

REN21 2013 Renewables Global Status Report: Focus On Australia

—Transcript of a webinar offered by the Clean Energy Solutions Center on 19 September 2013—
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Webinar Panelists

David Green Chief Executive, Clean Energy Council
Christine Lins Executive Secretary, REN21

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Moderator Welcome to today’s webinar hosted by the Clean Energy Solutions Center and REN21. We are very fortunate to have Christine Lins and David Green joining us. This great group of panelists will be discussing the REN21 Renewables 2013 Global Status Report with the Focus on Australia.

Next slide. 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. The information provided in this webinar is featured in the Solutions Center resource library as one of many best processes, resources reviewed and collected by technical experts.

Next slide. And, before we begin, I just want to go over some of the features of webinar. For audio, you have two options. You can either look into your computer or over your telephone. If you choose to listen to your computer, please select the mike and speakers option in the audio pane. By doing so, you will eliminate the possibility of feedback and then the echo. If you select the telephone option, a box on the right side will display the telephone number and audio pin you can use to dial in. Panelists, we just ask that you please mute your audio device when you’re not presenting. If anyone has any technical difficulties when the webinar, you may contact the GoToWebinar’s help desk at (888) 259-3826.

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Next slide. Now, we have a great agenda prepared for you today on REN21 Renewables 2013 Global Status Report with the Focus on Australia. Before our speakers begin their presentations, I just have a short informative overview of the Clean Energy Solutions Center initiative and then following the presentation we will have a question and answer session. Then wrap up with closing remarks and a brief survey.

Next slide. Now, this slide provides a bit of background in terms of how the Solutions Center came to be. The Solution Center is an initiative of the Clean Energy Ministerial and is supported through a partnership with UN-Energy. We launched in April of 2011 and are primarily led by Australia, the United States and other CEM partners. Now, outcomes of this unique partnership included support of developing countries through enhancement of resources and policies relating to energy access, at no cost expert policy assistance and also peer-to-peer learning and training tools such as the webinar you are attending today.

Next slide. The Solutions Center has four primary goals. It serves as a clearinghouse of clean energy policy resources. It also serves to share policy best practices, data and analysis tools specific to clean energy policies and programs. And the Solution Center delivers dynamic services that enable expert assistance and learning. Then lastly, the center fosters dialogue on emerging policy issues and innovation around the globe. Our primary audience is energy policy makers and analysts from governments and technical organizations in all countries. Well, we do also strive to engage with the private sector, NGOs, and civil society as well.

Next slide. Now, one of the great features that the Clean Energy Solutions Center is able to provide is the expert policy assistance known as ‘Ask an Expert’ and it’s a great service offered at no cost. We have established a broadsheet of over 30 experts from around the globe who are available to provide remote policy advice and analysis to all countries. For example, in the area of geothermal, Photovoltaic, and solar thermal technology, we are very pleased to have John Wright of Wright Energy Consulting serving as our expert.

If you have a need for policy assistance as well as emission technology development or any other clean energy sector, we use encourage you to use this useful service. Again, this assistance is provided free of charge. Now, to request assistance, you can submit your request by registering to our ‘Ask an Expert’ feature at cleanenergysolutions.org/expert. We also invite you to spread the word about this service that goes in your networks and organizations.

Next slide. So I encourage everyone to explore and take advantage of the Solutions Center resources and services including expert policy assistance, subscribe to our newsletter and participate in webinars like this.

Next slide. Now, I’d just like to provide brief introductions of our distinguished panelists. First up is Christine Lins, executive secretary of

REN21 who will be providing overview of the key findings of the 2013 global status report.

Next slide. And then following Christine, we will hear from David Green who will provide an overview of the status for renewables in Australia. David is the chief executive of the Clean Energy Council.

And with those introductions, I'd like to welcome Christine to the webinar.

Christine Lins

Thank you very much. Good afternoon, ladies and gentlemen. Okay. So I think by now you will be able to see my screen. I am happy and privileged to be here with you this afternoon and to present the global findings of—or the finding of the global status report along with David Green from the Clean Energy Council, our member who will give you insights into the situation for renewables in Australia.

