

REN21 Renewables 2014 Global Status Report: North America

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Webinar Panelists

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Sean Esterly Hello everyone! I'm Sean Esterly with the National Renewable Energy Laboratory and welcome to today's webinar which is being hosted by the Clean Energy Solutions Center in partnership with the Renewable Energy Policy Network for the 21st Century also known as REN21. Today's webinar, we'll discuss REN21 flagship report, the Renewable 2014 Global Status Report with a special focus on North America.

One important note of mention before we begin our presentation is that the Clean Energy Solutions Center does not endorse or recommend specific products or services. Information provided in this webinar is featured in the Solutions Center's resource library as one of many best practices resources viewed and selected by technical experts.

Before we begin, I'll go over some of the webinar's features. You have two options for audio. You may either listen through your computer or call in over the telephone. If you do choose to listen through your computer, please select the mic and speakers options on the audio pane, doing so will just eliminate the possibility of feedback and echo. If you choose to dial in by phone, please select the telephone option and a box on the right side will display the telephone numbers and also the audio PIN that you can use to dial in. if anyone is having technical difficulties with the webinar

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We encourage anyone from the audience to ask questions at any point during the webinar. If you do have a question, please just type it into the question pane and submit it through there. Those questions will be presented to the panelists during the question and answer session following today's presentation.

If you're having difficulty viewing the materials through our webinar portal, you will find PDF copies of the presentations at cleanenergysolutions.org/training and you may follow along as the speakers present. Also, we will be posting an audio recording of the presentation through the Solutions Center training page within about a week of today's broadcast and the Solutions Center is now adding webinars through the Clean Energy Solutions Center YouTube channel where you will also find other informative webinars as well as video interviews with sought leaders on clean energy policy topics.

Today's webinar agenda is centered around the presentations from our guest panelists: Rana Adib and Evan Musolino. And these distinguished panelists have been kind enough to join us to discuss the launch of REN21 flagship report, the Renewable 2014 Global Status Report. This 90-minute webinar will be looking in detail at the North America region and we will find out what renewable changes happened in North America over the course of 2013, learn which technologies are contributing to increase power capacity and hear how changes in policies have affected investment levels and market developments in the North America region.

Before the speakers begin their presentations, I just want to provide a short informative overview of the clean energy Solutions Center initiative and then following presentations is when we'll have the question and answer session where panelists will address questions submitted by the audience followed by closing remarks and then a brief survey.

I just like to provide a bit of background in terms of how the Solutions Center was born. The Solutions Center is one of 13 initiatives of the clean energy ministerial and was launched in April of 2011 and primarily led by Australia, the United States and other CEM partners. It now comes with this unique initiative in full support of developing countries and emerging economies, doing hands on resources on policies relating to new energy assets, no cost expert policy assistance and peer to peer learning and training tools such as the webinar you are attending today.

As for the primary goals for the Solutions Center, first goal is to serve as a clearing house of clean energy policy resources, Second, is to share policy best practices, data and analysis tools specific to clean energy policies and programs, and third, the Solutions Center strives to do deliver dynamic services that enable expert assistance, learning and peer-to peer sharing of

experiences. Lastly, the center fosters dialogue on emerging policy issues and innovations around the globe.

The primary audience is energy policy makers and analysts from governments and technical organizations in all countries. But then we also strive to engage with the private sectors, NGOs and civil society,

One of the marked features that the Solutions Center provides is the no cost expert policy assistance which is known as the Ask an Expert and the Ask an Expert program has established a broad team of over 30 experts from around the globe who are each available to provide remote policy advice and analysis to all countries at no cost. For example, in the area of energy and finance, we are very pleased to have David Nelson, senior director of research and programs at the climate policy initiative, serving as one of our experts. So, if you have a need for policy assistance to energy and finance 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 you can register through the Ask an Expert form on that page. We also invite you to spread the word about the service both in your networks and organizations.

In summary, we encourage you to explore and take advantage of the Solutions Center resources and services including the expert policy assistance, the database of clean energy policy resources, subscribe to the Solutions Center newsletter and participate in webinars like this.

Now, I'd like to provide a brief introduction for today's distinguished panelists. Our first speaker that we'll be hearing from is Rana Adib. Rana is a research coordinator at REN21 and will be discussing key findings from the REN21 Renewable 2014 Global Status Report. Following Rana, will be Evan Musolino who is a research associate and project manager for the climate and energy program at the Worldwatch Institute. Evan will be talking about key findings from the report as they relate to North America. So, with that I'd like to welcome Rana to the webinar.

