

REN21 2013 Renewables Global Status Report_ Focus On European Union

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Webinar Panelists

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Christine Lins Executive Secretary, REN21

This Transcript

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Vickie Healey

Good day everyone! I am Vickie Healy with the National Renewable Energy Laboratory, and I'd like to welcome you to today's webinar hosted by the Clean Energy Solutions Center and REN21. We are very fortunate to have Christine Lins and Rainer Hinrichs-Rahlwes joining us to be our panelists today and they'll be discussing the REN21 Renewable 2013 Global Status Report with a specific focus on the European Union. Next slide please. Christine and Rainer could you mute your devices please if they're not already muted? Thank you.

One quick important note I've mentioned, before we begin, we have a little disclaimer. The Clean Energy Solutions Center does not endorse or recommend specific products or services and the information provided in this webinar is featured in the Solutions Center's resource library as one of many best practices resources that are reviewed and selected by our technical experts.

Before we begin, I'll quickly go over some of the webinar features. For audio, you have two options. You may either listen through your computer or you can listen over your telephone. And if you choose to listen through your computer, please select the mike and speakers option in the audio pane. And if you select the telephone option, a box on the right side will display the telephone number and your audio pin that you should use when you dial in. And again panelists, we ask that while you're not presenting if you please mute your device so we don't get any background noise that could be going on.

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the presentations there. Follow along as our speakers present. And also, I would like to let you know that an audio and a video recording of the presentations will be posted to the Solutions Center's training site just within a few days.

So real quickly I will go over the agenda, and it's I think a great one today. We prepared for you data on the REN21 Renewables, 2013 Global Status Report and again there will be a focus on the EU. Before our speakers begin their presentations, I'm going to provide a short, informative overview of the Clean Energy Solutions Center initiative and then following the presentations, we'll have a question and answer session, then closing remarks, and we'll ask you to complete a brief survey.

Okay, so this slide provides a bit of background on the Solutions Center. The Solutions Center is an initiative of the Clean Energy Ministerial and it's supported through a partnership with UN Energy. It was launched on April of 2011 and it's primarily lead by Australia, United States and a few other country partners. Some of the outcomes of this very unique partnership include support of developing countries through enhancement of resources and policies relating to clean energy access. We have no-cost expert policy assistance that is available and peer-to-peer learning and training tools such as this webinar that you're attending today.

The Solutions Center has four primary goals. First, it serves as the clearinghouse of clean energy policy resources. It also serves to share policy best practices, data and analysis tools that are specific to clean energy policies and programs. The Solutions Center delivers dynamic services that enable expert assistance, learning and peer-to-peer sharing of experiences. Lastly, the center fosters dialogue on emerging policy issues and innovations for clean energy policies around the globe.

Our primary audience is energy policy makers and analysts from governments and technical organizations in all countries, but we also try to engage with the private sector, NGOs and civil society. A marked key feature of the Solutions Center that I like to go over real quickly is that we provide expert policy assistance, and we call this feature Ask-an-Expert. It's a very reliable service. It's offered through the Solutions Center, and we've established a broad team of over 30 experts from around the globe who are available to provide remote policy advice and also analysis to any country requesting the service, and this service is provided at no cost.

For example, just to give you an idea of who some of our experts are, in the area of renewable energy we are very pleased to have Toby Couture of IFOK which is located in Berlin, Germany; and also David Jacobs of the Institute for Advanced Sustainability Studies. These two gentlemen serve as two of our experts in renewable energy. And if you have a need for policy assistance on renewable energy or any other clean energy sectors, we encourage you to use this useful service. Again, this assistance is provided free of charge. To request assistance, you may submit your

request by registering through our Ask-an-Expert feature located on the Solutions Center homepage. We also invite you to spread the word about this service to those in your networks and also in your organizations. We encourage you to tour and take advantage of the Solutions Center resources and services including this expert policy assistance which I just described. You may also subscribe to our newsletter and continue to watch our training page on the Solutions Center website as we offer many webinars, and we invite you to participate in this.

So first up, I'd like to provide brief introductions for our very distinguished panelists. First up today is Christine Lins. Christine is executive secretary of REN21 and she'll provide an overview of the key findings of the 2013 global status report. Then following Christine, we'll hear from Rainer Hinrichs-Rahlwes, president of the European Renewable Energy Council. Rainer will be discussing the status of renewables and the European Union. So with that and those introductions, I'll turn the webinar over to Christine Lins. Christine, welcome. Christine, are you there?

Christine

Yes, thank you very much Vickie. I moved my microphone so that all the participants can also hear me, and I hope that works now. I welcome you also on my behalf to this webinar on the 2013 Global Status Report with a focus on Europe. Before I go immediately into the findings, in a nutshell who is REN21? We are a multi-stakeholder policy network. I would call it the coalition of [indiscernible][0:07:39.] both from the public and the private sector with the objective of advancing a rapid transition towards renewable energy. [indiscernible][0:07:50] the European governments that are members of the network, the European Commission is a member within the international organizations. And we're also honored to have EREC, European Renewable Energy Council as a member, whose president, Rainer Hinrichs-Rahlwes is today my co-panelist, to give you an overview of the main findings of the Global Status Report, and then out them effectively in European context.

The Global Status Report is an annual report that REN21 produces since 2005. It is based on contributions from a team of over 500 contributors, researchers and reviewers worldwide. It's launched together with UNEP's global trends in renewable energy investment. And this report is an overview on renewable energy industry, market, policy development, has a special section on distributed renewable energy in developing countries, covers all sectors from power to heating and cooling as well as transport and also gives an overview of all renewable energy technologies. In this year's report, we had a special feature on system transformation that was hosted by HINA because we see that the aspect of integrating renewables in the energy systems is becoming more and more important as their shares increase.

So in a nutshell, where do we stand with renewables in the world? Globally, there are 19% of final energy consumption supplied by

renewables. And then, looking at the chart, we see that about half of these is provided by modern renewables and the other half by at the moment a traditional biomass. I just have to say that statistics for traditional biomass are not fully clear, so we are relying there on definitions coming from the International Energy Agency and it is quite a challenge to identify the exact shares of traditional biomass use.

