

The Global Renewable Energy Transition: Who is leading?

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Webinar Panelists

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Kamyria

Hello, everyone. I am Kamyria Coney, and welcome to today's webinar, which is hosted by the Clean Energy Solutions Center in partnership the Renewable Energy Policy Network for 21st Century—REN21. Today's webinar's focused on The Global Renewable Energy Transition—Who is Leading? Today's presentation provides an overview of analysts findings presented and REN21's newly released 2019 version of the Renewable Global Status Report, with a regional emphasis on Europe. Before we begin, I'll quickly go over the webinar features. For audio, you have two options.

You may either listen through your computer or over your telephone. If you choose to listen through your computer, please select the mic and speakers option in the audio pane. If you choose to dial in by phone, please select the telephone option, and a box on the right side will display the telephone number and audio PIN you should use to dial in. Panelists—a gentle reminder—please, mute your mic when not presenting to avoid any interference from background noise. If you would like to ask questions, you may use the questions box where you may type in your question.

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or recommend specific products or services. Information provided in this webinar is featured in the Solutions Center resource library as one of many best practice resources reviewed and selected by technical experts. Today's webinar is centered on a presentation from our guest panelist, Rana Adib, who has joined us to discuss latest data and findings on what is happening in the renewable energy sector, drawing directly from REN21's newly released Renewable's 2019 Global Status Report.

Before we jump into the presentation, I will provide a quick clean overview of the Clean Energy Solutions Center. Following the panelist's presentation, we will have a question and answer session where Rana will address questions submitted by the audience. At the end of the webinar, you will be automatically prompted to fill out a brief feedback survey, and we thank you, in advance, for taking a moment to respond. The Solutions Center was launched in 2011 under the Clean Energy Ministerial. Created in 2010, the Clean Energy Ministerial and global forum were major economies and forward leaning countries worked together to share best practices and to promote policies and programs that encourage/facilitate the transition to a global clean energy economy.

Twenty-five countries in the European Commission are members. CEM members account for approximately 75 per cent of global greenhouse gas emissions and 95 per cent of global clean energy investments. This webinar is hosted by the Clean Energy Solutions Center, which is an initiative of the Clean Energy Ministerial. The Solutions Center provides objective analysis on policy and market mechanism option to help governments make informed decision on policy, regulation, and finance mechanism design that support the deployment of advanced clean energy technologies. This support is accomplished through access to expert assistance in capacity building activities offered through a team subject matter—experts living and working in locations around the globe.

The Clean Energy Solutions Center is co-lead by the governments of Australia and the United States. The Solutions Center provides several clean energy policy programs and services, including a team of over 60 global experts that provide remote and in-person technical assistance to governments and government-supported institutions, free web-based virtual webinar trainings on a variety of clean energy topics, creating partnerships with development agencies, and regional and global organizations to deliver support, an online resource library populated with over 3,500 clean energy policy-related publications, tools, videos, and other resources. Our primary audience is made up of energy policy makers and analysts from governments and technical organizations in all—in countries, but we also strive to engage with private sector, NGOs, and civil society. The Solutions Center is an international initiative that works with numerous international and regional partners. Several of the partners are listed above including REN21.

The Solutions Center's marquee feature is the free expert assistance service known as Ask an Expert. The Ask an Expert service matches policy makers with one of the more than 60 global experts selected as authoritative leaders

on specific clean energy finance and policy topics. If you have a need for policy assistance in renewable energy or any other clean energy sector, we encourage you to use this valuable service. Again, this assistance is provided free of charge and it's designed to provide quick responses. If you have a question for our experts, please submit it through our online format—cleanenergysolutions.org/expert.

We also invite you to share information about this valuable service to those in your networks and organization. Now, I'd like to provide a brief introduction and welcome to today's panelist. Rana Adib is an executive secretary of REN21, and we are pleased and honored to have her present the findings of REN21's newly released 2019 edition of the Renewables Global Status Report. Rana, welcome. The floor is all yours.