Rana Adib

Hello everybody! Sorry for those little glitches. I'm very happy to present to you the key findings of the REN21 Renewable Global Status Report which was published beginning of June. Basically, REN21 is producing this report every year and it has been published for the first time for in 2005. It provides a comprehensive and timely overview of renewable energy markets, industry, the investment flow, the policy landscape, and there is also a specific section on distributed renewable energy in developing countries. As well as one feature which changes every year, and which put this year on the tracking of the global energy transition. This is in particular with regards to the fact the REN21 was created at the Renewable 2002 conference which was 10 years ago.

Basically, in this report we are covering all renewable energy technologies as well as other sectors, so power, heating and cooling, as well as the transport sector. What is interesting is that this report is produced in a collaborative effort of over 500 contributors who are providing information on the situation of their countries on a specific topic, on the specific sectors. This basically allows us to also use informal data which for some sectors better reflect the reality of the sector than formal statistics only.

Let me start with a quick look at what happened during the last 10 years. What is really interesting to see in that the projected levels of renewable energy for 2020 were already surpassed by 2010. They really surpassed all expectations. This is not only the case for power but also for other sectors. When it comes for instance as an example to hydropower, we see that there was a tenfold increase during the past decade. What is also very important, also contributing to this growth of the market is that there was a significant reduction of costs from most technologies and that there are also supporting policies in more and more countries.

When you are looking basically at some of the assessments of how the renewable energy situation was forecasted, it's really interesting that for instance for IA when you look at their wind power global and solar capacities, there was a projected 25 Gigawatts and 2010 already achieved was just below 200 Gigawatts. This also shows that it is possible and that today the question is not really on how to make renewable energy possible but rather how to really achieve the 100% renewable future with full energy access for all.

Let me just highlight some key features in this year's global status report. Basically when we're looking at the share for renewable energy in the world, there was a 19% of global final energy consumption in 2012 which was covered by renewable energies. This is split into 10% of modern renewables and 9% of traditional biomass. Compared to the year before this did not really evolve in terms of numbers, however, this figure hides basically the rapid growth on modern renewable energy because it's first hampered by a slow migration from the traditional biomass towards modern renewable energy, but also still an increasing total global energy demand.

This also means to reach the sustainable energy for all objectives to double the share of renewable energy by 2030 from 2010 levels on reaching 36%. It will be necessary to really increase the efforts, speed up renewable energy deployment and also have more action in the field of energy efficiency to cut the demand.

In the report, we're looking into the renewable energy's champions. You will see that for the investment, there is China, US, Japan, the UK and Germany are leading. What is really interesting here is when you're looking not only into the absolute numbers but the investment relative to

the global domestic product, we have a completely different list of countries: Uruguay, Mauritius, Costa Rica, South Africa and Nicaragua. This also showed that there is really a rapid advancement of renewables in developing countries.

Looking at the total capacity or generation, you will see again that China obviously is really one of the main leaders. So very often, figuring on place one but the US and Canada are quite present too. For bio power generation, geothermal, for wind power, for hydropower, renewable power including hydro and even for solar PV. The power sector certainly the area where certainly the renewables are the most developed and where the potential is the most used compared to the other ones. This is partly also due to the fact that the policy and policy debate really focused very much on the power sector.

In 2013, renewable energy comprised 26.4% of global power generation capacity and there was approximately 22% of global electricity produced from renewable energy. What is very interesting is that the renewables accounted for 56% of the new installed power capacity in 2013. In some region even reached much higher numbers like in Europe. In China for instance, the new renewable power capacity has appalled the new fossil fuel and nuclear capacity for the first time in 2013. There is really a lot of things on going.

In the US, the share of renewable power rose to nearly 12.9%. This is despite of the drop in hydropower and the shale gas competition with quite low electricity prices probably also because of some former instabilities of markets and policy instability. There is a trend in North America also to have more community owned and cooperative projects.

The heating and cooling sector, you also really see an increase the energy share of final global heat demand as approximately 10%. However, this clearly is not representing the vast potential renewable energy have in this sector. In Europe, there are at least 20 countries who use renewables in their district heating system. Basically, there are some industrial trends on using combined heat in power plants and the development of renewable energy district heating systems, and also growing use of renewable heat for industrial applications. Yes, there is certainly this heating application is very much linked to the use biomass.

