

## Renewables Rising: What is driving uptake?

—Transcript of a webinar offered by the Clean Energy Solutions Center on 7 June 2017—  
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### Webinar Panelists

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### Sean

Hello, everyone. I'm Sean Esterly with the Clean Energy Solutions Center, and I wanna welcome you to today's webinar, which is being hosted by the Solutions Center in partnership with the Renewable Energy Policy Network for the 21st Century, also commonly known as REN21. And today's webinar is focused on renewables rising. What is driving uptake? Before we begin, I'll go over some of the webinar features. You do have two options for audio. You may either listen through your computer or over your telephone.

If you do choose to listen through your computer, please make sure you select the mic and speakers option in the audio pane to help eliminate any feedback and echo. And if you dial in by phone, please just make sure you select the telephone option to display the telephone number and audio PIN that you can use to dial in. If anyone is having technical difficulties with the webinar, you can ask for help through the question pane or go to GoToWebinar's helpdesk, and call them at (888) 259-3826 for assistance.

We do encourage anyone from the audience to ask questions at any point during the webinar. To do that, you simply type it into the question pane and submit it there. We will save those questions and ask them during the question-and-answer session following the presentations. If anyone's having difficulty viewing the materials through the webinar portal, we will be posting PDF copies of the presentations at [cleanenergysolutions.org/training](http://cleanenergysolutions.org/training), and you may follow along as these speakers present. And also, we'll be posting an audio recording of the entire webinar to that site, as well, usually within a couple days of the broadcast, and we are also adding recordings, now, to the [Solutions Center YouTube channel](#), where you'll find a vast library of other informative webinars and video interviews with thought leaders on clean energy policy topics.

And finally, one important note of mention 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 many best practices resources reviewed and selected by technical experts.

And today's webinar agenda is centered around the presentations from our guest panelists, Ms. Christine Lins and Mr. Li, who have joined us to discuss REN21's newly released renewables 2017 global status report and followed by a specific look at the 2016 developments in China. And before we jump into the presentations, I just wanna provide a quick overview of the Clean Energy Solutions Center. And then following the panelists' presentations, we will have the question-and-answer session where the panelists will address those questions submitted by the audience. And then, at the end of the webinar, you'll be automatically prompted to fill out a very brief survey for our feedback, and we thank you in advance for responding to that.

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

And as I said earlier, this webinar is provided by the Clean Energy Solutions Center, which focuses on helping government policymakers design and adopt policies and programs that support the deployment of clean energy technologies. This is accomplished through support in crafting and implementing policies relating to energy access, no-cost expert policy assistance, and peer-to-peer learning and training tools, such as, for example, this webinar. And the Clean Energy Solutions Center is co-sponsored by the governments of Australia, Sweden, and the United States, with in-kind support from the government of Mexico.

And the Solutions Center provides several clean energy policy programs and services, including their marquis service, which is a team of over 60 global experts that can provide remote and in-person technical assistance to governments and government-supported institutions, the no-cost virtual webinar trainings on a variety of clean energy topics, partnership building with development agencies and regional and global organizations to delivery support, and also an online library containing over 5500 clean energy policy-related publications, tools, videos, and other resources. And so our primary audience is typically made up of energy policymakers and analysts from governments and technical organizations throughout the globe, but we also strive to engage with private sector, NGOs, and civil society.

And one thing that leads to the Solutions Center's success is its action as an international initiative working with more than 35 international partners across its suite of different programs. So several of the partners are listed on the slide and include research organizations, like IRENA and IEA, programs

like SE4All and regionally focused entities, as well, like ECOWAS, the Center for Renewable Energy and Energy Efficiency.

And finally, just wanna highlight the Ask an Expert program, which is a no-cost expert policy assistance program. And the Ask an Expert service matches policymakers with one of the more than 60 global experts that we have that we're each selected as authoritative leaders on specific clean energy finance and policy topics. So for example, in the area of renewable energy policies, we have our expert, Mr. David Jacobs, who is the director of International Energy Transition, who could serve as one of our experts to answer questions on that topic.

