10 Questions to Ask About Scaling On-Grid Renewable Energy, Designing Stable Policy through Improved Stakeholder Engagement

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For more information, see the clean energy policy trainings offered by the Solutions Center.

Webinar Panelists

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Letha Tawney	Senior Associate, Markets and Enterprise Program, World Resources Institute
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Sean — Hello everyone. I'm Sean Esterly with the National Global Energy Laboratory and welcome to today's webinar, which is hosted by the Clean Energy Solutions Center, and also the World Resources Institute. And, today's webinar we'll be discussing the 10 Questions to Ask About Scaling On-Grid Renewable Energy: Designing Stable Policy Through Improved Stakeholder Engagement. And one important note to mention before we begin our presentation is that the Clean Energy Solutions Center does not endorse or recommend specific products or services. Information provided in this webinar is featured in the Solutions Center's resource library as one of the many best practices resources reviewed and selected by technical experts.

And before we begin, I just want to go over some of the webinar features. You have two options for audio. You may listen over your computer or over the telephone. And if you do choose to listen through your computer, please select the mic and speakers option on the audio pane to eliminate echo and feedback. And if you choose to dial in by phone please select the telephone option in a box on the right side of the display, the telephone number and the audio PIN that you'll have to enter to dial in. And pane lists we just ask that you please mute your audio device while you're not presenting. And if anyone has any difficulties with the webinar platform, you can contact their Helpdesk at the number at the bottom of the slide. And that number is 888 – 259 – 3826.

And if you'd like to ask some questions, we just ask that you use the question pane to submit that. And if you are having difficulty viewing the material through the webinar portal, you will find PDF copies of the presentation at cleanenergysolutions.org/training, and you may call on the speakers present, and also an audio recording of the presentation will be posted to the Solutions Center Training page within about a week of the project.

And today's webinar agenda presentations from our expert guest panelists today, Sarah Martin, Letha Tawney, Davida Wood, and Suphakij Nuntavorakarn. And these expert panelists have been kind enough to join us to discuss the 10 Questions to Ask About Scaling On-Grid Renewable Energy, framework that helps stakeholders engage with each other to resolve challenges related to up scaling of grid connected renewable energy in their country or region.

And before we begin our presentation, I'll provide a short informative overview of the Clean Energy Solutions Center initiative, then following the presentation we'll have a question and answer session where the panelists will address the questions submitted by the audience, and then some closing remark sand a very brief survey.

And this slide provides a background in terms of how the Solutions Center came to be formed. The Solutions Center is the initiative of the Clean Energy Ministerial in partnership with UN energy. It was launched in April 2011 as primarily led by Australia, the US and other CEM partners. Now comes with this unique partnership includes the developing countries through enhancements of resources on policies relating to energy access, no cost support for policy systems, peer-to-peer learning, and training tools such as the webinar you're attending today.

And there are four primary goals of the Solutions Center. First goal is to serve as the clearing house of clean energy policy resources; Second, it serves to share policy best practices, data, and analysis tools specific to clean energy policies and programs; Third, the Solutions Center delivers dynamic services that enable expert assistance, learning, and peer-to-peer sharing of experiences; And then lastly the Center fosters dialogue on

emerging policy issues and innovation around the globe. Now our primary audience is energy policymakers and analysts from government, and second organizations in all countries, but we also strive to engage with the private sector NGO and civil society.

And one of the more key issues that the Solutions Center provides is the Ask-an-Expert Policy Assistance. And three of these programs the Solutions Center has established is they brought a 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.

So for example in the area of Finances and Sustainable Energy Planning, we are very pleased to have [indecipherable 00:04:20] the CEO of Meister Consultants Group serving as our expert. So if you have any policies on Finance and Sustainable Energy Planning or any other Clean Energy we do encourage you to use that useful service, again they would be provided free of charge to you. And to request assistance, simply submit your request by registering through our Ask-An-Expert feature at cleanenergysolutions.org/expert. And we also invite you to spread the word about this service to any that might be able to use that in your network organizations.

So in summary we encourage you to explore and take advantage of the Solutions Center resources and services including expert policy assistance, the database of the clean energy resources, [indecipherable 00:05:05] and participate in more webinars like this.

And now I'd like to provide a brief introduction towards today's distinguished pane lists. And our first speaker that we'll be hearing from today is Davida Wood. And Davida is the Project Manager with the Electricity Governance Initiative at the World Resources Institute. And then following Davida, we will hear from Sarah Martin, a Research Analyst for the World Resources Electricity Governance Initiative. And within EGI, Sarah is involved in projects focused on renewable energy, energy efficiency, and holistic energy planning. And our third speaker today is Letha Tawney, a Senior Associate in the World Resources Institute's Markets and Enterprise program. And Letha leads the Charge Initiative in the United States and supports the global Charge strategy. And our final speaker today is Suphakit Nuntavorakarn, who is a Public Policy Manager at the Healthy Public Policy Foundation in Thailand. And Suphakit has been working on various aspects of renewable energy policy in Thailand since 2002.

And so with all those introductions, please join me in welcoming Davida to today's webinar.

And Davida we have here the slides up there, make sure you come off from mute. Davida I believe your microphone is still muted and if you could go ahead and un mute that…There you go.

Davida

Thank you Sean, sorry about that little glitch. Good morning everyone or good evening depending on where on the world you are.

Ten Questions to Ask About Scaling On-Grid Renewable Energy is one of the series of frameworks designed to help build stable markets through improved stakeholder engagement. As you can see on the slides, the topics that we have in this series so far are Electricity Tariffs, Integrated Resources Planning, and Scaling On-Grid Renewable Energy. These 3 are inter-related topics that are cross-referenced with each other to function as a series of frameworks. We do have other topics in the works. Specifically, our next topic will probably be a framework devoted to Distributive off grid Energy Solutions.