When we are looking at the transport sector, again, it's probably not reaching its potential but 2.3% of transport fuel demand were covered by liquid biofuels and there is certainly a growing interest in using gaseous biofuels and hybrid options, and also on linking basically electric transports to renewable energy. In the US there are for instance, 8,000 electric charging stations and this is something which was pushed very much by at the city level to really develop electric transportation.

Let me just highlight some of the trends in the different renewable energy sectors. On hydropower, there was a total hydro power capacity of 1,000 Gigawatt. In 2013, 40 Gigawatt have been added as new capacity which represents a 4% increase. There is a steady industry growth which is basically driven or very much ruled by China's expansion of the sector but also the modernization of ageing hydropower facilities.

In the US and Canada, which are some of the leading countries, they are representing the third and fourth biggest sharers when it comes to hydropower global capacities. In the US, there is an installed capacity of 78.4 Gigawatt producing 269 Terawatt hour, in Canada, 76.2 Gigawatt producing 388 Terawatt hour. There is certainly also, and this is with regard to the fact in the power market the question of how to integrate larger shares of renewable into the power systems and there is an increasing recognition of the potential hydropower place to compliment the rival renewable energy powers like wind and solar.

Looking at the solar photovoltaics development, 2013 clearly represented the record year for solar PV and for the first time more PV capacity was added than wind capacity. There was a 39 Gigawatt added reaching a total capacity of 139 Gigawatts. China accounted for a third of the global capacity additions followed by Japan and the US with the 4.8% Gigawatts. Basically, there is a spectacular growth and this is partly also due to the fact that there are really decreasing cost of the technologies. In the US, what is also interesting to mention, that there are sizeable concentrated PV projects which make the US a leading CPV country.

Looking at the wind power market still, there is an added capacity of 35 Gigawatts which is done from the year before by 10 Gigawatt, however, retained total capacity of 318 Gigawatt. Basically, the wind market in 2013 slowed down significantly mainly because of the steep drop in the US market which is due to policy instability. The offshore wind market had the record view with 1.6 Gigawatt of its total capacity. North America represents the largest regional market with less than 8% of the global added capacity. The US had +1 Gigawatt reaching 61.6 Gigawatt and Canada +1.6 Gigawatt reaching 7.8 Gigawatt.

Looking at the concentrated solar power, the United States and Spain still remain the market leaders. However, the market shifted continuously to developing countries with higher level of installation. Beyond the leading markets, the capacity tripled for projects coming in line at the United Arab Emirates, India and China. The total CSP capacity is 3.4 Gigawatt with 0.9 Gigawatt added in 2013 which represents an increase of 36%.

Bioenergy I'd say is one of the challenging technologies when it comes to having good consolidated reliable data because it's a very dispersed technology with lots of energy pathways or biomass energy pathways, and it's quite challenging to have good consolidated data here. The assessment is however is that the demand continued to grow steadily and the heating

power and transport sectors and that the total primary energy consumption of biomass reached approximately 57 Extra Joules in 2013.

What is important to keep in mind is that approximately 60% of this biomass was used as traditional biomass. The modern biomass heat capacity has to be at 296 Gigawatt thermal, bio-power capacity of 88 Gigawatt in total capacity. What is interesting to observe in North America is that the pellet industry expanded to keep up with the European demand. Actually in Europe, there is a lot of good policy environment and regulated framework for the development of biomass in particular also pellets and the North America industry adapted to this need.

For the liquid biofuels, they present 2.3% of the global transport fuel demand and the global production rose by 7.7 billion liters to reach 116.6 billion liters. There was investment in biofuel plant capacity which continued to decline actually from 2007 peak. North America remained the top region with regard to ethanol production and consumption, in the US with the production of 50 billion liters and then Canada of 1.8 billion liters.

The geothermal market is actually of 530 Megawatts generation capacity which came online in 2013. This accounts for replacement and that increase was about 455 Megawatt and there was a total capacity of 12 Gigawatt. This represents the capacity growth of 4% and is compared to an average annual growth rate of 3% in the previous two years. So, there is a slight increase of geothermal energy. Basically there is a use of lower temperature fields for power and heat which continues to expand. In the US, there was an added capacity of 85 Megawatts for a total of installed capacity of 3.4 Gigawatt.

Solar thermal heating and cooling is really and the heating sector again, is challenging because it's very dispersed. There is an assessment of solar water and air collector capacity of approximately 330 Gigawatt thermal. The 2013 trends are basically the huge of larger domestic systems but also a great interest in using solar thermal heating and cooling for district heating and cooling, but also for industrial applications. This is also due to the fact that there are technology developments and today you can there is clearly technologies which allow for producing heat at higher temperatures.