So if you have a need for policy assistance in renewable energy policy or clean transportation or any other clean energy sector, we do encourage you to use this valuable service. And again, it's provided to the requester completely free of charge. So if you have a question for our experts, please submit it at the simple online form located at <https://cleanenergysolutions.org/expert>. And we also do invite and encourage you to share this information with those in your networks and organizations.

So now, I'd like to introduce our very distinguished panelists for today's webinar. Our first speaker that we'll be hearing from is Mr. Christine Lins, who is the executive secretary of the Renewable Energy Policy Network of the 21st Century. And Ms. Lins has more than 20 years of working experience in the field of renewable energy sources, and we're glad to have her back on this webinar.

And then, following Christine, we will be hearing from Mr. Li, who is the former director general of the National Center for Climate Change Strategy in International Cooperation and the president of Chinese Renewable Energy Industries Association. Mr. Li dedicated his 30-year career to energy career to energy economy and energy environmental studies. And so with those introductions, I'd now like to welcome Ms. Lins to the webinar.

## Christine

Thank you very much, Sean. Good morning, good afternoon, ladies and gentlemen, wherever you are. It's a great pleasure for me to be here with you today and to present you the key findings of this year's Renewables 2017 Global Status Report. I'm joining you from Beijing, where we launched the Global Status Report today at the Clean Energy Ministerial.

This year's report features a new section on enabling technologies and energy systems integration because we see that renewables are really making their way into the energy system. And so we see that enabling technologies are becoming more important, and system flexibility is an important issue. We also have this year's report feature on deconstructing baseload, and I'm very happy we've been able to closely work with NREL, the National Renewable Energy Laboratory.

On this, I would like to thank you the Clean Energy Solutions Center for hosting, again, this lunch webinar. And I would also like to thank Li Junfeng, our partner throughout many years, for joining us today, but also said like to

join—I'd like to thank his team for translating the highlights of this year's Global Status Report into Chinese. We will make those available—this document available at the REN21 website.

This Global Status Report is brought to you on an annual basis. We do it since 2005, and I'm really proud to say that we are able to tell this story about renewable energy so well because we can rely on a network of over 800 active contributors and reviewers, tracking progress in 155 countries, covering 96 percent of global GDP and representing 96 percent of global population. We also make available all the figures of both, the Global Status Report and the regional reports that we are doing on the renewables interactive map. And you can download the data packs and the infographs on the different regions at this location.

So in a nutshell, 2016 was an interesting year as investors were able to acquire more renewable capacity for less money. We have seen that renewable policies and targets continue to spread. We have, now, 176 countries with such targets in place. We've seen newly installed capacity—161 gigabyte of capacity added. And for the fifth consecutive year, investment in new renewable power capacity was roughly double the investment in fossil fuel-generating capacity. 2016 was the 3rd year in the row, where global CO2 emissions from energy sector remain stable, despite the 3 percent growth in the global economy and in increased demand for energy which is very positive because it shows that we manage to \_\_\_\_\_ economic growth and CO2 emissions.

It was an extraordinary year that 47 percent of newly installed renewable power capacity in 2016 was solar PV, followed by wind—34 percent, and hydropower—15.5 percent. Nevertheless, the share of renewable energy in final energy consumption is only slowly increasing, and at the end of 2015, that's the latest information on energy demand available from the IEA. The estimated share of renewable energy is 13.3 percent of global final energy consumption. This share, despite the successes in electricity, is only advancing slowly.

One of the reasons for this is that we continue to have an increase in global energy demand. And secondly, because electricity is only providing a small share of global final energy consumption. When we actually look at the \_\_\_\_\_ sector, heating and cooling, we see that progress of renewables in this field is much less. And therefore, in absolute terms, in terms of final energy consumption share, renewables are not advancing as quickly as they should and also not as quickly as we want and, too, because the world has committed to achieving a doubling of the shares for renewables by 2030 within Sustainability for All. And clearly, with current progress, we are far away from reaching this objective.

So taking us back to the champions of this energy transition with renewables in the last year, when you look at the list of countries having invested in renewables, power, and fuels, in absolute term, that list reads China, United States, United Kingdom, Japan, and Germany. When you look at investment in renewable power and fuels per unit of GDP, you see that the list is mainly

constituted by developing countries—Bolivia, Senegal, Jordan, and Honduras, which is a clear indication that costs for different renewable power technologies have come down significantly. And these parts of the world that have an increasing energy demand are the ones that are massively investing in the field of renewables.