So turning specifically to 10 Questions to Ask About Scaling On-Grid Renewable Energy, paradoxically, building stable markets means being able to anticipate change. It means being able to anticipate market dynamics and design policies that are responsive to them. But how do you classify markets that are still emerging or technologies that are still maturing? And there, there are still so many unknowns. Prices, technologies…the way technologies interact with each other, and the skills that are going to be needed, both design skills and operational skills, all are in flux. So the 10 Questions are designed to raise the key issues that decision-makers need to think through in planning for the long-term. And they are specifically design for stakeholders to join in this dialog. If you have seen the presentations today, developed and developing countries face many of the same challenges, particularly with respect to balancing the stability that you need to stimulate investment, and the flexibility to be responsive to market signals.

So how can stakeholders operate as an ecosystem to create shared knowledge and good governance? So the task, I'm going to hand this over to Sarah Martin who will give an overview of how the 10 Questions are designed, and then Letha will give a global overview with examples from several countries and of using global data, and she will provide global examples, and from a global perspective. And she'll be followed by Suphakij Nuntavorakarn who will present the Thailand case. It's a really interesting case where the national solar plan was very successful but came through because decision makers were unsure of how to proceed when target was reached ahead of schedule.

And Suphakij will talk about the Thai's solar road map initiative, which was catalyzed by 10 Questions to Ask About Scaling On-Grid Renewable Energy. So Sarah…

Sarah

Thanks Davida. So before passing along to Letha and Suphakij, as Davida mentioned to explain how the 10-Qs can and have been used in particular country context, I'm going to go over to talk a little bit about what the 10-Q framework is, the features of the tool, and the intended purposes of the tool.

So the 10-Qs is a capacity building tool that aims to enhance engagement of electricity sector stakeholders. So these are anything from government agencies, policymakers in the electricity sector, regulators, utilities, civil societies, investors, entrepreneurs…

So in enhancing engagement of these stakeholders in the design, development, and implementation of electricity policy. So this is particularly important in the renewable energy sector as it is proven to be quite divisive, engagement with various stakeholders can be particularly critical in helping resolve some of these divisive issues. So for example, although many countries worldwide have in place policies to promote renewable energy scale up, oftentimes challenges and frustrations in the renewable energy priming process can hinder the achievement of renewable energy goals. So the 10-Qs framework offers a methodology to help anticipate and overcome these challenges by shedding light on concerns and offering a clear and comprehensive means of thinking through and discussing challenges that may arrive.

So challenges, as Davida mentioned, can be related to what kind of long-term infrastructure planning is required. So the idea is to create an understanding among different stakeholders involved in these sectors and to call attention to the processes that govern the electricity sector. So the framework is designed to be adopted to respond to nationally pertinent issues. This is not intended to be a prescriptive framework. As I mentioned here the framework is not a 10 questions to answer but 10 questions to ask, and again think through a lot of issues that may arise in the future with renewable energy planning.

So the framework presents these 10 key elements to consider when developing renewable energy plan. These are essential elements that are important in creating an enabling environment for renewable energy scale-up. Many of these are standard elements that can be found in other existing renewable energy guides or reports on scaling renewable energy. For example renewable energy financing models and mechanisms having predictable policies in place. These are often talked about in the context of scaling renewable energy, creating market stability, and are crucially important factors to consider.

Our approach however is to highlight the considerations that should be accounted for throughout the decision-making process. And these include transcending in the planning processes and stakeholder engagement. So for example, the first and second elements in the framework, which are the Planning Process and the Plan Objectives, speak to high-level choices and processes behind renewable energy planning. But the later elements speak to more detailed substantive elements that also need to be considered, such as infrastructure or human know-how requirement. These decisions are often not considered early on in the renewable energy planning processes, but are important elements to consider and have clarity on, and for stakeholders to have clarity on. For example, clarity on who is going to

bear the cost of extending transmissions line to connect to renewable energy projects to the grid. This is the factor that impacts not only project developers… so project developers that need to be aware of this cost when preparing bids, if they're suddenly hit with additional cost, this can cause a project to be stalled or abandoned. But this is an equally important issue to consumers for whom these costs can be passed down to and can create dissatisfaction, or can affect acceptance towards renewable energy, and can be equally harming to the progress of renewable energy scale-up in the country.

So having clarity on these issues, and transcend beyond these issues, involving stakeholders early on in the planning process, can resolve the issues down the line. So each element in the framework is presented as a question that policymakers can use when reviewing renewable energy plans and policies. As I mentioned previously, they cover a range of procedural and substantive issues related to renewable energy planning. You'll notice that these questions are all open-ended. We developed them deliberately this way to avoid yes-no type answers. So for example, question number two, “What are the objectives of the renewable energy plan?” We’ve deliberately not raised the question as, “Does the plan have clear objectives?” We don't want users to answer yes or no, but we really want to get users to dig deep and again think through what some unanticipated issues might be throughout the planning process.

So I want to break down one of the questions so that the audience can get a feel for the types of features that the 10-Questions framework includes. So each question is supported by a narrative that explains the significance of the question, and many of these narratives are supported through country examples to illustrate once again the significance of what we're trying to highlight. Each question also features an analysis highlights section, which really is there to help guide the user on high-level takeaways from each question, and what to look for, for one reviewing a plan or planning document.

Finally, each question includes a supporting bibliography for users who want to gather more information on a particular issue that may be pertinent to them or their country contact. So the text in the slide has been deliberately been kept small. I don't expect you to read what's included in there. But I do want to dig a little bit deeper into these questions, question number four, and again highlight further the types of information that we included in these questions.