Before I start taking you through the presentation in a nutshell, who is REN21? We are a mighty stakeholder network of experts and coalition of the willing that is composed of the public and the private sector with the aim of promoting a love of renewable energy. It's a network composed of international organizations, IRENA, the IA, the World Bank and different UN agencies, some development banks, different national governments, experts in the field of science and academia, industry associations such as the Clean Energy Council for Australia and different NGOs.

We are headquartered at the United Nations environment program in Paris in France. One of our flagship activities is the issuing of an annual report, the global status report that gives a picture about the status of markets, industry, as well as policy in all sectors of renewables in the field of power, heating and cooling and transport. It also covers all renewable energy technologies. It is nowadays based on contributions from a team of over 500 contributors, researchers, and reviewers worldwide. It is launched together with UNEP's global trends in renewable energy investment.

What I'm going to do in the next couple of minutes is to take you toward the main findings of the report knowing that the full document is downloadable from our website, www.ren21.net where you'll also find all the references and tables and the background information of the facts and figures. So in the natural as well as renewable energy in the world stand today and this is a specific slide which refers to 2011 but all the other data is actually data from up to 2012. But in 2011, the estimated renewable energy share of global final energy consumption was in the order of 19%.

When you look at the graph, you'll see that it is—this is divided half provided by modern renewables and the other half by traditional biomass. We have been observing that the share is continuously growing. However, the growth was relatively moderate. This is also due to the fact that energy demand is still increasing. I think that already shows that we definitely

when looking into the renewables sector, we must not forget also looking into demand side because renewable share will automatically increase if demand goes down but so far, an increase in the share of renewables.

What does this mean in the power sector? Their renewables comprise more than 26% of global power generation capacity around the world and about 22% of global electricity is produced from renewables. Renewables account for just over half of all new electric capacity that was installed in 2002 that was in the order of 280 gigawatts around the world. So meaning, more than half of all the power plants around the world were renewable-based. I think this is a figure that is—that is quite impressive and it shows that renewables are really quickly making their way into the energy system, into the power mix of countries.

As I've mentioned, we do not only look into power. We also look into heating and cooling and into transport. We see that renewables offer a lot of possibilities in the heating and cooling sector through the uses of biomass, geothermal, and solar thermal. We clearly see there a trend towards the use of larger systems in the field of heating and cooling. And I think it's quite encouraging also to see that solar collectors for the production of water and space heating and now it is used in more than 56 countries. As far as transport is concerned, liquid bio-fuels provide about 3.4% of global transport fuels and we see also with the introduction of other renewables that electric mobility is promoted in many countries and that often-used programs are closely tied with renewable energy policies and incentives.

Now, we're taking you in a nutshell through the different technological sectors. The year 2012 can definitely be described as a solar year. The total operating capacity of solar PV reached the 100 gigawatts milestone in 2012 and I would just like you to spend a minute looking at this graph where it clearly shows that it took us 15 years to go from close zero to 40 gigawatts and then in two years, we more than doubled the share around the world. This exponential increase was on the one hand coming with significant price reduction for solar PV modules that fell significantly from 2011 to 2000—from 2010 to 2011. Also in 2012, it fell by another 30%, which makes the technology competitive and available also for many emerging economies and developing countries that which of course also led to quite some challenging situations in the industry with quite some quality consolidation going on there.

By the end of 2012, Australia, China, India, and Japan had more than one gigawatts of PV capacity installed. Australia was among the top ten markets for PV in 2012. As far as concentrating solar thermal power is concerned, we see a similar development also from a different starting point. A lower starting point but clearly we see the interest in CSP on the rise. Australia added nine megawatts to its little power station. We have several plans and interests across Asia, Africa, the Middle East, and Latin

America starting along with the historic developments in the US as well as in Europe predominantly in Spain.

As far as wind power is concerned, similar success stories that you see also there, quite a continuous growth. In 2012, almost 45 gigawatts of wind power capacity began operation, which increased the global wind capacity of 19% to 283 gigawatts. Also, there we see a lot of things happening in Asia mainly in China.

Hydropower, we have another 30 gigawatts of new hydropower that was added in 2012. Globally, I think it is fair to say that globally there is a renewed interest in hydropower. The World Bank has just announced to reverse its decision and it will finance and have a lot of projects in future. So there is also a lot of dynamics in this sector.

