

# Energy Efficiency for Energy Access: Fighting Fuel Poverty in Developed Economies

—Transcript of a webinar offered by the Clean Energy Solutions Center on 18 May 2016  
For more information, see the [clean energy policy trainings](#) offered by the Solutions Center.

## Webinar Panelists

<b>Reid Detchon</b>	Energy & Climate Strategy
<b>Pascale Giet</b>	Rexel Foundation
<b>Frank Legardeur</b>	Rexel Foundation
<b>Jules Kortenhorst</b>	Rocky Mountain Institute
<b>Patty Fong</b>	Energy Efficiency of the European Climate Foundation

**This Transcript** Because this transcript was created using transcription software, the content it contains might not represent precisely the audio content of the webinar. If you have questions about the content of the transcript, please [contact us](#) or refer to the actual webinar recording.

---

**Stephanie Bechler** Hello everyone. I'm Stephanie Bechler with the National Renewable Energy Laboratory and welcome to today's webinar, which is hosted by the Clean Energy Solutions Center in partnership with the United Nation Foundation's Energy Access Practitioner Network supported by the Rexel Foundation. Today's webinar is focused on energy efficiency for energy access, fighting fuel poverty in developed economies. One important note of mention before we begin our presentation is that the Clean Energy Solutions Center did 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 practices resources reviewed and selected by technical experts.

Before we begin I'd like to go over some of the webinar's 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. If you choose to dial in by phone, please select the telephone option and a box on the right hand side will display the telephone number and audio pin that you should use to dial in. If anyone is having technical difficulties with the webinar you can contact, go to webinar's helpdesk 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 in.

If you are having difficulty viewing the materials through the webinar portal, you'll find PDF copies of the presentations at

[cleanenergysolutions.org/training](http://cleanenergysolutions.org/training). Also, an audio recording and the presentations will be posted to the Solutions Center's training page within a few weeks and they'll be added to the [Solutions Center's YouTube channel](#) where you can find other informative webinars as well as video interviews with thought leaders on clean energy policy topics. We have a great agenda for you today centered around presentations from our guest panelists Reid Detchon, Pascale Giet, Frank Legardeur, Jules Kortenhurst, and Patty Fong. These panelists have been kind enough to join us to discuss their respective organizations' experience in the nexus of energy efficiency, fuel poverty in energy access discussing the role of an energy efficiency crucial to improve energy access in developed countries and provide collective best practices.

Before our speakers begin their presentations, I'll provide a short overview of the Clean Energy Solution's center initiative. Then following the presentations we'll have a question and answer session where the panelists will address questions submitted by the audience. We'll conclude with some closing remarks and then a survey. This slide provides a bit of background in terms of how the Solutions Center came to be.

The Solutions Center is one of 13 initiatives that the Clean Energy Ministerial that was launched in April of 2011 and is primary led by Australia, the United States and other CEM partners. Outcomes of this initiative include support of developing countries and emerging economies through enhancement of resources on policies relating to energy access, no cost expert policy assistance and peer-to-peer learning and training tools such as the webinar you're attending today.

The Solutions Center has four primary goals. It serves as a clearinghouse for clean energy policy resources. It also serves to share best policy best practices data and analysis tools specific to clean energy policies and programs. The Solutions Center deliveries 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 policy makers and analysts from governments and technical organizations in all countries but we also strive to engage the private sector, NGOs and civil society.

A marquee feature of the Solutions Center provides is the no cost expert policy assistance known as Ask an Expert. The Ask an Expert program has established a broad team of over 30 experts from around the globe who are available to provide remote policy advice and analysis to all countries at no cost. For example, in the area of regulatory and utility policies we are very pleased to have Jay Riley Allen, research director at regulatory assistance project. He serves as one of our experts. If you have a need for policy assistance in regulatory and utility policies or any other clean energy sector, we encourage you to use this valuable service. Again the assistance is provided free of charge and if you have any questions for our experts please submit them through our online form at [cleanenergysolutions.org/expert](http://cleanenergysolutions.org/expert). We also encourage you to spread the word about this service to those in your networks and organizations.

Now I'd like to provide a brief introduction for all of today's panelists. First up is Reid Detchon. Reid has led the U.N. Foundation's Energy and Climate program since 2005. He is also the executive director of the Energy Future Coalition, a nonpartisan domestic policy initiative. He's responsible for the foundation's engagement with the U.N. on energy and climate issues. Following Reid, we will hear from Pascale Giet, the senior vice president of communications and sustainable development with the Rexel Group and the vice chairman of the Rexel Foundation. She joined Rexel in 2010 and is a member of the executive committee, and she created the Rexel Foundation in 2013.

Presenting with Pascale is Frank Legardeur, the energy efficiency marketing director with the Rexel group. Frank has two decades of sales and marketing experience working for different groups starting by the Hager Group, General Electric, where he has occupied different positions always at an international level. Next, we will hear from Jules Kortenhorst. Jules is the chief executive officer of Rocky Mountain Institute. He is a recognized leader on the global energy issues and climate change. His background spans business, government, entrepreneurial and nonprofit leadership.

And our final speaker today is Patty Fong, program director for energy efficiency with the European Climate Foundation based in Hague. Patty oversees the development and implementation of the program strategy, which aims to rule out the least efficient infrastructure, equipment, process via new standards and codes. Also, demand for energy efficient products and services and build political will and confidence for greater ambition on energy efficiency and savings. And with those introductions of our excellent panel today, I will hand the floor over to Reid. Reid, welcome to the webinar.

#### **Reid Detchon**

Thank you Stephanie. I'm delighted to be here with you today, with you today and thank you for organizing this. Thanks for the Rexel Foundation for supporting this and thanks to everybody participating, especially our high powered panel today which I will presume to be the least of the participants here. This is an interesting topic because while at the United Nations Foundation we focus on energy access principally in developing countries through the Sustainable Energy for All initiative of the UN and our energy access practitioner network, the problem does persist in many midlevel, middle income and even affluent countries including the United States. So it's an interesting topic for us to bring up here today.

You are probably I hope mostly familiar with the energy access practitioner network. I'd invite everybody to visit the website which is simple enough to remember, [energyaccess.org](http://energyaccess.org), to see the many resources and contributions that we have on those, on those pages. As again as you probably are familiar, the Sustainable Energy for All initiative which is now five years old, has three principal objectives, two of which are obviously linked today, insuring universal access to modern energy services and doubling the rate of improvement in energy efficiency along with a doubled share of renewable energy all by 2030. And these goals were picked up and reflected in the

sustainable development goals last fall as approved by the United Nations member states as a sustainable development goal seven on energy.