So as mentioned earlier, each question includes the highlights and analysis highlight section or Look-For section, which highlights the main takeaways of the question. So for example, question four, “How is the renewable energy plan designed to achieve the stated objectives?” talks about a design and development stage, how policies and targets set can differ based on different policy objectives wanting to be achieved. So for example, in some instances, targets are set by megawatts to be achieved by

a certain date, or a number of homes to be electrified by renewable energy by a certain date. The main takeaways from these questions is that in either case, target should be SMART. So Specific, Measurable, Achievable, Realistic, and Time-Bound; and should be rooted in technical and economic assessment in order to justify the targets that are in place and to create credibility. What's been seen is that unrealistic targets can reduce credibility and create a less stable market and cause unpredictability for investors.

So these types of main messages are illustrated through examples. And in this particular question, we viewed the example of Indonesia, where regularly changing renewable energy target based on unreliable data have caused uncertainty in the renewable energy policy framework. So renewable energy target that were initially set in 2006 at 25%, then revised in 2008 to 10%, then once again revised in 2012 to 25% by 2025, so the government's inability to show commitment or to implement policy initiatives have caused some serious bottleneck in the sector.

Moving on to how the 10-Questions framework can be used. So again Letha and Suphakijare going to talk more in detail about this. But generally, the 10-Questions framework can be used by government, government departments who want to coordinate between different agencies who are working on renewable energy planning; it can be used by regulators who want to facilitate technical working groups on public hearings; it can be used by renewable energy project developers, investors, entrepreneurs, stakeholders who are active in the renewable energy space who want to become more involved in reviewing plans or participating in renewable energy planning processes. The questions in the framework are formulated to emphasize the active roles that the different stakeholders can play in the policy design and review processes.

So to wrap up my portion of this webinar, I just wanted to point to the fact that the 10-Qs on renewable energy in particular aims to promote public interest, so to ensure the effectiveness of public expenditure, to reduce unnecessary costs that may arise through the scaling of renewable energy, to raise the quality of electricity services, and minimize social and environmental impact. All these public issues are important to consider not only from a citizens and rate payer perspective, but also from the perspective of renewable energy investors, and other stakeholders that are involved in the renewable energy supply chain; resolving issues that are related to renewable energy scale-up, provides the foundation for the politically stable policy environment that can reduce risk and improve certainty, and create the policy environment that stimulates sustainable energy market development.

So that's all from Davida and myself. And now I'm going to pass it along to Letha Tawney.

Letha Thank you Sarah. So I wanted to delve a little bit into a few of the specific questions and talk about examples from countries where either the question has played out is a bit of a cautionary tale or where the country has had a lot of success in achieving the stability and the social goals that Sarah highlighted.

So policy…We hear from the financiers constantly that what they need is policy stability in order to make investments. They need to know what their project returns or what their investment returns will be within a reasonable level of risk before they make their investments in a particular country. And that raises challenges in the electricity sector where policy very strongly shapes the marketplace because of the natural monopolies. So a great example from the US of policy instability that is a cautionary tale, I think well-known, is the challenges the US has with the production tax credit, which is the mode main support mechanism subsidy for the wind industry, the large-scale wind industry in the US. And the policy expires regularly. And every time it expires, there is a tremendous drop in the investment made in the wind industry in the following year. And then the policy is renewed, and the wind industry picks back up. And the boom-and-bust cycle that this creates is a challenge for the wind supply chain. It makes it very difficult to optimize manufacturing floors. It makes it difficult to prevent bottlenecks in delivering wind turbines and keeping prices low. But it also creates this tremendous uncertainty in the investment space in the American wind sector.

Despite that, the wind sector has grown and delivered gigawatts of capacity, but it's been bumpier than folks would like. And the US isn't the only place where this has been the case. Bloomberg New Energy Finance noted the fall in European investment by 85% to about 8 billion a year in the renewable energy, or 8 billion a quarter in the renewable energy sector in Europe since the second quarter 2013. And points to this… sort of hovered around that 8 billion a quarter since then, it really points to that new normal as both falling subsidies, but also the policy uncertainty in the European context at the moment. This policy uncertainty creates an investment challenge in more places than just the US. That said, the market stability does not equal static policy. We know that, and I'm sure it's widely known to the audience, the tremendous fall in prices since 2008 in solar. So policymakers face this challenge of having to provide financiers some stability but at the same time being responsive since the changing conditions in the marketplace and ensuring that they don't get caught out by, for example, the huge drop in solar prices.

And the 10-Questions are intended to drive home for policymakers, how to find that plan, the flexibility and responsiveness with stability for the finance community to make their investment choices. So digging specifically into question six, “How to create… how flexible is the plan to changing conditions?” So, exactly this question, what happens if progress towards the targets is faster than expected and Suphakij will tell us a little bit about how that worked in Thailand, how did the subsidies, if there are

subsidies, adjust price changes…and can investors predict when reviews of the policy will happen, and how they might play out so they can make investment choices and know what sort of timeline they need to execute on it.

The example here is the solar PV deployment in Germany between 2005 and 2013, and you can see there's this huge jump between 2009 and 2012. What happened here, between 2008 and 2009, is of course solar price PV dropped, it fell to the floor. But the subsidies, the Feed-in tariff in Germany, didn't adapt particularly quickly. And as the German government tried to adapt the Feed-in tariff level, solar prices kept falling faster and faster. We all read the projections, "Oh it can't possibly fall this quarter as much as it fell last quarter. This is the last year of prices falling." And so the German Feed-in tariff really struggled to keep up with how fast the prices fell And finally, and reigned in the level of insulation that was creating a real challenge in terms of the size of the Feed-in tariff through debt that repairs would have to bear going forward. And finally, in 2013 it arrived an approach that tamped back the installation. They hit a level they were a little more comfortable with. I think they are still trying to get a handle on how to reach a sustainable investment level for repairs. But it's important…this is…I think Germany is a great example of the policies wildly successful but that can create a challenge for the policy environment.