We also in the Global Status Report give an overview on the top five renewable energy champions both as far as annual investment in new capacities concerned as well as in total capacities. And then you see that we have quite some European countries in the classification. Of course, top player Germany in many areas, but you'll also find Italy, France Sweden in this ranking, and Spain for CSP for example. So we are constantly updating this and then one can clearly see that many European countries are playing an important role in the renewable sector.

When it now comes to power markets, the situation is as follows: In the world, globally about 26% of global power generation capacity are renewables-based and about 22% of global electricity is produced from renewables. Globally, renewables accounted for just over half of the new electric capacity that was installed in 2012, and in Europe the situation is even more interesting. They already had 70% of all annual power capacity and in European Union in 2012 being renewables-based. This is the light green shares and there you see this is [indiscernible][0:11:48] effectively a continuous trend that we have seen over the previous years that confirms that renewables are really making their way into the European Union's energy system.

As I mentioned before we do not only look at the electricity sector, we also are looking to heating and cooling as well as transport. And there we see that in the heating and cooling sector, there are numerous possibilities for renewables uptake both in the field of solar thermal, biomass and geothermal energy. In general, we see a transition towards the use of larger systems. And I think it's very encouraging to see that nowadays we're looking at [indiscernible][0:12:40] more than 56 countries all around the world for water heating and also increasing space heating.

As far as transport is concerned, liquid biofuels provide about 3.4% of global oil transport fuels in 2012. And we see that many areas in the world are effectively putting in place policies to promote electric mobility and often these policies are coupled with renewables' progress.

So let me quickly take you through some of the technology developments in 2012. In the field of Solar PV, we saw the total global operating capacity of solar PV reaching the 100-gigawatt milestone. I think the tendency of the graph speaks for itself. It took us about 15 years to grow from a very, very low share to 40 gigawatts, and then this year it was more than doubled in just two years. Again, here Europe dominated the market. Europe added out of the 30 gigawatts that were added in 2012, added 16.9

to nearly 17 gigawatts. That accounts for 57% of new installed capacity. And there are now 70 gigawatts to the end...currently 70 gigawatts in operation in the European Union. Prices of solar PV modules in fact during the last year failed by more than 30%, and of course there was also...due to these price reductions and heavy competition, there was some consolidation in the PV industry that somehow affected especially the European Industry.

As far as concentrating solar panel powers is concerned, the situation is [indiscernible][0:14:47] technology is on the rise. We see the interest in CSP grew particularly in developing countries, investments spreading across Africa, the Middle East, Asia and Latin America. Spain continues to lead the world for both deployment and total capacity of CSP, adding about 950 megawatts to increase operating capacity by 95% to a total of 1950 megawatts. And you see that this is technically the lion share of the global CSP capacity installed.

Now when it comes to wind, wind global power capacity reached 283 gigawatts. About 45 gigawatts of wind power capacity began operation in 2012. And European Union, in this period of time passed the 100-gigawatt milestone, adding 12 gigawatts of wind capacity for a total of exceeding 106 gigawatts. And I think it is quite remarkable to see that wind accounts for 11.4% of total EU electric capacity.

A very similar picture in the field of bioenergy. There was also an increase, not as rapid, but still an increase in the use of biomass in both heat, power and transport sector. Biopower capacity increased 12% to about 83 gigawatts. There was also a significant increase in Europe in the field of biopower mainly by biogas and CHP plants and also with renewable municipal solid waste.

So when looking at the jobs generated from renewables, we see that worldwide renewable energy employment continues to increase. There are an estimated 5.7 million people working in the renewable energy sector and we see that the bulk of employment is concentrated in some markets, the European Union clearly being one of them. All these data is taken from a report on renewable energy jobs issued by the International Renewable Energy Agency, IRENA.

As far as investments is concerned, the picture there in 2012 was a bit mixed. The overall new investments in renewables power went down 12% from the previous year. We had 244 billion dollars invested in the renewable sector; that is still the second highest ever. As I mentioned, installed capacity continue to grow due to foreign technology costs, but investment went down, and in Europe, we saw a significant reduction in the support for wind and solar project developments, but still we see that Europe remained largest in R and D in the field of renewables. And I think what we have seen in the past year is a continuation of the shift in the balance of new investment activity between developed and developing

countries. For this 244 billion dollars I mentioned before are composed of about 112 billion that are invested in developing countries and there we could notice an increase of 34% compared to 2011, whereas developed economies fell 29% to 132 billion. So we clearly see that investment went down. On the one hand, this is a result of total reduced cost but on the other hand and of the fact that OECD countries invested less than in previous years, but most of the other hand, a bit picked up by the strong increase of developing countries in renewables investment. And I think this is also a very encouraging trend because clearly developing countries have a large need of new additional capacity and we clearly see that they are making in many cases the shift to renewables. That is also clearly visible from the renewable energy policy landscape. We tracked policy development all around the world and then we see that there are about 140 countries now having renewable energy power grids and about 130 having renewable energy policies in place to really provide a new framework of reaching these targets. This is encouraging to see because it shows that the number of countries with renewable energy targets has more than doubled between 2005 and 2012.

And you see the map indicates depending on the level of color the number of policy types enacted. Clearly North America, the EU, China and India are the dark spots on the map as well as some parts in South America. This is where very elaborate policy frameworks are existing. However, in 2012 we also have seen their countries put in place, changed their policy frameworks and sometimes put in place retroactive policy changes which are effectively [indiscernible][0:20:53] with the industry and also creating a lot of insecurity for investors.

Now, a quick outlook on the global level, the UN Secretary General, Ban Ki Moon has announced his initiative Sustainable Energy For All and has announced that 2014 to 2024 will be the Decade of Sustainable Energy For All which is focused on three goals to be reached by 2030. Universal access to modern energy services, increase of the global rate of improvement in energy efficiency and the doubling of the share of renewables in the global energy mix, which according to the global tracking framework that was recently established under the coordination of the World Bank and International Agency in cooperation with REN21 and many other actors, the doubling of the share of renewables would result in a global share of roughly 36% of final energy consumption compared to the 18% that were in place by the end of 2010 which is seen as the baseline here for sustainable energy for all.