And so this is an issue that has in the last five years thanks to Sustainable Energy for All I think become much more prominent on the international agenda and much more accepted for the linkage between energy development and climate. The problem of course is that more than a billion people around the world have no access to energy, to electricity that is and another billion or so have intermittent access to unreliable electricity sources. And yet electricity and energy more generally is fundamental to economic and social development. So this is a problem that needs to be addressed in order to carry out both the remainder of the sustainable development goals and also relevantly to carry forward the nationally determined contributions under the Paris Climate Agreement.

The solutions are well known and thanks to falling prices are increasingly affordable all around the world. In many cases perhaps I would say even most situations today solar and wind in particular are cost competitive if not the cheapest option in many places, I'd say perhaps most places. But today we're going to focus particularly on energy efficiency as another element of clean energy and we'll see I think that the solutions that apply to the developing world, apply equally well to the developed world.

In this context I want to highlight an initiative that's been launched by the U.S. Department of Energy under the Global Lighting and Energy Access Partnership which is part of the Clean Energy Ministerial. The Clean Energy Ministerial as you probably know is about to have its annual meeting in San Francisco June 1st and 2nd to gather at the ministerial level and advance their initiatives. But this was launched earlier in the year to link up the thought that energy and access are linked. I think that the principal point, which is perhaps obvious to all by now, is that energy efficiency whether in appliances or other end use technologies makes access to energy more affordable because it reduces the cost of the services that are being provided.

To take the most obvious example if we were still trying to light up homes without energy using incandescent bulbs we would need much bigger solar arrays at much greater cost. But we've progressed of course through CFLs, compact fluorescent lamps and LED bulbs now to the point where lighting is affordable really to households anywhere in the world. As I mentioned, this Energy for Access Coalition is a new effort and it is aimed at developing the technologies that will—the end use technologies that will like the lighting example make electricity more accessible whether it's in televisions, fans or in more practical uses like medical devices.

The reason of course is that basic energy services are exactly the step you need for a social and economic development. And, beyond the direct benefit to households, the opportunities for productive uses for example in agriculture and health are extremely important to develop. So this new coalition is leading a year of action this year to mobilize commitments and support development and deployment of these technologies and I think that at

the Clean Energy Ministerial there will be a particular push for development of more low power technologies.

The Energy Access Practitioner Network is involved in this by working with now more than 2,000 members who are operating in 170 countries around the world to deliver principally off grid energy services. It has membership that ranges from large companies like Rexel to SMEs and NGOs that are operating on the ground. And I think that its principal value in many is as a networking function so that members can share experiences, keep up with the way the field is developing and importantly get information about financial opportunities for investment in their businesses and products and enable partnerships in that way.

According to a survey that we do annually even just in the past year the members of the practitioner network have provided service to more than 30 million people around the world. This is obviously a big and impressive number but as we think about the billion we're trying to reach there's obviously also far to go. So we welcome anybody on the call who has not yet become a member of the practitioner network to do so. There is no cost to participate.

Yasemin Erboy Ruff who many of you know and was on the call is our point of contact who would be delighted to sign you up. And we think that together we can be stronger than operating separately both in terms of advocacy for policy and delivering results and we welcome the growth of the coalition. Stephanie I think I'll stop there.

**Stephanie Bechler** Great, Reid. Thank you so much for that explanation. And next we have here – Reid, if you wouldn't mind muting your microphone. We're getting a little bit of echo. Excellent. Next we will hand the floor over to Pascale and Frank.

**Pascale Giet** Bonjour. Thank you Stephanie and thank you Reid for your presentation. So I'm happy to take this opportunity today to share Rexel's experience on energy efficiency. As you all know it's critical to address true quality in developed countries and Rexel has built a great experience in this are both in business and for the Rexel Foundation. Just as a quick reminder for those who don't know, Rexel is a leading global distributor of products and services for the energy world. So I will start by presenting the Rexel Foundation and some of its projects and then I will hand over to Frank Legardeur. He will share key figures on fuel poverty and highlight energy efficiency as a solution. And at the end of the presentation we will focus on two concrete examples of how Rexel and the foundation address true poverty in Australia and France.

So let me start by presenting the Rexel Foundation. So you all know the key figures but I will just remind you some of them. Three billion people around the world still don't have access to electricity and fuel poverty is definitely growing. This is why the Rexel Foundation for a better energy future is working on positive responses to these challenges. The mission is to improve access to affordable, efficient and sustainable energy for all. Energy efficiency is really at the heart of everything that the foundation does and we

believe that energy efficiency provides the key to lowering energy bills and energy consumption as well as changing behaviors.

We have three types of programs. We support NGOs engaging communities and driving autonomy in communities in communities, sorry in communities in \_\_\_\_\_. We work with social entrepreneurs also supporting them in the creating and implementation of innovative business models. And finally, the foundation funds research and studies to help raise awareness on energy efficiency and climate change at the large scale.

Since it was launched in 2013, the Rexel Foundation has about close to 50 initiatives around the world with a rough balance between the three programs I've just described. The footprint of the foundation's project is in line with the Rexel's group's own presence across the world. For us it's critical to insure the involvement of our employees locally and to enable a greater local impact. Our foundation's focus for the coming years will be on the regions of North America, Europe and Asia.

Our approach is by nature collaborative in order to leverage all available skills and competences and scale up projects. Indeed, one of our key principles when we work on the project is to gather proctors and build up a collaborative approach with the key actors of the energy sector. Today we work with more than 45 partners including companies and foundations, social entrepreneurs, academic institutions and nonprofit organizations. Through these partnerships, we drive economically and politically viable solutions, which are numerous for the future with a strong social impact. We work on projects that are replicable at a global scale.

The type of support provided depends on the energy maturity of the country where projects are located. The energy maturity is based on characteristic of the energy value chain in each country such as access to electricity rates, appliance equipment rates, population characteristics. If we look at the top of this slide, we can see that in developed countries our actions are targeted at promoting renewable energy, encouraging energy efficiency in buildings and fighting fuel poverty. At the bottom of the slide, you can see the target of our actions in emergent countries. I will not detail this, as this is not the purpose of this webinar.

I will now review concrete examples on the top three items centered on developed countries. Let's start with initiative enabling to promote and finance renewable energy. Energie Partagee first is a French initiative supporting citizen groups, developing their own sustainable energy projects by participating in their fundraising campaigns. The second project Grid Alternatives provides access to energy by installing solar solutions for Native American and training communities to the installation of these technologies.