Now, of course, when you look at the list, you see China in pole position in basically all of the different technology areas. It's really amazing to see how quickly—a bit more than a decade—within a bit more than a decade, China has established itself as "the" renewable energy champion in the world.

As far as the power sector's \_\_\_\_\_ concerned, about 30 percent of the world's power-generating capacity, renewable space, and they generate about 24.5 percent of global electricity demand. China, at the end of 2016, was home to more than one-quarter of the world's power capacity. And when we actually look at heating and cooling, progress is small, and shares are smaller. Approximately nine percent of total global heat demand is provided by modern renewable supply, being either biomass, solar thermal, or geothermal energy. And we see that deployment of renewable technologies in the heating and cooling sector is constrained by factors, such as comparatively low fossil fuel prices in many countries and a relative lack of policy support. I'm gonna come to this in just a second.

When we look at transport, there, also, the situation is that we have around four percent of world road transport fuels being liquid biofuels, biogas, advancing in some jurisdictions, such as in the U.S. and, also, in Europe. And we see electrification of the transport sector, and that has the potential to create the new market for renewable energy and for balancing high shares of variable renewables. But so far, advancement, electric mobility is not automatically connected with renewable energy programs, and that's a link that needs to be closed because, otherwise, electric vehicles just lead to increased fossil capacity if the electricity is not provided with renewables.

Here, you'll see the situation I mentioned before, 176 countries with targets, 126 countries in the world with power policies, 68 with transport policies for renewables, and only 21 with policies for heating and cooling. So that is one of the reasons why progress in that field is much slower than in other areas, and that's definitely something we think policy makers should address in the future.

As far as the power sector's concerned, we have policies in the many jurisdictions. Auctions were the most rapidly expanding form of renewable policy support. Auctions were held in 34 countries in 2016, and that was more than the double, compared to 2015, with Malawi and Zambia holding their first auctions and, also, with record prices achieved in some countries through the auctions of renewables power.

For the first time, the Global Status Report 2017 also tracks carbon pricing, policies, and we see that those are in place, nowadays, in 57 jurisdictions, whereas that does not mean countries, but that also means different regions, and yeah, so we are also trying to extend our tracking to this area. According

to IRENA, 9.8 million people work in the renewables industry. That's a modest increase of 1.1 percent over 2015, and we see that countries with stable policies are the ones benefitting most from these jobs. We have about 3.6 million people being employed in China, so clearly a big share.

Global investment went down. It went down to about \$242 billion in 2016. Also, this represents a decrease of 23 percent compared to the previous year. This decline is accompanied by a record installation of renewable power capacity worldwide, so we see that we could invest in more for lower amounts of money. Developing in the emerging economies overtook developed countries in renewable energy investment for the first time in 2015. But in 2016, the developed countries, we took the lead again, and the decline that we have seen is actually caused by a decline in various parts of the world, such as China, the United States, Middle East, Africa.

We have seen stable investment in India, and we have seen investment on the rise in Europe and in Australia. The top performer of investment—well, most of the investment was focused on two sectors, namely solar and wind. They continued to lead for money committed, each accounting for roughly 47 percent of total investment. So that's very positive how these two sectors developed.

However, when we think and when we talk about the global energy transition, it is important that all renewable sources are really being developed and exploited. And I think there is some more that needs to happen in these other areas.

The top star performer of 2016 was solar PV with 75 gigawatts added, bring the total capacity to 303 gigawatts. We have, now, at least 114 countries in the world with more than 10 megawatt of installed capacity. And also, here, China really needs to be complimented—34.5 gigawatt additions. That is up 126 percent compared to 2015, and that increased the total solar capacity 45 percent to 77.4 gigawatt. That is far more than any other country.

And from this graph, you also see how rapid this increase was, and I think that that shows, also, how much this energy transition is really underway. Fifty-five gigawatt of wind power capacity added, bringing the global total to 487 gigawatt. We have at least 24 countries that meet 5 percent or more of the annual electricity demand with wind power, about 38 percent in Denmark, and a bit more than 10 percent in Austria. And there is enough wind power capacity installed to meet 4 percent of total electricity consumption, nowadays, which is another indication that renewables are really entering as main players in the energy system.