South Africa, I think their reverse auction approach has proven to be an example of a real success in offering predictable pricing that consistently falls, but creates a stable policy environment to try investment into the country. So each of these blocks is around of a reverse auction that South Africa has done over the last few years to bring renewable energy onto their grids, these are large-scale renewable energy projects. And you can see that for each technology, the price has declined steadily as the learning curve in that country has evolved, as the sector has matured. And they have set targets that are technology specific in this case so folks in the supply chain know… expect that there will be X number of megawatts of the particular technology deployed over the timeframe of the five routes of reverse auction. And South Africa has managed to drive prices below the global averages. So you can see, so let's go back, you can see the global wind average in the blue line and the global photovoltaic average in the red line. And South Africa has managed to use the reverse auctions to really deliver low prices to the electricity grid that are really responsive to where global technology prices are at.

This is I think an example of trying to set a policy outfit that is taking into account how prices are falling. And Bloomberg Energy Finance points to a shift from Feed-in tariffs towards reverse auction as the renewable energy sector has matured, and we know more about what it takes to deliver a project, and project developers can bid into the reverse auctions with more certainty. There's also been a move in Germany and other places to set up digressions of Feed-in tariffs, and Israel actually set their FIT digressions

to the Bloomberg New Energy Solar PV price index. So they look at the global number of what this globally traded commodity trades at and try to set their FIT in response to that. And it's publicly available, it's transparent, it's not terribly predictable because prices in PVS are surprising to everybody. But it's one approach to trying to make the policy adjustment more open and clear to the investors.

Question seven drives to the heart of whose going to pay. And from our perspective, thinking about the social goods, we would like, you know, you want to think about how public… how any public support is going to be highly efficient, but it also how it's going to keep the actual financing cost for the project to a minimum since renewables are cost…are capital intensive. How will the incentive finally be supported? So is it going to fall on rate payers? Is it going to fall on taxpayers? Is it going to be socialized in some other way? And how politically vulnerable are those incentives particularly to retroactive cuts. So and as prices collapse and the economy slowed in southern Europe, Spain, Bulgaria, Greece and the Czech Republic all made retroactive changes to their Feed-in tariffs. And they did that because, you know, like Germany the installations grew, the size of the burden of the FIT grew, and they were trying to sort of get ahead of that public debt that they were essentially taking on. But that retroactive change has this incredibly chilling response from investors who, you know, suddenly see their regulatory risk for investing in a policy environment as very, very high.

So thinking hard about what structure…who's going to pay and how politically vulnerable will that payment mechanism be is crucial. And I think often we don't think enough about how the renewable energy industry or stakeholders are going to demonstrate social returns for the public support. I think that thinking about that ahead of time can be useful for protecting… thinking hard about the political vulnerability. So the US production tax credit, just to pick on my country, is both as we have seen politically vulnerable with regular explorations of slow renewals. But there's also been a series of studies including one that just came out from the Lawrence Berkeley National Lab about how inefficient it is. And the way the PTC works, you lose a fair amount in transaction cost unfortunately. Now it's widely considered in the US that this is just what our policy environment requires, the tax credits are what's feasible, we can't do national Feed-in tariffs, we don't procure energy with national auctions like South Africa does. So it's sort of a necessary evil in the US context but I think this doesn't help its case in terms of being politically vulnerable.

Now that said, the US wind industry has performed very very well, so I don't take I don't need to pick on the wind industry. Here you can see how our power purchase agreements in the US, the prices on them are very, very low. And in this case the regions in the red circles which in the US are interconnected grids, power purchase agreements fall well within the whole set of power prices generally. So when this competing very

effectively on the market with the PTC as inefficient as it is, enhanced. And so just because it's not ideal doesn't mean the wind industry is failing or we're not driving down prices, but it does create a more challenging environment than may be necessary. But of course change—prices aren't the only change that one needs to think about in this space. So question eight really points to thinking… kind of think over the horizon about what scale will it happen. So country sets renewable energy targets, or a state or a region sets renewable energy targets, and of course in almost no case do you stop there. It's not the end of the discussion. Suddenly you're going to turn off the renewable energy industry when you get to that target. And so thinking forward about what it's going to mean when renewables are not 1% or 5% of the mix but 10 or 15%. I'm trying to set a policy environment which is difficult and not straightforward, and I think resources like the Clean Energy Solutions Center are fantastic for this. They're really trying to get out a little bit over the horizon about what's going to happen when these targets are actually met. What will we do?

So around the world we've seen what's going to be the plan for curtailment. So when there's too much solar, too much wind, more than what the grid operator expected, who's going to back down what resource and was going to be paid for that economic loss by and under what rules. Is there a process for absorbing a longer-term, sort of continuous improvement process, technical committees, discussions among grid operators for absorbing whatever the preferred renewable is into the grid over the long term. And are the stakeholders, particularly in the US we've seen this among utilities, but in some countries it's been grid operators, in other countries it's other stakeholders, but are they really thinking about what's going to happen next. Often we found that stakeholders are so doubtful, that the targets are so ambitious, they're so doubtful that, "Are we even going to reach the target?" They've sort of no sense of what's going to happen after that. And in reality, around the world, renewables have fallen in price and deployed point faster than expected over and over and over again. And so they find themselves cut out short more often than not.

So China has been struggling with this, and has been over the last few years, putting policies in place. But, you know, they have built out wind very rapidly, on average 16 GW or so over a year, it's a huge amount of wind. And what they face, as they do that build out, is a real challenge with low capacity factors, the purple line at the end is the average capacity factor in the US. As you can see across the provinces of China, they struggle with really getting the most out of the wind farms they've built. And the red bars show how much has been curtailed, or wind power that was on the grid and available, and had to be dumped because the grid could not absorb it. And in China there's a variety of technical and market structural reasons why this is the case. And China is working hard on this. There's a variety of national labs, and research centers, and state grids, and so on that are working on this problem. But I think any grid operator has

to be thinking about what are we going to do when more of these resources are available than we think. Curtailment has been an issue in the US as well and has landed in court actually because the economics of who is going to have to pay for that lost generation was unclear. China has also been struggling to connect those… the turbines that they've been building to the grid; I think folks have heard about this. So the non-connecting capacity really peaked as a percentage of the fleet in 2010, and they've been driving that number down over time. And Bloomberg New Energy Finance submits that by 2013 they would have gotten it to about 12% of the fleet that is not connected. But again, the grid operator and building out the grid is not necessarily synced up with the folks who were planning the wind farms. And it's taken some time to get that conversation rolling and to get caught up with windmills.