As far as the jobs are concerned worldwide, renewable energy employment continues to rise. In 2012, there were an estimated 5.7 million people working in the renewable energy sector. We clearly see that more and more countries are aware and conscious of the benefits of renewables and put policies in place also for job creation and economic opportunities.

As far as global investment in renewable energy, 2012 was an interesting year because global—new investment in renewable power went down 12% as you see on the graph from the previous year's record, from 2011 record. I mean, on the one hand that is—that is an increase. But we also have to acknowledge that this is still the second highest ever amount spent on investment in renewables. What I show—showed it to you before is installed capacity continued to rise, continued to grow. So we also see that this is the retouching investment is up to a certain part a result of the falling technology cost.

But I think what is very interesting in 2012, what we noticed is the dramatic shift in the balance of investment activity between developed and developing countries. So this 244 billion are composed of 132 billion invested in developed economies, where investment overall fell by nine—29% so there was quite a reduction, whereas in developing countries investment reached 112 billion, representing an increase of 34% in 2000—compared to 2011. I think that already shows a very interesting trend. Namely that renewables are making their way into energy system of a broad range of countries. The developing which have an ever increasing and energy demands are the ones investing most heavily and in general what we saw mainly last year is a significant reduction in investment in many OECD countries.

So you see on this slide a reduction of 37% in the US, 27% in Germany, 51 % in Italy. But on this graph, you also see that Australia is a very—very admirable exception because there in Australia, investment increased by 40% to about 6.2 billion US dollars. So we see that many of the OECD countries went down. Australia increased significantly and a lot of the

developing countries increased investment which overall makes it—makes the reduction in investment only 12 % compared to the previous year.

I mentioned before that more and more countries adapting renewable policies in the global status report. We also look in the different measures that are used. It's very encouraging to see that the number of countries with renewable targets has more than doubled between 2005 and 2012. So we have a situation now that a lot of countries have targets and policies in place at least 138. So about 140 countries around the world have renewable energy targets, out of which nearly all of them, 127, have also policies in place to accompany and to ensure that these targets are actually reached. We see most policies in the power sector and we also see that policy makers are increasingly aware of potential national development impacts of renewables in the form of job creation, in the form of economic value creation.

The global status report provides a very comprehensive policy table which gives an overview on—of the applied instruments worldwide, on a country-by-country basis but also probably the underlying basis for the reduction in investment. What we do see is that there was some policy stability, instability in some countries so mainly in the OECD countries, mainly in the US and in Europe, we saw as an outcome or as a result of the financial crisis. We saw some retroactive policy changes which of course detrimental for the success.

So I'll finish with a quick outlook. Some of you might be familiar with the UN secretary-general's campaign, 'Sustainable Energy for All,' which is composed of three complementary goals to be reached by the world by 2030. One is to ensure universal access to modern energy services for all. The other one is doubling the global rate of improvement in energy efficiency and third, doubling the share of renewable energy in the global energy mix. I think this is a very good set of objectives.

Again here, you see the integrated approach of demand and supply looking there together. Together with the World Bank and the—or under the coordination of the World Bank and the IA, REN21 and other extras have worked towards the establishment of a global tracking framework where 2010 was established as the baseline of—for the initiative. In 2010, the renewable share and global energy mix was roughly 18%, higher percent to the figure of 19% for 2011. So you see that we are on the right track. But still, if this doubling was to be met that will result in 2030 in roughly a 36% share of renewables. There are several studies out there that clearly indicate that this feasible.

However, it will not be feasible if we continue with business as usual policies. We definitely need practical stable frameworks that are put in place because—and it's also quite ambitious because it does not consist about doubling the share of traditional biomass. But, really significantly increasing the share of modern renewables and in that sense the doubling

the share of renewables for 2030 will need to at least—will need to result in at least a tripling of the share of modern renewables including sustainable hydropower. Which I think already shows us that we both will need some big centralized projects but we also need small renewables installations and clearly we need a level playing field for renewables and an aspect that is becoming more important as the share of renewables increases is the integration of renewables into energy systems, into power grids, etcetera. There is a lot of work going on in this aspect and there are a lot of technical challenges to be overcome and there is of course also the need for policy addressing this integration aspect.