So REN21, early this year published a report where we looked a bit at the current thinking of the future of renewables and where we also analyzed different scenarios. We did not come up with our own scenario but we just did a comparison of different existing global scenarios ranging from conservative, moderate and high renewable scenarios up to 2015. And there effectively, you see the red dot in the middle is the sustainable energy for all targets and again you clearly see that the reaching of this

target, of the 2030 target is absolutely within the possible variation of scenarios especially those combining high energy efficiency ratios with renewables deployment. They come to the conclusion that much higher shares can be reached. But of course, we see that the conservative or moderate scenarios they arrived at effectively lower shares so it's clear that in order to reach this higher shares of renewables adequate policy frameworks are needed and need to be put in place, but I think it's also very important that we keep one thing in mind, that effectively historic projections in the past fell short. And this is just a graph showing what the International Energy Agency projected in the year 2000 as share for wind power globally. So you see the blue part of the graph is the projection for 2010 and the red graph is actually what was achieved. And at this point I really have to say that it is not only the international Energy Agency that got it wrong, even the European Wind Energy Association back then forecasted much lower shares for wind than were actually achieved. So I think this is just something that we have to keep in mind when looking at scenarios and in looking at projections.

But in conclusion, it's also clear that achieving objectives will take both policy action, as I mentioned before, and it will also...these policy actions will have to aim at significantly increasing financial flows into the sector. And for this to happen, stable and predictable policy frameworks are absolutely key. I have shown you before, at the beginning of my presentation that the current key of renewables globally is composed of a part of modern renewables and the part of traditional biomass. Within SE for All we are not talking about increasing the share of traditional biomass and so the share of modern renewables and sustainable hydropower they need to increase and they will at least need to triple in the next decades until 2030. To reach these objectives, in order for these to happen, it's clear that both centralized and decentralized renewables will be needed and fossil fuel subsidies will have to be phased out because they clearly and very significantly distort markets. And last but not the least, I have already briefly indicated at the beginning, integration of renewables will become more and more important, then I guess that might also be a point that Rainer Hinrichs will come back to. And with this, I would like to thank you for your attention and give the floor back to the Solutions Center and to Rainer Hawles' presentation.

Vickie Healey

Thank you Christine. Apologies for the dead air, I was having difficulty getting my mute off. So now we'd like to pass the webinar over to Rainer to tell us a little bit about the progress in renewable energy in the European Union. So Rainer, what's that?

Rainer

Yes, thank you Vickie. Good afternoon from my side or good morning to those who are still early in the morning. Indeed I'm trying to give you an overview of where we are in the renewable energies development in Europe, particularly, bear it in mind that in Europe we have a target for 2020 which were agreed on in the European Union. The target of 2020 basically meaning that we strive for the share of 20% renewable at least in

Europe's energy mix by 2020 and [indiscernible][0:27:28] by national targets for each member state depending on the renewable potential and economic capacity.

To start with, just a few words about who is EREC. EREC is the umbrella organization of renewables in Europe. We are representing all renewable energy technologies, meaning wind, solar, bio, hydro and geothermal; and we are covering all sectors which is electricity, heating and cooling and to a certain extent also transport. Our member associations, you see here, these are the big industry associations representing these sectors.

To start with, some facts about renewable in Europe, at present we have a share of around 13% of renewable in Europe's final energy consumption which is about 25% of the greenhouse gas reduction target of the European Union. About 1.2 million people are working in the renewable energy sector and the economic contribution annually from renewables to the GDP is around 130 billion Euros, so the significant part of Europe's wealth and Europe's energy security.

You saw this slide already in Christine's presentation which is indeed borrowed from REN21. For the last five years at least we can see that in Europe, not only the share of new capacity from renewable is increasing but we can particularly see that more than 50% of renewables in all these years were installed as a share of the total installations of electricity capacity. Last year and the year before it was even around 70%. Most of it as you can see here in blue, from wind power, and as you can see in green, from photovoltaics in particular for solar energy. And you see, on the fossil part of this graph, the only significant contribution in new installations on the fossil side was from gas and of course there is reason to believe that this has a lot to do with the fact that gas is in a way compatible with flexible renewable energies production.

Now let us look a little bit closer on the target achievements in the European Union. I already mentioned that we have the 20% target for 2020 in Europe overall and we have national targets for each and every member state. You see here the map of Europe and you can see that first evaluations in 2011 showed that most of the 27 member states, exactly 21, seem to be on good way to achieve the 2020 targets; 21 of the 27 were above their interim targets for 2011 and 2012. Only well, six member states were below their interim targets but it has to be mentioned, among them are at least two big European countries, France and the UK. The other four are Luxemburg, Latvia, Netherlands and Malta. All together the European Union in 2011 was above the indicative trajectory, so from that point of view it looks good for 2020.

Target achievement. This is what you see on this next slide. The individual member states, some of them are far away from their targets, others are already nearly there. You see here in the middle of this graph in yellow that until 2020, the European in average will need annual growth rates of

renewable of around 5%. But you will also see that on the one hand, we have countries like Sweden, they have more or less reached their 2020 target; and you see on the other side of the graph, particularly the United Kingdom who will need something like 16% of annual growth in renewable to achieve their relatively low target of 15%.

So you see there is a wide range and there is reason to believe that some of the European member states in the course of time up to 2020 may fall back below the trajectories and at the end of the day in 2020 may be below their targets. This coincides with the analysis done by a project which EREC is part of and I show you two slides of some details from this project. One is you see in black, that so far the European Union as a whole, in 2011, is above the indicative trajectory towards the 2020 target.

You see in gray that the European Union today still is even above the trajectory which the member states have outlined in their national action plans, but you see on the next slide that this is quite different in the different sectors. On top, in blue you see the electricity sector seems to be quite well performing where the actual RES share is above the trajectories from the national action plans. You see that in 2011 this also looked quite well for the heating and cooling sector, in red on this slide. And you see on the bottom of this graph in green, that for the transport sector already in 2011 the actual share was below the trajectory. So quite obviously there are different levels of action needed for the different sectors and you can see this even more clearly on this graph where we compare the actual growth rates in the European Union in the sectors with the necessary growth rates for target achievement. There you can see that in the overall energy supply we actually see something like a growth of 3%, plus minus 3%, whereas 6% would be necessary in the electricity sector we see actually growth of a little bit more than 6% although 8%...we see 8% and 6% will be necessary so this looks good.

