

# Getting Investment Where It's Needed: How do we level the playing field?

—Transcript of a webinar offered by the Clean Energy Solutions Center on 26 June 2018—  
For more information, see the [clean energy policy trainings](#) offered by the Solutions Center.

## Webinar Panelists

**Laura E. Williamson**  
**Aaron Leopold**  
**Christine Grüning**  
**Kanika Chawla**

## 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.

---

## Vickie Healey

Hello, everyone. I'm Vickie Healey, and I'd like to welcome you to today's webinar, which is hosted by the Clean Energy Solutions Center and Partnership with Renewable Energy Policy Network for the 21st Century, also known as REN21. Today's webinar is focused on getting investment where it's needed, and how do we level the playing field. Before we begin, I'll quickly just go over some of the webinar features for you. First of all, for audio, you have two options. You may either listen through your computer or over your telephone, and if you choose to listen over your computer, please select the mic and speakers option on the audio pane on the right hand side of your screen. Doing so – and 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 you should use to dial in.

Panelists, I'd just like to remind you that when you're not presenting, while not presenting, if you'd please mute your audio device, that way we'll be able to eliminate any background noise and things of that nature. If you'd like to ask a question, we ask that you use the questions pane up [inaudible] on the right hand side of your screen, or you may type in your question. The audio recording and presentations from today's webinar will be posted to the Clean Energy Solutions Center's training page shortly after the broadcast and will be added to the [Clean Energy Solutions Center YouTube channel](#) where you'll find other informative webinars as well as video interviews with thought leaders on clean energy policy topics.

Finally, one important note of mention before we begin our presentation is that we have a little disclaimer we'd like to read, and that is the Clean Energy Solutions Center does not endorse or recommend specific products or services. Information provided in this webinar is featured in the Solutions Center's resource library as one of many best practice resources that is reviewed and collected by our technical experts. Real quickly, I'll go over the agenda. So, today's webinar is centered around the presentation from our guest panelists, Laura Williamson, Christine Gruning, Aaron Leopold, and Kanika Chawla who have joined us to discuss the key findings from REN 21's renewable 2018 global status report. Then the panelists will delve into the varying investment levels across regions and its impact on access, specifically across developing countries of Africa and India. Before we jump into the presentation, I'll provide a quick overview of the Clean Energy Solutions Center.

And then following the panelist presentations, we'll have a question and answer session where our panelists will address questions submitted by you, the audience, and at the end of the webinar, you'll be automatically prompted to fill out a brief survey as well. So, we thank you in advance for taking some time to do that. The Solutions Center was launched in 2011 as an initiative of the clean energy ministerial. The clean energy ministerial is a high level global forum that promotes policies and programs that advance clean energy technology.

We were designed to share lessons learned and best practices, and to encourage the transition to a global clean energy economy. Twenty-four countries in the European commission are [inaudible] these particular countries are contributing 90 percent of clean energy investment, but they're also responsible for 75 percent of global greenhouse gas emission. This webinar is hosted by the Clean Energy Solutions Center which focuses on helping government policy makers design and adopt policies and programs that support the deployment of clean energy technology. This is accomplished through support in crafting and implementing policies relating to energy access through a low cost service of provided through expert policy assistance and peer-to-peer learning and training tools such as this webinar that you're attending today.

And the Clean Energy Solutions Center is co-sponsored by the government of Australia and the United States, and we receive in kind support from the government of Chile, China, and France. The Solutions Center provides several clean energy policy programs and services including a team of over 60 global experts that can provide remote and in-person technical assistance to governments and government supported institutions. We provide no-cost virtual webinar trainings on a variety of clean energy topics. We are engaged in partnership building with development agencies and regional and global organizations to help deliver the support, and we provide an online library that contains over 3,000 clean energy policy related publications, tools, videos, and other resources.

Our primary audience is made up of energy policy makers and analysts from governments and technical organizations in all countries. We also strive to engage with the private sector, NGOs, and civil society. The Solutions Center is an international initiative that works with more than 35 international partners across its suite of different programs. Several of the partners are listed above and include organizations like REN21, IRENA, the IEA, and we also engage with programs such as sustainable energy for all, and we work with regionally focused entities such as the ECOWAS Center for Renewable Energy and Energy Efficiency located in [inaudible].

Our marketing feature that we provide is our no cost expert policy assistance, which is also known as our ask an expert service. The ask an expert service matches policy makers with one of more than 60 global experts who [inaudible] authoritative leaders on specific clean energy finance and policy topics. For example, an area of energy access we are very pleased to have Harish Honday, who is the founder and chairman of [inaudible] India, so it's one of our experts. So, if you have a need for policy assistance and energy access or any other clean energy sector, which is – which are listed on this slide, we encourage you to use this very valuable service. And again, this assistance is provided free of charge.

It's designed to provide quick response assistance. So, if you have a question for our experts, please submit your questions through our simple online form, which you can find at [cleanenergysolutions.org/expert](http://cleanenergysolutions.org/expert). We also invite you to spread the word about the service to those that you work with in your networks and your organizations. So, now I'd like to provide some very brief introductions to you for today's panelists. First up today, we'll have Laura Williamson who is responsible for directing communication and outreach activities at REN21. And which is housed at the United Nations Environment Program in Paris.

[Inaudible] hear from Christine Gruning, who is the senior project manager and policy expert, and since 2011, she's been managing and implementing applied research, education and capacity building projects for the Frankfurt School at the UNEP Collaborating Center for climate and sustainable energy finance. Following Christine, we'll hear from Aaron Leopold, who is chief executive officer at Africa Mini Grid Developers Association. Aaron is based in Nairobi where he is working to rapidly improve market intelligence, policy coherence, and financing opportunities in the mini grid space across the African continent. And then lastly, we'll hear from Kanika Chawla, who is the senior program lead at the council on energy, environment, and water, one of south Asia's leading think tanks. And Kanika manages the CEEW's work on renewable energy policy, finance, and jobs from skills.

So, with those introductions, I'd like to welcome Laura to the webinar. And Laura, I'll be passing over the controls to you now.

**Laura E. Williamson** Thank you. Thank you, Vickie, and hello everybody. My name is Laura Williamson as Vickie pointed out to you all. So, I'm just going to wait for my screen to come up. Do we see any screen?