As far as distributed renewable energy for energy access is concerned, we still see that 16 percent of global population live without electricity. That's about 1.2 billion people, and about 2.7 billion people live without access to clean cooking. More needs to happen because with current rates, we are far away from achieving access—global access tools, sustainable energy for all by 2030.

However, we see, very positive, the increase of investment in, for example, pay-as-you-go solar companies. They raised \$3 million USD in 2012, and this amount went up to \$223 million in 2016. So we see that we have business models we know that with mini grids and off-grid solar systems and other technologies—micro grids—we have technologies available, but clearly, development needs to be increased.

We have, as I mentioned before, this year's focus of a new section on enabling technologies and energy system integration. This is important because we need, in the future, if you want to integrate higher shares of variable renewables, we need more system flexibility. We need to better manage supply and demand, and so we showcase different solution that can be applied from household level to utility scale, be it storage, be it electric vehicles, and some other technologies.

The Global Status Report, for example, shows that grid-connected battery storage grew by about 50 percent in 2016 to 1719 megawatts. We also see that global sales of electric vehicles in 2016 reached 775,000 units. That's more than two million passenger electrical vehicles on the world's roads by the end of the year. And as I mentioned before, so far, there is a little thinking of renewable energy and electric mobility linkages. And this is definitely something that needs to—for the grow.

Big focus, also, although we have talked most about supply side, of course, and the demand side, and we are also, on the Global Status Report, tracking the advancement of energy efficiency policies and show how this efficiency and renewable sector effectively go hand in hand. I think very encouraging to see that 56 countries in 2016 adopted new energy efficiency targets, and this is something which we'll definitely continue in the years to come.

A special focus this year on baseload. While power systems have always had to accommodate reliability in both supply and demand, the growing adoption of variable renewables is changing how traditional established power systems are planned, how they are designed and operated. And in such cases, traditional baseload generators, such as coal and nuclear, are beginning to lose the economic advantage. And they may not, anymore, be the first to dispatch energy.

And in areas where the demand is growing, notably in developing economies, there is an opportunity for new and less developed power systems to grow in concert with higher shares of renewable generation as more flexible systems are developed. So basically, we wanna showcase that it is possible to integrate high shares of variable renewables from 20 to 40 percent in Denmark, Germany, Uruguay, Cabo Verde, for example, already \_\_\_\_\_ today. And we want to deconstruct this myth, a bit, that baseload is absolutely key.

So in conclusion, we have seen record installations. However, progress is not fast enough to reach the Paris Agreement. And with the announcement of President Trump to take the United States out of the Paris Agreement, it is becoming even more evident that we need to speed up progress. And it was

very encouraging to see that many other countries—Europe, but also China and India—continued to make strong commitments towards the Paris Agreement.

We need to really consider that fossil fuels must be left in the ground. We still have an awkward situation that the governments of this planet spend four times more on fossil fuel subsidies than they spend on renewable support. The focus, in the future, is gonna be on dispatchable renewable energy and flexibility options, helping to integrate high shares of variable renewables. We are going to see a shift away from baseload.

I think we need to increase efforts to speed up sustainable energy access. Policy absolutely matters. System approaches are needed for linking the power, the heating, cooling, as well as the transport. So sector coupling is going to be of increased importance in the years to come, and we're definitely also going to see more enabling technology, such as storage and electric vehicles.

With this, I would like to thank you for your attention and hand over to my co-presenter, Li Junfeng for his insights. Thank you very much.

**Sean** Great. Thank you very much, Christine. And, Mr. Li, we'll hand things over to you. Just make sure that your microphone is unmuted.

**Li** It's okay. Can you hear me?

**Sean** Yes, we can hear you, and you'll just have to—

**Li** Hello?

**Sean** Yes, we can hear you. Just need to show your slides.

**Li** Okay. Can they see the slides? Can you see the slides? Hello?

**Sean** We cannot, right now, but we'll try it one more time.

**Li** Yeah. You can see. Can you see my—can you see that? Hello?

**Sean** Yes, we can, now. Yep. You're all set.

**Li** Okay. Yeah. I give you some introduction. I start now. I give you some introduction about the renewable development in China. Okay. Let's go down. It doesn't work. Okay.

