

REN21 Renewables 2014 Global Status Report: China

Transcript of a webinar offered by the Clean Energy Solutions Center on 27 June 2014 —
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Webinar Panelists

Christine Lins Executive Secretary, REN21

Li Junfeng Deputy Director, Energy Research Institute National Development and Reform Commission

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Sean Hello, everyone. I'm Sean Esterly with the National Renewable Energy Laboratory and welcome to today's webinar which is hosted by the Clean Energy Solutions Center in partnership with the Renewable Energy Policy Network for 21st Century, also known as REN21. And today's webinar is focused on the launch of REN21's flagship report, Renewables 2014 Global Status Report with a special focus on China.

One important note of mention before we begin our presentations 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.

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Panellists, we ask that you please mute your audio device while you're not presenting. If anyone's having technical difficulties with the webinar, you can contact the GoToWebinar helpdesk number displayed at the bottom of this slide, and that number is (888) 259-3826. We encourage anyone to ask questions throughout the webinar. If you do have a question, simply type it into the questions pane in the GoToWebinar panel and it will be submitted through there, and then I will present those questions to the panellists during the question-and-answer session.

If anyone's having difficulties viewing the presentation, you can find PDF copies at cleanenergysolutions.org/training and you can follow along as the presenters show those slides. And we will also be posting an audio recording of the webinar to cleanenergysolutions.org/training. And we now are putting webinars up on the Clean Energy Solutions Center YouTube channel, where you'll find other informative webinars, as well as a video interviews with thought leaders on clean energy policy topics.

Today's webinar is centered around the presentations from our guest panellists, Christine Lins and Mr. Li Junfeng. These distinguished panellists have been kind enough to join us to discuss the launch of REN21's flagship report Renewables 2014 Global Status Report. This 90-minute webinar will look in detail at the China region and we'll find out what renewable changes happen in China over the course of 2013, learn which technologies are contributing to increased power capacity, and also hear how changes in policies have affected investment levels and market development in the China region.

Now before our speakers begin their presentations, I'll provide a short informative over view of the Clean Energy Solutions Center initiative, and then following the presentations, we'll have the question-and-answer session where the panellists will address questions submitted by the audience followed by some closing remarks and a very brief survey.

This slide provides a good background in terms of how the Solutions Center came to be formed. Solutions Center is one of 13 initiatives with the Clean Energy Ministerial that was launched in April 2011 and is primarily led by Australia, the United States and other CEM partners. Outcomes of this unique initiative includes support of developing countries and emerging economies through enhancement of resources and policies relating to energy access no-cost expert policy assistance and peer-to-peer learning and training tools such as the webinar you're attending today.

There are four primary goals for the Solutions Center. First goal is to serve as a clearinghouse of clean energy policy resources; second is to share policy best practices, data analysis tools, specifically clean energy policies and programs; and third is to deliver the dynamic services that enable expert assistance, learning and peer-to-peer sharing of experiences; and then lastly, the center fosters dialogue in emerging policy issues and

innovation around the globe. Our primary audience is energy policymakers and analysts from governments and technical organizations in all countries, but we also strive to engage with the private sectors, NGOs and civil society.

Now, our marked key feature that the Solutions Center provides is the no-cost expert policy assistance known as Ask an Expert. Ask an Expert program has established broad team of over 30 experts around the globe who are available to provide remote policy, advice and analysis to all countries at no cost. So for example in the area of carbon management, we're very pleased to have Craig A. Hart, Associate Professor of the School of Environment Natural Resources at the People's University of China, serving as one of our experts. So if you have a need for policy assistance in carbon management or any other clean energy sector, we do encourage you to use this valuable service. Again, it is provided to you free of charge. To request assistance, simply go to cleanenergysolutions.org/expert and submit your request through the form located there.

So in summary, we encourage you to explore and take advantage of the Solutions Center resources and services including the Ask an Expert policy assistance, the database of Clean Energy Policy Resources, subscribe to the Solutions Center newsletter and participate in webinars like this here.

And now, I would like to provide brief introductions for our distinguished panellists today. And our first speaker that we'll be hearing from is Christine Lins and Christine is the executive Secretary of REN21 and will be discussing key findings from the REN21 Renewables 2014 Global Status Report.