**Vickie Healey** We see it. We just lost it.

**Laura E. Williamson** So, where are we going here? I didn't –

**Vickie Healey** Let's see. Do you want me to [inaudible] slides for you?

**Laura E. Williamson** Yeah, you can do that. That's great. Sorry, I'm not sure why nothing appeared or appears. So, anyway, while Vickie is bringing that up, hello everybody. Thanks very much for joining us. So, what we're going to do today is I'm going to give you a fly by overview of what happened in 2017 in the renewable energy sphere, and then we're going to move to our experts who are really going to do much more of a deep dive into sort of the investment, what's happening, what's not happening, and have more of a discussion about how we can really better understand and see what – how to improve the investment in renewable, particularly in emerging and developing economies.

So, for those of you who don't know who we are, REN21 is the global multi-stakeholder network. Can I do this, Vickie, or now do you need to do this?

**Vickie Healey** Let's see. Yeah.

**Laura E. Williamson** So, anyway, this is on Slide 2. We're the global multi-stakeholder network. Our mission is really dedicated to for the rapid uptake of renewable worldwide. We work across five key major stakeholder groups, so we really are trying to represent data that cuts across all sectors. Next slide. So, the global status report is a one-time look if you will to what is happening in a specific year. It does not do predictions. It does not do analysis. It focuses very much on one year and tries to provide the best possible data as to what is happening on policy development, markets, and investment. As I like to give as by way of an example that this is now in its 13th year. When it first started, the report was 30 pages. It's now 300, and I think that really is a very good way of illustrating just how far just the level of development we've seen in the renewable energy sector over the past decade. Next slide. So, 2017, another extraordinary year for renewable. We had about nine percent growth compared to 2016. So, we're looking at almost – we're looking at 2,000 – almost 2,200 gigawatt of renewable energy capacity by the end of 2017. Next slide. So, if we're looking at global investment, we saw about a two percent increase in investment relative to 2016. Developing in emerging countries, widen their lead compared to investment in developed countries, although that divide was driven mainly by China, which continues to lead in the emerging economy and developing country pack, if you will.

Just to keep in mind that these estimates do not include investment in renewable heating and cooling technologies. One of the challenges we really have here is that there's not a lot of data that's collected comprehensively for this sector, and as a result is not really presented in this data here. Next slide. So, if we look at new power capacity, there was an estimated 310 billion US dollars was committed to constructing new renewable power plants in 2017. This compares to 103 billion, which was committed for fossil fuel, firepower, generating plants, and about 42 billion for nuclear power capacity. Next slide.

If we look a little bit more specifically about investment by technology, the leaders were very much PV and wind. PV outstripped all other technologies 57 percent. Wind was a healthy 38 percent. Next slide. If we want to look at renewable energy sort of in the bigger picture total energy consumption, just over 18 percent of global final energy consumption was provided by renewables. Out of 100 percent, it's low. The good news is it keeps growing. The bad news is that we need to grow faster and better if we want to meet the sustainable development goals, objectives, and those outlined under the Paris Agreement by 2030. Next slide.

Looking specifically at renewable power capacity, we see that by the end of 2017, renewable power generating capacity was at an estimated 178 gigawatts. It's about a nine percent increase over 2016. Perhaps more interesting in this is that solar PV, as I mentioned before, really led the way, and it added that in along with wind, added more net capacity than coal, natural gas, and nuclear power combined. So, that's really a positive story for 2017 is we've now passed one of those markers where we're looking at installed capacity and really seeing that renewables are now surpassing a new capacity, the traditional fuels. Next slide, please. If we look a little bit more specifically at the power sector, we see that there were about an estimated 70 percent of the net additions to global power generating capacity came from renewables. So, I think it's safe to say that the global energy transition is well under way in the power sector, and that the power sector is really demonstrating to us that an energy transition with renewables is possible. Next slide.

And this bar graph here, I like to include because it really shows you the high share of variable renewables that you're seeing come into the grid. So, offsetting concerns or yeah, concerns about the stability of grid with high shares of renewables. We saw in 2017 significant levels of penetration in Denmark, Uruguay, Germany, Ireland. So, you know, fairly different countries around the world. Next slide. However, what we're not seeing is we're not seeing the same growth in the heating cooling sector, which along with transport accounts for 80 percent of the total final energy demand. By the end of 2017, the share of modern renewable energy heating and cooling was about 8.4 percent. So, still very low. A lot of this is to do – for a variety of reasons, but the modest improvements are sort of being hindered by low fossil fuel prices and a continued lack of policy support. Next slide.

We are starting to see in the transport sector some interesting developments. We're starting to see an increasing use of electricity in the transport sector. But overall, the renewable energy share in transport is only 3.1 percent, so again, fairly low numbers for a very important sector when it comes to energy consumption. Within the 3.1 percent, electricity is about 1.3 percent, but keeping in mind that if we're looking at renewable electricity, only a quarter of the 1.3 percent is renewable energy electricity. So, there's definitely a lot of room for improvement there. Next slide. If we look at where – go – yeah, the biofuel slide. Where we are seeing sort of a larger growth from the renewables aspect in the transport sector is in biofuels.

So, that's good news. The thing about biofuels is the biofuel production and use is very concentrated geographically. Where you're – we're seeing more than 80 percent of production is really taking place in three regions, countries. US, Brazil, and then the European union. So, still not being implemented, not being used at a global level. Next slide. So, – no, next slide. There we go. Sectoral disconnect.

So, one of the takeaways that we're really seeing at the end of 2017 is that we really need to close this what we're calling the sectoral disconnect. So, we're getting high shares of renewables in the power sector. We're really seeing a robust evolution in the power sector. Heating, cooling, and transport, which are very important if we look at their total contribution to total final energy consumption is lagging. And if we're serious about the goals, like I said earlier, meeting the sustainable development goals, reaching objectives under the Paris agreement, we need to speed up renewable energy power, but we also need to speed up the work in heating and cooling and transport, and particularly putting in place policies to make that happen. Next slide.

This somewhat complicated slide, don't hurt your eyes trying to read all those dots, is really there to show the policy disconnect we're seeing. So, at the bottom, we have power. We can see there's lots of blue dots. 146 had power targets by the end of 2017 versus 42 for transport, and 48 countries having targets for heating and cooling, so this really does show you the disconnect in the policy support structure, which is manifested in the slow uptake of renewables in heating, cooling, and transport sectors. Next slide.

The good news is subnational and local governments are really searching ahead. We're seeing a lot of developments at the sub-regional and local levels where municipalities are going ahead with fairly robust renewable energy agendas coming together and working in collectives, and sort of in a way pushing what is happening in some countries at the national level. So, really – so really setting the trend to develop national targets and policies. Next slide please. We're also seeing an increase in the corporate sourcing of renewable energy. And initially, many companies saw the adoption of renewable energy solution sort of mainly as an act of corporate social responsibility, but we're seeing now that with the significant reductions in renewable energy costs as well as the maturing markets and policy environments that renewables are cost competitive, and are attractive source of energy in their own right, and companies are starting to source it for critical – for critical applications, for example, data, data storage.