Through our partnerships, the aim is to provide access to energy for 1,000 Native Americans and they're working on \_\_\_\_\_ institute is also one of our partners and I will leave the Jules presents in detail what they are doing. Our involvement is about the Shine Initiative with public utilities, community organization and the purpose is to unlock the market of community scale

solar. Jules may come back on that. I will now continue with initiatives related to the profit of buildings and cities to improve their energy efficiency. Institut négaWatt and DOReMI work with homeowners effective cost efficient retrofit thanks to training and also work site assistance provided by skilled trade men. The aim is also to renovate from let's say 1,000 to 1,500 homes per year.

We are also supporting EcoBlock, which is an applied research program led by the University of Berkeley and the experimentation hints at providing that block can be entirely retrofitted after sustainable standards, energy, transportation, water, etcetera. This will prove the replicability of the concept that could be extended to vast areas in U.S. cities and more. The energy aspect to which Rexel contributes is focused on also all solar electricity generation, night time storage and street lighting and also share the clean solar power and electrical vehicles. Our U.S. subsidiary named Plax is providing in kind the required supplies which allows to build this highly efficient grid that will allow EcoBlock to be 100 percent autonomous in their energy prediction from renewables and we're allowed to use fossil fuels.

I will complete this first section with two initiatives focused on one households and fuel poverty reduction. The action plan for decreasing fuel poverty is building a model to retrofit the deteriorated shared household. This will provide a sustainable model that can be repeatable to the 100,000 buildings facing similar conditions in France. It also includes a key dimension in energy efficiency and by supporting occupant behavior change, by raising their awareness and encouraging good practices.

Another initiative in U.K. is the Energise Sussex Coast. It's training 600 energy experts to advise people on how to lower their energy bill and how to use properly the energy packs that will be distributed on this occasion. Now I will first hand it over to Frank before coming back and Frank will detail in parts energy efficiency in the fight against fuel poverty.

**Frank Legardeur**

Right. Thank you Pascale. And good morning or good afternoon, everybody depending on where you are in the world. So as Pascale said my name is Frank Legardeur and I will drive you through a brief summary explaining the link between energy efficiency and fuel poverty. First of all, let me remind you here the definition of energy efficiency in order to make sure we all start with the same concept in mind. Ok. Energy efficiency is aiming to manage and restrain the growth in energy consumption. Something is more energy efficient if it delivers more services for the same energy input or the same services for less energy input.

This is based on the international interagency definition. Ok? Energy efficiency is a critical topic worldwide. Just as a reminder according to the \_\_\_\_\_ again energy efficiency is seen as a world first fuel and could potentially represent 49 percent of the total CO2 reduction achieve by 2050. So when it comes to defining what fuel poverty is it is getting a little bit more complex or more difficult. Let's put it this way. In fact, there is no unique definition of fuel poverty. And here I've just taken a popular definition, an example to show you how different it is. Ok.

In the U.K., it used to be the highest one spending more than 10 percent of their income on fuel for heating. This definition has been revised in 2013 to cover all fuel needs, not just heating as well as being linked with the poverty line. In France the threshold for fuel poverty is not as clear as in the U.K. but the definition covers a driver of fuel poverty. So basically, we don't know really what we are talking about. In Ireland, the definition is directly linked to the energy efficiency level of the whole.

Now if we get to the figures in order to have a better view of this topic we can see that it is critical topic for many of our cities and developed countries as it affects a large number of people. In Europe depending on the definition used, it is estimated to be between 50 and 125 million people being fuel poor. And if you consider there is roughly 510 million people in Europe so it's between 10 per cent to 25 per cent, which is a very large number. Now if we look at low income households defined as people at risk of poverty there's a link in data of course. Our real fuel poverty is higher. In some countries, around 50 of these households are fuel poor. And you will see some here on the left side, Bulgaria and Cypress and Greece and Italy. Ok.

Let's give a zoom into countries. Ok. We're going to talk about U.K. and if you look in 2013, 17 percent of all U.K. households were not able to keep their home adequately warm—totaling roughly 4.5 million of households affected which is again a large number. Now if we look at the right side of the slide in France and if you consider the first 25 per cent lowest income households, 55 percent of them are affected by fuel poverty and simple definition of ten percent of income are allocated to energy in the 17 per cent.

So consequence of fuel poverty, what does it mean basically? What is the consequence? In fact, there's a couple that you can see here. The first one is physical health always impact. And let me just give you a couple of examples. It can be excessive \_\_\_\_\_ rate in winter time. It could hypertension, breathing infection or carbon monoxide poisoning. The second one is a mental health of risk and impact, social exclusion, stress and \_\_\_\_\_. The third one is remaining purchasing power. Of course, if you put all your money into your heating of your house you cannot put the money for food or health or leisure.

Fourth one is degradation of housing. If a house is not really well warmed of course, you are more humidity. You are having defective insulation and so on, poor roof, poor windows and so on meaning that a very poor environment to live in. Of course, this is going to be a complex program at the end of the month because it's putting you in an excessive debt. And the last one is a CO2 emission because for sure, if you are obliged to warm, to get a certain level of warmth in your house you're going to put your heating solution at higher level meaning consuming more energy and then issuing more CO2 gas.

Energy efficiency is key to reduce of fuel poverty. Ok. For the consequence I just mentioned it is critical to address fuel poverty. We have a couple of drivers that are very well known and they are listed on the left side here. The first one is the energy price. The cheaper it is the better it is. Household



income, of course the more money you make the easier it is for you to pay the bill of energy. And the quality of the housing. Of course, you are reducing the heat loss.

Solution, there are solutions existing, ok, for those three drivers. On some side, a government is acting to regulate energy price by subsidizing, easement for energy producer or consumer. They can also support household revenue through \_\_\_\_\_ but these solutions are relatively short term solutions especially in the context of community budget. On the other side which is the last one, quality of the housing, working on improving energy efficiency of a building is a long term solution and it can be done by working on first of all better insulation of your house that will reduce your heat loss or updating the equipment that is in the building to reduce the consumption as well as by installing energy management tools. Ok. All of these actions also giving job creation, reinforcing the relevance of national improvement scales.

Now getting to the root of everything, fuel poverty in developed economies. Of course as we have seen, there is a large number of people affected but the most important maybe is a simple one which is a lack of data. Ok. There is a lack of common and clear data to better understand and define action and fuel poverty. There is lack of reliable data either to all who complete or with just to give us. Ok. There are limits to use the data due to prediction of personal data. In many countries, you cannot just share the information and in some instances, data belongs to private companies making it difficult to access. So we don't have a clear visibility of always consider as a pull on that, um, to fix a problem.