The US is number two in terms of operational capacity and creates 16.2 Gigawatt thermal. When it comes to industry trends, China maintained its lead in the manufacturing of solar thermal collectors and there is certainly also an increasing international tension to quality standards and certification, also largely in response to the high failure rates associated with those cheap tubes from China.

Job creation is certainly one of the writing topics when we look at the policy making debate. Globally there is an estimated 6.5 million people

who work directly and indirectly in the renewable energy sector. When you speak with the policy makers, jobs and job creation, local economics etcetera is really a topic which comes up very, very much.

Renewable energy employment continues to advance. However, it also needs to be mentioned that the bulk employment remains concentrated in just a few countries namely: China, Brazil, US, India, Bangladesh and some EU countries. What can also be observed is that there is a shift along the value chain segments and from manufacturing to installation and maintenance.

In correlation with Bloomberg in energy finance and then UNEP Frankfurt school, we are also looking in the global status report into global investment in renewable energy. The global new investment in renewable power and fuels not including hydropower above 50 Megawatts was estimated at USD 214.4 billion in 2013 which is down at 14 % from 2012. When we include the hydropower projects, it reaches USD 249.4 billion.

What are the reasons for decline? Basically, there is certainly a policy uncertainty. There is a retroactive support reduction. On the other hand, there is also sharp reduction in technology costs. It's really important to also keep the impact of policy in mind. In the US for instance, there is a decline off at 10% approximately. The net investment in new renewable power capacity outpaced fossil fuels for the fourth running year, and this is also to keep something very much in mind that it's not only enough to look at into the absolute numbers.

Basically the next slide will illustrate very much on what happens or how to cost also have an impact on the development of renewable energy investment. The gray line here shows the investment in solar PV and it declined nearly 22% relative to 2012. However, when you look at the red line which is the new capacity installations, we have an increase of 32%. This steep cost reductions few have for these technologies and which can also be observed for instance in the wind sector is very attractive or is interesting, and to keep in mind it also offer the possibility to really develop new markets.

When you are looking at renewable energy investment in the world regions, this is something which is also reflective. Basically, there was an annual investment in 2013 of USD 122 billion in developed countries and USD 93 billion in developing countries. So, the developing countries are really increasing a lot.

A renewable energy policy landscape, as mentioned, investment takes place in renewable energies. The markets are there but the policy's landscape is really crucial for reaching these markets and continuing to reach them. The civility here is really important. That's also why it's very good that there is a further positive development actually.

So, basically 144 countries had renewable energy targets and 138 countries had renewable energy support policies in place in 2013. When you compare this to 2004 figure you'll really see a steep increase. What is also interesting to mention is that a lot of the developing and emerging economies have led the expansion during those recent years, with 95 developing countries having support policies up from 15 in 2005.

A challenge when it comes to policy is certainly is that there is a huge focus on renewable power policies, a huge presence of feed-in-tariffs and renewable portfolio standards. The recent developments really focused not only on adopting new policies but revising policies and adapting them to the majority of the markets and the technologies. Again, when you look at situation in Europe and in the US, this really shows how revisions and retroactive reductions can have a negative impact on the development of markets.

Another topic which comes up very much specially the case in Europe, that there are new policies emerging to advance or manage the integration of high shares of renewable electricity into the existing power systems including the support of energy storage, demands I mentioned and smart grid technologies. So, this is certainly something in the power market which needs additional attention and will also lead to the development of new policies.

Just quickly looking into renewables and the distributed renewable energy in developing countries. Renewable plays an immediate role when it comes to energy access and some there was an uptake and positive developments basically in all regions apart of Africa where the population growth is basically higher than the growth and population electrified. This is the region where there is a particular chance and some international programs certainly have a specific attention to this region.

One thing which is quite interesting I think in the context also of North America because there is a lot of technology developments and also mini-grid developments in North America is really an uptake of the topic of mini-grids to address energy access but also bridge-off grid and grid-connected power.

One of the conclusions of the last decade and the confirmation of this year's global status report, basically, the global perception of renewable energy have really shifted considerably. The past decade has set the wheels in motion for a global transition towards renewable and so there is a lot of positive developments. However, we also see, and basically from the developments over the last two, three years in some countries which were more challenging, that there is still a need for a concerted and sustained effort and action.

It shall be focused more on rigorous integration of renewable energy, certainly a levelised playing field for the entire energy sector, the long

term and differentiated stable frameworks to sustain and increase investment levels, and when we see the potentials which are not used that much that needs to be a much greater attention to heating and cooling and the transport sector.