I think that, currently, the \_\_\_\_\_, as you say, [inaudible due to accent] that Christine already to mention that. I do not want to give you that kind of introduction, but I'll give this one for—oh, this is [inaudible due to accent]. I'll just give it to you for China situation instead of a global one. You can see that China \_\_\_\_\_ renewable energy in the earlier, the 1990s, for [inaudible due to accent] under the law. You see the increase very fast after the law.



And 2016, China is \_\_\_\_\_ number one—I mean the first in the worldwide. The wind already reached about 150 gigawatt, and the solar is near 80 gigawatts. There, that renewable energy power is about a quarter of the electric supply, and I think it's about 12 percent of \_\_\_\_\_ energy in China.

This is the wind market. You see there, every year, China's wind increasing near about—near 30 gigawatts in the rest of the years. Earlier, in the beginning, [inaudible due to accent] China, every year only have one gigawatt. But after 2008, every year have six gigawatt. In 2009, it's about 13 gigawatt. Last year, they have about 23 gigawatt. The highest one is 2015. It's about 30 gigawatt. Then, after that, the market for wind, \_\_\_\_\_ about one-third of the world's [inaudible due to accent].

This is the solar market \_\_\_\_\_ China [inaudible due to accent], also the annual installations. Before the 2011, the Chinese solar PVs are very limited. But after 2011, the newly added the kind of a power for year is the increases are very, very fast, especially last year. I mean the 2015, we have more than 30 gigawatts of solar to be installed.

This year, I mean 2017, maybe we have another year [inaudible due to accent] more than 30 gigawatt. The last year, China, the government for a new target for 2020. We have—we said that solar should be about 110 gigawatt, but most of the people believe even—and for this year that China can [inaudible due to accent] it's 110 gigawatts by the end of 2017.

And for the future targets of China [inaudible due to accent] very clear ideas by 2020. That means that we are—our 13th Five-Year Plan, we have several target for renewables. [Inaudible due to accent] fossil fuels were supplied in [inaudible due to accent] energy. Also, wind should be about more than 200 gigawatt, and the solar is about 110 gigawatt.

But most of the people believe, I think, by the end of this year that it's gonna be over 180 gigawatt wind. By the end of 2020, the wind is gonna be at least 250 gigawatt, and the solar should be 150 or 200 gigawatt of solar. So \_\_\_\_\_ national policy to support this one, [inaudible due to accent] not now from the [inaudible due to accent] already that China newly added \_\_\_\_\_ demand. This money come from the renewables.

I think that in the next two or three years, the renewables still play very important role. Then, they can meet the demand of national energy—the newly added energy for that. Also, [inaudible due to accent] for the co-consumptions. In the last three or four years, [inaudible due to accent], especially [inaudible due to accent] reduced from 2010 to 2016 from 70 percent to about 61 percent. That's the Chinese [inaudible due to accent]. I stop here. I hope to have some questions from you all.

**Sean**

Great. Thank you very much. We will move ahead. I just want to remind the audience, if you do have any questions for our attendees today, you may go ahead and submit those through the question pane, and we receive those there and can ask them during our Q&A session. So the first question that came in is, I believe, for Christine. It asks, "Were there any findings about the failure

of renewable energy projects in developing countries? And could you maybe talk a little bit about some of the challenges that developing countries are facing in implementing renewable energy projects?

**Christine**

I don't know exactly. Thanks a lot, Sean. Thanks for the question. I don't know exactly what the person having asked the question has in mind. What we have seen in 2016—what has become evident is that some of the reduction in investment was due to the fact that some renewable energy auctions were delayed. So for example, in South Africa, the—South Africa, a couple of years ago, has started a very successful renewable energy independent power producer program.

But in 2016, an auction that was foreseen was postponed, that caused a lot of insecurity in the market, and that caused challenges for investors. So of course, another challenge that particularly developing countries and emerging economies face is that for renewable projects, most of the costs are upfront. And the investment is, then, recuperated over the lifetime of equipment, but operating costs are very low. And often, this represents, of course, an economic challenge.