In the heating and cooling sector instead of a growth of 5% which would be necessary, we see even a slight decrease. In the transport sector we see growth of a little bit more than 5% although seven and more would be needed. This is why it has to be stated today that particularly in the heating and cooling sector Europe seems to be lagging behind the targets. Overall, we have to agree with the European Commission who will say that current policies are insufficient to trigger other required renewable energy deployment in the majority of member states. So what you see is a mixed picture: on the one hand, above indicative trajectories and moving towards the 2020 target, on the other hand, in some sectors there is still a lot to be done to really reach the target.

So where are we today in Europe? We see on the one hand, and Christine outlined that in her presentation, there is a global uptake of renewable deployment and of policies for renewables and we see the growing global market for renewable whereas on the other hand we see that the share of Europe in this global market is decreasing. We see that there is a lack of

policy certainty in Europe. I would come to that in a minute. This means in detail that on the one hand, we do have the 2020 framework which is good and which is encouraging for those who really plan to invest in renewable, but on the other hand, we saw in several member states changes in the support for renewables. We saw even retroactive changes affecting already existing installations by retroactively imposing taxes or other costs on the installations which is quite problematic. We see even a complete moratorium for instance in Spain so although there is a mixed picture about policy uncertainty and this has a lot to do with the fact that so far the policy agreement only reaches out to 2020 with the targets and there's not yet a certainty, not even in an agreement about where we want to go for 2030. There are suggestions for that but, as I said not yet a policy framework and not yet agreed targets.

So what we need certainly is, quite soon, a stable and reliable new framework for 2030, integrated target and energy policy framework and I'm sure that this will have to include not only finding targets for greenhouse gas emissions reductions but particularly also for energy efficiency and renewable energy to really reap the benefits of this sustainable development.

Based on this, that we need a new framework for 2030, moving beyond 2020 which in the energy sector is already more or less tomorrow. EREC in 2011, already presented a suggestion to develop a new target for 2030 which should be 45% renewable which was based on the assumption that after the 20% target which might even be slightly exceeded, at least that was the assumption at that time, we thought this could be doubled again in 2030 so that 45% might be a good target for renewables in Europe in 2030. Just recently in April this year, we provided another brochure which you can download from our website, where we brought forward some quantitative arguments why we definitely do need this integrated framework including a binding renewables target, efficiency target and greenhouse gas emissions target. The major reason why we need it certain is because that this would provide a clear signal for investors and this would prove a long-term predictability of market volumes and market directions. And of course removing uncertainty by creating predictability would certainly decrease costs of uncertainty and in a way also help reaching the 2020 targets because once governments and investors can be sure that there is a common agreement on where to go after 2020, it may be easier to understand and facilitate the process to develop towards 2030.

Renewables are growing the economy. We heard this already on the global scale from Christine. In Europe, the renewable energy provided more than 130 billion euros of added value to the economy which was around 1% of the European GDP. We calculated that in 2020, if the targets are met, this can be increased by another 0.25% and in 2030, with an ambitious target that would be even nearly half a percentage point added to this 1% already. So renewable definitely will be able to contribute to economic growth and development.

Second point. Renewables will help Europe and the companies active in Europe, investors active in Europe to continue reaping benefits of their first-mover advantage. We read already in Christine's presentation that investment volumes, investment tendencies have shifted away from the industrialized world. It shifted away from Europe over to other parts of the world who have started to develop sometimes even very ambitious policies on renewable. We see here in the graph that from 2001 until 2011 the European share of the global market of renewable decreased from 54% to about 40%; and we do see other countries. In red, you see China, and on the right side of it you see other Asian and other developing countries that really came up with high market shares and also the US had partly very ambitious policies and targets for renewables. So if we want to maintain a strong renewable industry in Europe, new targets and then new policies, effective policies will certainly be useful and [indiscernible][0:42:38]

Renewables can also help saving money. Just in opposition to what some politicians try to allude, we should be aware that every year the European Union—and this is similar in other parts of the world, the European Union is spending around 388 billion euros for imports of fossil fuels. We could also say wasting something about 388 billion euros for imports of fossil fuels whereas at the same time, the European Union's trade deficit is at around 150 billion euros. So it definitely makes a lot of sense to try and replace these costs of fossil fuel imports by domestic renewable energy. So we suggest to reap the benefits of renewable by replacing fossil fuel imports by more and more renewables. Calculations show that by 2030 something like 550 million tons of oil equivalent could be replaced by renewables, saving something like 350 billion euros. To give you an impression what these 550 million of tons of oil equivalent mean, this is the joint energy consumption of a few big European countries, namely Belgium, Germany, Latvia, Poland, UK and Spain. So we could replace all this by renewable provided that we have an acceptable and reliable framework with ambitious targets for 2030, which is useful and necessary for [indiscernible][0:42:38]

Renewables are creating and maintaining a future-oriented and sustainable jobs. We have the global figure from Christine. Here you see the European figures already today. We have around 1.2 million people working in renewables. We project that in 2020 the target is reached. This could be already 2.7 million people in Europe and even 4.4 in 2030 with a new, ambitious policy framework.

To come closer to the end of my presentation, let me introduce to you a public opinion poll which was recently made by Eurobarometer earlier this year which shows that support for renewables is not only something which the renewable energy industry and some environments, we also are calling for, but which is completely in line with most of the citizens of the European Union. In this opinion poll, people from every member state of the European Union from every 27 member states were asked what they think what should be the energy priorities in their country for the next 30

years. This is why this odd number 2043 turns up in the headline. So they were asked what you're using, which of the following options should be prioritized in your country and the clear and undeniable fact is that 70% of all Europeans said renewable energy sources should be prioritized in their country. To make this clear again, this is not only an overall opinion of the European Union where 80 million Germans and a few Spaniards have "majoritized" the rest. This is the clear tendency in all European member states, in every single European member state we had the majority saying renewable energy should be prioritized and second there was energy efficiency, also clear majority for that and all the other options including nuclear and so-called clean fossils were only favored by around 10% of the European Union's citizens.