What we specifically see in the context of renewable global status report is that there are still sectors with a little consolidated information that's available, continuous information and data is not tracked and to basically monitor the advancements. In achieving this renewable energy transition, there is a real need for improved renewable energy data.

There is a need to change the current thinking and continuing the status quo of patchwork of policies and action is no longer sufficient. That's basically why we all need to work together and make this energy transition happen. I would just like to mention that the global status report is a collaborative effort and we are very happy for anybody who is interested in participating in this process to get in touch with us and collaborate. Thank you very much for your attention.

Evan Musolino

Thank you John for the introduction and Rana for the global overview. As John mentioned, Evan Musolino with the Worldwatch Institute in Washington D.C. It's an environmental nonprofit. We are doing work in the energy sector in the US and in countries around the world. Building off all of the great information Rana just gave you, I'm going to dive a little bit deeper into what's happening in North America and show some of the emerging trends from that region.

For the purposes of the global status report and since this is based on GSR data, that's what we'll be focusing on here. North America consists of the US and Canada, and while this is one of the smallest regions in terms of number of countries, it's one of the major players in the global energy sector.

As you can see, it accounts for 21% of global electricity generation and 20% of global primary energy consumption, just those two countries alone. In terms of renewables, you can see that the numbers on the side as well, 8% of consumption of solar globally, 29% wind, geothermal, biomass combined at 18% and 17.5% hydro. It's a very big player even though it's only two countries, a very big player globally.

The chart on the right highlights—these countries are really taking the lead on a number of different renewable technologies: hydropower, wind, geothermal, CSD in the US and down the line. They're also emerging leaders in fossil fuel energy, so there's a bit of competition there as we'll get into a little bit later into what the implications of that have on renewable energy sector.

Due to the somewhat limited time for the presentation, I'm going to focus mostly on power generation technologies though there are some very

exciting things happening in the heating cooling and transportation sectors in both the said countries as well.

Renewable technologies, as you've seen on the previous slide for both hydro and non-hydro renewable energy, the United States has the second largest installed capacity of any country in the world, highlighting a few developments in the individual technologies. Solar has seen strong growth in the PV sector as well as solar thermal sector. As you can see on the picture on the right, shows that new 337 Megawatts solar thermal plants that came online in California earlier this year which is a great new development.

The wind sector had seen a large drop off last year compared to the year before and as Rana had mentioned many times, policy instability playing a large role. This is certainly the case in the wind sector, and both tried to peak that we had seen last year and the drop off that we've seen this year, a lot of that due to the uncertainty over the production tax credit.

I'm not sure if people remember. At the end of 2012 the PTC expired. We've seen a rush of installations to get in before the credit expired. It expired at the end of the year, was off the books for a few weeks and then it was extended again for another year for wind in late January, this year. At the end 2013 it again expired and still despite some people in congress pushing for it to be extended again, it's now expired for all technologies, and it's still at the moment unclear whether we'll see that come back again.

We've seen this boom and bust cycle in the wind sector in the US, very much follow the PTC as it has been extended, expired, extended, expired multiple times in the past, so that's something to keep an eye on. Moving forward and unfortunately in the last year has had some negative consequences on the sector.

Geothermal added 84 Megawatts of new capacity in 2013 and the US now accounts for almost a third of total geothermal installed capacity around the world. It's nearly doubled the next closest country, it's 3.4 total Gigawatts installed. Philippines is the second country for accumulative capacity installed at 1.9 Gigawatts. Despite this leading role globally, it accounts for only about half of 1% of total electricity generation in the US.

Hydropower, the third and largest installed capacity by year-end 2013. Hydro in the US now accounts for 6.6% of total electricity generation.

Moving on to just highlight the solar sector in the US, one of the interesting sectors last year. First of all, as you can see on the right, like Rana had mentioned in her presentation as well, that the US is one of the leading countries in CSP installations worldwide. In 2013, US accounted for 42% of total installations. Globally totaling now 375 Megawatts installed and the year accumulative capacity that was second to Spain was

taking lead still with 2.3 Gigawatts installed to the US' 880 or so megawatts accumulative capacity.

Solar PV, as the graph here shows, has benefited from a steep drop in modular prices to install year and year increasing installations. Despite the impressive growth here, the US actually dropped in accumulative capacity a few spots and now ranks fifth behind Germany, China, Italy and Japan. China has added 12.9 Gigawatts in 2013 to jump above the US, and Japan also jumped above the US last year.

