REN21 Renewables 2014 Global Status Report: Australia/Oceania

Transcript of a webinar offered by the Clean Energy Solutions Center on 19 June 2014 —
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Webinar Panelists

Christine Lins	Executive Secretary, REN2
Kane Thorton	Deputy Chief Executive, Clean Energy Council

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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 the 21st century, also known as REN21.

In today's webinar we'll discuss REN21's flagship report, the Renewables 2014 Global Status Report with a special focus on Australia and Oceania. And, 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.

And, before we begin I'll go over some of the webinar features. You have two options for audio. You may either listen through your computer or over your telephone. And, if you choose to listen to your computer, please select the "mic and speakers" option in the audio pane. Doing that will just eliminate the possibility of feedback and echo. And, if you choose to dial in by phone, then please select the "telephone" option in that box on the right side of the display with the telephone number, passcode, and audio pin that you can use to dial in.

And, panelists we just ask that you please mute your audio device while you're not presenting. And, if anyone is having technical difficulties with the webinar, you may contact the GotoWebinars Help Desk at the number displayed at the bottom of the slide. That number is 888-259-326.

I want to encourage everyone from the audience to ask questions at any point throughout the webinar. If you do have a question for the panelist, then simply submit that question through the "Questions" pane, and those would be presented to the panelists during the question and answer session of the webinar. If you're having any difficulty viewing the materials in the webinar portal, you will find PDF copies of the presentations at cleanenergysolutions.org/training, you may follow along as our speakers present.

We'll also be posting audio recording of the presentations to the Solution Center Training page within a week of the webinar. And, it will also be added to the Solutions Center YouTube channel where you will find other informative webinars such as video interviews with thought leaders on clean energy policy topics.

And, today's webinar agenda centers around the presentations from our guest panelists Christine Lins and Kane Thornton. And, these distinguished panelist have been kind enough to join us today to discuss the launch of REN21's flagship report, Renewables 2014 Global Status Report.

And, this 90 minute webinar will look in detail at Australia and Oceania region, and we'll find out what renewable changes happen in Australia over the course of 2013. We'll learn which technologies are contributing to increase power capacity and here how changes in policies have affected investment levels in market development in the Australia region.

Now before our speakers begin their presentations, I just want to provide a short informative overview of the Clean Energy Solutions Center initiative, and following the presentation we'll have the question and answer session where panelists will address those questions submitted by the audience, and then closing remarks and a brief survey.

Now this slide provides a bit of background in terms of how the Solutions Center came to be formed. And, the Solutions Center is one of 13 initiatives of the Clean Energy Ministerial that was launched in April 2011. It is primarily led by Australia, the United States and other CEM partners. So we have come to this unique initiative, it includes report of developing countries and emerging economies, to 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 going to be having today.

And, there are four primary goals for the Solutions Center. First goal is to serve as a clearing house of clean energy policy resources; second goal is to share policy best practices, data and analysis tools, specifically clean energy policies and programs; and third is to deliver dynamic services that enable expert assistance learning, and peer-to-peer sharing of experiences; and then lastly the center also fosters dialogue and emerging policy issues, and innovation around the globe. Now our primary audience is energy policymakers and analysts from governments and technical organizations in all countries. We'll also strive to engage with the private sector, NGOs and civil society.

One of the mark key features that the Solutions Center is proud to provide is the no-cost extra policy assistance known as Ask-an-Expert. Ask-an-Expert program has established a broad team of over 30 experts from around the globe who are available to provide remote policy advice and analysis to all countries at no cost.

So for example in the area of buildings, we're very pleased to have Caesar Trevino, leader of the Mexico Green Building Council, serving as one of our experts. So if you ever need policy assistance in buildings, or renewable energy, or energy-efficiency, or any other clean energy sector, we do encourage you to use this valuable service. Again the assistance is provided free of charge. So to request assistance, simply submit your request by registering through our Ask-an-Expert feature at cleanenergysolutions.org/expert. We also invite you to spread the word about this service to those in your networks and organizations.

So in summary, we just encourage you to explore and take advantage of the Solutions Center resources and services, including expert policy assistance, the database of clean energy policy resources, subscribe to the newsletter to learn about new opportunities and information, and participate in webinars like this.

So now I'd like to clarify the brief introductions for today's distinguished panelists. Our first speaker that we'd be hearing from is Christine Lins, the Executive Secretary of the Renewable Energy Policy Network of the 21st Century. And, then following Christine, we will hear from Kane Thornton, the Deputy Chief Executive of the Clean Energy Council, the peak body for the renewable energy and efficiency industry in Australia. And, so now with those introductions, I would like to welcome Christine to the webinar.

Christine

Thank you very much and good afternoon ladies and gentlemen, and welcome to today's webinar. It's a pleasure to be here with my colleague Kane from the Clean Energy Council to provide you with some insights on the status of renewable energy in Australia and Oceania, a region that was on the rise during the last year, and there's also some interesting progress.

I'm going to, the way we're going to proceed is, I'm going to take you to an actual domain findings for the Global Status Report, followed by Kane's presentation on the details of the situation of renewables in Australia and Virginia. So the Renewables Global Status Report was launched about two weeks ago, at the Sustainable Energy For All Forum in New York, and is the result of collaboration of all 500 people from all around the world, contributing data about the status of market industry investment and policy landscape. We do have a focus on distributed renewable energy in developing countries, and this report features the tracking of the global energy transition indicating 10 years of renewable energy progress, as we are celebrating the 10th anniversary of REN21 this year. The report covers all technologies and all sectors from power, heating and cooling to transport.