So I think if we are asking for new and reliable and ambitious framework for renewables to move beyond 2020, to 2030, then we would likely say we are in line with most of the European citizens. And maybe I used this part of my presentation to add a few ideas on what this actually would mean. Indeed, it would mean that Europe as a whole would strive to reach very high shares of renewables in all sectors, not only electricity but also heating and cooling; and transport. And this striving for high shares of renewables which by 2020 certainly would have to be the dominant resources, 550, sorry, but moving to that by 2020 and 2030, this would mean that existing energy systems would have to be changed to more flexible systems which are able to provide energy security with increasing shares of renewables particularly from wind and solar added up with bioenergy, hydro and geothermal. But these systems certainly would have to be more and more flexible, using flexible sources to balance those renewables when they are at a certain point in time not available because the sun is not shining at night or because the wind is not blowing. This will certainly require ambitions to change the system logics to a more flexible one, away from the existing energy system which in many member states is quite "unflexible" with badly functioning markets. So I think this is where we have to be heading for in the near future to prepare this for the next 10, 15, 20 years.

And with these thoughts, I come to my last slide, just mentioning that those of you who happen to live in Europe and who happen to be interested in continuing this discussion, and who happen to be available in Brussels in November, they might wish to join our policy conference where we discuss all the developments, how to move to 2020 and to 2030 on the European level. And with this, I thank you for your patience in listening to me and I am ready to answer questions if there are some. Thank you.

Vickie Healey

Thank you Rainer and Christine. Those were both great presentations with just terrific information included. So at this point we'd like to move on to our question and answer session, and we do have a few great questions from the audience and we'll use the remaining time to answer and discuss those questions. And please, if you do have a question to ask again, a

reminder that there is a questions option on the control panel on the right side of your screen. But feel free to go ahead and type your questions into that location.

So the first question, Christine, is actually for you. And this goes back to your slide where you were discussing CSP. The person who has asked this question is curious as to whether the 950 megawatts of CSP added in Spain were created from one single plant or multiple plants. Christine?

Christine Sorry, can you hear me now Vickie? Sorry, I forgot again to unmute my microphone.

Vickie Healey That's quite all right.

Christine I forgot to unmute my microphone. I'm very sorry. That is actually several different plants, and what we see just at the beginning of this year, we had the opening of the largest CSP plant in the world, the middle region in the United Arab Emirates. So we see, especially the middle region but also other parts of Africa, Asia and Latin America really increasing their interest in CSP.

Vickie Healey Okay, thank you so much. The next question, I guess is really, I could direct to both of you and it's more of your thoughts on what could or should be done to address the high electricity prices in Germany.

Rainer Well, as I happen to be a German citizen, I may be able to say something to that. I think there are various aspects: one is indeed electricity prices are high for various reasons, only one of them being renewables, the other one of them being taxes being... elements which were priced in earlier for greenhouse gas emission subject because although the cost for these certificates went down considerably, so this is a discussion which is going on in the country and also in other European countries and where I have the impression it will be quite important for process towards the 2030 Agreement of the European Union. Basically I think we have to be aware that energy prices, as they are seem today do not really include the full truth of what they are consisting of.

First of all, whereas on the one hand, in most countries, the share of renewable energies in the price is clearly shown on the electricity bill, the share of support for conventional and nuclear energy is not shown on the electricity bill because this is considered to be cut out earlier. Be aware, this is not the case. Renewables and nuclear still receive high amounts of subsidies. The other hand of course is how you can calculate actual electricity prices in markets which are dominated on the one hand by a few big companies which on the other hand are accommodating all these higher shares of renewables which bring down the electricity price on the one side, but on the other side in the calculations of implemental costs, these lower electricity price due to your renewables. It's shown as additional costs due to renewables, so there's a lot of confusion in this. I

think what we need will certainly be more transparency about how electricity prices are really composed. We will certainly need clarity about all other elements of costs, what is for production, what is for transport, which is for renewables, which is for subsidies for conventional, which is for subsidies of nuclear. And certainly, we will need to see how this can actually be calculated in a way that is transparent for most of the citizens and not just some people claiming costs are high whereas they, in average are quite very [indiscernible][0:55:17] I'm not sure whether this completely answers the question but I hope I could give some aspects.

Vickie Healey

Thank you, Rainer. That actually explains a lot about the current state of electricity prices in Germany, so thank you. Our next question, I think Christine, I'll direct this one to you first. Then Rainer, you may have some additional comments. The question is: to develop renewable energy there is a high need to improve power storage facilities and to modernize the electricity grids. Is there any evidence for new policies at the EU level that you see coming forth in the future? And are these subjects recognized as key aspects in order to reach the 2020 targets?

Christine

Yes, I think there is an emphasis in the European Union on the need for reinforcing grids, electricity grids and also for interconnecting the different national grids because we have to take in consideration where there is different shares, of high shares for viable renewables in power systems in different parts of Europe. And by interconnecting them the systems will be much more able to accept these higher shares of renewables. And this is also of course an important European dimension of reinforcing the European power system. So I would say that, yes there is some emphasis on this. And then of course, we also have different examples from the association where there is priority access to the grid from renewables which I think was one of the key success factors of renewables uptake in Germany. And where we see right now, that with high shares of renewables and high penetration of renewables, [indiscernible][0:57:25] prices for electricity are coming substantially down which of course sometimes challenges the business model of utilities because it makes connection capacity economically less viable. But there is I would say a lot of need to still shed some light on the integration aspect. But yes, there are examples in Europe, and I think the priority access is introduced in many laws above all in the [indiscernible][0:58:06] have been really a key in success factors in the European Union.