It's also being seen renewable energy power is being seen as an energy security issue. Next slide please. So, investment, which is probably why a lot of you are interested in this webinar today. This gives you sort of a global overview of the investment pattern for 2017, and I know that Christine will go into this more in depth, but if we look at 2017, we can see that China, Europe, and the US accounted for nearly 75 percent of the global investment in renewable power and fuels. If we go to the next slide, I think this gives you sort of the top investment by dollars, but if you look at the second entry, the second red circle which starts with the Marshall Islands, get a far more

interesting picture I think. This is where we're looking at investment by GDP, and you can see the emergence here of very small countries, really showing the uptake of renewables in those countries.

And this investment trend is particularly important in the context of the SDGs. Particularly SDG 7.1, on reaching a universal energy access. Next slide please. And here, you know, we're really looking – when we're talking about universal energy access, a main component of that is distributed renewables for energy access. You know, renewable energy offers many opportunities to kind of tackle the challenge of the lack of energy access. You know, larger scale grid connected generation is – it's more – excuse me. The distributed system is often more cost efficient and relatively quick to install compared to large scale grid connected generation. We're seeing that distributed renewables for energy access, what we call DREA, are playing a very important role in improving access, and they're serving an estimated 300 million people. That was the figure by the end of 2016, and one can only anticipate those numbers are growing.

Next slide. From an investment in the sense of off grid PV solar, there was about a 60 percent growth rate between 2010 and 2017 for solar lanterns and standalone solar home systems. The fact that developing countries are investing in off grid solar systems reinforces the potential of renewables to increase energy access. One of the real challenges we face here, and I think Aaron may speak to this and maybe Kanika as well specifically in developing countries is that we need better data concerning decentralized energy systems around the globe. It's very difficult to get a good idea about what's happening, what are the trends, what are the investment trends.

There's a lot happening, but it's not visible for energy planning, policy design, and then investment. So, that's a real area that we need to wrap our hands around and improve. Next slide, please. Continuing on the access theme, there's just a couple quick slides on clean cooking, which is of course a very important component. We are seeing the increase in clean cook stoves. Unfortunately – I say unfortunately because we're talking about it from a renewable energy perspective, the majority of clean cook stoves, over 70 percent, are using liquefied petroleum gas. So, yes, they are cleaner from a health perspective, from a caloric perspective, but our push of course is that we should be really using renewable energy as much as possible to meet these needs. Next slide.

Investment is growing, but it's a bit uneven. I mean this chart shows you it sort of increased. It was a bit of a peak in 2013. It went down. It came back up again, and 2017 it dropped again to about 18 million USD. So, it really highlights these investment numbers are sort of a good indicator that shows the challenges of investing and increasing the presence of clean cook stoves in the energy transition. Next slide please. So, if we want to sort of do a bit of a summary, renewables are increasing in all sectors, but the uptake needs to be accelerated, and we need to see scale up, particularly in the transport and heating and cooling sectors. Especially in view of climate and development goals, which I mentioned earlier. There is uneven progress between the

sectors and between the different geographical regions, and there's a fundamental disconnect between commitments and real action on the ground.

To be blunt, basically, the global renewable energy transition is progressing, but far too slowly. It's not happening fast enough. Next slide, please. And so, in conclusion, it's happening. The transition is happening. Record capacity additions, falling costs. Clearly illustrating that the transition is possible. It's not happening fast enough. We need to see a better integration of sectors really looking at the planning, the policies and regulatory frameworks that can support that. We need to be better at linking energy efficiency with renewables. If we're serious about achieving SDG7, we need to start with energy efficiency and renewables together to get to 100 percent energy access. A level playing field. Sounds like a broken record, but we really need to get a level playing field.

We're still seeing high levels of investment in fossil fuels, fossil fuel subsidies, which are about 2 to 5 times higher than the support we have for renewables. So, evening that out is important. And finally, and part of the reason for this webinar is to make the trends visible. There's lots happening. There's lots happening on the ground. Unfortunately, the data is not consolidated, which means that what is happening at subnational level, at the local level, in the distributed off grid renewable sector, the innovative business models, those developments are not being seen, and so they're not being counted. And given the development of the sector and the way it's evolving, this is really becoming a crucial point here in the sector. Next slide, please.

So, that was kind of a whirlwind tour of what happened in 2017. I know the slides will be made available, so I hope you weren't frantically taking notes, but were more listening to the story, and now I'm going to pass the controls over to Christine Gruning who will look more in depth into what is happening from the investment side in the renewable energy sector. Thank you very much.

### **Christine Gruning**

Hello, my name is Christine Gruning. I just realized my microphone was still muted. So, welcome to the presentation. Laura already gave a good introduction to investment in renewable energy. My name is Christine Gruning. I'm working for the Frankfurt School UNEP Collaborating Center, and we are annual basis providing a report which is going really in depth in renewable energy investment. And we are cooperating with REN21 as is kind of a system report showing the different sides of one very interesting topic. Yeah, now it's working. So, this slide gives a bit of an overview about investment and renewable energy over the last year by asset class.

So, we can see we have really increasing investments over the years. It was – it rose only a bit from 2016, 2017, so we have investments of 280 billion. The difference is really if you have a look at the details. That's for – so here, this graph looks really complicated, but it's actually really interesting. As for the investments in rule books, it's interesting to have a look at the whole value chain. So, what you can see here in green, investments in the early stage of the finance continuum. For example, investments in R&D or public markets



equity is have only a really short small share, but they are basically a bit showing the future. They are not increasing the capacity, but they are indicating there are actually investments in R&D, which will in the future result in higher investments. The large chunk of the investments is an asset finance. This means investments which actually resulting in increased capacity and make sure investments are in solar and wind.

Here was 49 billion, you can see that a small developed capacity, all investments from [inaudible] solar are really an important part, especially in here at combination of public support teams. And finally, the last part here in light blue, this are investments are not generating capacity, but are related to a position of transactions. As an indicator of the development of maturity of the market. So, for an investor, it's always important to know when I'm investing in renewable plant, is there an option to sell my asset later. And this transaction increased quite a lot over the last years, which shows that from investment perspective, it's not really a [inaudible] investment renewables, but I will be able to sell my asset later. Laura already indicated we have decreasing prices in technology, and this when we have a look at the value chain, we see the different impact from this decreasing technology crisis. For the arrows here, start [inaudible] for asset finance. That's actually a good development. It's like what you have to pay for one installed capacity, and either is decreasing. But for all investments at the lower part for the finance to continue, this decreasing prices are actually putting a lot of pressure on the companies, and I think it was about four years ago, five years ago, we could see it a lot in Germany where really a lot of startups and renewables. They went bankrupt.