Let me start in a nutshell with a quick look on the decade. The last decade of evolution of renewable energy was impressive. The development has surpassed all expectations. You see the increase between 2004 and the industry in 2013 on the chart. Renewables power for example, renewables power capacity excluding hydropower, so it's sevenfold increase during the past decade from 85GW in 2004 to 560GW in 2013.

So this purely indicates that renewables are not anymore as small but they are becoming a part of the mainstream economies. Also, most technologies had decreased and the port policies have continued to spread throughout the world. And, I think the main difference to a decade ago is that as of today, renewables have a track record.

Numerous scenarios, projected renewables for 2020 have already… were surpassed by 2010, and today renewable energy technologies are seen not only as a tool for improving energy security, but also as a way to market greenhouse gas emissions, and to provide various and inherent social benefits and workshops. And, we also see there's more and more projects, regions, cities, adopt 100% renewable energy target where we clearly see that the ambition is on the rise.

So what is the situation of renewable energy in the world? Currently renewables provide an estimated 19% of global final energy consumption. There's still… we can see that we still have a long way to go to realize a renewable energy future predominantly relying on renewables. There were new [indecipherable 00:09:57] just shared by final energy consumption remained in 2012, remained about 11 in 2011, even as the share of modern renewables increased. And, this is because the growth in modern renewables is hampered by a slow migration away from traditional biomass, and the continued rise involving renewable energy demand. So that already indicates the interlinked nature and the need to not only look into supply-side policies but also to look into the demand-side policies, and put the focus and emphasis in energy efficiency especially in light of the objective of the Secretary General of the United Nations, and then his initiative sustainable energy for all to double the share of renewables by

2030 from 2010 levels from 18% to 26%. So that already indicates there's a long way to go and it can only be reached if we managed to curve the map.

The Global Status Report then provides an overview of the renewable energy champions. And, this year we've compared… actually we did an exercise showing on the one hand annual investment in total amounts, and there you have countries like China, the US, Japan, UK, Germany as the leaders. But then we also put investment in relation to GDP, and there we get a completely different case, that is Uruguay, and Mauritius, Costa Rica, South Africa and Nicaragua. So that already highlights the level of advancement of renewable energy in emerging countries and developing economies.

While looking into total capacities of generation, there we see that when it comes to total capacities per capita, the EU is leading. We have 42% of global non-hydro renewables capacity in Europe, compared to less than 17% of global energy demand. And, this high share of varied renewables explains the need for increased retention on integration of varied renewables in the energy system. And, I think this is important to recall especially in view of the current discussion that we have in Europe about integration of renewables.

So let me turn a minute to the power sector where the situation is that renewables comprise 26.4% of the global power generation capacity, and about 22% of global electricity that is consumed once produced from renewable. So 1/5th of electricity could use and consumed in the world, generated in the world is renewable space. Renewables accounted for 56% of new installed power capacities, so more than half of all the newly built power plants are renewable space, some higher percentages even in some other parts of the world, for example 60% goes up to 72% for the European Union. The total capacity of renewable energy power is 1560 GW. And, we have a situation that the arrival of the renewables are really achieving high levels of penetration in several countries. We had twin meetings about 33% of electricity demand in Denmark, 21% in Spain, and Solar PV made nearly 8% of electricity demand in Italy. So just effectively to give a few examples that renewables are really contributing significantly.

As far as heating and cooling is concerned, often referred to as the neglected side, we all see that we made a lot of progress in the field of electricity power generation. But in the field of heating and cooling, heating and cooling there's a long way to go. There's a small amount of growing renewable energy share of final global heat demand, which is about 10%. But still as a lion's share of final energy consumption is used for produce…for the production of heating and cooling. It needs to be further focused on the promotion of renewables in the [indecipherable 00:14:27].

As far as transport is concerned, liquid biofuels make about 2.3% of total transport fuel demand, and receive that there is an increasing initiative to link electric transport systems with renewables, particularly at the city and regional level. So what the global reports says, it goes into the development in all different technologic areas, and shows what happen there in the course of 2013.

In the field of hydropower for example, there were about 40 GW of new capacity added. I'm going to go through this very quickly for the sake of time. In the field of Solar Photovoltaics, 2013 has really been a record year. There were about 39 GW of PV added. We see the steep increase in the curve bringing the total capacity to 139 GW. And, for the first time, there was more PV capacity added than wind, and the PV accounted for about one third of the renewable power capacity added during 2013.

China accounted for a third of global capacity additions, followed by Japan and the US. But Australia was ranked sixth in terms of PV per inhabitant and installed its 1 millionth PV rooftop in 2013. I'm sure that Kane is going to go into further detail about this encouraging trends of solar PV. We have seen that the cost have come down significantly, and solar PVs released back in to play a substantial in the electricity generations in some countries, and low prices are opening new markets from Africa, the Middle East, to Asia, and Latin America.

As far as wind is concerned, again 35 GW of capacity were added. However that was… heat waves were less compared to increase with 2011 to 2012, which is mainly due to the market in the US that was down nearly 10 GW compared 2012, reflecting primarily a steep drop or a stop and go policy in the US as far as the renewables are concerned. Also wind had a record year with 1.6 GW added. And, globally wind power capacity by the end of 2013 was now an estimated 3% of global total electricity consumption.