Rana

Thank you very much for this introduction and thanks a lot for the opportunity to present to you the Renewables 2019 Global Status Report, which is actually hot off the press, because we launched it this night at the LO15 CT time. So, you're probably the first people who are hearing our story of this year. So, for the ones of you who don't know us, REN21 is the Renewable Energy Policy Network of the 21st Century. What we are is a community of passionate players who are working together to build a sustainable energy future with renewables. But we are not only a community of these players from different organizations like governments, inter-governmental organizations, NGO and _____ associations in science and academia; we're also a network which has a vision, which is 100 per cent or more, let's say, high share renewable energy system linked to energy efficiency.

We're producing knowledge and information which is shared and owned and used by many, and we're telling a renewable energy story to really make the thinking and the way we think about renewable energy evolve and to influence policy and regulation frameworks to inform these frameworks so that the renewable energy uptake can happen. Moving to the next slide. So, I spoke about the information and knowledge. I will present you, now, our so-called Flexi-publication—the Renewables Global Status Report—which we are producing since 2005 every year. We are currently also working on a new series—which are the Renewables in Cities Global Status Report, because we see that the role of sub-national governments and municipal governments is increasing.

We have also produced regional reports, and this is really to describe what is happening, concretely, on renewable energy. So, it's very objective. It's descriptive, I guess. We also have another report series which is the Global Futures Report, where we're rather capturing the way we think about renewables today—about the renewable future—and we have some _____ reports. So, this is the knowledge part.

As I mentioned, the idea's really to inform processes and to shape the global energy debate. We're doing this, mainly, obviously, at events and debates, webinars, et cetera, but REN21 is also the international convener of the International Renewable Energy Conference, which it's taken place alter

years. And for our expert community, we have, alter years, an event which is the REN21 Academy, which is much more informal way of working together and really shaping and designing, being creative, innovative, about how to advance renewable energy. Now, to come to the Renewables Global Status Report, I mentioned that we are producing this report since 2004. We started doing this, actually, because renewable energy was not visible globally.

So, when we looked into energy statistics and we knew, however, from industry project developers, et cetera, that things were ongoing. So, the idea was really to build on this expert community. It's like a big jigsaw puzzle, I guess, where we're bringing together much information to them, have good and reliable data on what is happening with renewable energy, and to be able to tell the story. The report has different captioned chapters—one, which is the "Global Overview", where we're looking into all energy sectors.

There is a "Policy Landscape" because policy and regulator frameworks are fundamental to drive the tradition. "Market and Industry Trends"—here, we are looking not only the different renewable energy technologies, but also, the interlinkage with everything which is in aiding technologies with system integration, where we have this separate chapter. And "Distributed Renewables for Energy Access" because renewable energy is a key technology when we're talking about sustainable development goals and energy access. "Investment Flows" "Energy Efficiency" and a "Feature"—which this year, was specifically focusing on renewable energy in cities. So, as I said, there is a community of experts participating, and I invited all of you to participate here.

You can either—can see the data, participate as a peer reviewer, and it's really a great, collaborative undertaking. Now, over the years, we have really built out this really quite specific and identified REN21 and Reporting Culture because REN21, with this undertaking, allowed us to really collect data and disburse information. So, when we're looking into energy sectors like heating, when we're looking into energy access, there is no globally consolidated information because it's not centralized. So, this is where a collaborative and community-based approach is really complimentary or very strong. We're using formal and informal data, and everything is sourced very rigorously, and there is a clear transparency, which also leads to the fact that even official policy makers, I guess, do use this information, even though it's not on the official statistics.

There is a collaborative validation process, and we're also using this information, as it will hopefully agree upon _____ presentation to really tell the story and present the data in an impactful and attractive way. So, when we're looking at the developments of 2018, they're clearly—all in all, there is another strong year for renewable energy. The total global capacity rose 8 per cent in 2018 and the non-hydro capacity—so, everything which is not solar PV, wind, biomass, geothermal, et cetera—rose by 15 per cent. So, this is clearly a very strong signal. The added capacities in 2018 was of 181-gigawatts, with solar PV driving with 100-gigawatt, wind power—51-gigawatt, and hydropower—20-gigawatts.

Now, what we see here—and this is in particular in the power sector—today, renewable energy is mainstream. It's not a question of pioneering countries anymore. There are 90 countries which have more than 1 gigawatt of renewable power installed and over 30 countries that have more than 10 gigawatts. Now, logically, you would say like, this is also reflective in creating investment. This is, unfortunately, not the case in 2018.