So, having a look at the investment according to region, we have split it here the region – the investments in three larger regions first. We have on the one side the developed countries. We have the other developed countries here with [inaudible], and we have separated China, India, and Brazil. Over the last years, they're not really like developing countries in [inaudible] and especially China, it's really the dominating country from an investment perspective. Invested roughly 45 percent of the overall investments. The developed country that – investments in the developing countries, developed countries decrease over time, maybe in there were fewer investments in offshore grid, offshore [inaudible] firms. Investment in China, India, Brazil, the numbers here are a bit confusing, but it's basically the boom of China is driving this whole group.

And for the other developed countries, we'll have a look at the closer. Basically, they are always – the investment is slightly increasing over time. I think this is basically only a bit of a different way to split the region. And it shows a bit as well that like the investment – we are in a transition to go to low carbon development. This is all the process. See in Europe, there was the majority of investments like the [inaudible] was in 2008 to '10. Developed a lot of public support, which triggered really a lot of investments. So, the uptake of the renewables is not really the problem in Europe. They are currently facing other problems like more grid – how to integrate it in the grid and really increase the level of renewables in the existing grid.

On the country, you can see the develop – on China, at the different stage, and really it's an ongoing upward trend, and in other countries like Brazil, it's kind of always here a bit more, a bit less, so this shows really like integrating one – increasing capacity will move – it's really a process. Based on our impression, the major drivers of the process are on the one side, the price effects. We have really decreases in prices for – in some technologies for more than 70 percent. The other driver of policy frameworks like feed and tariffs or the green stimulus program in the United States.

The other drivers, the characteristics of the energy market from [inaudible] and the volatility of the renewables. So, having a closer look at the investment in Middle East and Africa, really a lot of investments in Egypt and the United Emirates. However, we investment data here are [inaudible] energy finance. Database or the project database, which means like every year which was close last year in 2017 is included. So, there is as well especially in country which have a rather small investment volume overall. If there's one huge investment or two huge investments, such as Egypt and Emirates, United Arab Emirates last year, this is then really rely—incline a high investments like in one year, and the next year it might fall down. That's what we can see actually in Africa where they have some years already some really a lot of investments, and next year the financial closer was maybe one year earlier or one year later.

That's why we normally really like to have a look at the data over time. Only a bit to complete the pictures, Laura already said a thing. On the technology side, we could see the beginning ten years ago, there was always solar and wind was dominating, but not as much as currently because currently there are only a few investments in biomass [inaudible] and small hydro geothermal, and really the leading technologies are clearly solar and wind. While in solar, the small distributed capacity is really important. So, it's about more than 19 percent. It's about a small distributed capacity. To fill in the picture, if we're talking about dollar trends, and we have decreasing price effect, we have implicitly mean like on the gigawatt and store gigawatt side, this is even more averse to see that we have increased investments.

And this year for the first time, we made investments in solar outstripped investments in coal, nuclear, and gas combined. So, we can really see that there is a lot going on. There are lots of investment in renewables, but as Laura really indicated, it's still the share of the generated capacity is smaller, rather small, about 11 percent. So, it's still a long way to go to the transition, but it might – it's really possible. Thank you for your attention, and I – the presentation to the next.

### **Aaron Leopold**

So, thank you very much. I think that all the presentations so far have really done a great job at introducing my presentation. So, again, my name is Aaron Leopold, and I am the new CEO of a new organization representing renewable energy developers in Africa. Specifically distributed mini-grid systems, and our association is called AMDA, the African Mini-Grid Developers Association, and I wanted to with this presentation give a little bit of commentary on the presentations that have preceded mine through a

discussion of distributed energy systems in Africa. So, first of all, as was just indicated by Christine, the – in one of her last slides, the investment in distributed solar in particular has radically increased over the past couple years in Sub-Saharan Africa, which as Laura pointed out is a continent where we still have an enormous number of people, over 600 million people that have zero access to electricity services to moderate energy services. And globally, we have over a billion people that lack access to modern energy services entirely, but that number is double, over two billion people lack adequate access.

So, although we have this picture of investment in renewables being important, our message is – well actually investment in any sort of energy is important in many countries where medical clinics and schools don't have energy access. However, even in these areas that don't have any energy at all, the focus is still on renewables because as everyone has pointed out, the costs have dropped precipitously recently. They are very, very quick to deploy these distributed systems in particular, and they're reliable. So, moving onto my next slide, I wanted to talk a little bit about why distributed energy, and if we take a look at Sub-Saharan Africa as an example, one of the reasons why electricity access has not expanded is that the electricity providers are not able to make ends meet, partially because of management issues, partially because the customers they are trying to serve aren't able to afford energy. So, or energy built by traditional large infrastructure needs.

So, in Sub-Saharan Africa, only about 25 percent of utilities costs across the 54 Sub-Saharan countries are actually covered by the government. The other 75 percent are donor subsidies, and only two countries are fully cost recovered in Sub-Saharan Africa. If you look at these issues, it's not only that cost inhibits growth. It's that cost inhibits reliability. Cost or these issues we're talking about really are kind of just putting handcuffs on the energy sector in Sub-Saharan Africa.

So, as these technologies and prices have dropped over the beginning of the 21st century, a number of entrepreneurs have entered into the space to say, "Do we have to build from the grid downwards and outwards, or can we not start from the bottom and work up, and start from rural communities and work in towards the cities?" So, mini-grid companies essentially have been estimated by the International Energy Agency and a variety of other key research organizations focusing on energy – if you look at this chart and the pie graph in particular on the right, mini-grids have been estimated in Sub-Saharan Africa to be the most cost effective way to deliver energy access to almost 50 percent of those who lack access by 2030.

And an additional 23 percent of those people would be best served by completely off grid options, such as solar home systems, rooftop solar. That was mentioned in Christine's presentation as having radically seen scaled up investments. So, why do we need an industry association? I should have put one of the other slides you'll see at the end about the financing gap right here. So, why we need an industry association from mini-grid companies is

essentially that increase in investment has been seen by those solar home system companies.