So fuel poverty is a complex topic. We're looking from a large number of variables. It could be on housing insulation, housing equipment, energy expenses, lifestyle and so on and so on. Ok. Also low viable income. And fourth, there is a lack of coordination between all the actors involved in addressing the issue of poverty. In fact, there are many actors acting on fuel poverty from different aspects, housing, energy, social ails and in most of the cases, there is no actor coordinating all of the action. That would potentially lead to more efficiency overall.

So for all these reasons Rexel is working on different types of action on fuel poverty that takes this complexity into consideration and more important action that has a potential to be scaled up to a large number of people. And I will now hand over to Pascale Giet that will present you couple of case studies explaining how Rexel is working on this fuel poverty.

### **Pascale Giet**

Thank you Frank. So let me give you some concrete examples. In Australia and in France, as a reminder sorry on the context now between 200,000 and 300,000 people in Australia living in fuel poverty today. So we have identified characters as the best project to target the households needing to support, to improve their energy efficiency. Two actions have been conducted. First, replacing all old consuming appliances such as ovens of heating appliances by their energy efficiency equivalent. Caritas has the ability to detect households needing support and Rexel has been able to find an efficient alternative and organize its delivery. This goes hand in hand with

the potential support provided by Caritas for people struggling to pay their energy bills.

Second, Rexel is also providing energy audits to fuel poor households identified by Caritas and then better use our energy expertise. In order to make sure the impact is long lasting one Rexel volunteers will visit the households a second time and measure the achieved energy savings in the same audit a year later. After the success of the pilots touching 170 homes per years since 2014 we are now replicating this through all the country, all years prior.

And now let me present a new initiative in France with Soleni. The Rexel foundation supports Soleni with dedicated experts providing mentoring and supporting the impact in self-assessments. Soleni is helping low income households to be more energy efficient through an energy assessment or on this rising energy savings and the installation of energy saving equipment. The impact of Soleni is very promising. They managed to reduce the household's global energy bill by 25 percent. This is great purchasing power increase for these households. On top of this, their work also impacts positively the house comfort, the health of its inhabitants. So Frank mentioned that all that before.

The model developed by Soleni is a very innovative one as the service provided is totally free for the low income households. Its cost is covered by energy providers, local authorities or social housing companies. These actors gain value by avoiding unpaid bills, by improving relationships with inhabitants and lowering habitat degradation. So as a result, the households supported can efficiently manage their own energy consumption thanks to the expert advisors and to the energy efficiency kit provided by Soleni.

Soleni is really a very interesting model as it has a double social impact first by hiring people in professional integration and giving them training. Second by conducting fuel poverty and by being an economically viable model that can be replicated in many areas. In this respect, it's a model for bettering the key stakeholders that have the key to reduce fuel poverty and get the best out of it. It's a real life evidence that energy efficiency is a critical solution to fuel poverty issues.

With this I would like to thank you for your attention and I think that I will now hand over to Jules Kortenhorst, a great partner of ours addressing fuel poverty. Frank and myself will be happy to answer your questions during the Q&A session in the last 30 minutes of the webinar. And let me already mention that our next webinar will be scheduled in June. Thank you to all the panelists.

**Jules Kortenhorst** Merci Pascale. I am delighted to be here this morning and to talk to you a little bit about the work that's the Rocky Mountain Institute and \_\_\_\_\_ are doing empowering low income households in clean energy future. And a lot has already been said about the importance of energy efficiency but with my first slide which is a slide taken from the platform of the energy transition commission, I'd like to draw your attention to the fact that we cannot address

the global challenge of climate change and stay well below two degrees if we don't work on both axes of our energy future. Yes, it is exciting to see how much the share of low carbon energy is growing. But we are still at the moment scaling that at well below one percent per year. But the –

**Stephanie Bechler** Jules, if you don't mind me interrupting for just a moment, we're not seeing the full slide show right now. We're still seeing your notes page.

**Jules Kortenhorst** Oh, let me do this. Does this work?

**Stephanie Bechler** That's perfect. Thank you.

**Jules Kortenhorst** Apologies.

**Stephanie Bechler** No worries. Happens all the time.

**Jules Kortenhorst** So as you can see from this chart in order to get to the green zone at the top right hand side of the page we need to both drive the share of zero carbon energy at more than one percent per year but we also need to increase the energy productivity or energy efficiency improvement by more than three percent per year. And what we're going to be talking about here is what is crucial is that in order to hit that number we need to get everybody engaged. This cannot be something that only involves a limited part of society. We need to involve industry. We need to involve low and medium incomes.

So on that basis let's talk about U.S. situation which is where most of our LMIs, lower middle income activities are currently taking place. And people might think that in the U.S. this is not as much of an issue but you're wrong. Over a third of Americans and unfortunately a growing size of the American population is struggling to make ends meet. They live paycheck to paycheck. Fully ten percent live in poverty by U.S. government standards but a further 20 percent do not hit the level where they can think in a structured manner about their energy use. They cannot think beyond the next month's paycheck.

So we're talking about a total 40 million households in the United States that are currently not really engaged in the transition to an efficient energy economy and that we need to bring along. And for them the cost of energy as we've already been saying is not just about a nice to have improvement but is really about their economic survival. Historically we have looked at the problem of energy efficiency in the low income, lower middle income area as something that's, that we experts in the department of energy and community organizations can address in a sort of top down manner. But the critical faults development that we have seen in this area over the last couple of years is that we need to take a completely different approach in working with community organizations, in working with lower middle income groups in addressing these issues not just top down but also bottom up.

Historically a lot of the focus has been on optimizing short term reductions in energy bills by subsidies and by philanthropy. But in the long run where a third of the U.S. population requiring some help in making the energy transition we need to look for a much more structural solution that optimizes

long term energy independence for these families. Organizations have also historically worked on behalf of low income end users and one of the conclusions from the work that we are doing is that it is now critically to really involve these end users hands on in order to accelerate the speed of the transition.

Whereas traditionally many of the low and middle income projects have been perceived from the pushback of a multiyear master plan and big approach we think that right now this need to be complimented by experimentation and nimble projects from the bottom up that create innovations and that accelerate the transition. In order to help all of these shifts take place over the last year and a half we've been working with a whole group of organizations that you see listed here on this slide at the bottom in what we call our electricity innovation lab, LEAP initiative.