Following Christine, we'll be hearing from Mr. Li Junfeng. Mr. Li is the deputy director of the energy Research Institute at National Development and Reform Commission. And so with those introductions, I would now like to welcome Christine to the webinar.

We can see your slides, Christine, but just a reminder to unmute yourself.

Christine

Thank you very much. Good morning, ladies and gentlemen and thank you for the opportunity to present to you the Renewables 2014 Global Status Report and the main findings to just provide some context for the China's specific information. REN21 issues this report now already since the decade. It's the 9th global status report since the declaration REN21 in 2004. The reporting space on contributions form a network of over 500 contributors and researchers and reviewers and provide a global overview on market, industry, investment and policy trends in the field of renewable energy. It also provides information on distributed renewables in developing countries and this year's feature shed light on tracking the global energy transition on progressing renewables in the last decade. It

covers all technologies and covers all sectors from heating and cooling power to transport.

Well, let me start by saying that the evolution of renewable energy over the past decade has surpassed all expectations globally on the one hand, but clearly also as far as China is concerned. A decade ago, there was not a lot happening in the field of renewables in China. Nowadays, China is the champion and the main country market industry player in nearly all renewable energy areas. Global installed capacity and production from all renewable technologies have increased substantially over this last decade. Renewables power capacity, for example, if you look at power capacity excluding hydropower saw a seven-fold increase during the past decade from 85 GW that you see on this slide in the second slide to 560 GW.

Cost for most technologies have decreased significantly and support policies have continued to spread throughout the world. Development in the early 2000 showed upward strengths in the global renewable energy investment, capacity and integration across all sectors, yet most of the mainstream protections, not particularly extraordinary expansion of renewables that was to unfold in the coming decade. Numerous scenarios projected levers of renewables for 2020 that already surpassed the 2010, and an example is a projection from the World Bank which projected 6 GW of wind for China to be installed by 2020. In 2011 there were actually about 60 GW of wind installed already so 10 times the projected amount in the decade earlier.

So we see that also with the cost reductions, support policies have been spreading throughout the world and I'm going to come to this in a little moment. Let me now take you through some of the main findings featured in this year's global status report and then when you look at the renewable energy share in final energy consumption, you see that this remained at about level with 2007, even as the share of modern renewables increased. So we have a situation when 19% global final energy consumption come with renewables and this stable amount caused a rapid growth in modern renewables, tempered by a slow migration away from traditional biomass on the one hand, and a continued rise in total energy demand on the other hand.

And then when you look at sustainable energy for all, the campaign of the UN Secretary General, Ban Ki-moon. This campaign sets the objective to double the share of renewables by 2030 from 2010 levels from 18% to 36%. And it's clear that in order to reach these, increased efforts to speed up renewables deployment are needed, as well as action in the field of energy efficiency to curb energy demand.

So as we know, human beings are competitive, not only in football. We are also listing renewable energy champions in different market segments. You'll see that China is, in many areas, featuring prominently at position number one. And when it comes to investment in renewables power and

fuels in absolute terms, China is number one, followed by United States, Japan, the United Kingdom and Germany. And then, when we did this year, we also provided information about investment in renewables, power and fuels related to GDP, so per capita. And there, we get a completely different list of countries namely, Uruguay, Mauritius, Costa Rica, South Africa and Nicaragua. So we see that actually emerging economies and developing countries are doing quite some efforts to increase their renewables share.

When it comes to total renewables capacity installed per capita, these yellow lines, we see that still, the EU is leading. We have a situation where 42% of global non-hydro renewables capacity is in Europe compared to less than 17% of global electricity demand. And these high shares of renewables explain the need for increased attention on integration of reliable renewables in the energy system, but also here on this slide, in terms of total capacity, you'll see that both in overall capacity, but then in the field of hydropower, in the field of wind, in the field of solar water heating and in the field of geothermal heat, China is the fore position and also prominently positioned as far as biopower and solar PV are concerned so really quite some impressive numbers.

As far as the power sector is concerned, 26% of global power generation capacity are based on renewables and 22% of global electricity demand was produced, was satisfied renewable energy sources. Renewables accounted for 56% of new installed power capacity. The total renewables power capacity was 1560 GW. That is an increase of more than 8% over 2012. And we have a situation that China's new renewables power capacity surpassed new fossil fuel and nuclear capacity for the first time and 24% of global renewables power capacity are located in China, and renewables in China account for more than 20% of electricity generation, so it also acquired significant numbers.