CSP, Concentrating Solar Power, again here, diversification of markets, the United States and Spain, the super dominant markets were joined by the United Arab Emirates, India, and China, so there is an increase in technology. But of course starting from a much lower basis than wind or solar.

Bioenergy demand continued to grow in the [indecipherable 00:17:46] and achieve both in the heating power and transport sectors, total primary energy consumption of biomass which approximately 57 EJ in 2013, of which almost 60% was traditional biomass. And, there was more than bioenergy heat technology for the majority of biomass used, and we see that the field of bio power capacity goes up by an estimated 5 GW to 88 GW, so also some increase there.

In the field of Geothermal, the net increase of geothermal generating capacity was about 455 MW bringing the total capacity to about 12 GW.

We see that the use of low temperature feeds for both power and heat continues to expand, which increases the application of geothermal energy beyond high temperature locations. And, countries with capacity added, New Zealand, strong in the region, and followed by Turkey, and the United States, Kenya, Mexico, the Philippines, Germany, Italy, and Australia.

Then when it comes to solar thermal heating and cooling, their sole amount of water and air collector capacity exceeded 283 GW in 2012 and reached an estimated 330 GW of by the end 2013. We see that there is a trend towards a larger domestic systems going into some district heating and cooling, as well as industrial applications, however last year also saw some industry consolidation. And, also in the field of solar heating and cooling as in many other areas, China is an important player which accounts for more than 80% of the global market.

When it comes to jobs and employment, about 6.5 million people working directly or indirectly in the renewable energy sector. The bulk of employment remains concentrated in a few parts of the world namely China, Brazil, US, India, and some EU countries. China remains the largest employer in the sector with about 60% of employment concentrated in Solar PV. And, in general we see some trends, some shift along the value chain segments from manufacturing to installation and maintenance.

Now when it comes to investments, 2013 was the second consecutive year of planning investment after several years of growth. And, this was due, you see it on the graph, investments went down to about 214 billion including hydropower investments larger than 50 MW, the investment level reached about US$249.4 billion. And, the reason for this decline was policy uncertainty on the one hand, retroactive support reductions especially in some European countries. But also, and this we should not forget, that sharp reductions in technology costs, we still have the situation that net investment in renewables power capacity outpaced fossil fuels for the fourth year running.

But this is the trend that we have seen last year where you see on the graph the orange… the orange line indicating the increased Solar PV global capacity additions, and the gray line showing any trouble investment in Solar PV capacity. And, even as global investment in solar PV declined nearly 22% relative to 2012, new capacity installations increased by more than 32%. And, this sharp cost reductions throughout the last year as we have seen in Solar PV, and also also to some extent in wind, make renewables very attractive for new markets and developing countries where there is strong need for electricity generation capacity and where energy demand is increasing.

So yes it is a challenging situation for some industrial players, but it's a very good signal because emerging markets are clearly on the rise, and it's

already… it's also shown in this graph showing how global investment is spread by world regions. They have a situation that in 2013, Europe's investment in renewables was down 44% from 2012, you see the light blue part on the graph. And, for the first time ever, China invested more renewables than all of Europe combined.

We also see that there are some changes and increase. The most notable was Japan, invested in renewables increase by 80% relative to 2012 levels, and we also see sharp increases in countries like Canada, Chile, Israel, New Zealand, the UK, and Europe for example. And, the rise in the renewable energy investment in Asia and Oceania, that is the dark blue on the graph on the bottom of the right side of the chart, could be observed, which continued uninterrupted increase in investment overtaking US investments to become number three in renewable energy investments.

And, Australia was ninth largest investor and leading in the Pacific. And, New Zealand, as I mentioned, also increased investments of some very, very positive trends. Of course in addition to some mixed messages market coming from markets like Europe and the US, where you see in the last two years some reductions. So in general I would say the renewable energy investment into 2013 shifted east and shifted south because also the Americans, Latin America, excluding Brazil saw quite some significant increase input.

On the field of policy, an interesting situation there, we have by early 2014 at least 144 countries in the world that have renewable energy targets in place, and 138 out of these had support policies, developing and emerging economies have led the expansion in recent years and now accounts for 95 countries out of this 144 with policies up from 15 in 2005. And, it really shows how much progress we've made in introducing policies in developing and emerging economies.

As in past years, most renewable energy policies elected are revised. 2013 focused on the power sector, Feed-in-Tariffs and renewable energy portfolios are the most popular instruments, have exceeded public competitive bidding, are tendering further prominence with number of countries turning to public auctions rising from 9 to 55 as of early 2014.

We also have 19 countries with heat obligations and 63 countries with policies to promote the production of consumption of biofuels for transport. In 2013 as I mentioned already, there was an increasing focus in the revision of 815 policies and targets, including retroactive charges with some adjustments made to provide policy efficiency and effectiveness, and aid to curtail costs associated with supporting developments of renewables.

And, particularly in Europe, these new policies are merging to advance or manage integration of high shares of reliable renewables in the policy systems, including the support for energy storage, demands of

management, and it's not with technologies. I've worked on distributed renewable energy developing countries, we see that energy excess in the use of distributive renewables is increasing. We make progress on all developing continents where the growth in population electrified is bigger than the growth in total population.

In Africa however, the population growth rate exceeded the rate of electrification, and there are still only 43% of the population electrified so that already shows this kind of challenge. We see that the world energy markets have been increasingly recognized as business opportunities, the new business models emerge, and many technologic solutions such as mini grids or ICT applications available to really provide sustainable energy to the poor in a distributed way.