Rainer

Okay, maybe I can add to some aspects. When I fully agree with Christine that there is a lot going on, discussion number one and partly implementation on the European level, I think the fact that we now have 10-year network development plans which I discussed in the member states and coordinated on the European level certainly shows that at least the problem is understood that to a certain extent grid enforcement, grid enhancement, but also developing smarter grids on distribution and transmission level, this is in the minds of those who have to take the

decisions. So this is ongoing including some discussion about developing storage capacities, sharing storage capacities across border. So this seems to be in the policy decision pipeline. But still I think there are a few more decisions, clear and unambiguous decisions which have to be taken. In a way, we see that in countries like Germany where the official decision is to phase out nuclear and to go to something like 80% of electricity by 2050 the latest, so where it is understood that system transformation in a way that grids need to become more widespread, smarter, more flexible. Their development is taking place although even their discussions about whether or not to build a specific balance is what's going on. On the other hand, there are some countries in Europe; which are, at least, not so clear in the decision to further develop renewals to tend to go on, regarding their Grid System just as it is; meaning, they are relying on inflexible baseline and shying away from high shares of renewal.

So even for this question, a major part of the answer is we certainly need a quite strong policy—understanding a policy agreement among the 27 member States of where we are really heading far beyond 2020; because understanding that high share of renewal would actually be part of the policies—will be part of the energy mix will certainly make it easier for the most of it to decide about the necessary greater half and treat exceptions than the situation where they can still think they may be able to stop the development. So, after the exempt policies are like priority access—priority access to the greatest policies, which nearly enable and move members States afterwards, enhancing the grid that are necessary to move forward in the right direction.

So, I don't hear anybody.

Vickie Healey

Can you hear me now?

Rainer

Yes, I can.

Vickie Healey

Hello! Okay, I'm sorry I'd hit mute instead of unmute and my apology for that. Thank you for these great answers.

The next question has to do with impacts on—of renewable energy on the electricity market. And Rainer, I think we'll start with you on this because, again, we have an example from Germany. And the question is: What are your observation and considerations, considering the increase of renewable energy and the price development on the Electricity Market? For example, Germany is confronted with an erosion of return on investments on really any kind of Power Plant. And, a little bit of a follow up to that is: Will investors continue to invest in renewable Energy Power Plants if prices continue to decline?

Rainer

Okay, I can try. We are facing this situation where we, on one hand, not have very high shares of renewals in Germany. The actual share of renewals in electricity supply is around 25%; up from 5% in only 10 years.

So, there's a really considerable change in the energy mix. This certainly had consequences on the necessary technology changes. We already discussed earlier about necessary adaptations of Grid infrastructure of connecting a lot of e-centralized, particularly PV installation, but also smaller Wind Farms to the Electricity Grid and transporting it to where the consumption is.

So, this is the first part of the change. The other idea is that the energy market design, which till basically consist of futures markets for traditional base rather than the what have and the Stock Exchange for COPIC Energy remark markets, this is a market design which was not designed for—obviously is not really ready for a market with high shares of many renewable energies. This is why it is true that there are times when a lot electricity from Wind and Solar is in the Grid—is on the market than [inaudible] [1:04:39] of stock market prices go down very much, partly even below zero. So—and of course at the same time, the effect of rating hours of Conventional Power Plants are further reduced due to priority excess of renewals.

So, we have a situation that the market, at least, the spot prices but related to that certainly other future prices that does not really provide significant return of investment of the average price of energy—on the energy-only markets is decreasing every year. A tendency which we have been observing for a few years already now and which we expect to continue if we don't manage to change the market design in a way that on the one hand, renewal energies are remoderated according to their actual investment cost on the one hand. And that on the other hand, we managed to remoderate those power plants, which are providing balancing capacities. Most of them are already there but they need to be kept on operation through the up and running when needed. So basically, in order to avoid having a next webinar already; I think basically, we need to develop a new market design, which can build with these higher and increasing shares of renewals in the market.

This is a problem similarly—similar to the one which we are facing technically but it can be done and there are examples that power can be done.

Vickie Healey

Great! Thank you, Rainer. That is a great answer to that question. And, I'd like to turn—I'm looking for my question, excuse me—a little bit to the Transportation Sector Policies that impact bio-fuels and electric vehicles. And, the question is, since bio-fuels have an accordant limitation and electric vehicles seems low to deploy at any significant rate, do you have any thoughts or recommendations on what type of policies are need to address these issues for the Transportation Sector?

Christine

Allow it and maybe start, in general, and head over to Rainer for any Europe-specific aspect of this answer. First of all, as far as bio-fuels are concerned, there is a lot of discussions, technically, about how Plant Bio-

fuels are used. However, there is a lot of research going on of second and third generation bio-fuels, producing them from [inaudible] [1:07:58] material and non-food. So, I think there's a lot of technology progress they made.

There's a lot of progress in the field of IT of actually—with IT and then, as far as electric community is concerned, I think there is quite some encouraging samples that are just remembered and also in Norway at the beginning of September. There are, nowadays, Parking Charging Stations for electric vehicles. They have also different advantages, tax advantages in the policy. We have even parent's letter and if you want something there, just locate it, an electric ushering assistant auto lit.

So, I think these initiatives are emerging everywhere and we also see that countries look into electric mobility in combination with renewables because, of course, it also makes in the whole discussion about storage. And, I think what we will see in the future is more integrated policies emerging on city levels and there are already some great towns other crossing Europe and beyond about time that electric mobility combined with renewable support can already be best.

And do you want to add something, Rainer?

Rainer

Yes, May I just roughly make clear that indeed Renewal Mobility for the time being, is quite strongly relying on bio-fuels—first generation bio-fuels but all of which are considered to be sustainable. Second- generation bio-fuels are being developed but this obviously takes longer than some supporters we're foreseeing.

On the other hand, the Electrical Mobility, which some people consider to be, at least for the years 2013 only, the major part of Renewal Mobility; this is only just developing—I think the basis for the fact that all these three developments are not developing as far as we might wish, all that they do is the lack of policy uncertainty. So, if I put this to the three-point, which I just mention for first generation bio-fuels; the discussion on sustainability criteria, indeed let you—most of these bio-fuels now following sustainability criteria so that they can—can be used for renewable energy in transport and also for target reaching in the European Union. But still, the ongoing discussion on, maybe, limiting the share of first generation bio-fuels with the European Commission launch with their suggestion on advanced sustainability criteria certainly grown some uncertainty and that, again, the policy changes in the past where lending tax incentives were being exchange due to a negative part for second-generation bio-fuel.