There are two reasons for this. One is that solar PV and wind, which have been driving very much the renewable power uptake, has continuous cost reductions. So, basically, for one euro invested, you would have a higher share of installed capacity. There is, however, another aspect. So, from 2018 to 2017, the investment went down—investment for renewable power and fuels went down—from \$326 billion US to \$289 billion, and this is, in particular, a consequence of a revision after solar PV policies in China.

China is a leading country—has been a leading country for many years—and, as a result, this really had a major impact and reduction on the investment. Now, the good news, however, is, as I mentioned before, we're not only talking about pioneering countries anymore, and the global market was able to basically balance out this significant reduction in China. So, that's quite a good news. What is clear is, again, that the developed countries, for the first consecutive years—developed and emerging countries had been leading compared to the developed countries, even though there was, for the first time since 2014 an increase, again, of [Inaudible]. Now, I mentioned, in China—when you're looking on the slide on the bottom at the right, in green, you will see how significantly China investment went down.

And the regions which were able to pick up, basically, on this reduction were Europe, the Middle East, and the US, in particular. I'll come to this later. Now, I haven't spoken a lot about power, and in the power sector—which is really the driving sector, basically, for renewable uptake—their renewable energy share represents 26.2 per cent of the global electricity production. So, what is really interesting here is that, for the first time, more electricity was generated from solar PV than from bio-power.

Now, when we're looking specifically into the power market, we do see that renewable energy is now more than 33 of the global installed capacities generating capacities. And this is increasing since a longer time already. And when we're looking at the capacities without hydropower—so, we have wind power with 592 gigawatts, which represents 25 per cent; PV—solar PV was 505 gigawatts, which represents 21 per cent; and, for the first time, hydropower does not represent more than 50 per cent anymore. Yes. bio-power, geothermal, [Inaudible] represent six per cent.

When you look at this slide, you clearly see that solar PV has been driving around 55 per cent of these new editions—solar PV editions—and, in 2018, yes, I think you see the numbers. I'm not going to go through these in detail. Now, what is very interesting—and this is an indicator for the fact that renewable power, today, is globally the least cost option. So, when we're looking specifically at the newest—at the new capacity—so, net capacities—for power generating capacities, renewable electricity represents a share—

since 2012 already—of over 50 per cent, and this is increasing regularly. I think that this year, if I'm not mistake, we are at 64 per cent—at the highest here ever.

So, this is very clear that today, when—I take the example—in Brazil, there was a technology neutral option, and in this case, solar PV and wind have been driving, basically—or have been the winner, even though there was no restriction on which type of technology generation technology [Inaudible]. So, I spoke about solar PV. Very clearly, solar PV is thriving. And again, I remind here of the fact that in China, which was the leading country, solar PV went down significantly, and still, the installed capacities in [Inaudible] have been growing and reached, for the first time, were more than 100 gigawatts for the first time. What is also interesting, with regard to the fact that it's spreading all over, is that 11 countries have added more than 1 gigawatt in 2018.

What is interesting here, when we're looking into innovations, is we do see a development of floating solar with PV, which is often installed close or connected to hydropower capacities, also, which is driven very much by countries or cities which do have restrictions in terms of space. As hot markets are here—China, Japan, Korea, Chinese Taipei, and the UK and floating systems include in at least 29 countries. For the first time, their one-gigawatt mark has been surpassed on this technology, very much driven by China. The other technology is the wind, and here, there was an increase of 9 per cent to 591 gigawatts. 51 gigawatts have been added compared to 2017.

And what we see in the wind market, even though some key markets have been contracting, actually, the uptake is still happening. And we also see here, again, a development of new market segment, which is the offshore wind market, which is driven very much by European countries. By the end of 2018, 17 countries had offshore wind capacities. The UK is leading with 8 gigawatt of installed capacities, and other countries—so, some countries in Europe and two in Asia connected 4.5 gigawatt. So, here, we are talking about an increase of the capacities of 24 per cent.