When it comes to heating and cooling, heat from water and biomass, solar and geothermal sources accounts for small but regularly rising share of global final heat demand accounting to an estimated 10%. And we see that the use of modern renewable heat technologies is still limited relative to their vast potential. There are, however, encouraging best practice examples. Denmark, for example, has banned the use fossil-fuel fired boilers in new buildings as of 2013 and aims for renewables to provide almost 40% of total heat supplied by 23. And then go through some findings in China in different technology sections of my presentation. When it comes to transport, liquid biofuels met around 2.3% of total transport fuels demand. And there is also limited but increasing initiatives to link electric transport systems with renewable energy particularly at the city and the region level.

So I'm taking you through the main findings of different technologies in a nutshell. In the field of hydropower, about 40 GW of new hydropower capacity was commissioned in 2013, increasing the total capacity around

4% to approximately 1000 GW. And global hydropower generation during the year was at an estimated 3750 GW hours. Modernization of aging hydropower facilities is a growing global market. Some countries are seeing a trend for smaller reservoirs and multi run of regular projects. China led in terms of capacity added in 2013 with about 29 GW in additions and China remains number one for hydropower capacity and generation. And what we see nowadays is that there is an increasing recognition of the potential for hydropower to complement other renewable technologies such as variable wind and solar.

That brings me to the next slide. The solar market had a record year in 2013, adding about 39 GW for a total of approximately 139 GW. For the first time, more PV capacity was added than wind and China saw spectacular growth accounting for nearly 1/3 of the global capacity added, followed by Japan and the United States. Solar PV is starting to play a substantial role in electricity generation in some countries particularly in Europe, while lower prices are opening new markets from both Africa, the Middle East, to Asia and Latin America. China produced 67% of PV modules worldwide and invested significantly in PV manufacturing as many older, less efficient plants were shut down and consolidation was encouraged.

As far as wind is concerned, more than 35 GW of wind power capacity was added in 2013 for a total about 318 GW. However, following several record years, the market was down nearly 10 GW compared to 2012, reflecting primarily a steep drop in the U.S. market. Also, wind had a record year with about 1.6 GW added of almost all of them in the European Union. Wind generated 140 billion kW in China in 2013, that's up 40% over 2012, and exceeding nuclear generation for the second time running.

Globally, wind power capacity was enough to meet an estimated 3% of the global at electricity consumption. And clear again here that China led the market and was the largest investor in wind energy. China added estimated 16.1 GW with new capacity 2013, increasing the total installed capacity by 21% and about 14.1 of the 16.1 GW were integrated into the grid. And also, China added 39 MW of offshore capacity for almost 113 MW in total.

Concentrating solar power, also increase there, while the United States and Spain remains the market leaders, markets continue to shift to contrast this high levels of insulation. Beyond the leading markets, capacity nearly tripled with projects having online in United Arab Emirates, in India and in China. In the field of bioenergy, demand continued to grow steadily in the heat, power and transport sectors. Total primary energy consumption of biomass reached approximately 57 EJ in 2013, of which almost 60% was traditional biomass, and the remainder was modern bioenergy. Heat accounted for the majority of biomass use, and global bio-power capacity was up by an estimated 5 GW to 88 GW. And we see that the demand for

modern biomass is driving increased international trade and solid biofuels including wood pellets.

In the field of geothermal energy, we saw a net increase of geothermal of about 455 MW, bringing the total capacity to 12 GW. The use of low-temperature fields for both power and heat continues to expand, increasing the application of geothermal energy beyond high-temperature location. China remains the presumptive leader in direct geothermal energy and is a significant user of geothermal for heat purposes as well.

Solar, water and air collector capacity also saw an increase and reached an estimated 330 GW thermal by the end of 2013. As in past years, China was the main driver accounting for more than 80% of global market. Demand in some key European markets continue to slow, but markets expanded in countries such as Brazil, and solar thermal heating is now cost competitive. The trend towards deploying large domestic systems continued and as did growing interest in the use of solar thermal technologies for district heating and cooling, as well as industrial applications. China maintained its lead in the manufacture of solar thermal collectors. And in China, solar water heaters cost far less over their lifetimes than do electric or gas water heaters and that is clearly a major factor for driving the market.