One of the interesting stories however, moving from last year into this year, is what we can see it happening in new installations. Renewables last year accounted for 38% of additions in power generation capacity. Through a quarter of one of 2014, they accounted for 92% of new capacity added to the grid network in the US including 100% of new capacity additions in January 2013 from renewable energy sources. So, it's a very unique positive trend that we can hopefully look and see continue moving forward. As you can see, renewables are being added at a much greater rate than over 2013. The one caveat to this is, while the rate is greater, power generation capacity is just being added in a much slower rate overall than in 2013.

So that's what this graph on bottom left corner shows that the red bar shows total capacity added in 2014 versus total capacity added in 2013 in the blue. So even the old renewables are taking the lead in what's being brought online overall power generation capacity, this new power generation capacity is lagging behind what had been added before. And all of this information is coming from FERC Federal Energy Regulatory Commission and their monthly reports on capacity additions in the US.

So, moving on to spotlight a few things in Canada, from the first slide as well. Canada has the fourth largest installed renewable capacity this is including hydropower, whereas the US was second including and not including hydropower, Canada does drop off on hydropower. It's not included.

The solar sector in Canada still remains limited and it has reached—and this is surprising even to me, and we founded in the GSR research that Canadian solar was the third leading PV module manufacturer in 2013, just after some of the Chinese companies.

The wind sector was the biggest surprise, biggest most interesting stories in Canada last year, saw a 70% increase in installed capacity over what was added in 2012 with the addition of 1.6 Gigawatts. That was a record level of new installations in a year for Canada and was fifth in the world, even outpacing the US by one spot in annual additions. Electricity generation from wind was also up in the year, up 3% in 2013 over 2012, and now accounts for 1.5% of electricity generation in Canada. This is a very interesting emerging trend especially as we've seen solar, the share of

solar generation in Canada declining over the year. That's a good sign to see the wind sector taking off a bit.

Hydropower remains the dominant renewable energy source in Canada, 500 Megawatts of new hydro was added in 2013 bringing a Canadian total to 76 Megawatts installed, fourth globally, one behind the US.

Interestingly, while it's behind the US in total installed capacity by one spot, they flip flop in terms of share generation. Canada actually gets more generation out of less capacity based on their uses than the US does with its hydropower capacity.

Ocean energy, another unique component of the Canadian energy mix output from the tidal array in Nova Scotia actually declined this year. It was less than half of its five year average, but the 20 Megawatt array still remains one of the world's largest ocean power installations. We may begin to see this sector increase as well due to policy changes which will be discussed in a bit more detail in a little bit. But Nova Scotia has added feed-in- tariff incentives for ocean power to its existing feed and tariff system in 2013. So, that could also be an interesting new development to keep an eye on.

Just a quick little spotlight of wind development in Canada since that was one of the most interesting sectors last year. This shows where most of the wind capacity is now as you can see is focused mainly on the provinces of Ontario and Quebec, east of the country. Total installed capacity with the 1.6 Gigawatts added in 2013 has now reached 7.8 Gigawatts which breaks kind of into the top 10. It's ninth in the world behind France in eighth.

Investment obviously plays a large role in some of the technology trend bands that what saw here. As what I mentioned, in non-hydro renewable just saw USD 214 billion invested in the sector. In 2013, Canada and the US are some of the bigger players in terms of investment as well as capacity. So, the US, the second largest investor in small scale distributed renewables in wind power beyond just its role as the second largest investment destination for renewable energy.

As with many leading countries, the US was down last year, down about 10%. Canada on the other hand had 44% growth in renewable energy investment, driven in large part by the wind sector. As you can see, Canada was the fifth largest investor or received fifth largest investment in wind power over the year. That 44% increase brought them up to 6.4 billion and brought them into the top 10 globally as well.

Coupled with investment it's interesting to look at the policy situation in both these countries and they're each unique in the sense that while there is some activity at the federal level in both countries, that really a lot of the movement is taking place at the sub-federal level, so, the state level in the US and the provincial level in Canada.

As you can see here, these are some of the major policy drivers of what's happening in the sector. That's what's in place in the US. Here at this map, at the bottom shows renewable energy being included in electricity generation bills by state. So, while there's a lot that's already on the book, in both the US and in Canada. As you can see, there's a lot more coming in the US or at least in the discussion stage.