With this, I would like to thank you for your attention and hand it back to the organizers.

Moderator And we'll turn the presentation over to David Green at this point.

David Green Oh, thank you very much and for those of you listening there, good afternoon from Melbourne. Just once the slide that come in from the screen, just a bit of the—but it's—oh, there are the slides. Just a little bit of the political and policy contracts for the presentation I'm about to give. As many as you are probably aware, we had the federal election in Australia about ten days ago and the main platform of the now Liberal National Coalition who forms the government was amongst some of the things that abolition of Australia's carbon tax. The Prime Minister has now signed the executive order which instructs the public service to start the process for doing that which will require legislation. The climate change minister has now also signed the executive order which will lead to the winding down of the Climate Change Authority and the Clean Energy Finance Corporation. Both had happened in the last 48 hours after the Prime Minister was formally sworn in by the Queen's representative in Canberra.

So we're very much in a very live political scene here. But I think the thing that is—will interest the Clean Energy Council is the key policies worked that we all worked on which is the renewable energy target and it shall be explained my presentation. It was in fact created by the coalition a number of years ago by a previous Liberal prime minister and they have made an absolutely solid commitment to it through its duration. And they maintained a strong bi-partisan commitment to the Australia's renewable energy target and beyond that to Australian's United Nations climate change targets as well such as the context. But some of the things they may refer to maybe institutions that—and I know they're all going to be quite apparent as they were when there was such a—less than a year ago by the previous government.

Finally, just for those who aren't aware, the Clean Energy Council is the lead organization in Australia for all forms of clean energy through—from energy efficiency right away through to wind, various forms of solar, geothermal, etcetera. We have roughly 500 members. We run among some

of the things, policy work, accreditation scheme to solar industry and obviously all the usual accounts and corporate functions. But that's enough of the background but it will it be useful for completely politically? To give you that background, perhaps I could ask our colleagues to move from the first slide on to the next slide, please.

This slide just shows that and it partly emphasizes the point that Christine made about the volume of renewable electricity generation in the—in Australia, which is 13.14% from renewables and different fossil fuels, some 86%. I should point out that all the figures I gave will sadly be electricity only because unlike the UK where I worked up until a year ago, all the targets here are based on electricity use unlike the European target that I'm more used to which covers both transport, electricity and heat. I'm more than happy to pick up on those points of discussion but all these points relate to electricity.

See if I can have the next slide, please. So the next slide just shows of that breakdown of electricity from renewables, what is it made out from. Hopefully, a lot of hydro particularly in Tasmania, a small contribution from geothermal, quite a lot of contribution from wind, and also from large-scale solar and small-scale solar. Today, we actually launched the guide to installing solar PV for business and industry in Australia, which we launched with one of the Chambers of Commerce here in Victoria today. Obviously, last year we also were delighted to mark the installation of the millionth solar roof in one of the domestic in Australia. And that's really been far ahead and there's every indication whatever changes happen federally or indeed in the state level, there will be a powering ahead of domestic solar, which is extremely popular with consumers, as well as controlling their energy bills.

Next slide, please. This just shows the cumulative installed capacity of solar PV. You can see a very dramatic increase there. There was this amazing interstate competition. Bear in mind that solar is federal system, very amazing interstate competition over feed-in tariffs from 2007 to mid-2011. But even though virtually all the states of Australia have either abolished or won back their feed-in tariffs of the protected set on price for solar PV and obviously the growing imports of solar PVs from China in particular. It's not what we hoped and we believe to a self-sustaining basis where we have every expectation it will continue to grow. The real challenge in the industry here is that all these process taking place in the context of a decline in energy demand in Australia. So clearly, there's a quite a job to be done to make sure that the upward trend in solar particularly and in wind as well continues because obviously we're now—developing the clean energy is not very much challenging than those who generate their power from that more conventional sources. But looking at the international press, some of them—many of us are now facing in many parts in the world as we see the growth in this region of renewable energy.