So the US… this has also happened in the US, this is a national level deployment of small-scale solar PV in the US. So in the US it's mostly behind the meter on rooftops in homes. And utilities across the country were perfectly happy to allow customers to do that because it's so expensive, you know, subsidy dependent, it was going to, you know, they could very much manage the deployment. And as prices in PV fell, those economics changed dramatically. And in a couple of states, California, Hawaii, Arizona, utilities have realized that even as the subsidy regimes expire, the prices of solar has fallen so far that they can't, as Arizona Public Services put it, they can't control the deployment of small-scale PV any longer. It's so economic that homeowners will go out and do it anyway. And, you know, it's a case of the utility just believing that renewables were never going to be cost-effective, you know, it was always going to be just an edge, a marginal product, it could never compete with what they were doing. And you could see the projections for 2014 and through 2016, there's a massive increase in the solar PV small-scale that's expected in the US. And among the utilities that are facing this created a real backlash in some cases and soul-searching in other cases, they're not all being retrograde about it. But it's difficult for stakeholders to think about what comes next sometimes. And I think planning ahead for that can prevent all sorts of policy uncertainty, and investment uncertainty, and stalls in the market. So I love to… I'm looking forward to Suphakij's explanation of Thailand as a great case so I'll hand it over to you now.

Suphakij Thank you Letha and hello everyone. I'd like to say the [indecipherable 00:43:51] from Thailand related to their 10-Questions to act on renewable energy. And we'll start from their master plan on renewable energy development by the Ministry of Energy, then I will share with you some key problems on renewable energy development and the process to addressing and developing the solutions, including the solar PV roadmap initiative, and also the process… the working process on preventing the negative impact from biomass power plant projects, as well as the emerging of social enterprises for small-scale renewable energy development.

So the alternative Energy Development Plan or EDP, if there are long-term master plan on renewable energy developed by the Department of Alternative Energy Development and energy conservation and the time frame of the plan user,2012 until 2021, the plan set the target of a 13,927 megawatts between 2021.And you can see that packet for biomass is2800 megawatts and 3600 megawatts of biogas for municipal [indecipherable 00:45:21]is 400 megawatts within 2021 and 3000 megawatts of solar energy, wind and also many hydropower.

If we consider the trend in interconnected renewable energy, you can see the increased trend particularly the solar and the biomass, and also biogas. But regarding solar PV in Thailand, you can see that majority is solar fund, which is larger than one megawatt in the purple here, while commercial social rooftop show here is just a small proportion. And if we consider the residential rooftop in Thailand, it's extremely tiny. But in other countries, they are some proportion of residential rooftop in Malaysia, or even large proportion of solar rooftops by households, by buildings, and factories as in the US, in Germany, in Italy and even in the UK, the big majority.

Also the obstacles to solar PV expansion in Thailand is also about packet, which is related to question number three in the 10-Questions on this scaling of renewable energy. The packet on solar TV has been used as quota that when the solar PV project submitted for [indecipherable 00:47:05] through the grid were more than the packet, then the Ministry of Energy stop accepting the new project. And after that it is totally dependent on the Committee and the Ministry to decide on when to be opened again sometime in two years or four years. There are no criteria or mechanism, and it is not clear for the stakeholders as well for their consideration and they will be open to accept a new project again.

Also when the ministry increases the packet for 1000megawatt more last year in 2013, the ministry already allocated into 100 megawatt for commercial rooftop and another 100 megawatt for residential rooftop and 800 megawatt for solar farm by highway community. And now there are 100 megawatt packet or quota for residential rooftop is already full because as you can see it by household allow the country and now we do not know when the ministry will increase the packet or open another round for residential rooftops.

Another key obstacle to solar PV expansion in Thailand is the problematic vehicle framework and enforcement by other ministries. Solar PV have more than 2 kilowatt if considered effectively by Ministry of Industry according to the industrial [indecipherable 00:48:48]. So almost all solar rooftop need to apply for the sector commission. And there are various problems in the Commission for Sales. We understand that this is Thailand only in the world and actually would like to shake it up.

Consequentially some solar rooftops sectorly contradicted with the regulation of the residential are as in the land use of the area. This is responsible of the Ministry of interior. So the problem now that we in Thailand try to solve is…therefore my colleague Dr. [indecipherable 00:49:42] said in a series of interview at [indecipherable 00:49:43] in cooperation with the Ministry of Energy is planning the solar PV roadmap initiative in the last year 2013 and it's still and ongoing process.

The roadmap process is designed to increase the relevant stakeholder to helping solar power to the main stream. The roadmap process comprises of research platform, policy platform, as well as the public knowledge, the 10-Questions on scaling of renewable energy has been used as a framework for designing and implementing this process. We aim to develop solar PV roadmap for Thailand together with our relevant stakeholders as well as to create a network of stakeholders that operate based on the culture of [indecipherable 00:50:41].

The process also tries to address the economic and financial aspects such as how can policy in Thailand can be designed to enhance domestic relocation along the solar [indecipherable 00:51:00], and what our innovative listeners can [indecipherable 00:51:02] capture. So you can see that regarding the research platform, there is also a number of technical issues, such as the technical impact, more positive and negative of solar power to the grid. How to manage the grid to maximize the solar benefits to the grid and how to integrate into the Thai utilities the planning practices and reports, also the economics and financial aspect, and also the policy aspect, how to exploit the solar potential which is really huge in Thailand while keeping social and environmental considerations in mind.