As I said here, it was leading with approximately 80 per cent of the market share. Now, bio-power—and I'm mentioning this here because bio-power is clearly a big contributor—and continues to contribute—also to the power market segment. So, bio-power capacities increased 6.5 per cent in 2018—most rapidly in China, with an increase here of 9 per cent. Top countries, again, were China, Brazil, Germany, India, UK, and Japan. Obviously, bio-power has an advantage, because it is an electricity which you can more or less put on and off and can complement variable renewable power generation from solar PV and wind.

In this context, what is really, really interesting is to see the development of variable and renewable energy, which is reaching really high shares in the power grids. So, when we're looking here—sorry. I see that my slides are—so, we see here that there are countries—we're looking at the top countries. Denmark has reached over 50 per cent of variable renewable electricity shares; Uruguay over 30; then, we have between—so, over 20—Ireland,

Germany, Portugal, and Spain and Greece and UK, and Honduras, followed by Nicaragua, just below 20 per cent. What is really interesting here—it's when you go back a couple of years ago—just a few years ago—people were very afraid of the challenge of integrating variable and renewable power into the grids.

Today, we clearly see that this many flexibility options do exist to integrate this—whether it is grid management, demand site management, better interconnection—obviously, also, storage, but then, also—and this brings me to another slide—I'm jumping—hydropower. Now, on hydropower—obviously, hydropower, in such a grid, has—or in a grid—has the real advantage of bringing in a flexibility. And this is also where hydropower has a major role to play in the future electricity system. So, in hydropower, 20 gigawatts have been added in 2018. China represented more than 35 per cent of these new installations, followed by Brazil, Pakistan, and Turkey. And the generation is estimated at 4,210 terawatt hours.

Now, I'm jumping back—sorry for this. I think it is really interesting when we're looking to the variable renewable electricity, we do see that the developments here are quite exponential. From one year to the other, the share is increasing significantly. And even when you're looking into just on a couple of days or one day some regional grids, we reach shares of variable renewable education of 80, 90, and even higher per cent. So, this just shows how resilient and how innovative we can be in driving our energy systems in another way. I'm jumping right then.

So, on the hydropower segment, what we also see is clearly, with regard to the need for higher flexibility in the grids, pump storage is actually increasing. The grid connected energy storage capacities in thermal storage—sorry. A storage place meets real and in 2018, it was 167 gigawatts, of which 160 pumped storage. So, it shows how important this is. This residual 6.6 gigawatt were split between electric-chemical storage and thermal storage.

It's very clear that we speak a lot about [Inaudible] but thermal storage, in particular, when you're talking about the integration of different sectors, can play a significant role, in particular, as costs are much lower—up to 10 times lower—compared to battery storage. Now, this is the positive part of the story of 2018. And I think the conclusion here is very clearly—nobody is going to question anymore whether renewable power plays a role or not, and the developments are very positive. It's the least cost options. We know how to drive this, and we know what's regulatory and market design we need here.

But electricity is not everything. When we're looking at the overall energy picture, we do see that the situation is much more critical, compared to the 26.2 per cent of the share in the renewable power sector, when we were looking at energy, more than renewable energy only represent 10.6 per cent of the total final energy consumption. These are 2017 data. Now, what is happening here? We're looking at different energy sectors and electricity represents only 17 per cent of the total final energy demand, whereas heating and cooling represents 51 per cent of the total final energy demand.

And when we are looking here, renewable energy represents only 9.8 per cent of this demand—so, approximately 10 per cent. What are the difficulties here? It's clearly the lack of policy support in the sectors. I will come back to this later but will present you what other technologies they enroll here. So, I have mentioned the bio-power sector.

Clearly, in heating, bio-heat is the driver. I have not included a slide on this, because it's a bit sketchy, but—and also, to invite you to basically have a look at the full report and search for it, because we have really good other figures here. Another driving technology has been, obviously, in the heat sector—solar and water heating. And you clearly see that the capacities here are leveling down. There was only an increase of 2 per cent to reach 480 gigawatt [Inaudible] installed capacities.

The majority of this capacities are glazed collectors and basically, in terms of absolute numbers, the market is really going down. Now, this said, also, in this sector, we do see development. One is clearly that we're talking today about also the development of larger-scale solar heating installations, which can provide energy or medium-term heat to commercial applications. What we also see is that solar heating is included in district heating systems—whether it is in district heating systems or for cities, and here, you clearly see a big jump, I guess, between 2017 and 2018. 37 new large-scale solar thermal systems were commissioned in 2018.