In conclusion, I think the last decade test showed that the global perception of renewables have shifted. As illustrated by the cover of… a recent cover of the New Yorker, I think that we can see that today renewables have arrived to the mainstream, and now the preferred energy source of the general public in nearly all parts of the world. But despite all these achievements, it is also clear that we need to move fast, and more deliberately. If we are serious about doubling the shares of renewables in 2030, and about the joint excess to clean and sustainable energy for all people by 2030.

Integration of renewables into existing energy systems will be a challenge. The systems were designed for centralized generation and often have difficulty in coping with integrating decentralized flexible renewables. And, for this, what is needed is close collaboration between all sectors from public and private sector that is needed in order to make this integration happen.

That is something that REN21 is committed to achieve together with its partners from both the private and public sector. And, with this, I would like to thank you for your attention, and give the floor back to my colleague to tie the loose ends and for his further elaborations.

Kane Thank you Christine, and good morning or good afternoon to everyone joining. Thank you again to REN21 and Clean Energy Solutions for the opportunity to join the webinar today. And, I'm going to really focus on Australia, and to a lesser degree the Oceania region. As the Clean Energy Council, we are [indecipherable 29:09] of the renewable energy and energy efficiency industry here in Australia, so you'll have to excuse my bias towards Australia in my presentation.

Anyway we move on to the first…to the next slide. Maybe just a really high-level overview of the current status of renewable energy in Australia. And, this slide, it really shows that renewable energy is starting to make a move as far as its contribution to the energy mix in Australia. 14.7% of the total energy is coming from renewables by the end of 2013. And, the

right-hand side chart which shows that the lion's share of that renewable energy is hydropower.

Australia has a long history of hydropower going back almost 100 years of development throughout the 1960s and 70s. But as I'll get to in my following slides, more recently a lot of that hydro development is now really complete and much more focus on wind and solar. And, as you can see here, wind now up to 27% of the renewable energy contribution, and solar moving quickly now up to 11%. Maybe it's just worth noting the fossil fuels previously dominated Australia by coal, black coal and brown coal generation, with small percentage coming from gas by power generation.

We can move on to the next slide. I thought I'd just stop by just giving you an overview of some of the key drivers within the energy market within Australian. And, I expect these common drivers for energy markets rather around the world certainly at the moment. Australia is, for the first time in certainly the last 30 or 40 years, seen a fall in overall energy demand while peak demand continues to increase steadily, largely driven by air conditioning use. And, now some of the overall energy demand is falling and that's for a number of reasons.

Firstly, obviously the Australian economy is, you know, a state of transformation largely manufacturing sectors kind of slowed down, and our services sectors are growing, obviously has an impact in energy demand. But also I think it's fair to say the increasing uptake of energy efficiency, and also demand side, as I mentioned are starting to part in terms of the overall energy demand and the efficiency about consumption.

Australia has had a carbon process in place now for a year or so, and very clearly would seem that having an impact on the overall level of emissions, and obviously constraints on our fossil fuel intensive energy fleet. And, it's worth knowing a lot of that cold power station fleet is quite old and very much approaching the end of their operating line.

There has been a significant progress in Australia, and around the world on entire electricity process and this is meant only from a policy and regulatory approach has been a significant be response of that predominantly in the form of the regulation and the costs associated with our electricity networks in Australia.

And, the fourth key market driver is the rising gas prices. Australia has an abundant supply of natural gas, and causing gas and there's a lot of developments occurring at the moment to developing these energy facilities has already had a significant impact on gas process domestically. And, I think it's fair to say that it's got a long way yet to go as we really move towards international prosperity. So really what does this mean I guess from a renewable energy perspective? These are all quite important drivers. We know here in Australia we have massive renewable resources,

we have some of the world's best renewable energy resources right across the whole suite, opportunities, we have a well-developed industry and certainly traditionally over the past years, we have what we considered investment grade policies support which I'll come back to a bit later in the presentation.

So I think as Christine said, for the rest of the world, we're really starting to see that the renewable energy sector mature in Australia, and starting to really I guess reach some pretty cool mass and start to have impact on the energy market and start to obviously drive down cost and increase scale and I'll come back to that later quite shortly. May I have the next slide please.

So I'll just take a bit of a tour through each of the technologies. Solar PV has really been the fastest mover in renewable technologies in Australia over the past two or three years. Australia now ranking sixth in terms of PV uptake as a percentage of the population. And, we ticked over a significant milestone, a million Australian homes with rooftops PV which equates to one system every 2 minutes and 39 seconds in 2013.

And, this is obviously, you know, the back of some healthy levels of support from governments, state governments with Feed-in-Tariffs, and also Federal government through the renewable energy target. Those two incentives combined with the effect and the cost of solar PV has come down fairly significantly over the past three or four years. And, we've seen retail electricity process increase. And, that's meant there has been a pretty fairly positive payback for Solar PV. We've seen over the last year or two a lot of those state based Feed-in-Tariffs went back, which obviously meant some.. a bit of a bumpy ride for the Solar industry in this area over the last couple of years.

But still .8 GW installed in 2013 again under some fairly challenging business conditions bring us to a bit of a 3.3 GW in total in Australia. We're also seeing really the increased interest in community owned renewables across the board in Australia, certainly I spent some pioneering community owned wind projects, I'm seeing a lot of public interest and community interest in PV projects. As per CPV with… we're saying we've got a good number of projects around in Australia that are very much in the demonstration areas of development and obviously more opportunity for that technology into the future particularly given that the pickiness about…the next slide…

Moving on to wind, Australia was the only country in the Pacific to add wind capacity at about 100 MW or a bit more throughout 2013 and bringing out the total installed capacity to a bit of a 3.2 GW. We saw a number of large projects commissioned throughout 2013 including the mechanical wind project down in Victoria which is certainly now the largest commission project in Australia at 420 MW. We've also seen a

number of the wind projects under construction and continually on construction into…early in 2014.