But those solar home systems are limited in their capacity to deliver high levels of power, which are important for productive energy uses, large scale commercial, small industry, and medical requirements. So, these systems are essentially what we say as necessary but not sufficient. They are 100 percent radically better than not having any electricity at all. They serve tremendous – they have tremendous advantages for the people that are using them, but at the end of the day, you're not going to be able to run a commercial or small industrial application with them. That's not what they're made for, so this is fine. In the mini-grid space, however, we have seen a lack of investment. This has been due to a variety of reasons, primarily because governments have not yet really been able to create regulation in many countries that give investors the security to place their larger amounts of money into these larger systems in poor parts of the world.

Where you're putting an expensive asset, you need some security, especially when you have an unsecure customer base. So, donors have been working together with these companies that I represent, and also with governments in Sub-Saharan Africa to try to create a better investment climate for the mini-grid companies. And this has been challenging for a variety of reasons, one of which is that which Laura ended her presentation on, mentioning that data, and a lack of available data is a massive problem for particularly the energy access sector because of what I mentioned before. That the customers in this case are often impoverished, and there's a lack of clarity about their ability to pay.

So, there are two questions that arise from that. One, do we need to see commercial returns from these poor communities. And two, are there any proxies we can use to better understand how these poor customers would pay if they had access to energy. And we can take a look at some of the solar home system payment histories as very, very valuable information that we should be using, but of course they're not serving exactly the same populations because even though they're addressing an energy access need, they're often serving peri-urban and sort of middle poor. Not poorest of the poor communities, whereas many of the mini-grid companies are trying to really prove that these systems can work in the most impoverished conditions.

So, this lack of data is something that AMDA is really focused on, and we have with our 18 member companies from Kenya, Tanzania, Nigeria, we're growing very very quickly as well. We have just set up and are formalizing our membership kind of onboarding process, so you'll see those numbers grow dramatically in the next few months. We literally were just launched one month ago. The 18 companies we have, part of our membership requirements are that everyone provides data around cost per connection, around system reliability, around revenue per user, and other key elements. These will not be made public, but they'll be made available in anonymized form to key stakeholders, and you'll see a snapshot of some of this in just a minute. The other things we're going to be working on as you'll see on the

bottom row here are policies, as I was mentioning working with regulators to help build up a safe environment for companies to operate.

And also working with the funders to help them better understand what are these companies, how can they perform, how do they perform, and what is the potential in the future, and what type of funding do they need, and when do they need it. So, these are the inputs we see on the bottom, and we're hoping as any industry association hopes that we're going to see an adaptation of policy priorities and improvement in understanding of the sector and scaled up deployment of mini-grids. So, I realize I'm slightly behind on time, so I'm just going to kind of go quickly through this.

One of the main challenges is for us, these revenue per user is quite low. This is a snapshot from an IFC, kind of a benchmarking study that was undertaken initially a year and a half ago and was just updated in May of this year. We see in the circle on the left that the revenue per user is only about 84 US dollars per year. So, subsidies will clearly be required, particularly in Sub-Saharan Africa, to bring energy access to all. Because \$84.00 US per person per year is not enough to cover the capital expenditure and operating costs required for these systems. So, that's just kind of an FYI that when we're looking at the business models for these companies, we have to be very clear that we're not going to make a profit in rural Africa in the next few years, and that's also okay because all the utilities are also highly subsidized, and they've always been subsidized in the US and in Europe. Electricity infrastructure was heavily subsidized by the state.

And it's very clear that we should expect that same is the case in the poorest countries in the world. So, that said, kind of a pessimistic note. If you look however at how the sector is performing, if you look on the left, the cost per connection from 2014 out to 2018 has initially increased because quality was increasing out to 2016. But beginning at the light blue line in 2017 and 2018, we've seen dramatic cost reductions that we are expecting to continue into the future in terms of the cost per connection as I was mentioning. Whereas the number of connections per year has increased dramatically. So, essentially, that last bar on the right, the lower cost of connection and the higher number of connections, we're seeing simply economies of scale at work, that the sector is performing as a new sector, a growing sector should.

And that we're expecting by 2020 that the costs are going to be dropping by about 30 percent again. Now this is all quite surprising in some ways given that if you look at where the funding is coming from, it's been overwhelming amount of – [audio cuts out].

**Vickie Healey** Hi, it looks as though we may have lost Aaron's audio. Aaron, if you can hear us, we can no longer hear you.

**Aaron Leopold** - in many ways.

**Vickie Healey** There you are.

**Aaron Leopold** Sorry?

**Vickie Healey**

I'm sorry, Aaron, we had lost your audio for just a few moments, and I was – but then you came back on. So, now we can hear you, thanks.

**Aaron Leopold**

I'm in Nairobi, and my connection goes in and out occasionally, sorry about that. What I was saying is that the public sector investment in this space has been very very low compared to the stated objectives of the donor community. Only 14 percent of our members' investments so far have come from the public sector. So, essentially, what we have is a context where we have nearly \$1 billion US that has been dedicated to the mini-grid space in Sub-Saharan Africa, but only about seven percent of that has been disbursed so far. So, we've got a lot of promises, but not a lot of delivery from the donor community.

And one of our messages is we'd like to work with the donor community to help find out what is blocking these transactions from happening. And just to show you if we go back to the last slide, if the money does really start to flow, the connections are going to skyrocket. The costs are going to come down, and essentially have a very optimistic look about energy access and renewables in Africa in the future. So, just the last slide in the last content slide really is that if we look at the pipeline for our industry association alone in Kenya and Tanzania, we're looking to electrify our pipeline if we find the funding is to connect over a million people by 2020. And this is in contrast to the rural electrification agency of Tanzania that is currently only planning to connect about 150,000 people out to 2020.

So, we are looking to do radically more than the governments are currently planning to do, but there is this financing gap. If we just look at the white bar, the financing gap is still over 100 million US dollars at the moment for what our member companies have already identified and are looking to build out. So, what we essentially need again, as I was mentioning, is an increase in this public sector support to reduce that gap and to ensure that those one million connections from just these few companies are a reality. And as we see those economies of scale really take off, of course the support from governments will be less and less necessary just as it was in the renewables space in Europe and in United States in the early 2000s. We as I mentioned have a very rosy view of the space, but only if we can come together and really deliver on what has in some cases already been promised.

But where we haven't really figured out a way to deploy the capital as it's needed. So, with that, if anyone wants to learn more about the mini-grid space in Africa or wants to work together or ask any questions, finance, regulation, policy, becoming a member, et cetera. Please do get in touch with my e-mail. It's on the screen. Thank you. With that, I'm going to pass off to Kanika, and I look forward to your questions. Thank you.