So when it comes now to the socioeconomic benefit of renewables, jobs creation has come to the forefront of the policymaking debate, and globally, an estimated a 6.5 million people work directly or indirectly in their renewable energy sector. This employment continues to advance to multiple countries, but the bioenergy investment is concentrated in just a few countries mainly China, Brazil, the United States, India and some in new countries. China remains the largest employer in this sector with about 60% of employment concentrated in PV and the market shift towards the installation segment of the value chain.

Now when it comes to investment, also quite interest in global investment in the renewables power and fuels, not including hydropower was at an estimated \$214 billion. Including hydropower, we arrived at about \$248 billion. New net investment in new renewables power capacity outpace fossil fuels in the 4th year running, and the second consecutive year of planning and investment, as you see on the graph after several years of growth was due in part to uncertainty over incentive policies in Europe and the United States so retroactive discussed reductions in support in some countries, and last but not least, further reduction in technology cost as the next slide illustrates. And actually, what you'll see there is, I think, really interesting. The orange line draws the Solar PV global capacity additions so that line goes up. So we have 39 GW of PV added, and the gray line shows annual global investment in Solar PV capacity. And even at the global investment in solar PV declined by nearly 22% relative to 2012. New capacity installations increased by more than 32%.

This deep cost reductions throughout last year as seen in PV and also in wind make renewables attractive for new markets in developing countries where there is strong need for new electricity generation capacity and where energy demand is increasing. So clearly, opportunities for new markets and then also what we see when we look at the investment made.

2013 was a situation where investment in renewables in Europe was down 44% from 2012. And also, in China, investment declined but despite the overall decline in China's investment, for the first time ever, China invested more in renewable energy than did all of Europe combined and invested more in renewables power capacity than in fossil fuels. China was the biggest investor in utility-scale projects. And in general, we see that 2013 brought a clear shift in investment moving east to Asia and Oceania and moving south to the Americas to Latin America as can be seen. There are also noticeable trends, Japan, for example, invested more in renewables. Investment in renewables increased by 80% relative to 2012 levels. And other countries increased their investment in 2013 including Canada, Chile, Israel, New Zealand, the United Kingdom and Uruguay, so also quite the diversity to that.

When it comes to policy, clearly, this is very encouraging. By early 2014, at least 144 countries had renewable energy targets, and 138 countries had renewable support policies in place. Developing and emerging economies have led the expansion in recent years to account for 95 of the countries with support policies up from 15 in 2005. We see that as in the past, most policies are active in the electricity field with feed-in-tariffs and renewable portfolio standards being the most prominent options, but we also see that public tendering is scaling crowds with policies in that area are rising from eight countries and 2004 to 55 countries in 2014.

We also see that trends in putting heat obligations and biofuel obligations, we also see the 2013 provided an increased focus on the revision of existing policies, sometimes including retroactive changes with some adjustments made to improve policy effectiveness, but especially in Europe, caused some problems, but we also see that new policies are emerging to advance and manage the integration of high shares of renewables in electricity into existing power systems, including the support for energy storage, demands of management and SmartLink technologies. And I think, actually, when looking into the Chinese example, we can clearly see that China is the best practice case study to show how stable policy framework can create an industry and can create a market that is playing in the top league of the world.

China met the goal to add 49 GW of renewables capacity in 2013 and we have a new targets, adopters for 2015, but I guess Li Junfeng is going to tell us a bit more about this and just a minute. I'm concluding with a look on distributed renewable energy in developing countries. Here, we see that energy access and the use of distributed renewable energy increased and we make progress on all developing continents except Africa. The growth

in population electrified is bigger than the growth in total population in Africa, however, the population growth rate exceeded the rate electrification, and therefore, they're still only 43% of the population electrified.

We have new business and finance models for rural electrification emerging and we have technology options ranging from mini-grids to ICT applications. The most successful program to promote the deployment of small-scale decentralized wind turbines worldwide is located in the Mongolia, and we see that China added 1.8 million biogas installations for a total of more than 43.5 million, thus remaining the leader in the use of small-scale biomass plants.