Next slide, please. I won't dwell on this one too much. May I remind again to be on the website later and but this just shows the scale of investment in Australia comparing 2011 to 2012. All these figures are from our Clean Energy Australia report, which we launched in Parliament in June this year. Obviously if anyone wants downloaded a copy of the full report, you're very welcome to go to our website and get a copy of it. But this just shows the scale of investment that's taking place amongst the range of technology in Australia. Obviously, the biggest investment has been in solar and that's been a lot of household-based investment as well as now some quite large and remote solar farms are developing as well.

Next slide, please. Again, it just puts it in a different form. You can just see that one's a more colorful and diagrammatic form there with obviously wind a pretty large proportion. But the light-blue color is small-scale solar and that's really powered ahead in the last few years.

Next slide, please. We are always keen to try and understand what the job distribution is in this field. It's obviously something that's very important particularly with solar which plays an electric across the whole of the country. You can see from this number full-time employees working there in the industry across the country and they're not surprisingly solar PV outstrips in any of those because it is very dismissive. It is very localized. There's loss of a lot of electricians involved and they're busy as I say being the clean energy heroes of Australia and day to day installing solar on roofs across the country.

Next slide, please. This just say—gives a state-by-state snapshot. For those of you who aren't aware, Australia is the classic federal system, one of the only four fully federal states in the world. So energy policy in Australia actually sits with the states. They just give out certain functions the federal government in Canberra. Obviously, the climate change negotiations they conducted February as are some of the energy market operations as well. But broader the energy markets are not joined up bearing in mind it takes four hours to fly across all of Australia to get from one market to another. Most of the installation work that is going on has been in the southeast perimeter which stretches around from where I'm speaking from in Victoria in the bottom right hand picture here right the way up to Queensland in the top right on the sides. The fascinating thing's many are interested in this energy.

If you look in Western Australia and in Northern Territory but you won't see it in this slide but there's an awful lot of remote area power grids in those areas with remote aboriginal communities in which are switched away from diesel into solar but obviously also in the mining areas a lot of which is in the North or Western Australia. They are very remote and they are looking increasingly at how they can use solar or where appropriate wind although traditionally they've obviously used that diesel on where it's available gas but increasingly they're getting things about other that could be used. But it's not one unified market. It's two markets, the small

one in Western Australia, the bigger one in Eastern Australia with lots of smaller network particularly around parts of Western Australia and Northern Territory.

Next slide, please. This again gives you the same information in a diagrammatic form. So from here you can see very obviously at the bottom, New South Wales which is a state in which Sydney is based with a very large amount of hydro. That's the snowy hydro steam very much since it's hot there but also quite of a wind and also solar PV. Victoria, where I'm speaking to you from, has quite a dominant on its wind. It's very wind we're seeing here but also solar PVs come up very strongly. Whereas in Queensland, very strong on solar PV for it's a sunny state, subtropical and obviously also got potential to bio energy which by in large using for gas from the sugar processing industry, a sugarcane industry up in Queensland.

But again, with a number of climate zones we have in Australia, clearly we've got a lot of climatic variation and therefore a lot of potential for different forms of renewables with the one overlaying that it's very sunny for most times of the year. But the challenge that produces is the very steep rise in air-conditioning there across all of Australia which now means these are very picky demand to be left across the electricity network in the warmer months of the year which is basically off in the southern hemisphere around December.

Next slide, please. Again, just giving a breakdown of megawatt capacity by state. I won't dwell on this. It's quite a dense diagram. A dense table but does emphasize the points that are being made in my earlier slides.

Perhaps I can just quickly move on to the next slide. This is now just starting to look at about the sizes of some of these schemes and where they are and its total capacity. So for example, you can see again New South Wales a very large amount of installed capacity but a big capacity to do more and in New South Wales, quite a large amount of renewable projects in development by megawatt. Similarly in Victoria, lesser in Tasmania because they've got quite a lot of smaller island stake with a quite a lot of old hydro there already and then distribute it across the other countries and other territories and states. We can see in South Australia, SA on here, whereby in large or many or quite a few days of the year wind is now providing base load in South Australia so it'd be quite a development of that wind technology up there.