And at the LEAP initiative, we convene a microcosm of stakeholders in New York that are at the nexus of clean energy and low income communities. We engage with regulators, with community NGOs, with the local utilities and with efficiency and renewable energy service providers in addition to the traditional environmental organizations. And the rules of engagement of this group are also different. The picture here sort of shows that the way in which we work with these stakeholders in a continuous dialogue in a setting where each of the organization is respected for what they bring to the table.

And rather than providing top down solutions from the outside, this change lab strengthens the capacity of local partners to come up with and launch and drive low income focused initiatives in collaboration with key allies. So we've asked these stakeholders please, look around the room. What is it that you can do under different ground rules? With who do you have a relationship? What is the contribution that you can make? What do you believe is the most important thing that needs to happen in the state of New York?

And so some of the initiatives that have been initiated by our electricity lab include the involvement of individuals and community advocates in a new mold for the dialogue between governments around the energy proceedings that are currently going on in New York with the New York \_\_\_\_ proceeding which is laying out the future business models at pricing structures for the electricity system in the state of New York.

The second initiative is co-lead by individuals at the community level in working with \_\_\_\_\_ to create funding streams for energy plans that are community lead. So communities are working with New York state to create those funding streams that they think are most crucial for them to make the transition to a low carbon future. And finally, individuals and NRDC together with the community preservation corporation are educating lenders, the people who provide financing on why and how to include energy efficiency in multiple family home projects, for example home mortgages in order to provide access to energy efficiency finance at the bottom of the pyramid.

And what we're doing in New York to some extent builds on the work that we've done earlier in the city of Fort Collins. About three years ago RMI partnered with Fort Collins utilities and the council, the city council of the city of Fort Collins to help frame a fairly ambitious plan for the city of Fort Collins to drive their carbon emissions down by 80 percent by 2030. And on top of the initial plan we are now working with the utility in implementing a program opt out on bill that drives the implementation of efficiency and solar for all of the citizens of Fort Collins.

So instead of thinking about something that people have to proactively choose, the great advantage of working the municipal utility in Fort Collins is that with a mandate from the city council, Fort Collins utilities can make this about our program and will take local citizens by hand and help them implement the energy efficiency measures in their house, through an on bill tariff program. So the participants clearly benefit without incurring up front debt. They bill neutral or even better level from the improvements in their house but it also provides the model for the utility to continue to have a viable business as they help drive down the amount for electricity in the city.

Pascale already mentioned our Shine program which is another example of our community involvement focused on lower and middle incomes. In addition to energy efficiency, we believe that solar is a major opportunity for lower middle incomes. But until now, people have thought about solar as something that also, that only the wealthy can put on their rooftop of their villas in the suburbs. Community solar provides the opportunity to take a completely different track. Community solar is the solar projects at the scale of one to two megawatts that are creating access to solar for groups of citizens but that are currently not in all locations benefitting from the economies of scale, of utility scale solar but also not benefitting from the clear advantages of rooftop solar in the residential market with free access to real estate and attractive net metering tariffs make it easily competitive.

So the starting point of community scale solar costs at the moment is in the order of seven to eight cents per kilowatt hour. And in order to really bring economic attractiveness and be competitive we need to move the cost of community scaled solar down to the level of utility scale solar where the price is as four to five cents per kilowatt hour and be able to compete in the wholesale markets. And we believe there are two critical levers to do this, two critical categories of levers to do this. The first category of levers on the left hand side of this slide are the levers that are in the control of the community. The decisions on siting and permitting, the structure of the contracts that a community puts out in its RFP. By standardizing and simplifying the approach that communities take to setting up community solar initiatives we can make it much easier for developers to put community solar projects in place.

But the second set of levers on the right hand side come from the supplier side. These are sort of levers that create a standardized solution that as a result of economies of scale can drive down costs significantly, reduce margins, reduce hardware costs and reduce labor costs. And together these two

categories of levers we believe will rapidly see a further drop in community solar cost of 40 to 50 percent bringing it within reach of households in the lower middle income segment. So we are fairly excited to be working on this in New York state, in California and with the support of the Rexel foundation.

And then there is of course the traditional residential energy programs. The cost of energy, low performance house is continuing to affect very low and low to middle income families the hardest. So how do we help these families make the initial efficiency improvements to their houses? Our residential energy plus program has a number of initiatives that focus on low and middle income houses. Most recently, the federal housing finance agencies rules for taking into account energy efficiency in the lending of both Freddie Mac and Fannie Mae were up for consideration. And together with a coalition of organizations, we have extensively commented on the proposed rulings that will drive how the federal housing finance agencies take into consideration the cost of utilities.

Low income consumers in the U.S. can spend as much as 20 percent of their monthly income on utility bills. And if the lenders can take into account the energy efficiency investments and that creates a much more financeable and much lower risk financing opportunity for these families. So our finance the future industry memo details specific recommendation to the FHFA and both distributed and created the significant commentary on these rulings in order to help Freddie Mac in particular to take energy efficiency into consideration in their financing decisions.

We also have been working in partnership with Energy \_\_\_\_\_, a Dutch company with the city of San Francisco and the state of New York and Vancouver to support transfer of technologies of industrially fabricated predesigned, net zero energy retrofit packages. And the idea here seems to be quite simple. Take a low income house and put a shell around it and put a package in place that almost in one fell swoop moves public housing from quite energy inefficient to maybe close to net zero and \_\_\_\_\_ in Netherlands has by now conducted 6,000 of these housing, public housing retrofits and is looking to dramatically scale this up. And our partners are sitting to learn from that Dutch experience and scale that to millions of American homes. And finally we are working to scale residential PACE property accessed clean energy financing in the U.S. as a major enabler of financing for lower middle income families to put energy efficiency packages onto their houses.

I know that this call is primarily about the developed world but for one minute, I want to draw again our attention to the developing world as well. Because in exactly the same way that we've been talking about benefits of energy efficiency for low and middle income households in the developed world, we've recently been doing work in the developing world. And again, the starting point of energy efficiency is such an obvious solution also in countries like Rwanda. RMI has in Rwanda developed an LED lighting switch out program which can save 20 percent of peak power and in addition save \$20 million to \$25 million for an exchange that Rwanda currently spends diesel power generation.