So I'm not saying that it is all without challenges. And of course, integrating these high shares of variable renewables will require different business models and will require a different approach to grid management and will require more flexibility of the system, but is something that we see evolve, and we definitely will see more and more happen in the years to come.

**Sean**

Great. Thanks, Christine. Next question is for both the panelists and asks, "What is the—if you have any figures on the price for installed kilowatts of solar and wind energy? But more importantly, maybe, what is the forecast of cost? Do you see those going up or down? And how is that comparing, now, with the cost from fossil fuel energy sources?"

**Christine**

Yeah, I can start. We have, in the Global Status Report, a whole table that also is \_\_\_\_\_ close collaboration with IRENA, where we display ranges of cost because, of course, in different countries, suggestion is different, and the cost of different equipment is different from country to country. We foresee that costs are going to continue to come down.

In the aftermath of President Trump's announcement of pulling out of the Paris Agreement, the day after, on Friday, Bloomberg New Energy Finance announced the start of operation of five solar power plants in Italy with a total install capacity of 63 gigawatt with no support—financial support—so with just market price. We have also seen very, very low prices in different tenders, and so, in general, we are quite optimistic that this trend of cost reduction is gonna continue. Maybe not in the same steep curve as we have seen it in the last couple of years.

**Sean**

Great. Thanks. Mr. Li, anything to add as far as costs of solar and wind?

**Li**

Hello?

**Sean** Yes, go ahead.

**Li** What's the question? I do not have the question?

**Sean** Oh, it was on the forecast cost of solar and wind.

**Li** Oh, the forecast for the solar wind. I think that the current forecast, the solar, the wind, the solar, as I said, the people believe in the next three years, China [inaudible due to accent] 25 or 30 gigawatts to be installed new—that's annual—per annual \_\_\_\_\_ additional installations. The wind, maybe a similar kind of capacity, the 25 to 30 gigawatt.

So last year, they have about 150 gigawatt for wind already. It's about 80 gigawatt solar already. That means in the next three years, at least another 75 gigawatt to wind [inaudible due to accent] gigawatt of wind and the solar. So I think they're kind of [inaudible due to accent] the next three years.

By the 2030, most of the people believe this is much higher. They are double again for both wind and solar. That means by the end of 2030, people believe at least 400 to about 450 gigawatt of solar and wind. That's the \_\_\_\_\_ forecast for installations of solar and—solar PV and wind.

You saw that [inaudible due to accent] for solar [inaudible due to accent]. Recently, they have a [inaudible due to accent]. They have about [inaudible due to accent] people that have to be approval. Maybe they can build in the next two or three years. That means China maybe have about one gigawatt of solar [inaudible due to accent] for that. That's a general—additional information.

**Sean** Great. Thank you, both. We'll move on to the next question, now. "There was some mention of a decline in renewable energy developments in 2016. What are some possible explanations, do you think, for that?"

**Christine** Well, the decline, I think the person is referring to is the decline in investment. We have seen a decline of 23 percent in dollars invested in renewables. However, we have seen record capacity of 161 gigawatt. The main reason for this is the fact that, effectively, costs have come down. The reason for a decline in investment in some regions—in China, I think it was—that 2016 was the main focus on investment in grid and making the grid \_\_\_\_\_ to absorb high shares of variable renewables.

And in Africa, some of it was related to what I mentioned before—the delay in different auction programs. So all in all, I think it's very positive that investors got more capacity for the money committed. However, we see that, especially when it comes to the Paris Agreement, progress we are making is not quick enough, and there needs to be additional efforts, so a kind of twofold message of 2016, but clearly a very positive one of significant cost reductions.

**Sean** Thanks, Christine. We had a question come in from Mauritius, which is relevant to them. They're asking—or stating that, "Small-island developing

states are unique and are more vulnerable to climate change. But since they are blessed with renewable energy, this can be a solution to energy security and climate change mitigation for a lot of small-island developing states. Are there any plans for REN21 in the future to have any specific studies focusing on small-island development states?"

**Christine**

Well, we do effectively, in addition to the Global Status Report, also produce some regional reports. We are doing in them in cooperation with \_\_\_\_\_ have produced so far that regional reports for the MENA region, for the Western Africa, Eastern Africa, and Southern Africa. And we're doing them in cooperation with Regional Renewable Energy and Energy Efficiency Centers in these parts of the world.