I think it's fair to say there's a bit of stalling in development of wind technology at the moment. So while there will be a few projects for each commission in 2014, we expect all to be a slower year certainly in the next year or so than the previous years. And, I guess to note that in Australia, I think New Zealand to a certain degree, obviously the cost of wind has been trending down while the cost of wind is still well above the wholesale energy prize, it is becoming increasingly competitive with newly build certainly coal and gas lines and plants.

It's worth noting I guess in terms of wind, obviously wind deployment is focused on the southern and eastern coastline of Australia, all of it's onshore, happening offshore wind, and it's worth noting South Australia is certainly the state that's leading the way as far as wind in Australia. Now well over 25% of its generation for that state comes from wind. And, in fact, just today, that breach is as high as 50% wind generation for the day. So while the overall contribution of renewables is relatively… still in the relatively low-level worth 8.7% across country in some regions and jurisdictions of Australia, certainly as it relates to wind, it got quite high right of penetration. And, they're really saying it has a pretty material impact on the electricity mix in those states.

It's obvious a lot of the discussion for the moment about interconnection and the strength of the network between those states so that well Australia can take advantage of some of the best wind resources, we can also ensure that that energy makes it through the demands centers distributed around the country. We could move on to the next slide.

So touching on geothermal, I think it's fair to say in this scenario that New Zealand is certainly been leading the way more traditionally in geothermal. It was number six for generation capacity up to 0.9 GW last year with another material increase. A new 82 MW geothermal power station came online in 2013 in New Zealand. Well in Australia I think we had some notable advance particularly with the first EGS facility in the Northern part of Australia which is essentially moved through and demonstrated its potential, which we know is quite significant in Australia now given the geothermal resources. Obviously some significant challenges had for the geothermal in Australia particularly given the changes in the policy environment so I'm not too sure. The next slide.

Solar thermal heating and cooling, we've certainly have strong market for solar hot water in Australia. Slowed little bit over the last years predominantly because of the significant uptake in Solar PV and the impact that it has had on obviously consumer spending, and obviously rooftop availability had some impact on the uptake or solar thermal for heating and for cooling. It's fair to say it's still early… still at the earlier stages there but obviously a lot of interest in solar cooling particularly in

the residential and small commercial sector given the heat and conditions here in Australia. Throughout 2013, 600 MW of unglazed solar thermal came online reaching 5.1 GW. So some, you know, still steady growth in that area. Let's go to the next slide.

Overall investment dollars really for the third year in a row, we were over $5 billion worth, that's in Australian terms, 4.4 last year in US dollar terms. So another year of steady investment. I think the right to deployment were up a little bit. Some of the…obviously the cost of deployment is trending down so those slow investments are fairly stable again after last year. I'll come back shortly to give some insight as to how it might look in the next couple of years.

These obviously exclude R& D and it's worth noting that there continues to be a fair amount of activity in R & D in Australia, particular the in the solar sector. It's fair to say Australia has got some real, some really world class capability in solar PV R&D, and that continues to receive a favorite attention particularly from the Asian region where some of the leading Asian businesses partnered with some of Australia's research institutions in again particularly the solar sector, and New Zealand also had a steady increase in this as well. Next slide please.

So what's the market outlook? Obviously as has shown it has a massive renewable resource and potential. A lot of that has been very well developed, you know, resource… well sophisticated resource assessments, a lot of projects with planning approval certainly in the wind sector, and increasing in the large-scale solar PV sector. I think it's fair to say the Australian consumer is really awakened as far as the understanding of the benefits of solar PV and rooftop generation, and that appetite doesn't look like it will change anytime soon.

On the policy front, I think it's fair to say it's fairly challenging policy environment in Australia at the moment for the renewable energy sector. Obviously with the change of government late last year, this meant that the carbon price has been replaced last year and currently in place is set to be repealed by the election committee from the government. And, they're really working towards introducing legislation to have that Carbon price repealed really early into July, so that's obviously subject to the vagaries of the Australian Parliament.

They're also committed to abolishing the $10 billion Clean Energy Finance Corporation. This was an institution set up by the previous government really aimed at providing competitive finance to those earlier stage projects and technologies where financing is obviously a key barrier, both in terms of the cost and availability of the significant amounts of finance necessary. And, unfortunately the new government is committed to abolishing that institution. And, they've also very substantially reduced the funding available to the Australian Renewable Energy Agency, and

also moving to wrap that institution back up into the realm of government department.

It's worth noting the Australian Renewable Energy Agency has been playing a pretty important role particularly for those earlier stage technologies like geothermal energy, like Marine energy, and also large-scale solar to really provide that grant funding into those projects to help them get away and straight some of the first projects in the country. So really I guess the reduced funding for that institution is going to mean that we're likely to see a slowdown in the innovation in the energy in certain renewable energy sector in Australia in the incoming years.

And, the fourth barrier is probably the one that is most significant in terms of the outlook as it relates to technologies like wind and solar. The government is undertaking a review of renewable energy target. And, renewable energy target really is critical to the deployment of renewable energy in Australia that's game has been in place since 2001, and the legislative target that requires liable parties particularly electricity retailers to purchase a certain amount of their energy from renewable sources, and that creates renewable energy certificates as the currency for that scheme.