A utility that is struggling financially because it is dependent on high cost diesel and has a power deficit that causes load shedding. And there's lighting contributing to more than 30 percent of the peak demand of the utility. The switch out from traditional light bulb to LEDs is a very obvious one which is why we have worked with the Rwanda utility to move over to LED lightbulbs across the country. So with that quick reminder of the fact that this is an issue not just in the developed world but also the developing world I'll hand it over to my old colleague Patty Fong from the European Climate Foundation.

## Patty Fong

Thank you, Jules. Thank you, Stephanie for the opportunity to present at today's webinar. So a lot has been covered already from the previous presenters so this means I get to speed up a little bit more and jump more into the projects. But let me go through briefly into the introductions. Some background on the European Climate Foundation. So we are a foundation of foundations, a major philanthropic initiative that was established in 2008 to foster development of a low carbon society and play a strong international role on mitigation climate change. And so I have the pleasure of being on this webinar with Jules who served as the original CEO of the European Climate Foundation.

We currently carry out our work through both a series of sectoral programs and cross cutting initiatives. So on the sectoral programs we work on clean power, actually clean energy on energy efficiency which is the program that I lead and on clean transportation. We've also recently established cross cutting initiatives in the area of law and governance on finance and economics, on innovation and industrial policy and on carbon pricing. We worked at the EU level so mostly in Brussels but also in four major countries. We have a mix of cross cutting political work and sectoral programs in Germany, the U.K., France and Poland.

So Frank gave a very good overview of the fuel poverty situation in Europe so I'll just be brief in giving some background here. Here is a map that shows where fuel poverty exists if you use the definition of the share of population that is unable to keep their homes adequately warm. Now Frank mentioned that that estimate is between 50 and 125 million people in Europe depending on how you measure. At the low end, at 50 million this still represents one in ten. At the high end, this is one in five people that live in fuel poverty. So the proportion of people in fuel poverty or at risk is quite high and potentially growing.

The European commission also adds two more definitions to fuel poverty because as Frank mentioned there is not common definition. Another definition is a share of total population that cannot afford to pay their utility bills on time. And the third definition is on the share of population that live in a poor quality home so whether this has a leaking roof, damp walls, floors or rotting window frames or floors. And what you see from these maps is that the majority of fuel poverty is in southern Europe and central eastern Europe. Although you also see for example in this third map in countries like the U.K. and Ireland where a primary cause of fuel poverty is actually the quality of the homes.

In countries in central eastern Europe such as Bulgaria, people who are at, in fuel poverty or at risk of fuel poverty, those people are actually two out of three people in Bulgaria actually fall in this category. So that's really quite a very high percentage compared to let's say the average across the E.U. But that doesn't mean that it doesn't exist in other countries as well. In western Europe, for example in Belgium, the people who – one in six people in Belgium for example live in poor quality homes. And in countries such as Portugal or in Slovenia it would be one in three.

Now as I mentioned that this problem is expected to increase in the coming years. Europe's population is aging and this population is especially at risk. It's estimated that by 2050 the number of people over the age of 65 will double compared to what it was in 1990 and those in the aging population are relying on pensions which means they will have lower income and will likely need to live in more comfortable homes for longer hours during the day. And as the elderly that is actually most at risk for the health impacts from fuel poverty.

And one other interesting statistic is that those countries I mentioned, central eastern Europe and southern Europe which have the highest rates of fuel poverty are actually also highly dependent on fuel imports for heating and actually are the most energy intensive in Europe. So by addressing energy efficiency of buildings in these countries, you actually have multiple benefits from this investment.

So Frank also mentioned the causes of fuel poverty and the solutions so I won't spend too much time just to reiterate that there are let's say the easier but shorter term but easier methods which usually are intrinsic income support schemes and fuel subsidies or price caps to deal with the issue. Deep energy renovation of buildings is a more economic sustainable solution with multiple benefits. It is much more difficult which is why we need new innovative ways of creative a market and addressing how to deliver and invest and finance energy efficiency improvements in our homes.

But how you promote to the deep energy renovation of buildings depends on your starting point. So for example in the U.K., the U.K. has amongst the highest levels of fuel poverty in western Europe. As I mentioned it has a highly inefficient housing stock which is one of the main causes for its high level of fuel poverty. And the illnesses caused by the cold homes is estimated to cost 1.3 billion pounds a year. Four times more people die its estimated in Europe and in the U.K. living in cold homes than on British roads in 2011. And it's also estimated that 2.23 million children in England were living in fuel poverty in 2014. There's a survey done by net moms, the largest network of, online network of mothers in the U.K. estimated that one in four families in their network had to choose between heating or eating.

So what we supported was a campaign to build a multi-stakeholder alliance and generate political support for addressing fuel poverty, um through energy efficiency measures. This was a three-year campaign for warmer homes and lower bills which just ended at the end of last year. It was the biggest fuel poverty alliance ever assembled with 100,000 grass roots supporters, 200



alliance members which include major organizations representing elderly groups, children's groups, families, trade unions, other NGOs, companies, and industry associations and also garnered the support of more than 200 parliamentarians.

Their key policy objectives from this campaign was to make home energy efficiency a U.K. infrastructure investment priority to ask for grants to make two million low income homes energy efficient by 2020 meaning meeting an energy label for buildings of band C which is about midlevel from an A to G scale and to retrofit six million low income homes by 2025. Also, to create a delivery program for low income homes in partnership with local authorities and to provide zero percent financing for the able to pay households.

Now this was a timely campaign because we knew that poverty was a political priority and so we wanted to make fuel poverty also a political priority. And the U.K. actually is one of the few countries in the E.U. which actually had a very specific definition for fuel poverty so actually it could be measured. The campaign succeeded in getting the support of all major parties except for the party that won the election last year. So under the current government, the current government does not believe in public, significant public support for energy efficiency so they have actually rolled back many of the existing legislation and cut back public funding for energy efficiency measures in buildings. They have set out to insulate one million homes during their term but this represents a 78 percent reduction compared to previous programs that were supported between 2010 and 2015.

So our partners in the U.K. are now revamping their strategy, still building on the alliance of members which I believe this campaign was not wasted even though it has ended but it has built, fostered understanding amongst a wide variety of groups, social groups, health groups, environmental groups, companies which previously didn't have a deep enough understanding of the benefits of energy efficiency towards their goals. And so this now has created a strong base from which to work in trying to get a new enabling policy framework and supporting conditions to address fuel poverty.

As an example that we have been supporting is in Poland where 60 percent of households burn coal for heating their homes indoor. More than half of the households in the city of Krakow which is Poland's second largest city, burned coal indoors to save on winter energy bills. Krakow is one of the most polluted cities in Europe. It rivals that of China. Breathing of air quality in the winter is estimated to be equivalent to smoking 2,500 cigarettes every year. Frustrated by the poor air quality a campaign, a grass roots campaign was started in 2012 to demand better air quality for their community.