Obviously, a lot needs to be—more needs to be done in RAD and for electrical ability, my intuition is that there are mainly two elements which have to be dealt with. One is the fact that the capacity of batteries still is limited in a way, with at least for long distance travel this past—at least

pure electric powers are not considered to be adequate; this is when high-breed cars come in.

And on the other hand, the policy incentives for really introducing these innovative electric powers are obviously lagging behind. Some member States of the European Union have targets in a way that they say, “We want a certain number of electric vehicles being on the roads.” But in centers, likely, were using other Transport Policy decisions when the catalytic patterns that was introduced—when bio-fuels were introduced by just giving some financial incentives for doing so. This is still missing and so, I think a clear direction is needed and where our policy issues are taking them, of course, clear incentives at least for a trip off period.

Vickie Healey Okay, thank you for those answers. Next question and Rainer, you’ve discussed this a little bit in the previous answer but for a little elaboration. To both of you, do you feel that high subsidies for renewable energy are still needed in the EU to the increasing capacity throughout the region? And Christine, I think, perhaps I’ll start with you.

Christine Basically—I think—yes, can you hear me?

Rainer Yes.

Christine I think I’m unmated now. Okay, very good. In general—the old picture, globally according to the International Energy Agency, we really have about 523 Billion were spent on Fossil Fuel subsidies, who about 66 Billion Renewable support. So, you already see that the speakers are—in the public discussion often are quite distorted when in it comes to the high amount of subsidies dispersed for Renewables when you put that in line with Convention with you, you can see that the picture is different.

And, I think also, there’s a lot of debate about this going on in Europe. You are being commissioned in about to launch data on how to base—spend pocket money and it seems that there is last year of public support in Europe sequenced Fossil Fuel compared to a relative loan share to what you could see; if I have the biggest currency in my mind, it’s 130 Billion in the energy sector overall compared; out of which, 30 Billion are spent on Renewables and correct me if I’m wrong. So, I think these are the biggest that their [inaudible] [1:15:33] have taken out of the people to commission and will not be published. But then, of course, that has produced of a lot problem in the discussion because it clearly shows that this—the amount of these figures that are accounted that were spent on renewable is often I have to say, exaggerated/

Rainer And so, to follow up on this, a decrease in the figures are correct; at least they are correctly quoted. They are from elite draft of commission paper assessing market information in energy and particularly Renewables where indeed these figures 100 million Euros support for the Conventional

and Nuclear, as opposed to only 30 to Renewables. So, these are the figures.

I'm sure when the final document comes out, these figures would have change, somehow, but they are already given indication that at least the continued existence of fossil and nuclear subsidies; wisat least as big a problem as subsidies for Renewables. And then when it comes to subsidies for Renewables I think it is important to be aware that on the one hand, some of the renewed energy technologies are already now cost-competitive with new Conventional Power Plants in more and more places. Installations of new wind farms is definitely cost-competitive with new or gas or a whole Bof-fuel Power Plant.

So, in this respect, certainly subsidies have been reduced but on the other hand, we discussed this a few minutes earlier—as long as the market is not really working in a way that there is fair access or all energies according to their capabilities and according to their specific quality, will reveal some kind of policy framework; which ensures that Renewables are fairly treated on the market.

And the second point, of course, is the cost of Renewables have been down dramatically over the last decade and if somebody had told me, I was, as you know is I am a supporter of Renewables. If somebody had told me only five years ago that, meanwhile, PV electricity from a rooftop is generally is much, much cheaper than buying electricity from a utility; I would certainly have not been asked about this person, but this is true.

So, cost for renewals are going down more in more technologies and more places are becoming cost-competitive. So, what is needed is a new—shall we say, market design—your policy framework, which is ready for a market;which is based on increasing shares of Renewables.

And in this context, certainly, I think the actual need for payment—subsidy payment for Renewables will go down in relation to policies certainty when it comes to future targets and future market values. So,basically, the earlier we have a clear direction of policy decisions, the earlier—the faster we reduce subsidies for renewals. And of course, the earlier we delete the subsidies for unsustainable energy. Again, the earlier we can have fading out of subsidies for renewable.

Vickie Healey

Thank you for those answers, great answers once again. The second question—and first, before I proceed with the questions, I just want to let the audience know and also the panelist, that we have received far many more questions than we possible have time to answer. So, if we don't get to your question on this webinar, I apologize in advance for that, but I will send out the questions subsequent to the webinar to the panelists so that they can answer you directly and I say that and we need to first ask for the permission of Christine and Rainer to do that.

Linre We'll do all these...

Christine Sure, that's okay for me, yes.

Vickie Healey Okay, thank you so much. And in this next question is looking forward a little bit. So, this question has to do with policies that support emerging technology. And the question is: What do you consider to be the most important support policy for the innovation change and for the emerging Renewable technology? And, where do you think there's a significant room in supporting policies for this emerging technology?

Christine What I think—I'll start maybe—I think we have seen very clearly on the—on both my grasps from the part of Rainer that the investment efforts in emerging economies in the growing Renewables are substantially increasing so there's a lot of deployment happening in markets outside the European Union. But still, Europe is in the front when it comes to RAD. And I think this is also something where I see very strong involvement in the future of Europe in the field of innovation. I think there's a lot of need to keep that up and to really continue on researching on the different renewable technologies because as the energy pointing up, you have seen quite a lot of questions actions and a lot of improvements in the past and I think there is still a lot of possibilities to increase efficiency as I said, in the years to come.

So, I think we need RAD but I also think that we need a lot of dedicated research in the field of integration of Renewables when it comes to integration into Power Grids. So technically, research to ensure the stability of Grids, while at the same time, absorbing high shares of Renewables. Different integrated models were used to integrate multi-million set management, looking at buildings at Heinsport Metro Power Plants; all these different things, which I think will be absolutely keep and I think we also need some innovation in the field of policy when it comes to integrating our shares of Renewables and your business models for utilities to cope with this change. I think there are plenty of possibilities, and also, of business opportunities for European Companies to really stay on the cutting-edge of technology-development and it's—and [inaudible] [1:23:15].