That review is underway. An independent panel has been appointed by the government to take that review and they're expecting to report back to government in late July for government to make a decision on the future of that scheme sometime later this year. So obviously that will have the outcome of that review, it's fair to say we'll have the material impact as to what some of these numbers, the investment numbers, the deployment levels of wind and solar and other technologies probably in the years to come.

As I said consumer support remains strong certainly in the small-scale systems. And, I guess despite all of that, you know, it's fair to say the long-term outlook for renewable energy looks favorable. The cost of these technologies are coming down, the cost of retail electricity is continuing to trend upwards, and so it's very much a trend at play here. I think it's fair to say the renewable energy target is critical to ensuring that the deployment continues over the coming years. But nevertheless there is still this inevitability about the economics of this technology in the long-term. We go to the next slide

Christine Sorry Kane, I seem to be having some technical difficulties…

Kane That's okay no problem. Look that's… I've actually noted I don't have it on the slides, that could be probably…

Christine That could be why. Thank you.

Kane Look having wrapped up, I'm very happy to take questions obviously on any of that very brief overview of the market place within Australia for

renewable energy. Obviously 2013 was a very…was another steady and positive year in the industry. The strong uptake of solar is very strong, good strong uptake of wind, you know, I think there's certainly some uncertainty about 2014 and what comes after 2014. The review of the renewable energy target is obviously going to be critical to that, and you know, we're hoping for the right outcome so that the industry continues to grow here in Australia. So thank you very much and I'm very happy to take questions or comments.

Sean Thank you to both Christine and Kane for the excellent presentations. And, at this point we will go to questions from the audience. And, we received one through e-mail. And, just before we start, I just would like to remind the attendees today that if you do have any questions for the panelists, you can submit those by typing those into the question pane, it will be submitted that way.

And, so Kane one of the questions we have is, "What do you foresee in the future for stronger policies in Australia for an increase that would help drive an increased rate of deployment of renewable energy? It has to be when looking at the… some of the current efforts of the government?

Kane It's a good question. Look it's fair to say that the industry is quite anxious at the moment in Australia. And, that's if you look I guess at the policy changes that are being put in place over the past six months with the new government, I think the industry is right to be anxious and concerned about the future. The review of the renewable energy target will really determine that, and so, you know, I think the outcome of that review will really dictate whether the industry continues, you know, with fairly steady and strong growth.

I think the current renewable target takes us up to about 45,000 GW hours of new generation about 2020. And, so that's a pretty strong level of deployment that we would require in wind, solar, and other technologies between now and then. There's… I think it's fair to say it's unlikely there'll be any increase in the renewable energy target as a result of that review, and lot of anxiety and concern that there may in fact be a material reduction of the target out to 2020, and therefore the right of deployment is likely to be slow in the coming years.

So, you know, I think there's certainly in the long-term out beyond 2020, in 2030, very clearly there's a big opportunity in Australia and there's an inevitability I think, about the levels deployment of renewable energy over the coming years. A lot of concern that the renewable energy target review, assuming that a slowdown of deployment levels throughout than an acceleration.

Sean Thank you Kane. And, I'm kind of…as a follow-up to that question. If the RET is cancelled, the renewable energy target is canceled, do you have

any insight or ideas on what a replacement for that? What the alternative project might be?

Kane Yes it's a good question. I think it's fair to say there really isn't much discussion about an alternative. I think it's fair to say that the debate at the moment in Australia is very much about the level of deployment of renewable energy. There's very little… there's no real credible suggestion that the renewable energy targets scheme as a policy measure is not an effective measure. You know I think it's worth noting it was designed back in…well it's put in place back in 2001, it's been reviewed on a number of occasions, and each time it's concluded that it's very effective policy mechanism.

And, therefore the current review, I think it's fair to say is less concerned about, "Is the right mechanism to deploy renewable energy?" It's much more focused on, "Is it is deploying the right amount of renewable energy?" particularly in the context where our demand in Australia has reduced and we really do now have at the moment an oversupply of energy largely because we have a lot of old fossil fuel-based generation that has not exceeded the energy market like some people may have anticipated.

So I think the short answer is, you know the mechanism itself is quite effective and probably supported. The real debate is how much renewable energy we need to bring into the energy mix over the coming decade.

Sean Great. Thank you Kane. And, Christine do you have something to add?

Christine Well I think it is worth noting for the audience who might not be familiar with the review of the renewable energy target in Australia, if I understand correctly, and Kane correct me if that's wrong, this is a review process that takes in to the legislation that happened, is it every two years? Because I remember I was in Australia at the invitation of the King and his Council in 2012 where this renewable energy target review was ongoing at that moment, which of course is an element of policy which introduces insecurity of the market, and we always say that predictability of the policy framework is the most important thing. But it is not something completely unusual, but it's something that is taken to the legislation on a regular basis over the…Kane is that correct?

Kane Yes Christine that's correct. To me it's quite a cruel piece of legislation in many ways because as an industry, we really are facing at the moment essentially the second review in two years. It is a legislative review for every two years and in fact noting that each review takes probably over a year. By the time the government makes a complete… makes a decision and should that then require legislation, so the previous government reviewed this game, that review completed in about April last year, and now this review which kicked quite early in the year. So as you could imagine that's having a significant impact on investors in the renewable

energy market in Australia. It's very, very difficult to get policy certainly or to reach commercial close on a project when the critical policy is being reviewed every two years.