Concerning the policy platform, it is the series of workshop, admitting several stakeholders on technical aspect, economic aspect, policy working group, and also the meeting of the multi-stakeholder advisory committee. This is the ongoing process and various problems, various issues has been brought up and studying and also discussing in various workshops, and meeting and plan to finalize the roadmap next month. And we'd like to share with all of you both in Thailand and international level also.

Then I move to present about question number ten on environmental and social impact of renewable energy. This is the [indecipherable 00:52:57] of the loophole in the legal framework for renewable energy process less than 10 megawatts. Considering the regulation by the Ministry of Energy, the set-up of very small power producer who can use the project list in 10 megawatt and is above to 90 megawatt, is another channel of small power producer.

But the regulation by the Ministry of Natural Resources and Environment, and regulation is enforced since 1992.The Environmental Impact Assessment or EIA has been enforced to determine how the project from 10 megawatt and above. So in practice, our very small power producer

project do not have to come back. And the Environmental Impact Assessment do not have the get the EIA approval for the project. So in Thailand, we have the problem about the biomass [indecipherable 00:54:07] with the size between 9.0 to 9.9 megawatts.

And if you see the information from the Ministry of Energy at December 2012, the project which already selling electricity to the grid about half or 20 projects in the size of 9.0 to 9.9 megawatts. And out of the total of 42 VSAP projects, and the project which already signed our purchase agreement but not selling electricity to the grid yet is really numbered 132 projects in the size of 9.0 to 9.9 projects out of the total of 174 projects.

So, yeah, and also just to give you an example of a case of the negative impact from the three biomass open project in the same area, out of these 3 projects using [indecipherable 00:55:15] as the fuel, and the 6 megawatt, 9.9 megawatt and 9.0 megawatt, for the installed capacity, and then of this project the EIA. And the local communities allow the area experiences negative impact from particularly that problem for many years.

And they even conduct the local keeper even conducted the preliminary community based mapping in order to show the problem particularly pollution. Until 2012 that the regulator enforced [indecipherable 00:56:03] for biomass power plant project less than 10 megawatts. And the project owner must submit the environmental checklist with the project application and in the court effective cover many issues on environmental potential, environmental impact throughout the project lifecycle.

Also if the process, the multi-stakeholder process of the national assembly according to the national health act that can address various issues related to health, and they have the channel to submit for the approval by the ministerial cabinet meeting. And in last year, in 2013 the ministerial cabinet resolution approved the solution on preventing the negative impact from biomass power plant project composed by the national health assembly.

And the solution includes not only to lift all the issue to the environmental impact assessment only but firstly it's probing to conduct the provincial initiative planning framework for renewable energy project development and the decision-making process. And also improve the land-use handling for biomass project and improve the incentive and criteria for project approval by the regulator. Also, there should be factor to local communities around these biomass power plant projects for meaningful participation in the decision-making process. And lastly to develop the environmental monitoring plan and strengthening the enforcement of the monitoring plan.

And the last part of my presentation is about question number seven on Finance Mechanisms. And it will forecast on the problem of financing small-scale renewable energy. Since the fund of the government to support

renewable energy is really centralized, so in the case of the private company that want to develop renewable energy power plant, you can have access to a number of supporting measures from energy conservation funds.

But if the local community want to borrow or get support for local small scale skilled renewable energy project by themselves, there are very many obstacles to have… they actually have no direct access to the energy conservation fund. And also another problem of financing small-scale renewable energy is about the…at the [indecipherable 00:59:06], that only the project that generate electricity and selling to the grid can [indecipherable 00:59:18]. But, if the local community can produce, can generate their own electricity, or can generate their biogas, so cooking for their own use, there is no [indecipherable 00:59:33].

But many communities, local people, and local enterprise of Thailand, and sometime maybe in cooperation with academics, they will try and develop different renewable and small-scale renewable energy. And some of them become experts and be able to sell the products for wider services and continuously develop the product, or becoming the process for innovation by local people, local community and local enterprises. So just November last year, the network of social enterprises on small-scale renewable energy [indecipherable 01:00:21] in order to develop and expand small-scale renewable energy in a sustainable manner [indecipherable 01:00:31].

We try this innovation and innovative solutions for financing small-scale renewable expansion. And just to give you briefly the idea of the products and services by these social enterprises on small scale renewable energy such as biomass application for electricity generation, even for cooking gas in households, or even small and medium enterprises or SMEs. And several social enterprises are providing the building installation as well as the training process on biogas from [indecipherable 01:01:18] and using various local materials to view the biogas system.

Also, a community in Thailand learned to develop the biomass, biogas electricity generation and now they are providing the installation and training cost on this system. This system can generate 5 kilowatts, which is enough for several households.

Also another example is the wind turbine, solar PV light; this is developed by local enterprise in [indecipherable 01:02:00] province, which is also a member in our network. And also, the community enterprise selling and providing the services on micro hydro power of 1 kilowatt or 1000 watts. So at present in our energy power network of social enterprises for small scale renewable energy, the several enterprises on biogas, on biomass, one on wind turbine, one on solar PV, and the process on various technology, one renewable energy in our network and also two enterprises on [indecipherable 01:02:43] knowledge management and this also includes my own system.

There are many challenges ahead for the network of social enterprise either continue our support for renewable energy innovation develop just [indecipherable 01:03:03] for the product services, building management capacity for social enterprises, strengthening the revolving fund of the network, and also from the policy point of view, there is no systematic energy policy to support small scale renewable energy.

However, this is viewed as a challenge for another finance mechanism for small scale renewable energy that hope to expand on their own. So that's all for my presentation. Thank you very much for your attention.