And even though this wasn't a campaign about fuel poverty, it was about air quality because in Poland there is – air quality is tangible. People don't like it. There are say groups in a category of being poor and yet the way that they live is just accepted as normal. So realize that Poland is highly dependent on coal so 90 percent of the power generated in coal is from burning coal. The remaining coal that is of say lower quality that cannot be sold to utilities are actually sold into the markets to households. And these are households that

are actually single family homes where they're either under heated or they buy inefficient stoves which burn all kinds of solid fuels so not only coal but also biomass, wood and waste. And so these occupants that – people who live in these homes before this campaign didn't realize the connection between burning coal to keep their homes warm and the quality of their air that they were breathing.

So what this campaign has done is actually created understanding that air quality is related to the how they were using, how they were keeping their homes warm. And so there was a demand from local governments and regional and national governments to address this problem. Krakow, the city of Krakow wanted to actually ban the use of coal stoves starting in 2018. This was overturned because there was not precedent for it. So finally, after three years of campaigning the president of the country signed the first anti-smog law. And this paved the way for regional efforts to ban the use of solid fuel stoves or solid fuel coal for heating indoors.

What advocates have done is work with policy makers who the easy solution would have been to say, "Let's use public funding just to change out the stoves for more efficient stoves, cleaner stoves." But instead help them understand that actually, if you make that investment to improve the efficiency of the home you'd actually be saving on costs and saving on the subsidy that you would have to provide to change out the heating appliance in the home. So now, they are working with several regional governments to help design their programs that would be both a carrot and a stick that would both support the switch to more efficient stove but also invest in improvements of the efficiency of the home.

And the third example is one that Jules already mentioned and that is net zero renovations and social housing through the energy sprawl program. This was a five-year government funded market development program to drive energy efficiency in buildings. That was the starting point. It wasn't on social housing. It wasn't actually on trying to achieve a net zero reduction or net zero end goal for buildings. What they came up with was a net zero energy renovation program that after the initial investment program could be carried out without subsidies and with a 30-year energy performance guarantee.

Why did they actually settle on net zero as a target? It was a more attractive proposition for occupants to agree to actually do the works in their home and it's easier to provide an energy performance guarantee. Why social housing? Because in the Netherlands there are 2.4 million homes that actually are quite homogeneous in typology and in need of structural upgrades. And you also had to, only needed to deal with a limited number of owners. They are now working with about 27 housing associations who have put forth 111,000 homes to be renovated to net zero standards.

And what they have found as key factors for success for their program was that first you needed to have a nonprofit independent facilitator that simultaneously lifts regulatory barriers and helps to curate financial conditions, organizes the demand and steers the construction sector. All of

these pieces will not happen on its own and you need a single entity or team that is helping to pull all these pieces together and support the coordination.

You need a scale of demand which is working with social housing association was really critical as the first step to promote innovation and industrialized approach to building retrofits. By having a minimum order, let's say, from social housing associations it inspired builders and manufacturers to innovate prototype and refined package solutions. As a result, four of the largest construction companies in the Netherlands have developed industrialized prefabricated concepts which have reduced innovation time from around two weeks to less than one week for one prototype. Renovation time can now be done in one day and costs have so far been reduced by one half.

So the costs are from the first prototype was about 130,000 Euros per home. This has been reduced to about 60,000 per home. Now this is still quite high per home which is why they need to replicate and scale by scaling further their program across Europe and working with manufacturers in a European market they hope to reduce the cost significantly. We're now working with them to replicate their program in the U.K., France and in Germany.

So in summary in order to address fuel poverty in Europe we need to promote fuel poverty strategy at both the E.U. and national levels. And this includes promoting the shift of public budgets from just income and heating subsidies support schemes to more effective renovation measures. We need to baseline the problem and support effective program design with a collection of better data and a more accurate and common definition of fuel poverty. We need to increase the affordability and accessibility of energy renovation through innovative industrialized approaches that is based on a customer service perspective and this is one that both Jules has mentioned.

We need to make – another option is to make highly efficient household appliances and services more accessible and affordable through leasing services. So for example building on the circadian based business models. An example of this is a social housing association in the Netherlands. Again another example which found that many of their occupants were unable to pay their rent on time. And they were still paying their utility bills because if they didn't pay their utilities they would be cut off. But they could actually delay paying their rent. And so what they did was they worked with Nela, a major household appliance manufacturer which provides high end appliances and usually not affordable for low income households to work on a leasing model so they actually changed out these energy using highly inefficient appliances in these low income households through a leasing scheme. And this allowed Nela to actually access a new market segment which they weren't able to reach before while giving low income households access to more efficient appliances.

And the final example is to promote and establish minimum efficiency standards for buildings and products as a basic human right just as health and safety codes as a basic human right and as a sustainable solution for the economy. So two examples that our partners in the U.K. and France have secured over the past couple years. In the U.K., they succeeded in getting in

place a law that from 2018 private landlords would not be able to rent F and G rated properties. This affects an estimated 682,000 domestic properties, most of which are inhabited by the fuel poor. And from April this year landlords will not be able to refuse reasonable requests from tenants to improve the building energy performance.

In France, France adopted the energy transition law last year and as part of that law they are obligating all homes to be – all that homes that are consuming more than 330 kilowatt hours per square meter or let's say an F or G label to be renovated by 2025 and by 2030 all buildings which change owners or change tenants must be renovated. So this is a far enough time period away which gives a signal to the market and to building owners what is coming and allows time and allows to meet that requirement and it also allows time for the building center value chain to organize itself to help building owners and occupants find innovative ways and affordable ways to meet this requirement. And I will end here. Thank you.

**Stephanie Bechler** Thank you so much Patty and thank you to all of our panelists for those excellent presentations. We have had a couple of questions come in. If you have not typed in a question yet, please use the question pane on the go to webinar tool bar and let us know if you have anything to ask these panelists. We'll start with – and this is a general question for everybody. For the sake of common language and shared efforts as we raise awareness of the needs and solutions should practitioners be referring to energy poverty or fuel poverty?

**Pascale Giet** Hello. This is Pascale speaking. As a matter of fact, having activities both in the U.K. and in the U.S. it seems that appropriate word in the U.S. is energy poverty as we speak about fuel poverty in the U.K. But I think energy poverty would be more adapted to actually. I don't know what is the feeling of Patty for instance.