**Kanika Chawla**

Hello everyone. So, after those very comprehensive presentations, I think that that makes my job much easier. I think a lot of the good and the bad has been covered by the presentations already, and a lot of what Christine covered in her presentation about how India and China are an outlier in terms of investment, well that's entirely true. Some of what Aaron also mentioned, which was true in the context of Africa, is also true in India. In that sense, it's

an interesting market to work in. The renewable energy market in India is growing rapidly, so to monitor the flows of finance and the dynamics driving those flows is interesting, and that's what I intend to talk about today. But before that, I'd like to [inaudible] energy environment in water where I work.

We're an independent think [inaudible] here in India. And we work on a range of issues from energy access to technology finance and trade. We work very closely both with government, but also with industry actors and investors to understand what are the bottlenecks to the energy transition, and what are the ways to de-risk the market and deepen it so transition can be both efficient and timely. So, when we think about renewable energy, I think in the context of the coverage of the GSR but also the global narrative around renewable energy. We often think about it as a climate change [inaudible] sort of mitigation action, but in developing countries, that's not the only driver for renewable energy adoption and scale up.

In the Indian context, there is several domestic drivers that are actually – on which actually climate action ranks quite low. And this is also true for other emerging economies, which is why the transition narrative emerging in the economy needs to be quite unique. But similar to what Aaron was mentioning in his presentation is that it is the building of infrastructure and access to electricity both that is reliable but also affordable. And not just for household consumption, but also for a consumption for manufacturing and other productive uses and the creation of jobs. Just by way of context, India creates ten million new – sorry, ten million new people enter the Indian workforce every single year just to maintain the current level of unemployment.

And that makes jobs a really important part of the national narrative. It makes the – it makes jobs really important for [inaudible], and if we are able to show just how much renewable energy contributes to the job creation and the potential renewable energy has in creating more jobs, there is a huge sort of civil society push that the energy transition receives. And then sort of once we covered all those development priorities of the country, then there is the priority around using renewable energy to of course act as a mitigation action, but also what are the applications of renewable energy for adaptation activities, especially in the context of India where the climate risks are a big challenge to some of – the growth of some of our very, very fragile but important indigenous industries.

So, coming to the discussion today around investment, and some of this has already been covered by Laura and Christine, but I'll talk about it more specifically in the Indian context. So, India does – India has more than 300 days of sunlight in a year. As I'm sitting here in Delhi in the peak of summer, I'm not so pleased about that, but that being said, we have a lot of resource to harness, but we don't necessarily always have access to affordable capital or to the most modern technology at the cheapest prices as is the case for a lot of other developing countries is that there is this technology transfer problem or technology from developed countries is not necessarily making its way into developing countries in real time. And many developing countries getting caught in the technology trap.

So, every single year, India receives for – I mean an increasing amount of investment just as other countries in the world. But in the last two years, interestingly, the tide has turned. More investment in solar than in wind, which was not always the case. The solar sector is fairly young. It's [inaudible] in the last four years. We have a very, very long way to go. We have very large 100 gigawatt of solar capacity target by 2022, and there's only four years to go. We still need to go from 20 gigawatts now to 100 gigawatts, so there's still a long way to go. The principle impediment through that actually is the flow of capital. One of the reasons for that is that in India, an over reliance on bank debt. We don't have a very large bond market, and borrowing capital from foreign markets comes with the risk around currency fluctuation. So, it's important for some people to access new sources of capital, but also access existing sources of capital at cheaper prices.

And you see the graph on the screen now shows the amount of capital required for rooftop and utility scale projects, and if you compare with that the kind of investment that's going now, the delta of the actual financial investment in the sector with the investment that is [inaudible] is growing year on year. And one of the reasons actually for that is because even though we have the offers a very large renewable energy market, and you know, we're primed to be the second largest renewable energy market in the world after China. The reason that it continues to be impediment to the flow of finance in the country is because there's a lot of risks. Some of these risks are real and some of these risks are perceived. The perceived risk or the danger between the real risk and the perceived risk is actually a function at least to a large extent because of data positing, which is also something Laura and Aaron covered. And one of the reasons for that is because it's still a young sector and there continues to be not that much evidence that's emerging from it, and because we're not curating the data around the investment flows very well.

And not sort of the disclosure around that is fairly limited. That as a result of that, a lot of investors are just not certain they should put their money here. But there is also some very real risks, and these risks are not necessarily specific to renewable energy, but they are more specific to the macroeconomic variables in emerging economy, and especially in countries like India. And this is true also for other emerging economies where risks around currency fluctuation for instance or the risk around the financial health of the utilities [inaudible] the risk on the receivables, as well as political risk around sort of currency and convertibility and other associated risks act as big impediment for investors, especially for investors that have a low risk appetite, and those actually interestingly are the best match for renewable energy projects.

So, institutional investors like pension plans and insurance companies are the ideal match for renewable energy projects because they offer you long-term loans at low interest rates, and that would of course then form renewable energy projects that have 25 or 20-year purchase agreements would be the best bet. But because they are low risk appetite, they're not so interested in investing their money in renewable energy project in emerging economy. And



as a result, renewable energy developers are only being able to access high cost capital or relatively high cost capital, and that's why even in a country which is actually in some cases much farther along and has much more installed renewable energy capacity than say countries in Africa or also in parts of Southeast Asia.

Despite that, two-thirds of the cost of every unit of solar and wind electricity comes from the cost of servicing your debt and paying returns to your equity investors. And really so the future gains in the decline in renewable energy prices are not going to necessarily come from technology prices going down further because technology prices are already fairly asymptotic to zero.

But it's going to come from gains that are made in the cost of finance and being able to access debt at lower prices. You're going to be able to do that if you have more sources of debt and they are more competitive with each other. But also, if you're able to reduce some of the risks. So, we have heard a lot today about what is happening and also why is it happening, but I'd like to spend some time talking about what can countries like India do, and also if there's opportunity for collective action. And Aaron talked about this to some extent around the use of public money. And there continues to be especially for utility scale projects in developing countries a lot of multi-lateral development banks and development finance institutions.

But also, domestic development banks using public money to do project finance. In many countries, but especially in India, the renewable energy project in the utilities scale market have already advanced to a level where that's not the best use of public money. And so, this public money should then be redirected away from large scale renewable energy to more off grid applications or productive use applications of renewables, which are still more nascent markets, and also that this money should be used to drive in private capital rather than just crowd out private capital by doing project finance.