Sean Alright, and thank you to everyone for the wonderful presentations so far today. And at this point, I'd like to remind the audience that if you have any questions to the panelists, any of the panelists, you can submit those to the question pane and I'll present them during the next question and answer session.

And so I would like to start with some question. And the first question that we have is, how can the government ask for, or Ministry of Energy, use the 10-Questions that are already operating on their energy renewable targets? And these questions are for anyone so feel free to jump on the line. Remember to unmute yourself and go ahead and try to answer.

Letha Hi this is Letha. Davida did you want to go ahead?

Davida Yeah, but it's fine. Go ahead.

Letha So I think a lot of countries and sub national regions have already set targets, and may even have renewable energy policy environments in place. But as places have changed so dramatically, I think many are considering reviews and how to further stabilize their markets using the…I think the government task forces and Ministries that are set up with figuring out how to implement legislation or figuring out what the next targets should be, could really use the 10-Questions as a template to structure their work plan, and make sure they're covering the bases and bringing in the stakeholders that they'll need for the next round.

Davida And to add to that, we really encourage as much as possible governments being concerned about their plans and in writing stakeholder engagement ahead of time. And this pre-emptive move to head off problems that we already know are likely to emerge. Stakeholders have a surprising amount to say and to contribute and so our idea is for governments to make their plans for the next step of their [long vision 01:06:07], and use the 10-Questions to convene stakeholder engagement on specific topics. It can also be used, as Suphakij presented, to design a research agenda where a series of policy papers can be designed to solve gaps in management that the 10-Questions have identified. And again, this could be a multi-stakeholder endeavor where different, for example, issue briefs are assigned to different stakeholders to have strength in that area.

Suphakij Yes I would like to add to the situation where [indecipherable 01:06:54] government or the Ministry responsible for renewable energy plan, maybe they already have and even implementing or imparting, but if the countries are facing many challenges on renewable energy, if some country is not increased as fast as the one while some country is for some technology increase very fast, so the 10-Questions can be used as a framework or a checklist that maybe some issue, if not dealt with properly or may have to think more, like the authority of the Ministry of Energy or whatever…whichever Ministry be responsible for the renewable energy depends.

Another big issue to that I think not only Thailand is facing is the cooperation between Ministries. Not only within Ministry of Energy themselves but as a, for instance in Thailand, the cooperation with Ministry of Industry, Ministry of Interior, even with Ministry of Finance or other Ministry. And the multi-stakeholder process can be initiated as a like a supplement mechanism or process to support the working together between Ministry and finding the answer together. Not only solely between the two or three Ministry themselves but also the public process in the [indecipherable 01:08:38] participation, the stakeholders can discuss and share with the Ministry related to the issues to find the solution together.

Sean Great. Thank you everyone for providing an answer. That was great. So I'm going to move onto the next question from the audience, and it's a two-part question. First part of the question asked, What do you see as the biggest obstacle – Regulatory challenges or Technological challenges? And then to follow up on that, Could you discuss what the nature of regulatory challenge are for large-scale renewable energy integration? So just to recap, What do you say is the bigger challenge, regulatory challenge or technology and What are the major regulatory challenges?

Letha This is Letha again. For large-scale renewable energy integration, I think it's… there are technical challenges but I think the regulatory challenges are more difficult often to resolve. Grid operators are very sophisticated all over the world and there are a lot of resources for them to, you know, folks like NREL and others solve some of the other technical challenges that are real when integrating variable resources. But how the markets are structured, how the economics unfold is tricky. And making changes to it upsets how, you know, investment decisions that were made previously and can create stranded assets and so on. So I think the regulatory challenges can be larger. In particular, questions about who ends up in the dispatch stack when, for which value of energy, and who doesn't, and what happens when they're pushed out. I think those are the issues that are emerging in Europe and the US and China, although their each context is making sort of a different choice about who's getting pushed out of the dispatch stack at different points. But on some small-scale, I think Suphakij, you may have a different perspective.

Suphakij Not really. Because either both the large-scale and small-scale…firstly we also consider the technical aspects and also lean to like in a way process and innovation is really important for renewable energy development. But it is very clear [indecipherable 01:11:44] that for all other renewable energy… for many renewable energy in Thailand, for [indecipherable 01:11:53], the solar PV road map initiative process that we ran from last year until now, and we are finalizing the process, it's clear from many workshops and meetings that we ask the multi-stakeholder participants in various workshops and meetings to [indecipherable 01:12:17] the important issue or the priority issue or the key problem. And it's very clear that on certain policy, number one…so as I mention that target that has been used as a quota for example and the problematic vehicle and institutional framework between Ministry of Energy, Ministry of Industry, Ministry of Interior, related to the extension of solar PV, it's clearly the key challenges now. In one workshop we even come up with the conclusion that if we can solve this kind of big issue, the potential of our ability in Thailand for innovation and to capture in the global revolution if not to have to do but now we are facing with the bigger problem from the… like collaterally and policy point of view.

And even for small scale renewable energy, if the… for example in my presentation, the issue about finance mechanism, is that for my point of view is total directly collaterally a policy aspect that…actually small scale renewable energy do not have access to the main fund…renewable energy fund for the country or to the [indecipherable 01:14:05]. So actually the more on their own [indecipherable 01:14:11] if not they have to bring it and low budget or they have to apply for each budget or each project something like that. So from this issue, from the regulatory and policy aspect, if we can solve this then the…how to overcome the technical aspect and also the innovation process is…another big issue, maybe it's a temporary issue, the regulatory and policy aspect.

Sean Thank you so much again. And next question, moving on to…from the audience it's, Where can attendees find additional resources or get help in answering questions that they may have for their energy planning processes?

Letha I think the…Oh sorry, you go ahead Suphakij.

Suphakij Oh no, no. It's just maybe Davida or Sarah can answer this but maybe Letha you can start first?