Renewable portfolio standard is generally cited as a main driver of the renewable energy markets in the US with most states setting a renewable protocol of 10 to around 33%. These have come under fire increasingly in a number of states. I've seen 16 of 29 state level RPS policies. In some levels there are efforts to remove them. So far none of those have been successful. But that's also another thing to keep an eye on. At the same time, there have been many positive examples of states taking action to increase RPS. You've seen that in California, Minnesota and Colorado well significantly last year.

New metering is also increasingly playing an important role and we've seen a few states, California again, New York, and Vermont increased in metering. New York tripled its cap and Vermont raised its cap from four to 15% of peak demand for renewable systems. So, those are interesting to keep an eye on for as well.

One of the main provincial level drivers of renewable energy development in Canada, Ontario had seen some changes to its feed-in-tariff both due to a previously scheduled internal review and also a ruling from the World Trade Organization on the domestic content requirement and was previously in placed in Ontario. Based on that ruling they first produced the share of domestic content required to meet to gain the incentives and then removed it entirely in 2013. So, that's now in compliance with the WTO rules. This is something we're seeing now come up not just in Canada but also in feed-in-tariff policy around the world whether you're allowed to really incentivized domestic manufacturing through the specific corners of that, seems to be settled for the moment in Ontario, but that's an ongoing issue in the global renewable energy policy sector.

That's a very, very quick overview of what's happened in the last year and hopefully puts some of the global numbers in perspective of what's happening in North America. Just a few quick things to maybe look out for in the energy sector in both the US and Canada, both renewables and non-renewables. The first couple of things here has to do interestingly with some collaboration between Canada and the US both on some renewable energy developments and also fossil fuel developments. So the tar sands, shale gas and oil developments in Canada and the US have a large potential to really transform the North American energy market.

I'm sure that many of you are aware of the Keystone XL pipeline decision has been pushed back and that is sort of seen in many ways as the cornerstone of the fossil fuel cooperation between the two countries. So,

that remains to be seen what happens there. But in the US alone, there's a lot of issues with shale gas development. How that placed with renewables, whether the market will be domestic, whether it will be opened for an export. So, there's a lot of potential for movement there.

We're also seeing collaboration in hydropower. While there are already some interconnections between the two countries on hydro development, we're seeing the development of new potential interconnections for baseload power from HydroQuebec to New England and 250 megawatts of balancing hydropower for wind development in North Dakota. So that is an interesting thing to keep an eye on and see if more Canadian hydropower will be coming across the border and influencing the US energy mix.

A few domestic issues in the US: the integration of renewable energy and energy efficiency in state plans under the recently released EPA guidelines for reducing emission rates from existing power plants. As long as the regulations or the standards survive the probably impending court battles, we should start to see states defining, designing their implementation plans for renewable energy. It can make up a large component of that. So, we'll see the role that man plays moving forward there.

The potential extension of the Production Tax Credit which I mentioned before, the investment tax credit now is still available to solar projects through 2016. That's still playing a role, but we'll see what happens with that as we get closer to 2016. Some new financial incentives at the federal levels, so deduction in bonus depreciation and master unlimited partnership for renewable energy are just a few of the things that are moving at the federal level and not directly renewable energy related, but one of the big moving energy issues at the federal level in the US.

We're now losing energy efficiency legislation in both the House and the Senate, which had been seen as bipartisan measures in both places. The Senate version of the Shaheen-Portman Energy Efficiency Bill ended up not passing which was a bit of a surprise but there's still some momentum behind that, so that maybe the next thing to move in terms of energy policy at the federal level in the US. That's an interesting policy development as well.

Just a quick highlight of one of the maybe less impactful but more interesting developments in the US solar sector, the solar panels on the White House were reinstalled this year after many years of people pushing President Obama to reinstall the panels. So as you can see that they are going up in the air back online in the White House. Thank you very much. I look forward to answering any questions.

Sean Esterly

Thank you both to Rana and Evan for the presentation and we'll move on now to the question and answer section of the webinar. We did have a couple of questions come in. one of the questions Evan before that last

five that you had was one the new EPA emission standards for utilities, the one/eleven. Could you expand a little bit on that and see just maybe discuss how you think that policy or that regulation may affect future renewables?

Evan Musolino

Sure. I guess to give a little bit of background on the standard as it threaten now calls former states to reduce the emission rates from extinct power plants. And as the EPA designed it, renewable energy and energy efficiency can play a significant role in doing that. They will basically account credit towards reducing the rate from power plants. I see it as only being a positive for the sector.