Can we move on to the next slide, please? Again, a very dense table so, people, you may want to download this and look at it, the ledger. But it does just say the remarkable growth in solar. Just to point briefly, on the left-hand side you'll see ACT. ACT is the Australian Capital Territory which is as its name implied, is the state in which Canberra and the Federal Parliament is based. Not only does the Federal Parliament have solar on its roof but the state government there, they have a very

interesting scheme which is what's called a reverse auction. It basically declared themselves open for business of solar, a part of their own demand and for the state's demand and the territory's demand as well. But on doing that, they've invited people to come forward and bid for contract to supply them. That's gone very well and the contract has been formally signed to develop a reasonably sized solar farm just outside of Canberra. It was signed about two or three weeks ago.

Again, if anyone's interested, you can look at our website and you can find out a bit more about it. But it's a quite interesting development. But obviously, the very big growth in capacity of the solar has been particularly in New South Wales on the back of some very generous feed-in tariffs which is now largely watching the system. But also quite a growth in Victoria and obviously also in South Australia and WA, Western Australia where you can just see the growth has been since 2001. Fairly steady up to 2006, in 2012, they are making a very big change from 2008 onwards when it was the very generous feed-in tariffs across most states in Australia. Again, most of us have now wind it back but we certainly believe the market is now about to have a very self-sustaining basis.

Can we move on to the next slide, please? That was the cumulative capacity of installed. This is the annual capacity. Again, it just shows the rate of installation in the—between 2001-2012 period. Again, a very similar picture.

So perhaps we can just move on to the next slide which goes by installations. You'll see the bottom right-hand corner there, the time this table was done, it was 936,810. Not long after, we got to one millionth roof which we celebrated with a hot soda here in Melbourne but very strong interest. It's now across most states in Australia and it was a very effective campaign run by a grassroots organization in Australia called Solar Citizens which is about mobilizing those one million households to a lot with the case solar. So they did a very effective campaign. During the election, for example in Western Australia, the state government there were getting to traumatically cut back the support for solar and a very, very rocky period rather than what we would argue towards the phase period and as a result of very active campaign run by Solar Citizens. The state government there changed their mind within a week of announcing the changes in their legislative policy there.

Now, we'd just like to move on to the next slide. Again, about solar. Again, it just illustrates graphically what's been going on. So I do commend to you our report which gives a lot more of this and you can study in more detail at your own leisure.

Again, if I can move on to the next slide, please. This actually shows installation of solar water heating. Not quite such a positive story because some of the incentive for solar water heating have been wind back. Before,

it pretty got a self-sustaining basis so that solar water heater that you made in some cases here in Australia particularly in Victoria where I'm talking from. This—the issue that this will face is this a lot of people they think about solar water heating at the moment when their existing water heating goes wrong and therefore it's safe to make kind of alternative distress payment.

We are certainly pressing the governments to be a bit more systematic about this and we are very pleased to see that the incoming government of the now Prime Minister Abbott is committed to a new program of assistance for the solar water heating sector and that together with the program of potential support for solar PV is very sensitive again to be focused predominantly on low income households. We haven't by large acquired as much benefits as some of these programs, as many of us would think they should do.

Now, if you want to move on to the next slide which will look at the cumulative take-up of wind. Again, you can see a very rapid growth in the green bars there. Picking up particularly from 2008 and 2009 when the MRET was introduced, the Mandatory Renewable Energy Target and it's not going as rapidly as it used to now. Wind is by no means as popular as solar but it is still very popular in many parts of the country and there are some deals being closed now which means there's some good prospects being developed out there.

If I may move on to the last few slides. The next one, very briefly, it's about geothermal. At geothermal, a bit of a challenging history on geothermal in Australia, quite a lot money has been there, put in to developing some of these wells. Some of them are coming through quite well but it's been avoided when it comes from the bigger ones. So there are sure a lot of developments here that should turn into generating reality. So some of them have not proved to be as driven as they might have been but it is again a technology. It's got potential. Good, good geothermal sources in some parts of the country and services that we hope would be a bit more of in the future.

Now, if I could just look at bio energy which is on the next slide, please. Bio energy, quite a lot of bio energy along a string of it in Queensland on the top-right at the side of the slide. Again, based on the sugar industry, sugarcane industry up in Queensland but again, quite a lot of biomass there, bio energy schemes based there in both ACT and New South Wales and also here in Victoria. This does mean there is potential for it. We would like to see it more developing. Not so much in some of the other parts of the country but it tends to the area where there's good crop growth and potential for bio energy. Certainly some of them we think will be a bit more of particularly get the opportunity in some states where it's a bit colder to use the heat as well.