And we see also that local power utilities are expected to install individual off-grid PV power plants by the end of 2014 to ensure establishment of long-term operation and maintenance management systems for these PV plants before the end of 2015. And China established a new electrification target requiring the electrification of the remaining 2.7 million people by 2015, so also, there are some best practice examples. So, in conclusion, I would say that the last decade had shown that the global perception of renewable energy has shifted considerably. Today, renewables have arrived in the mainstream and the other preferred energy source of the general public in many parts of the world. China has clearly demonstrated its ability to become the global renewable energy champion in less than 10 years. And also all the speakers clearly document the advancement achieved during the last decade. It is clear that we need to move faster and more deliberately if you are serious about doubling the global share of renewables by 2030 and about ensuring energy excess to clean and sustainable energy for all people by 2030. For this to become a reality, we need more rigorous integration of renewables. We need a levelised playing field for the entire energy sector.

We need long-term, differentiated stable policy frameworks to sustain and increase investment levels. I think after all we also need to pay greater attention to the heating and cooling sector and the transport sector as we see that we have made a lot of progress in the electricity field, but it's still heating and cooling and transport are lagging behind. And last but not least, we need improved energy data monitoring to be able to document the advancements achieved in renewable energy transition. And for all these close collaboration between all extras from the public and the private sector as we do within REN21 is needed to make this energy transition with renewables a reality soon. And with these, I would like to thank you for your attention. And hand the floor over to Li Junfeng to give you some insights into the Chinese market. Thank you very much.

Li Junfeng

Thank you. Okay. These are some of the brief introduction about the China Renewable Energy Development. Just like Christine mentioned with that in the rest of the years, Chinese Renewable Energy develop well. To give you some introductions, since the Chinese market is quite big, as

Christine mentioned, that China is a big power store in the world. In the last two years, every installation of new energy power generation, it's about 100GW. But the renewables after 2006 gradually take the major part. From many kinds of renewable energy, the share, the newly added gradually increased. In the very beginning, only by 22, but it was starting to [inaudible] [0:33:27] already over the certified already. In 2013, the total renewable energy capacity is over 300 GW, about 378 GW, taking 30% of the total capacity. I think of that more than 1 trillion kWh made up over the 20% of the total electric supply there in China.

You see from the kind of non-fossil in China in the final use. I think the renewables take small shares, but it then gradually increased. Here, noting close, is a non-commercial of the renewables. Non-commercial renewables in China is more than 10%. Here [inaudible] [0:34:27] renewable energy, this increased from 1980s only about 3% or 2%. Now, it's near on 2%. Mainly from this kind of renewable energy supply manage the hydro power, followed by wind, bio mass and the solar. I think especially since 2012, China's approach over the nuclear is so large of the Chinese [inaudible] [0:35:04] power generation. The number one is geo coal, number two is the hydro, the number three is the wind, the number four is the nuclear.

This slide shows you China's Renewable Energy Investment. As Christine mentioned, last year China has about 56 billion include the R&D for investment, a little bit of slide less than 2012. When [inaudible] [0:35:47] the price, especially the price of Solar PV, the gas cheaper to make the investment appears lower. But as in the capacity is still increased, I think the Chinese renewable investment in many parties, hydro, by wind, then solar, somewhere of all this. Currently, I think of the wind, the solar, and hydro [inaudible] [0:36:20] investment.

Here is the Chinese renewable under the market. In the left diagram shows the hydro from 2006 to 2013. In 2006, China only had about 130 GW hydro. But by 2013, we doubled. It's about a mere 300 GW. It's 280 GW of the hydro. Wind is greater connected in 2006 less than 2 GW, but now we have 75 greater connected when the power is installed. It's about 71 GW. It ranks number one in world-wide.

Also the PV has increased very, very fast. In 2006, China almost nothing, but in 2007 here, it's about 15 GW almost. So, only 2013 this year there was over 10 GW of PV to be installed. The current rate for this year is 10 to 14GW in 2014. So, I think the PV is made kind of part of the renewable energy since the hydro installation annual added is declined. Wind almost stable [inaudible] [0:38:15] like 15 to 18 GW, hydro 15 to 20 GW. But the PV is a big potential. My projection is that by 2016, the annual added [inaudible] [0:38:31] 20 GW.