Letha You know I think the work that's come out of the clean energy ministerial, the resources used such as those at the beginning Sean, there's also the emerging out of the climate negotiations, the Clean Tech Center that is offering similar complementary support. I think more and more groups like SMAP at the World Bank are thinking about these issues. But also we've seen South-South learning are happening and will be really crucial so grid operators and I think it was grid operators from Thailand then

Tanzania working together to talk about how to integrate renewables on their grids. So I think there's opportunity to reach out through South networks as well to folks who are facing similar challenges with similar infrastructure.

Davida Yeah. And I just wanted to add to that. And I'm going to go back to the previous question about the biggest obstacle. I think that it depends. The biggest obstacle for us, I think most of the presentation is made clear that the first round of [indecipherable 01:16:48] and other regulatory incentives can be really successful in scaling up to the first set of targets. But most of that, I think there's a different set of regulatory issues that speak to how the [indecipherable 01:17:06] go to a larger scale and solve renewable energy on a larger scale, and that requires facing a trend that's emerging for a different role of the grid, where prices, technologies, interaction technologies are all happening at the same time. And WI is producing a learning tool on plan that are affecting the future of the grid, and that can… will be available in the next couple of months so that's just a little plan for our upcoming resource.

Suphakij Maybe I would like to add briefly that in the publication on 10-Questions on scaling of renewable energy, for each question at the end of each question, a number of example of key publication or research or report or study that you can find from the internet, from various countries on the issue. So for all of these issues there are actually many publications such as how to fight and [indecipherable 01:18:23] one group of publication that may be useful for the specific issue that may be each one of you are assessing.

Sarah Thanks Suphakij, we should have said that from the beginning.

Sean Thank you guys. And the last question that I've received at this point is, Is there any sort of template or best practice incentives policy for renewable energy at this point? So for instance, [indecipherable 01:18:59] are very popular around the world. Is there anything like that that is just accepted as the best practice?

Letha I think we see a lot of local adaptation to the basic principles of efficiency, stability… the key to ensuring that there's some sort of… the incentive reduces transaction processes and finance costs. But each country, I think Suphakij's presentation really points to how unique each grid is, and the political… and the renewable energy resources and so on…And so you see a lot of variations on themes, as I mentioned Bloomberg New Energy Finance has been thinking… has seen a trend towards reverse auctions away from Feed-in tariffs. For a long time Feed-in tariffs were preferred to reverse auctions, I think as the market matures, we'll continue to see an evolution but the basic principles behind who's been relatively successful, I think have begun to emerge around efficiency and transparency and so on…

Sarah Thanks Letha. This is Sarah and this is answering both this question on, you know, best practices or good roadmaps for intended…but also building on the last question about further resources. So the 10-Question framework on scaling renewable energy actually uses as a companion, reports that we wrote with WWF on achieving renewable energy targets. And in that report, one of the main takeaway messages… it's the report that builds on 10 different case studies of countries around the world that had put in place renewable energy targets, and kind of looking at the policy mechanisms that has been put in place, but also kind of the institutional set up. One of the main takeaways from that report has been that regardless of the incentive or the policies that are in place, whether Feed-in tariffs or a bidding mechanism, the importance is not that one is better than the other but the importance of processes that guide these mechanisms. So transparency, participation, so those are kind of the factors or the features that are important to have in place to guide the policies. And there isn't necessarily a silver bullet for which incentive mechanisms work best.

Suphakij I would like to add…I would like to share the evidences from Thailand point of view. That the…we found that the basic principle of [entirely 01:22:23]. If the [quite crucial 01:22:26] for renewable energy development as the provider, like a [indecipherable 01:22:33] like a guarantee and stable policy environment. However [entirely 01:22:40] is not the one and the only answer to renewable energy development and it's totally not the perfect answer for all countries. Each country need to adapt to their own context and maybe even to each context of each renewable energy technology or solar PV in one situation and micro hydro power in another situation for example. But we have not the good experiences with the mechanisms from the potential environmental and social negative impact from the renewable energy projects because in our experiences, the bidding process is some kind of the pre-condition of the project. Because before the project enter the bidding process, they do not want to have any—they don't want to provide any information or any public participation in the local community allow the project. But after they win the bidding, they try many ways to like advertise their project to get extra funds from the local people. However, I do not know in detail much about the labors auction. But each country has to like a thing I would say not only one issue but more like a holistic issue. And I think you can help you to think in this manner that it's not only renewable energy or electricity but the other issue at the same time and find the best policy or regulatory mechanism that can also adjust and concern about the flexibility of the plan and the policy as well.

Sean Alright. Thank you again to the panelists. We are out of time so end questions. So at this point, I'd like to ask our audience to take a minute to answer a quick survey that we have on the webinar that you viewed today. And we just have 3 short questions for you to answer. And your feedback helps us evaluate where we are and improve for the future. So if you can

go ahead and display that first question. And the question is, Webinar content provided me with useful information and insight, And you can respond, when you go to the webinar window. Alright the next question… The webinar's presenters were effective. And then the final question is, Overall did the webinar meet my expectations

Alright and thank you for answering our survey. And on behalf of the Clean Energy Solutions Center, I'd like to extend thank you to our expert panelists and to our attendees for participating to today's webinar, very much appreciate your time and thank you for being here. And I invite our attendees to check the Solutions Center website over the next few weeks if you'd like to view the slides from today's presentation as well as listen to an audio recording. We will be posting that on the site as well. Additionally you can find recordings of previously held webinars and find information on upcoming webinars as well as resources on clean energy policy topic such as 10-Questions about scaling on-grid renewable energy.

So we also invite you to inform your colleagues and those in your network about Solutions Center resources and services, including the no-cost policy support. We hope to see you again at future Clean Energy Solutions Center events. And this concludes our webinar.