If I could move on now to the final few set of slides. The next one we have hydropower. Again, quite a cluster of hydropower schemes around the New South Wales and Victoria. A lot of that is off shoots of the Snowy Hydro Scheme. Again, Tasmania, Tasmania hydro and all form of electricity in Tasmania come from hydro. But again, some interesting developments taking place and some new ones under developed. I think it's a smaller scale one. So we think there will be some further potential for that as well.

If I can now move on to the next slide, please, which large-scale solar. Now, two quite large-scale solar schemes are being concluded to contract stage very recently when we—I think particularly in the remote communities, there will be more potential for large-scale solar. You can see the clusters. They really are in the remote areas where there's a lot of potential for off-grid solar and your basic putting solar instead of some fairly polluting oil diesel and that some of the many communities are getting much more strongly interested. Again, you'll see the few dots from Western Australia. They by large mining sites where they're using solar for housing or their back-up facilities.

Moving on to marine energy, on the next slide, please. Thank you. Obviously a big island, Australia, there will be a potential for a lot more marine. You see it clustered around Victoria where you've got some very good tied origins that had been exploited. This is quite an interesting innovations taking place. And something ARENA which is the federal government's R&D agency for renewable we're getting to see more of. So we're reasonably confident that some of these will begin to develop. There are some good marine opportunities that have been looked over for west coast of Australia as well. So again, that's something we'll see—I believe we'll see a bit more of or the part under the phase some would like to see.

Finally one last slide...next slide, thank you. It's finally on wind power. This is the main site. There's a great cluster of them in South Australia where some of the base load is that now for wind. Again in Victoria and again in New South Wales are they are interlinked by one grid that stretches right out to Queensland as well. Not so much potential in Queensland. It's going to be more solar and biomass in Queensland where South Australia and Victoria more wind. There's just been a strengthening of the grid connection between South Australia and Victoria are announced and that should help some of the power flaws in the wind in South Australia where there's still quite a few steps to go. Although the general view is that it is market of almost nearly saturation for wind there in South Australia and because that clusters you can see around there are on the large urban areas rather than some of the very remote areas where you tend to find more off grid potentially with wind or solar.

So that really concludes my presentation. I'm happy now to the best of my ability to answer any questions so we can close down the slides up there

and I can hand it back to our convener to take as many questions and discussions. Thank you all very much.

Moderator Thank you, David and thank you, Christine, for the great presentation. We did get a couple of questions from the audience. I do want to remind all the attendees today, if you have any questions, you can submit those through the Question pane in the GoToWebinar panel. The first question refers to a specific slide that was in your presentation, David. It refers to slide 15 and it notes that there was sharp decline in photovoltaic growth after 2008. Were there any policy changes or is it based on the economic crisis? Do you have any insight on to the cause over that decline?

David Green Well, as I said, in 2008 it's when the state government began to wind back their feed-in tariffs. They came out very strongly around 2008 and then 2011 time, they began to wind back. I haven't got the precise slide in front of me. I'm just looking for it, to be told but basically the decline from—in where there's a huge increase in 2008. I'll show you my slide. That was very much in the back of the feed-in tariffs and then that's carried on but drops. There was some slight drop of it as the government wind back their feed-in tariffs but we see they continued up with growth. As you say, you can see a decline in 2011 here. That's very much been on the back of the changes in the feed-in tariffs and similarly, you see a quite a marked decline in the light-blue line on the slide 15 which was in Tasmania. That was again a result of the policy changes. Very often the policy changes happen virtually overnight so you get a bit of a rush to sign up then it start to level up after awhile.

Moderator Thank you, David. Another question that we received is regarding the current status energy storage highlights in Australia. Could you talk a little bit about any energy storage projects or pilot demonstration efforts going on?

David Green There's a lot of interest in energy storage in Australia. As is in many countries as way of balancing out the renewables averaging and there've been one or two developments on a small island called King Island. They have policies in some energy storage. There are companies very actively looking at it. It's an area that ARENA, the Australia Renewable Energy Agency is very actively looking at of the moment. They are very keen to encourage particularly spot or remote area. Remote area schemes but I think their grant support over this scheme is just getting to get underway. Everyone is saying this is a next big thing is to get the storage cracks.