We are currently discussing with \_\_\_\_\_ Caribbean Renewable Energy and Energy Efficiency Center, and the same thing in the Pacific Islands about working together with them towards establishing some of these reports. But so far, this is under discussion. There is nothing concrete on the table.

**Sean**

Great. Thanks, Christine. And I know that you touched on electric vehicles in the study. I don't think it's a main focus of the study. But do you have any insights into how electric vehicles have improved and such as their charge time and range or any other information on that for one of our attendees?

**Christine**

No, we are not. I mean it's—the Global Status Report does not give details about the functionality of electric vehicles. We more track progress on policies and then also give some overview of major development. We see that the charging times are coming down. We see that Norway was particularly successful in having a high share of newly registered cars being electric vehicles.

We are putting a focus on just outlining that in every infrastructure charging stations are needed. And we give some overview, but clearly, the Global Status Report is, by no means replacing a dedicated report or dedicated literature on electric vehicles. If an attendee has detailed questions about this, we can orient them towards different associations working on this. We will definitely be able to provide some further information, but very detailed, technical specificities won't be contained in the Global Status Report.

**Sean**

Great. Thanks, Christine. And so going back to some of the failures in developing countries, the attendee got back and noted that one of the major challenges that they have is literal failures of some of the renewable energy projects. Systems will be installed and then, whether due to maintenance and operation, cease to continue to function as they should. Do you see any solutions to that or any efforts to address that issue?

**Christine**

I think what is absolutely key is that not only system is installed but also that maintenance is provided. I think it's very important that people are trained on how to operate systems. And ultimately, I think a successful renewable energy policy will lead to the creation of local value, either manufacturing of components of systems or installation of systems. Clearly, without such an operation maintenance infrastructure, it is difficult to keep up high quality of

equipment. So I think it's essential, too, us to focus on these areas when talking about facilitating access to energy, to not only provide the equipment, but also provide corresponding capacity building and the enabling training.

**Sean**

Okay. Thank you. And then, during your presentation, you also noted that renewable energies are overtaking some of the more conventional sources for baseload power. Which technology, specifically, are you seeing take the place of those conventional sources? Oops. Christine, you're on mute.

**Christine**

When we see about progress that was made in the last year, it was mainly on wind and solar. What we have, nowadays, is the ability to—a very detailed wind measurements. Solar radiation maps exist. So there is detailed techniques about predicting the productivity of this equipment. So I think we are making progress on this.

And through a more efficient design of the system, baseload of fossil fuels and coal will become obsolete in the—not from today to tomorrow, but in the longer term because it is just very difficult to combine large shares of baseload with high shares of variable renewables because the system is just not flexible enough. And we must not forget, and that's one of the reasons, also, why I'm saying that we need to start thinking, also, about the other renewable energy technologies that we also have, so \_\_\_\_\_ baseload renewable technologies, such as hydropower, such as geothermal, such as biomass. So I think what it's all about—an intelligent combination of different technologies in order to create more flexible systems.

**Sean**

Great. Thanks. And the next question is for Mr. Li, as it pertains specifically to China. One of our attendees is wondering, "What is the adopted practice for demand side management charge settlement in China?" Do you have any insights on that?

**Li**

No. I think that for the demand \_\_\_\_\_ there's a—for the current market, the people need more the kind of [inaudible due to accent], especially for the environmental pollution control issues. As you know, China have a lot of dust, so everywhere, they need a \_\_\_\_\_. That's the kind of demand side \_\_\_\_\_. They need more [inaudible due to accent].

**Sean**

Great. Thank you. Next question is—we actually got a couple questions on energy storage systems. "Was there any research done on the status of some energy storage—what the emerging technologies are and what's most competitive, now?"

**Li**

I did not catch the question. What the question \_\_\_\_\_?

**Sean**

It's about energy storage systems. Which energy storage system technologies are being most deployed the most and our most commercially used?"

**Li**

It's not really the commercial use. Most of the time, the storage, and there two side to use. So one for the electrical vehicles, some of them, that's [inaudible due to accent]. [Inaudible due to accent] have energy kind of fixture of such storage yet.