Since the Chinese growth in the year 2013, hydro is about 30 greater connected. It includes more hydro, the wind about 14 GW. Also, the wind

power performance is a great factor. In 2011, 2012, 2013, the power energy hour is increased. Before 2011, the annual for electricity hours is less than 2000 hours, but 2012 is 20-80 hours already. I think they increased quite a lot. So the PV last year is 11.3 GW that included large scale and the disputed. CSP, commercial, only 10 MW, but then several other case for the demonstration which is not commercial used yet.

For energy, another bigger contribution for power generation, there are about 6.2 GW include 2.3 return of waste to energy. [inaudible] [0:40:04] include some landfill for that. Then also China has some of the answers to those available from the kind of corn. Every year, they have about 1 million pounds kind of acid produced as bio fuels. China has about half pounds diesel available every year and used by the waste area.

For Solar Thermal, as Christine mentioned that they fall annually, they're about more than 40 GW including of solar thermal. Hot water could be installed. Currently, totally in 2013, it's about 200 GW. So, annually, it's 40 GW for that. Solar hot water, the cost I think even cheaper than electricity and gas. So, in a rural area and a small town, solar hot water is needed resources for heating energy especially for the hot water supply.

Chinese policy, learned from Europe, especially Germany, we have tariffs for power generation, subsidies come from the financial money. [inaudible] [0:42:04] that means from the other users. Every user pays about 0.015 Yuan per kWh for the subsidy to the renewable energy. The renewable in the beginning that was 0.1 and that means only an advance of 15 in 2006. But in 2009, it's about 0.2 cents. Last year, 1.5 cents. Also wind is the lowest rate 55 Yuan. The highest is 61, but it did also some were kind of high, off shore wind just published last week. It's about 55 cents per kWh.

For Solar PV, it's similar. Also there are three types of rating. The lowest is 90 Yuan, the 95 [inaudible] [0:43:28], but in [inaudible] [0:43:30] area, they still keep 1.15 Yuan per kWh.

For the distributed, you can [inaudible] [0:43:39] directly to the final users, but you also get subsidies 42 Yuan per kWh. [inaudible] [0:43:52] in China.

The distributed grid connected to the projects there are still problems since you get subsidies but you get some barriers for the final users, how to connect the users, how to sign agreement and how to make the kind of agreement to be implemented. This [inaudible] [0:44:32] government tried to organize and started to publish the new policy for distributed, maybe they're kind of cheaper, didn't get simple, get more subsidies for distributed.

That's China's five nonstop year plan from 2011 to 2014, The non-fossil—non-fossil fuels will reach number 11.4 probably by 9%. Then by

2020, then about the fifth-year, 15%. I think it's about 4—the total demand by 2015, maybe 4 billion TCE of—you see, the tonnes of coal equivalent. The Europeans are already using tonnes of oil equivalent, the Chinese tonnes of coal equivalent. And then also our electricity, they're about 6.15 trillion kilowatt hours, and also 17% of carbon intensity reduction, 16% in energy intensity per—per GDP. Also the Chinese have projections, the annual growth of electricity at 5 to 8%, and the coals it takes about 65%. So the reduced, the kind of the coal consumption, it actually reduced the sale for the coal. That means, gradually to reduce the dependence on coal [inaudible] [0:46:19.3]. So the renewables is the one of the sales [inaudible] [0:45:53.2] coal. Next please.

So, therefore, the target, the ones going back to the—by—by—by 2020 or by 2015, there might have been 42—420 gigawatts for hydro. For wind, about 100 gigawatts of wind, and it includes 5 gigawatt off-shore. For PV, it comes to 75 gigawatts, but most people think, the solar will be 50 gigawatts, 50. It's about 1 gigawatt and I hope about 2020, there's 3 gigawatts. The biomass, they want to go by 2015 with 13 gigawatts. That means, double then [0:47:16.9]. Next please.

I think the integrated, the kind of demonstration of the—the products. There are also some demonstrations of new energy cities. They try to select from the hundred cities. I think the target of energy, each of the cities will be 3% of primary energy consumed for renewable energy currently. By 2015, consumption no less than 6%, so on top of the renewable energy used. Also, there are at least there are two kinds of new energies at least in solar or wind or biomass. They also have green electricity at green counties.