I think the positive news is that I think everyone has accepted, including the new government, that that is very unhelpful part of the legislation. And, there is broad agreement that this review of… one of the conclusions of this review will be there shouldn't be an ongoing two-year review. In fact 2020 is probably the right time for another view of this game. So if no other… if there's no other change to the renewable energy target from this review other than the fact that there might be another two-year review then that would be a great outcome in the industry.

Sean Great. Thanks Kane and Christine. And, now shifting to a different topic. Kane how are the grid companies in Australia adapting to the growth of rooftop solar or rooftop photovoltaics?

Kane Another great question. Look I think Christine in her presentation made reference to the fact that the electricity grids were built around very much a centralized model and that's very much the case here in Australia. So the short answer is that the businesses are not responding very well to the accelerated uptake of Solar PV, rooftop PV.

I think it's fair to say that the rate of deployment of PV has caught many people by surprise and the network businesses in particular. And, you know, I think the levels of deployment of Solar PV are still relatively small in terms of the overall energy mix for most networks. And, so I think it's fair to say that the technical issues are not significant. I think there's probably some very isolated cases where there are high penetrations out on very narrow parts of the network. But on the whole, I think the technical issues aren't so significant.

I think what we have saying is an increasing discussion about essentially the business model for these network businesses, noting many from the government-owned, they're certainly monopoly regulated businesses, and most of their…basically their business model is based on volumetric processing. And, so a combination of lower energy demand and the impact of Solar PV is meant that these businesses are no longer making the same money essentially from customers as they were. And, so we're really starting to see, we're trying to say those businesses are acting numerous ways, everything from suggesting that Solar PV should be… shouldn't be connected to the grid through to arguments about changing entire of our arrangements so that these businesses can recover a greater amount of cost.

So I think it's fair to say, it's very early days, I think the grid business is really a bit behind in the game. I think they're being surprised by the rate of uptake and the impact of things like solar PV on their networks and, you know, we're really only now saying, I think mature conversations

about what that means in the future, what it means for, you know, the technical aspects of the grid, you know, what it means for [indecipherable 00:59:27] whole range of technology issues and then equally what appropriate arrangements might be so that we continue to support solar. But yes certainly they're very complex issues.

Sean Okay moving on to the next question. It asked, "Kane, can you please can you make an informed guess as to what clean technologies will receive the most investment in the coming year?"

Kane Yeah. Look, in Australia, if you just look at the cost right down across different technologies, and you know, large scale wind is currently the lowest-cost technology. And, so, you know, I think it's fair to say it's likely to continue to receive the greatest level of investment. All, be it rooftop Solar PV, I guess, it's in my presentation, the economics of rooftop PV along with, I think, the Australian public's engagement with Solar PV means that its popularity and the level of investment is likely to continue to grow quite strongly. So I think, you know, really these two will be the standout leaders.

We're starting to see, you know, the growth of commercial scale Solar PV. When I say that I mean, you know, businesses, this is inside the made up rooftop of, you know, large warehouses, manufacturing facilities etc. and that's the sector that's starting to grow quite strongly in Australia. Again in particular given the economics, as-is large-scale Solar PV ground-mounted we've got some really exciting demonstration projects around the country albeit given the reduction in some of the grant funding programs available, then those projects will have some…likely to have some challenges in the next year or two.

But certainly given the developments internationally among industries then we would think that that technology has a strong future. So they're probably the latest, certainly some interesting developments in geothermal and marine energy, again they still have got a long way to go I guess to demonstrate the different forms of technology. And, with the reduction in government funding, it's fair to say they won't play a major part in the local investment in the coming at least few years.

Sean Thanks Kane. I think building a little bit on your comments about Solar, the next question is regarding concentrated solar power. They mentioned that there is the RIVA project, the Trust project, a few others… where do you see this segment of the market going in Australia?

Kane Yes certainly there's a number of really interesting CSP projects around the country at the moment, relatively smaller in scale but really exciting demonstration projects. I think it's fair to say it's a technology that has a lot of potential in Australia, obviously fantastic solar resource, particularly when you think of the storage, and that's a topic I haven't touched on. But given the increasing pickiness about energy demands, given this long

narrow nature of electricity grids, then CSP with storage has a massive potential and a lot of opportunity.

This technology is still at an early stage and so while we do have those demonstration projects, you know, it's fair to say the government programs and supports for these types of technologies, I think is going to slow down their deployment and uptake over the coming years. But, you know, I think the cost trajectory is there, the opportunity, and the role of that technology, again storage compliant is strong in the market, I think over time that value will be more, you know, readily acknowledged and realized, and certainly it has a long-term…has a healthy, healthy future. The short-term is going to be a little bit more challenging given the limits of government support.

Sean All right thank you Kane. We have a couple of questions for Christine. Christine, the first question is, "Is there ever likely to be a truly binding global agreement on CARP? And, if so, do you think it would be most likely to be based on emissions, carbon budget per person, carbon budget per GDP or some other?

Christine I guess if I had the correct answer for that question I would not be sitting here but I would already be somewhere else. I think that… I mean the world looks into having an agreement in Paris in Autumn 2015, at the day of 21. A couple of months ago I would have been pessimistic about this agreement but with the recent announcement of Obama and the commitment to significantly reduce the emissions of power plants, as well as the invitations received from China, and the need to curb CO2 emissions, also out of all the pollution problems that the country is facing, I'm quite confident that we might be able to reach the annual emission reduction agreement in Autumn 2015.