**Christine**

And if I can add to this—so in the Global Status Report, we are, on the one hand, tracking grid-connected battery storage. We are also shedding some light on pumped hydro-energy storage, and then also looking at some systems that either can be deployed at household level but also storage for power markets for utilities. So we are looking into different—and then, also, of course, you have heat storage and electric and thermal storages.

We have, for the first time, have focused on the storage solutions in the Global Status Report. REN21 has, earlier this year, launched its Renewable Global Futures Report for which we've asked about 120 experts around the world what their view is on the future for renewable energy. And there, also, storage and different options are outlined. So people interested in this might want to consult the Global Futures Report, which they find on our website [ren21.net/gfr](http://ren21.net/gfr) for Global Futures Report.

**Sean**

Great. Thank you, both. So at this point, that's all the questions I have received. So we'll move on, right now. If another question comes in, we can always come back to it. Oh—and of course, just as I said that, one came in. So this one is about fossil fuel subsidies. It's saying, "As a result of your and other similar policy disseminators, many countries have now —" sorry. Let me read through it and try to word it here.

So they're noting that fossil fuel subsidies can, obviously, create a drag on accelerating renewables. Do you have any good examples of countries that have ended their fossil fuel subsidies?

**Li**

I think—

[Crosstalk]

**Christine**

There are some, but—no, go ahead. Go head, Li.

**Li**

I say that I do not give any information. That's your question, so sorry.

**Sean**

Yeah, go ahead, Christine.

**Christine**

So in the Global Status Report, you also have an overview of fossil fuel subsidies and how countries approach it and which countries are trying to phase them out. In general, I think we noticed that countries have made these high-level commitments. The G8, back in 2009, has agreed to phase out fossil fuel subsidies. However, we still have situation today that four times the amount of renewable support is put into a fossil fuel subsidy. So we have started to look into the subject. It is a fairly complex one and will definitely require further attention in the next year's reports.

Great. All right. Thank you. So moving along, do wanna just thank everyone for—our attendees—for their time and Christine and Mr. Li for the presentations. I'd like to give you the opportunity, before we wrap things up, for any closing remarks that you might have. Christine, if you'd like to start.

**Christine**

Yes, again a big thank you to the Clean Energy Solutions Center, and then, of course, also to Li Junfeng and his team. We were thrilled to launch this year's Global Status Report in China, which has really made tremendous progress. And also, I think the announcement of the Chinese government to invest a total of \$360 billion USD in renewable energy through 2020, which averages a total—an average of \$72 billion per year over the next 5-year period is amazing. It is less than China invested in previous years. But still, I think, with this, China will maintain its position as lead investor.

I think we have seen, in the past couple of days, also, the strong commitment to international collaboration. And we at REN21 look forward to working with all of you on continuing the global energy transition. And of course, should anybody be interested in joining the REN21 network and contribute, we are very open to this. We can only report about the progress of renewable energy because of the excellent contributions of many of our partners and members, and we are welcoming anybody who wishes to do so in our network.

And again, a big thank you to Li Junfeng for his availability, the excellent cooperation, and also the highlights of this year's Global Status Report have been translated by Li Junfeng's team into Chinese. They are, as of now, available on the REN21 website, so you can download them together with the full report, which comprises about 200 pages—infographics and also PowerPoint presentation for your further use. Thank you very much.

**Li**

So thank you for the attendees.

**Sean**

Great. Thank you, again, both the attendees. We do appreciate it and, again, appreciate everyone's time for joining us today. We want to invite all of the attendees on the line to feel free to inform colleagues and those in your networks about the Solutions Center webinars. Again, the recording of this one will be posted Solutions Center website within about a day or two after the conclusion. We will also be posting the slides that were presented here today to the website.

Additionally, you will find information on other upcoming webinars and training events on the website if you are interested in those. And just a reminder, we're also posting webinar recordings, now, to the [Clean Energy Solutions Center YouTube channel](#). I do recommend checking that out. A lot of great videos out there.

And so with that, I would just like to finally, kindly, ask you to take a moment to complete the short survey that will appear when we conclude the webinar. And with that, hope everyone enjoys the rest of your day, and we hope to see you again at future Clean Energy Solutions Center events. And this concludes our webinar.