Moderator Very good. Another somewhat relatable question to energy storage but also involving off grids, small grid solutions in the isolated areas such as mining region, the aborigine regions, are they utilizing off grid, small grids? Do you have any details on the experiences made there?

David Green They certainly are using it. I couldn't give you all the details and that's certainly on our website. But there is a lot of interest in remoter communities in using off-grid solutions. I know some quite big solar

schemes that are developed completely without subsidy in Northern Territory where they're basically replacing the old diesel engines with solar and they seem to be working there very well. But these are very remote sites. Off with their own, just a small group for one town. They're not interconnected and subject to the logistics of building the solar schemes. They can work very well in Australian environment. Again, certainly we've been working very actively with Green Earth to promote through a series of workshops we've done across Australia looking at off grid systems. So in certain area, there's a lot of interest.

Moderator All right. Thank you, David. That was all the questions that we received from the audience. At this point before we take our quick survey, I just like to provide the opportunity for you, David, or you, Christine, for any closing remarks that you might have.

David Green Shall I go first, Christine, or you want to...? All I'd want to say is I've been very absolutely pleased to take part in this seminar. I would want to convey to people listening there across the globe that Australia's very much open for business on renewables and don't be put off by the headlines in the international media about what various politicians may and may not be saying. There's a very active renewable industry here, very strong across the party support for it. The new climate change minister and the energy minister are both extremely keen to see more people come into Australia to support the renewables regime. So I would encourage people to look at the potential here. Get in touch and see what could be done.

Moderator Thank you, David. Christine, we should have--

Christine Lins Thank you very much, David.

Moderator We did have a question come in for you, Christine, while David was providing his closing remarks. It's a question that asks, how effective do you think the 'SE4All' initiative will be at driving international action?

Christine Lins Well, 'Sustainable Energy for All' is an inspirational goal. I think what it will do it will help more and more countries to get on board. I think it's an initiative which mobilizes a lot of action in different areas and what we clearly, I mean and the situation has changed completely to a decade ago. A decade ago, we have a couple of countries being renewable champions. Now, the geography is spreading and with such an initiative such as 'SE4All.' I think this helps to generate a large buy-in of countries because clearly as I indicated, this—the doubling of the shares of renewables is not going to happen just by chance. It needs really the efforts of all the countries and I think 'SE4All' will mobilize a broad set of countries who will take action and to follow the different champions that are out there.

Just following David's remarks, I can just confirm. I had the privilege upon the invitation of the Clean Energy Council to be on Australia about a year ago from now. It was in September 2012. It was really interesting to

see the dynamic place. I think the renewable energy target that is there is a very, very good framework and I think it's very impressive to see a country heavily relying on coal really going renewables. There's definitely a lot of challenges still to be overcome. But there are also a lot of things happening. And yeah, I just look forward that the energy revolution continues down under.

Thank you very much for listening in and thanks to the Clean Energy Solution Center for hosting today's webinar.

Moderator

And thank you again for the presentations today. Now, we'd just like to take a moment to ask the audience to answer a very brief survey on the webinar you viewed. We just have three short questions for you to answer. Your feedback just helps us improve future webinars. Andrew, if you could put up the first question, please.

The question is, the webinar content provided me with useful information and insight.

Moderator

Okay. And the question, please. The webinar's presenters were effective.

Moderator

And then the final question. Overall, the webinar met my expectations.

Moderator

All right. Thank you for answering our survey. On behalf of the Clean Energy Solutions Center, I'd like to extend a thank you to our expert panelists Christine and David and to our attendees who are participating in today's webinar. We had a great audience. I very much appreciate your time. I would like our attendees to check the Solutions Center website over the next few weeks. If you'd like to view the slide and listen to the recording of today's presentation as well as any of the previously held webinars including the REN21, it's there. Just so you'll find information on upcoming webinars and other training events. We'd also invite you to inform your colleagues and those in your network about Solutions Center resources and services including the no cost policy support.

I hope everyone has a great the great rest of your day. We hope to see you again at future Clean Energy Solutions Center events. And this concludes that webinar.