I think overall it's still very unclear how these regulations will sort of shake out and what each individual state will do but I think it's definitely a strong incentive to develop renewable energy to start investing overall in just low carbon technologies, and that's hopefully we'll see that work out. Renewable start taking the larger share away from some of the dirtier sources such as coal that a lot of people are saying this rule is designed to attack, whether that's true or not I guess I won't comment on. Yeah, I think renewable energy and energy efficiency also in combination will be very important for a lot of states, meeting these standards.

Sean Esterly

Thank you. Moving on to the next question and this could be for both of you, what are some of the main political factors behind the renewable energy support policies at the state and federal levels?

Evan Musolino

I guess I can take the first shot at that. We're just discussing EPA regulations, how to shake out maybe first of all that's necessary for our states to include some of these technologies in the generation mix. So, that's sort of a new motivation and a new development. But previously, I think renewable energy, green jobs are very important in the US, and Canada as well. Significant manufacturing based which is only helped by the development of a strong domestic market both for solar, wind, and some of the other technologies, but then you also see jobs further along. The value of chain of renewables and some secondary employment installations and thing like that. Definitely the economic implications and the energy security implications as well are really important factors for politicians who are looking to promote the renewable energy sector.

Sean Esterly

Great. Thanks Evan. Go ahead Rana.

Rana Adib

Just to add on this. One trend which can certainly be devolved as really the importance of choice by the customers and this is also something which is really taking into account more and more I'd say, at the local level to really offer customers to choose for a green power trends. I think that approximately, 50% of the US population can choose now to be provided with green power. And this is also certainly something which is I mean where the policy environment is aware of this motor too.

Sean Esterly Thank you both. Now, question specifically for the REN21 global status report, is there any specific data on solar PV capacity in the US provided in report?

Rana Adib Yes. In the global status report we are not really going down to the country level because it's really aggregated information. For PV we are using the data provided to a large extent by the industry associations. When it comes to generation like this which we are not using specifically but were just available, and for country data, you might visit the REN21 renewables interactive net which connects us if you click on www.mac.REN21.net where we are presenting the data which have been collected. I hope this answered the question.

Evan Musolino If I could just jump in. in terms of the overall cumulative capacity in the US and new additions over the last year, since the US is one of the leading countries. It should be included in the reference tables in the back of the report. But anything deeper than that are down to the state level wouldn't be there.

Sean Esterly Thank you guys. At that point that's the last question that I have from the audience. Unless another one comes in, I would like to move ahead now to any closing remarks that you might have. We can start with Rana if you have any closing statements or anything you want to add?

Rana Adib As a closing statement, just always keep in mind that what has been forecasted for today, a couple of years ago was really much below of what was possible. But it is really, really important not to lose these overall targets which is the global energy transition. This is very important when it comes to creating the levelised playing fields. I think that comparison depends on there is really an energy market, a conventional energy market which is existing and very powerful, and some renewable energy really can be competitors, fossil and field subsidies and also others. So, that's really something to keep in mind.

Evan Musolino I think the only thing I would say as a closing statement is probably that despite how politicized energy development has become at the federal level in the US and Canada, there's really a lot of things happening in both countries and a lot of effort being put forward at the sub-federal level to ensure that renewable energy is playing an increasingly important role in either the state provincial or subsequently the federal energy mix in both countries. So hopefully, we can see that continue and maybe those sub-federal policies and efforts can serve as a bit of a lesson for federal policy makers that we can see these national efforts take a larger role in the development of the sector in both the US and Canada.

Sean Esterly Great. Thank you both again. Now, I just like to ask the audience to take a minute to answer a quick survey on the webinar that we have viewed today which have three short questions for you. The first question is, the webinar content provided me with useful information and insights. The

second question, the webinar presenters were effective. The final question, overall, the webinar met my expectations.

Thank you for answering our survey. On behalf of the clean energy Solutions Center, I would just like to thank again Rana and Evan for the presentations and for joining us today and I'd also like to thank our audience for participating. We very much appreciate everyone's time and I do invite the attendees to check the Solutions Center website if you'd like to view the slides and then within about a week we should have posted the recording of today's presentations there as well.

Additionally, you can find the information of other upcoming webinars and training events on the site and just a reminder we are now posting webinar recordings of the clean energy solutions in a YouTube channel. So, please feel free to check that out if you'd like to see other webinars and other videos on clean energy policy topics as well. We also invite you to inform your colleagues and those in your networks about Solutions Center resources and services including the no cost policy Ask an Expert support. And with that I hope everyone has a great, the rest of your day. We hope to see you again at future clean energy Solutions Center events. This concludes our webinar.