They have 200 counties. Each of the counties, they have subsidy about 25 million per county to support the [inaudible] [0:48:18.2] institution. They have also kind of microgrid. They try to use these microgrids in technology to promote the grid. They have them in remote area. They use the kind of more renewable energies. Those who support, they kind of dispute it, the new energies especially PV power innovations. Currently, they have the annual target is about 8 gigawatts of distributed renewable energy. For the first and a half year, it's not going very well. So they tried to make a better policy to promote energy [inaudible] [0:49:00.4]. Next please.

And if you include the kind of demonstration of products. I think that demand, they try to have a large scale use for solar and for [inaudible] [0:49:21.5] and biomass for the integration of such kinds of energy. Also, they encourage the local usage of renewable energy, but they focused on transition of the manufacturers and users. And that means, the local government you couldn't only focus on the manufacturers, but also they focused on more use of renewable energy. Next please. That's—that's all. I don't know. I'm not a mathematician, but thank you for your attention.

- Sean** Okay. Thank you both Christine and Mr. Junfeng for the presentations and we'll move on now to the question and answer section and I just want to remind any attendees, if you have any questions for the panelists, go ahead and submit those with the question window into webinar panel. And so, we'll go ahead and start with the first question from the audience. And that question for either Christine or Mr. Li is which country will be the next major players from the developing world in terms of renewable energy after China.
- Christine Lins** Well, maybe I can start. I—I really think that we are going to see China play in the—in the main league in the years to come. We also see that nowadays, Latin American markets are emerging very promising development in Mexico, in Brazil, in Costa Rica, in different countries there have very promising development in South Africa, lots of things happening there, and I think also we are going to in the next decade, and most likely see quite a lot of development on renewables in India.
- Li Junfeng** There are similar [inaudible] [0:51:34.6].
- Sean** Yeah. Did you want to add something?
- Li Junfeng** Yes. I think we have similar and that because personally I think that India maybe there and that's a booming area for renewable energy. It seems today I have a very good policy instruments and they also have a bigger demand for electricity and energy commission, so I think India may be the next one.
- Sean** Great. Thank you both and moving on to the next question. It's kind of a two-part question in reference to China. Let me read the whole thing first and I can repeat it if you need me to. What kind of new renewable energy technologies will find good opportunities in the China—Chinese market and also can foreign startup companies with these kinds of technologies find good opportunities in china?
- Li Junfeng** All the renewable energy—sorry. What I said, yeah. All the renewable energies will be—
- Sean** Yeah, go ahead.
- Li Junfeng** Yeah, all the renewable energies are available in the market of China composed of hydro, wind, solar, and biomass. And in China also where it comes all the foreign investments to work in China. There's still a lot of companies working in China already. It's a matter of how you include the supply like hydro, the Alstom is one of the biggest suppliers of hydro equipment for wind like Vestas, GE, Siemens, and the [inaudible] [0:53:16.8]. Solar I think some of the people supply PV equipment, but they supply the manufacturing equipment DuPont and others. Also, they include lot of [inaudible] [0:53:37.7] lots of [inaudible] [0:53:32.7] like the Silicon from [inaudible] [0:53:32.7] and others.