And what I mean by that is that the reason private capital is not investing in renewable energy projects is because they think it's far too risky. But if public money could be used to underwrite some of those risks and act as sort of a safety net for these private investors, private investors would enter this market, and over time with their confidence in the market would build, and the role of public money could be phased out. And that same public money can then be circled back and used for new and sort of more nascent markets whether in the DRE space but also perhaps in the more supporting technologies like energy storage and other such.

There's also an opportunity for countries to collaborate, but also for multi-lateral development agencies and DFIs to collaborate together in developing some de-risking mechanisms. The call for action really needs to be that there needs to be collaboration, but there also needs to be innovative thinking. Because the existing business models and existing financial models haven't gotten us as far as we'd like to be. And in order to accelerate the pace of deployment, we need to think about innovative ways of addressing the risks

that are plaguing investment and the deepening of markets. And so, I have two such examples here.

One is what we call the common risk mitigation mechanism, which is a comprehensive risk guarantee for non-project specific risks. So, there really is macro-economic risks that plague renewable energy deployment, and this would work across many emerging economies. And the natural diversification effect of that would bring down the cost premiums of doing this de-risking. But there's also an opportunity for existing insurers and re-insurers to participate in this sort of more global market of projects that need to be de-risked, and also for public money to underwrite the premiums of such an insurance mechanism. Another one that's something we've heard before around one of the issues that is already becoming quite prevalent in countries with large shares of renewable energy is the risk around integration of renewables into the grid, and this problem is something that is going to happen at a much earlier stage for developing countries because of the technology off the grid in these countries.

So, even though in many of the emerging economies the grid is fairly younger, it is also not technologically as advanced. So, integration of renewables becomes likely more difficult, and so the grid integration problem is going to come much sooner. And while that does – there is the need for systemic correction on the technology end to make that connection, there needs to be sort of a stop gap solution we already think of so that existing commissions, renewable energy projects don't go out of business and we don't end up in a renewable energy bubble. And so, one of the ideas around that is can there be a way to do some risk sharing between the transmission companies and the utilities as well as the developers.

But all of these are just ideas that need to be made fit for purpose for different markets, and in the case of India, this is sort of market responsive because we're seeing what's happening here. But what we can do to facilitate investment is going to be quite specific for different countries. But in the Indian context, even though we have a very dynamic and fast growing renewable energy market, there are several opportunities for accelerating the base, and being more efficient with the use of public money, and these are just two such examples. So, with that, I'll stop now so we still have some time for question and answer, so I'll hand over to Vickie.

**Vickie Healey**

Apologies. I was on mute. Stand by while I set up the remainder of my presentations, which I'm having difficulty doing. So, with that, I just want to thank all our panelists. Laura, Christine who did have to leave a bit early, and Kanika for those excellent presentations filled with great information on financing renewables. So, with that, we do have a couple questions that came in, and I just want to verify – can people see my screen?

**Aaron Leopold**

Yes, we can.

**Vickie Healey**

Okay, all right, thanks. So, a couple questions did come in, and I will present those. These first two questions, Laura, came in while you were presenting. So, the first one – but of course all panelists are welcome to respond to these

questions. The first question is focused on the return on investment figures that were displayed, and the question is based on many factors, but are any of you aware of the average return on investment by renewable energy technology type and region? And I believe I have you all on mute, so you may want to unmute yourselves to respond to the question.

**Aaron Leopold**

This is Aaron. I don't have those numbers, but of course the short answers vary dramatically from place to place and from application to application. The smaller the system the smaller the economies of scale, and you know, you have price per kilowatt hour or per – I believe there was 2.9 cents or something for solar in the emirates last year. But that price would never be possible in a rural community in Africa, and therefore the returns are completely out of synch with one another. So, maybe someone else has an answer to that that is more concrete, but all I can tell you is that they're like comparing ten different types of fruit. Not even just apples and oranges, but all the fruit.

**Kanika Chawla**

Hi, this is Kanika. So, I agree. I'm actually with Aaron in the Indian context as well for large utility scale, solar, and wind. You can get sort of returns on equity investment in the range of sort of 12 to 15 percent. In some of the projects in the past, you could even actually get more because the [inaudible] were so much higher, and they were sort of – the competition in the economy in the renewable energy market was much less. But in the distributed renewable space, those are – they're actually also – one is they are lower, but there's also the problem that they're very difficult to calculate because it's a very promoter driven business, so the division of this is my return on equity and this is the debt I'm servicing and this is my working capital is not as clear. So, it's run in a little bit sort of less balance sheet way, and it's hard to sort of necessarily clearly say this is the return on investment you're going to get.

**Laura E. Williamson**

This is Laura from REN21. I'm not going to step in on the finance thing. My knowledge is not as diverse as Aaron and Kanika's. So, if the person who asked the question feels like it hasn't been responded to a level that you're interested in, I would suggest you send it in and we also ask Christine.

**Vickie Healey**

Great, thanks to all of you. Laura, this question also came in while you were presenting regarding the chart displaying investments per developed/developing countries, and the question is if a developed country invests in renewable energy in a developing country, how is that counted? Are the numbers shown in the chart you were displaying regarding counting investments? And so, I'll turn that question to you.

**Laura E. Williamson**

Good question. I believe it counts for where it has been – where the money is originated. So, it would be the investment of within the country from its origin.

**Vickie Healey**

Okay, great. Thank you. So, turning over, Aaron, a question for you. As many grids are considered good solutions, what is blocking finance from going to them?

**Aaron Leopold**

Thank you, Vickie, and to the person who asked the question. The answer is complicated, of course. There's a variety of reasons, one of which I mentioned before is that a lot of people are expecting commercial returns. They're looking for viable business models, and the answer to that is any business model can be viable given the right circumstance if you have something that's in high demand and you have a high ability to pay, then you'll have a great business model and the investors will be running towards you. If, however your objective is to go to a new place, work with new customers who don't have very much money, the investors tend to have a different opinion about the opportunities there. So, what we're essentially seeing is there's a mismatch in many cases between what is realistic for the companies and what the desires of the investors are.

And there's a real hope – the reason why this exists is there's a real hope on behalf of donors that unlike the utilities, which I mentioned my first substantive slide, are heavily donor dependent. There's a hope on behalf of the donors that the mini-grid companies will be some sort of new breed, a new generation, and this will be the case. What we're finding, however, is while the utilities certainly aren't perfect, but they're also doing a very, very difficult job of electrifying very complex geographies and poor communities. So, there's no excuse for them to be completely bankrupt, but the point is that we do need public support at the moment, and that will change over time. But right now, the investment really isn't flowing because we feel that there's a mismatch or lack of understanding between what's happening on the ground, what's possible, and what the investors really want. So, a couple of years ago, we were talking about getting a debt facility for mini-grids up and running and that we need to have project finance –we'd have project finance tools sorted out by now for mini-grid companies.