**Stephanie Bechler** Great. Well, thank you. Our next question is for Rexel asking there's many work that you're doing, a lot of work you're doing in Europe but they want to know if you have any plans to expand to Africa. They're specifically asking about Ghana since they've been suffering a lot of energy poverty.

**Pascale Giet** Well, as I mentioned we are covering the countries where we have subsidiaries. And the reason why is that we want to involve our employees. So as a matter of fact we are not active yet in Africa. That's why we are not covering Africa with the Rexel Foundation.

**Stephanie Bechler** Understood and for your work in France one of our attendees would like to know what approach you use to implement energy efficiency and how you select specific projects over others.

**Pascale Giet** So, talking about what is covered by the Rexel Foundation we have an executive committee which is choosing the different projects based on different KPIs and those KPIs are available on the website of the foundation. As I mentioned before one of the KPIs to have scalable projects. Most of the time it's very early stage initiatives because we want to encourage innovation. But the purpose is to raise the bar as soon as possible.

**Stephanie Bechler** Thank you and are there volunteer opportunities with the Rexel Foundation?

**Pascale Giet** Always opportunities for volunteers. Some of our partners are providing volunteers from their own companies. We have volunteers within Rexel Company and we will be more than happy to have some others joining the forces.

**Stephanie Bechler** Thank you and this question is for Jules. In the USA there have been low income weatherization programs for a decade and do you feel that these programs have made an impact on the U.S. problem or are they too small to really help the situation?

**Jules Kortenhorst** I am not as familiar as some of my colleagues with the details of the weatherization programs across the United States so I'm a bit hesitant to answer. But it is certainly fair to say that overall the quality of the housing stock across the United States still lags that in some of the most efficient countries around the world. So independent of the question of whether those programs have been as effective as they need to be the challenge ahead of us in scaling these programs and bringing weatherization to the build environment across the United States needs to scale up very significantly.

And the other thing to bear in mind is of course that this is very much a state by state challenge in the United States so both in terms of the climate and therefore the requirement for weatherization but also in terms of the scale and impact and focus of these programs across the United States. There's a huge difference between different parts of the United States and the requirements in different parts of the United States. So independent of the question of how much progress we have made there is an enormous challenge ahead of us to make much further progress across the country.

**Reid Detchon** This is Reid Detchon. I'll comment on that as well. Based on our observations from DOE I think that, I think that you can make two conclusions about the low income weatherization program. It's clearly effective in its direct impacts at the time but you have both a problem of housing that continues to deteriorate independent of the energy efficiency aspects of it. And then of course a continually changing and in some ways growing population of people who need these kinds of services. So I think it's a somewhat of a \_\_\_\_\_ task to try to deliver these outcomes certainly useful in the near term. But there's I think some question about its persistence in terms of the value and impact over time. And of course that depends as well on other variables such as the housing stock itself.

**Stephanie Bechler** Thank you, Reid. We have one question here for Patty that's come in. Patty, you mentioned in the Netherlands the construction companies are using some prefabricated concepts to decrease the time spent on projects and the cost. Can you give us some details on those concepts the construction companies are using?

**Patty Fong** Well, I can't give you a lot of the detail. What they do is they actually use drones to fly over to the buildings and actually take snapshots. And then they take it over to a factory so that these – they actually – they need to have a

scale of a minimum number of kind of similar type. Actually they can actually build a factory that's nearby and build these prefabricated pieces. So it's not only as Jules mentioned like you can snap onto the exterior but they also change up the appliances inside as well. And to make it all fit, this is why they go through several prototypes.

They've actually had to go back to the manufacturers to actually design for example the boilers or water heaters in a different way so that it could fit and not take up let's say additional space. And so it starts to, through experimentation they start to look at different ways where both the appliances in the building as well as the construction or the pieces outside fit together so that it maintains the look and feel of a kind of a good quality home and still be functional as well both indoor and outdoor. Hope that provides enough detail for you.

**Stephanie Bechler** Thank you very much.

**Jules Kortenhorst** And that highlights Patty if I may jump in – this is Jules. And that highlights this additional shift that we've seen which is that some of these successful programs are not necessarily driven top down from national governments in the European side from the federal government here in the United States but are piloted bottom up by community organizations and businesses that find innovative solutions that can scale and the willingness to pilot and the willingness to learn from those pilots and improve and then scale. I think it's a powerful instrument that we're seeing that can help us accelerate progress and have more impact more quickly.

**Patty Fong** Jules, I agree with you but the energy concept was actually funded by the Dutch government 45 million Euros over five years. Hopefully it doesn't cost that much every single time but you give the – let's say you give initial funding to create that pilot and then you step back and you allow an independent team to work with the stakeholders and the value chain to design a concept. In order to replicate their program in other countries that have received EU funding of different sorts as well as secured funding from national governments and also some funding from some of the social housing organizations in the national level to develop these prototypes. But I wouldn't underestimate the amount of resource and time needed just to coordinate all the complexity of the stakeholders that need to be engaged to provide a product and a service that is attractive for the building occupant.

**Jules Kortenhorst** I completely agree with you, Patty. Yeah.

**Stephanie Bechler** Well, thank you both so much. That is all the time we have for questions right now. If there's anything else that you wish to ask our panelists, please submit it in the questions pane and we'll get the questions to them after the webinar concludes. We'd now like to move on to a brief survey to ask the audience how we can improve on future webinars. If you could please answer the first question on your screen. The webinar content provided me with useful information and insights. And please select strongly disagree, agree – sorry, strongly agree, agree, not sure, disagree and strongly disagree. Thank you.

We will go to our next question. The webinars presenters were effective. Thank you. Our third question, overall the webinar met my expectations. Great. Our fourth question, do you anticipate using the information presented in this webinar directly in your work and/or organization? Great. And our final question, do you anticipate applying the information presented to develop or revise policies or programs in your country of focus? Excellent.

Well, thank you all so much for attending this webinar. I'd like to extend a thank you to our panelists as well for their excellent presentation. If you would like to check the Solutions Center website, we will have the slides available and you can listen to a recording of today's presentation as well as previously held webinar. Additionally, you'll find information on upcoming webinars and we are also posting the recordings on the [Clean Energy Solutions Center YouTube channel](#). Please allow about one week for that to be posted. We invite you to inform your colleagues and those in your networks about the Solutions Center resources and services including no cost policy support. Have a great rest of the day and we look forward to seeing you on future Clean Energy Solutions Center events. This concludes our webinar.

DRAFT