- Sean** Thank you and Mr. Li, I was wondering if you could talk a little bit. Are there any PV, photovoltaic grid connection issues in China?
- Li Junfeng** There are some of the grid [inaudible] [0:53:59.2] especially, the kind of the, you know, last time there are two or three, yes most grid connections should be in the western part, but to most kind of [inaudible] [0:54:09.4] in the—in the west and eastern part of China, so you need the kind of transmission lines. There are shortages of some transmission lines, so the [inaudible] [0:54:20.1] to approval of several transmission lines to set more transmission lines there from the western to the east including the solar, wind, the grid connection, and the [inaudible] [0:54:40.1] operation situations will be changed. There's my answer.
- Sean** Great, thank you. And another question in regards to China. The attendee notes that in early 2012, there was a national standard issues in China in relation to wind farm, grid connection. Has something similar been issued for PV?
- Li Junfeng** Yes. I'd say they are working on it, standards for wind already, but then now they work on kind of a standard, therefore, the kind of PV including the grid connections and [inaudible] [0:55:20.5], PV [inaudible] [0:55:21.2] standards, yes.
- Sean** Okay, thank you Mr. Li. And we have a follow-up question for the question on the foreign startup companies. Do you have any suggestions on what's some of the best practices are for bringing technologies to China as a foreign startup?
- Li Junfeng** Kindly repeat the question again. I could not catch the question.
- Sean** Do you have any suggestions on maybe some of the best practices for bringing foreign startup technologies to China?
- Li Junfeng** I think that everything—I think including some microgrid and, therefore, storage technologies. If you have a very good [inaudible] [0:56:10.6] in China, the Chinese they're following more the kind of demand of renewable energy, the storage of energy rather becomes the problem, also how to have more consumption of renewable energies. So there's lots of kind of chance for foreign international companies. Also, China has a very good and successful story and, therefore, they tend to—to reduce the cost since all the wind and the PV, therefore, the cost, the kind of reduction [inaudible] [0:56:46.4] to other countries. I think the renewable markets are not only in China, but, you know, the big I suppose worldwide since the renewable—so they were [inaudible] [0:56:55.9] renewables not less than 20%. And [inaudible] [0:57:04.9] for the 80% of them are probably intended for fossil fuels. So we need to have a large scale use. That's my answer.

- Sean** Great, thank you. And another question in regards to China. What trends have you seen in regards to hybrid systems comprised of PV and wind energy in China or other mixes and that could be grid connection or off grid.
- Li Junfeng** I think that there are two parts of biomass, the kind of small scale is used [inaudible] [0:57:40.9] in remote area. The hybrid system of solar, wind and managed in, you know, you know, the remote area back in Mongolia and for the kind of the [inaudible] [0:57:53.9], but if there are some grid connections, you know, in Mongolia, and other area like the wind and biomass, you know, the PV power. So they kind of link together [inaudible] [0:58:08.4] television to send to the grid. So there are lots to go, the hybrid systems, but they also have the smaller hybrid systems available in China.
- Sean** Thank you, Mr. Li. And you have any comments on the financial situation of Chinese PV companies? Are things getting—improving or getting worse for them?
- Li Junfeng** They are improving. I think that most of the company are improving and like—like [inaudible] [0:58:44.3] like the kind of the solar, and they're getting much better, but some obviously have problems with timing since they are [inaudible] [0:58:55.2] the cost and—and the profit, but they're getting better.
- Sean** Great. And, could you talk a little bit about the trends for energy storage technology in China?
- Li Junfeng** Well, only if you're looking for studies, well actually there's, but there's a lot of—a lot of other companies that work on that. There are two parts of the story. To [inaudible] [0:59:22.5] for power use then the next to create a lot of work on that on this area, but also a lot of—kind of battery protection for electric vehicles. This is another big area for—for energy storage. So, therefore, they're not—not always successful, but there's a lot who try.
- Sean** Great, thank you very much. And at that—at this point, that's the last question that I have from the audience, so we can move on now to the attendee survey and attendees, I will just ask that if you could help us by completing our survey. It just helps us improve for future webinars and you can answer, right and go to webinar window. The first question is the webinar content provided me with useful information and insight. And the second question, the webinar's presenters were effective. And the final question is, overall the webinar met my expectations. All right, thank you for answering our survey. I didn't receive any more questions, so now I just like to give Mr. Li and Christine a chance for any closing remarks that you might have.

Li Junfeng

No, I do not have. Maybe Christine, you make closing remarks. I do not and I think that I'll say good bye to everyone.

Sean

Okay. Let's move on from there then. All right and so on behalf of the Clean Energy Solution Center, we just want to thank both of you again for the presentations today, and taking the time, and yeah also for the question and answer session. And then I'd also like to thank our attendees for participating in today's webinar and I very much appreciate your time, and I do invite you back to check the Solution Center website. If you'd like to view the slides from today's presentation and listen to our recording of the webinar as well as any previously held webinars. Additionally on the cleanenergysolutions.org page, you'll find information on upcoming webinars and other training events. We're now closing the webinars' recording for the Clean Energy Solution Center you tube channel as well. So that I hope everyone has a great rest of your day and we hope to see you again at future clean energy solution seminar events. And this concludes our webinar.

DRAFT