But the reality is we haven't actually invested enough in the data, which is what Laura said. This is the other big impediment. Donors don't know what's realistic because we haven't really paid for the research and analysis and analytics to go into what is happening on the ground and how can we using some empirical evidence really look at how the sector is evolving and evolve our financing to match that. So, that's one of the main reasons why AMDA was created is to help bridge this data gap. Because we can only have project financing and predictability for investors when we have the data in aggregate, in a trustworthy fashion, and historically accurate. And so, we're building that right now.

**Vickie Healey**

Great, thanks Aaron. A quick question, I guess this could be for all of the panelists regarding policy. What kind of policies from your perspective do you believe can reduce the disconnection that Laura mentioned in her presentation?

**Laura E. Williamson**

So, this is Laura. If I understand the question correctly, you're talking the person who asked the question is talking about the disconnect we're seeing between heating cooling transport and the power sector. Basically, there has to be the political commitment to do it. That's a rather blunt answer, but the power sector has traditionally been a much easier sector to manage. It's

centralized. You had large investments. The issue with heating and cooling, for example, is it's quite a decentralized sector. While you have in many countries heating and cooling in the residential being electricity based, there's also – there's also heating and cooling with gas, heating in particular. You have these – I'm blanking on the word, but in cities a municipal central heating systems. You have mom and pop stores that are making and building, selling heating appliances, cooling appliances, cooking appliances. So, the sectors themselves, both the heating, cooling, and transport sectors, they're quite complex sectors. So, from a policy side, it requires a lot more interaction and integration with various aspects of what is being produced, what is being consumed, et cetera.

So, what needs to be done is to take the innovation and things we're seeing in the power sector and start to apply those seriously to heating, cooling, and transport sectors.

**Vickie Healey**

Great, thanks, Laura. Next question, Kanika, this is for you. What are the predominant risks plaguing investment flows into renewables in developing countries?

**Kanika Chawla**

Thank you for that question. So, the predominant risks actually vary from country to country, and they're also often sort of the quantum of the risk itself. Also varies. So, for instance, in most developing countries, the financial has the utility that's quite bad, and so that is actually a big risk because for developers and [inaudible] agreement with the utility, they're not actually sure if they'll get paid. And then the rule of law or the absence of it, and then sort of the absence of contract enforcement can make that quite a big risk. The other opportunity but also risk that exists in these countries is around the demand risk is that for many of the developing countries, if not all, there is a growing energy demand. And part of that is because there is latent demand from the community that don't have access to any electricity at the moment, but there is the aspiration that they will one day need electricity. So, there is – you can take a bet on that and sort of build out your energy system or install mini grids or micro grids, and or a combination of all these.

But you're not necessarily sure that your demand estimation is actually correct or that the economy will grow the way you think it'll grow. That's another risk. Then there's the risk I already talked about around currency fluctuation. There's political risk, and political risk is always of two kinds. There's of course big political risk around sort of [inaudible] and other such, but there's also sort of a milder version of it, which is around policy uncertainty, which is with a change in regime, there'll be change in laws, or that incentive of to what renewables will not be consistent, or they'll be sort of pulled back midway, and this sort of policy uncertainty also contributes to a lot of the perceived risk from an investors' point of view. After that, there is sort of the risk around technology familiarity because there's not been necessarily very long periods of longitudinal data that shows how well the technology renewable energy technology is performing in these geographies.

So, a lot of these risks manifest into different degrees, but they're fairly common in most developing countries.

**Vickie Healey**

Great. Thank you so much for that answer. We only have a couple minutes left, so any remaining questions we have received I'll forward on to our panelists so they can respond to those questions individually to the person asking the question offline. But at this point in time, I just really want to thank our panelists once again for a really informative presentation session as well as the Q&A that followed. Some great answers to some very good questions, and so now I just would like to provide the panelists an opportunity to provide any additional or closing remarks they'd like to make before we close out the webinar. Laura, we'll start with you.

**Laura E. Williamson** Okay, thanks. Thanks to everybody who participated, particularly for those of you who are getting up very very early or are up in the middle of the night. It's always nice to see people from different regions. And I would just encourage you that there's a lot going on in this sector. Lots of organizations doing really interesting work, and depending on what your focus is, to reach out and to cooperate with those organizations that are relevant for you. We as a multi-stakeholder network really bring in and depend on the knowledge and expertise of our network. So, for example, we work with CEEW. We're going to be working some more with AMDA now that they're up and running. The Frankfurt School. And it's only by working collectively together that we can actually make this energy transition happen.

So, please use the networks around you, whether they be regionally, whether they be internationally. We all have lots of information and knowledge to contribute, and it's only by working together that we get this sort of jigsaw puzzle. We can actually create the real picture of what's happening real time in the energy sector. Thanks.

**Vickie Healey**

Thanks, Laura. Aaron?

**Aaron Leopold**

Just a word of thanks to all the organizers and participants for a very interesting session.

**Vickie Healey**

Thank you for your time and a great presentation. Kanika, lastly to you.

**Kanika Chawla**

Thank you. I'd like to thank the Clean Energy Solutions Center and REN21 for putting this together, but also to Christine and Aaron, I learned a lot from your presentations, and to all of you who were listening, thank you very much for giving us your time and attention.

**Vickie Healey**

Great, thanks again to all of you. On behalf of the Clean Energy Solutions Center, I'd also like to extend a thank you once again to all our expert panelists, and importantly a very hearty thank you to all of you attending and participating in today's webinar. We very much appreciate your time, and we hope in return there were some valuable insights you picked up along the way, and we hope that you take this information about our webinar series back to those that you work with within your ministries, departments, organizations, networks, and others.

We also invite you to inform those in your networks about the Solutions Center's resources we offer as well as our services. Especially the no cost

policy support we provide through our ask an expert service. These are very valuable resources and services provided at no cost to those who utilize them. We invite you again to share the information about those. Then again, lastly, I invite you to check the Solutions Center's website if you'd like to view the slides and listen to a recording of the day presentations. We'll be posting those to our training page, and we'll also be posting them to our [Clean Energy Solutions Center YouTube channel](#), and those will be posted within the next few days.

Finally, I'd just like to ask you if you would mind taking a moment to complete the short survey that will appear when we conclude the webinar. So, with that, I invite everyone to please enjoy the rest of your day or evening, and we hope to see you again at future Clean Energy Solutions Center events. This concludes our webinar.

DRAFT