Vickie Healey Rainer, do you...?

Rainer And, I think, Christine that—as Christine mentioned, most of the important aspectw, already I should add one—, indeed on 100—we'll need continued efforts in RAD, answering for these specific questions; which I'm now coming up with Renewable, providing high-end—high-end shares. There was a specific situation of increase in shares of very few Renewables. So, all these elements of Metropolitan Grid Integration—Grid Transformation that this will certainly be necessary and generally industrialized countries will have an important role in enabling Policy Programs supporting RAD and not only RAD, but facilitating market's

entrance and penetration of these innovative technologies of these innovative solutions for integration.

In this context, it's far important that member States in the European Union—that countries all over the world are aware of the fact that for certain innovative technologies to really trigger the development, it will continue to be necessary to have technology-specific support technology-specific incentives and not just shift all policy support or what you so-called, "Market-based Technology Mutual Solutions." This one certainly must be the way forward to really further develop new solutions and help them provide the share of the solution, which they really can.

Vickie Healey

Thank you. I think we have time for one more question and this is looking at a comparison of two different policies that are both great options for promoting Renewables. And the question is if you could address the pros and cons between Freedom Care versus quarter-based system; such as using the Germany-Sweden example, which is big two different policies. One country has implemented Freedom Care and the other, quarter-based system. What do you feel are the viable options going for or the preferred options going forward in the long run regarding these two policy options?

Rainer

Okay. Maybe this time, I start and Christine could have the last word. Indeed, these are the major policy options, as you already mentioned, they are what they used to be; completely different and they are converging while in the reality of many countries. When it all started, we had minimum prices, feeding terrorist for specific countries—for specific technologies in several countries which were very successful because they provided certainty for a certain period of time; because they provided, on the one hand, clear and defined return of investment; on the other hand, these polices avoided overcompensation by just providing thigh chance to already mature technologies.

These are—These system are—also have the advantage that it was applicable not only for existing—and energy-producers as the existing utilities but it makes it possible for many smaller actors with private individuals; be it farmers, be it cooperatives; to deal with the support system and merely invest in Euros; which then, lets you more than 50% of the Renewables operations in Germany, being owned by privately people and individuals.

On the other hand, we have Return-of-Agreement Certificates, which were meant to edge certificates—the value of certificates to electricity prices when we traded on the subject market, which were in used in a number of countries; namely, the UK and some others.

These Return-of-Agreement Certificates, where used by whatever desired work, were being used by utilities, by those who have—who have been used to trading of energy markets and who have been used to dealing with...etc, etc.

What we see, meanwhile, is that in reality [inaudible] [1:28:34] are using market elements; either by providing part of it via the market and just adding it in you. On the other hand, we see the Return-of-Agreement Certificate system adding elements of bondings or providing more certificates to less mature technologies. So, in a way, we see a convergence of these systems. Still, I think it's important to be aware that whenever you apply a support system, one of them or a mix will pass, the more reliable the support framework, the advantage of return of investment and the time-track is; the less you see past of risk, which is particularly the need of the characteristics of the certificate training. You always have element of economic risk in it because you cannot really be sure how long you really get which kind of remoderation for your investment.

So basically, what is more applicable for new market entrance and new technologies in the other world can be dealt with by incumbent to the market participants, where as I said, there is convergence and this used to something which will be further developed.

Christine

So, adding on to what Rainer said, we just see the entire mark of the world, notably in Brazil and in South Africa, very good experiences were made with [inaudible] [1:30:18] whereas we still see that the lion's share of renewables in the world is eloquent and sort of elite, was based on the city of Paris.

I think people in the past have rarely put market discussion in this unit, where we clearly what I think was somehow; many people come to the conclusion, what is the most important as I has also mentioned is stability and predictability. This is what is needed to attract investors to market to give free insurance to the industry and to really have a clear strategy for deployment with these—in this respect, all issue of [inaudible] [1:31:00] is fundamental and that's why I think this discussion that is probably going on in the European Union on the 2013 Policy framework containing a renew data1 target. It's very important because they are really taking its predictability and the stability, also framework; but on how exactly the framework looks like—needs a lot of very detailed measures—I think there are excellent examples out there with various markets, which just show how markets can be developed.

And with markets also, in industries also had an emerging policies to makes it definitely also and deserve further retention. And with respect to Vicky, and already thank to you Paul, Reina, Eric and to Vicky and [inaudible] [1:31:57]

Vickie Healey

Thank you Christine.

Rainer

Thank you for inviting.

Vickie Healey

Yes Rainer. Thank you so much to both for the great presentations and your outstanding answers to the questions. Again, I'd like to just let the audience know we apologize that we did not have time to answer all of the questions that were asked and we will be forwarding any unanswered questions to the panelist to respond to directly after the webinar.

So with that, I'd like to just take a couple of minutes for a quick survey to get your feedbacks on how you viewed the seminar and the presentation. Your input is really important to us so that we know what we're doing things right and what we can improve.

First question: the webinar concept provided me with useful information and insights. So it's just so ideal by clicking on the radio button that—that fits your answer. And our next question—Excuse me. The webinar's presenters were effective. Next question: overall the webinar met my expectations.

Thank you all to—to all of you who responded to our poll. And so, with that, in behalf of the Queen Energy Solution Center, I'd really like to extend a very hearty "Thank you" to our panelist; Al, Christine and Rainer; and to our attendees for attending our webinar. You've been a terrific audience, you've asked great questions and we very much appreciate your time to attend. And I invite you all to check the Solutions Center website over the next few days if you would like to go back and review the slides and you could also listen to an audio recording of today's presentation, as well as previously held webinars. Additionally, you'll find information on upcoming webinars and other training and events. And, we also again, invite you to inform your colleagues and those in your network, about the Solution Center resources and services, including our No-cost Policy Support offering.

So with that, I wish you all a great rest of your day and we'll get to see you again at future Queen Energy Solution Center Event. This concludes our seminar.