I think it will… I mean I don't know exactly how it will look like. I could very well imagine that there will be on emission reductions. The European Union as well is currently discussing the energy and climate package focusing on 2030 where most likely on October this year a decision is expected. So we're moving towards this direction, and as of today I'm more confident than I was a couple of months ago that such an agreement will be reached. But how exactly…how it will look like is something that will need to be determined in weeks and months to come.

Sean All right, thank you Christine. And, another question for you. It asked, "Either in your report or elsewhere, has any research been done on how renewable energy aids or detracts from global or regional security and the elimination of poverty?

Christine Yes there were several reports looking in this practically [indecipherable 01:06:50] for example has published earlier in June about what they called the Two People's Outlook. There are several studies petitioning from the REN foundation for all initiatives. There are several publications showing

that energy is at the core of development and that effectively it would affect…and especially in Africa, large parts of the population are un-electrified. And, there's only 43% of the population, I think, has access to electricity, and that is clearly…I mean these are the poorest regions of the world. So there is a very close link between energy access and poverty.

This has been studied, and as I said, we are trying to shed a light on the distributive renewable energy situation in developing countries because it is not only about providing access but providing sustainable access. And, so the more we see it in this area is often lacking and also causes policymakers to be hesitant about putting frameworks in place. So it's been a vicious circle. But yes, there are several publications looking into this.

There was also a special report of the World Energy Outlook about two years ago showing energy access, so there are several links. And, also the person who asked that question should be able to find a lot of literature in the footnotes in the Global Status Report in the online version. The report can be downloaded free of charge from the REN21 website, Ren21.net/gsr, and there you have all the footnotes and the references of all the literature that went into the distributive renewable energy section, and there you should find a lot of literature that can orient you in that domain.

Sean Thanks Christine. And, just one quick follow-up for that question on that international law and the climate debate in general. Do you think that there's any potential for international jurists in law to get involved in the climate debate?

Christine Well I think so. There is a lot… I mean… I would suggest that the person who comes up with this questions send me an e-mail and then I'm happy to put him over in touch with like-minded people work in that field.

Sean Great I'll certainly forward your e-mail along. And, that was the last question that I received from the audience at this point. And, with that I just like to give both Christine, starting with Christine and then Kane just to transfer any final closing remarks that you may have.

Christine Thanks a lot John well I think that overall 2013 has been an interesting year, challenging some parts of the world mainly in Europe and the US, interesting in other parts of the world, exciting in other parts of the world such as Australia Oceania, such as China, which has really establish itself as the renewable energy champion in less than a decade.

And, then we see…I think the progress that we see in developing and emerging economies in policy frameworks and investments is very encouraging one because these are the regions of the world where energy demand is rapidly growing. I think that we have made a long progress, big progress along the last decade, and we'll definitely have an exciting

decade ahead with probably new challenges. And, I'm also pretty confident that in close cooperation with public and private sectors, we can face these and contribute to increasing the share of renewables in all different sectors from power, heating and cooling to transport. And, with this I transfer you over to Kane.

Kane

Thanks Christine. I think in the Australian context we…we're in a similar…we're in a very similar situation which is, you know, as an industry, we've developed a lot over the last decade. We feel a lot with each critical mass, we've seen costs come down. The industries, particularly wind and solar, really start to mature and so we feel there's really a trend at play here. And, I think saying I'd like to repeat regulate is to say that the next six months is riddled with challenges. We've certainly got a policy challenge in front of us over the coming period, but the next six years is riddled with opportunities. And, so I think while, you know, I think it's likely to obtain another challenging year but we continue the march towards becoming a very, very competitive within the energy sector. And, in the long term, there's no question that renewable energy has a very large role to play here in Australia.

I think listening to Christine give an overview of what's happening around the world, on my level, that reminds me that Australia is probably a little bit out of step with the rest of the world, and the progress that's occurring in other parts around the world. But equally it makes me feel a little bit better because some of the policy uncertainty is certainly not just us in Australia but I think it reminds us all that there's an inevitability about the role of renewable energy in the energy mix globally and also here in Australia. So thanks again for the opportunity to speak today.

Sean

Great. And, thank you both again for the presentations and the great discussions afterwards, and addressing the questions from the audience.

And, now at this point, I just like to ask the attendees for today's webinar to just take a second. We have three short questions for you to answer that just helps us evaluate how we're doing and how we can improve for future webinars.

So Heather if you could please display the first poll question for the attendees. And, that question is, "The Webinar content provided me with useful information and insight"; and the next question is, "The Webinar's presenters were effective"; and the final question is, "Overall the Webinar met my expectations".

Alright thank you so much for answering our survey. And, on behalf of the Clean Energy Solutions Center, I would just like to again extend thank you to both of our expert panelists today for joining us, and to our attendees for attending today's webinar. We do appreciate your time very much. And, everyone should check the Energy Solutions Center website if

you'd like to view the slides or listen to the recording of today's presentations, as well as any previously held Webinars.

So you can go to the cleanenergysolutions.org/training that's where you can find that information on additional webinars, find the slides from this webinar, as well as a recording which we will post there. You can also now access webinar recordings at the Clean Energy Solutions Center YouTube page, and that's the second link on the slide, and we have additional videos on there as well. And, so that I hope everyone has a great rest of your day, and hope to see you again in future Energy Solutions Center events, and this concludes our webinar.