This is a quite significant increase and has been driven very much by policy frameworks. Very clearly—and I'll come to Europe later—but Europe has been driving in this development. Now, the other energy sector is transport. 32 per cent of the total final energy demand and only 3.3 per cent offer renewable energy share. So, you see where it's getting worse and worse, but I promise you, there will be good news at the end.

What is challenging in the transport sector is also that the transport demand is increasing significantly. So, that's one aspect. The other is that transport accounts for 23 per cent of the global CO₂ emissions. What is happening in this sector? Renewable energy played a role here since a long time already when we're looking to buy fuels—whether it's ethanol, biodiesel or HVO—as _____ production has increased nearly seven per cent in 2018.

The [inaudible] and produced together almost 70 per cent of _____ fuel. We also see that the development of biomethane for the use in natural gas vehicles is growing—in particular, driven in Europe, but also partly in China. And that's clearly something which is still continuing, driven very much by mandate. Sorry. I lost the word.

The other aspect—and everybody—here's the word—e-mobility, e-mobility, e-mobility. Yes. The e-mobility is there. And when you're looking into the market, the growth rates are very impressive. We are talking about _____ which have increased by 68 per cent.

But today, there is 260 million electric two-wheelers on the road, 40 million electric three-wheelers on the road. So, in 2018, more than 2 million electric

cars have been sold. It's, again, China which is leading, with 50 per cent of the global stock, followed by the US. Now, this is very positive, because it allows for better integration of renewable energy power, and a good integration between the power sector and the transport sector. What is challenging, however, is this market is high concentrated.

Forty per cent of all EVs were just sold or used in 20 cities—20 major cities. The share of electric vehicles is approximately—I don't recall the exact number, but last year, it was approximately two per cent of the sales of bio-vehicles. So, it showed that we're still talking about a market segment which is not generalized yet. And another aspect, which is, however very critical when we're coming from the renewable side is that today, the e-mobility is not driven in a harmonic or an integrated way with renewable energy uptake. Only 25 per cent of the power use in electric vehicles is renewable, and this clearly indicate that there is a much stronger—there is a real need for a stronger integration of planning and of policy and regulated frameworks.

Sorry. I'm jumping back, because I think it is—one thing which is interesting when we're looking into the role of renewable electricity in the transport sector, is also the development of so-called electro-fuels—power to X. So, power to liquid, power to gas. Because these developments—and we're talking here more about demonstration projects so far—but these developments will also allow to provide renewable fuels—or renewable based fuels—to market segments which are not only road transportation for live vehicles, but also heavy-duty vehicles, aviation, and shipping. Now, this is a slide I wanted initially to show you at the start, but apparently moved it around in the wrong way. So, now you discover it here.

Again, renewable power—17 per cent. This is where we have the success story. Heating and cooling—51 per cent of the total final energy demand—only 10 per cent of renewables transferred 32 per cent of the total final energy demand; only 3 per cent of renewable energy. So, this is actually where we have a challenging message when we're looking at 2018. But it is fundamental.

If we're serious about Paris Agreement, if we're serious about sustainable development goals, that we transform this electricity transition into an energy position. Now, it is very interesting to look into what happens on the policy side here, and we clearly see that the main reason why renewable power has been driven in a successful way is the fact that since 2004, renewable power policies have increased steadily. There were some pioneering countries—in particular, in Europe—which had a real vision of developing a renewable industry, which put in place market conditions, investment in research and development demonstrating progress and job creation. And, as a result, a whole industry could be established, which was driving innovation and which was driving cost reductions. So, policies and regulated frameworks are key, and they are key also when we're making sure—or we need to make sure—that renewable energy today is operating in a level playing field.

So, I'm not only speaking about support mechanism like feed-in tariffs or even auctions, but it's also—when we're looking to policies and regulated

frameworks—the possibility to ensure that renewable power has access to the grids, that administrative processes are not taking too long—that there are very strong signals to private sectors, to industry, and investors—to engage into renewable energy. So, 135 countries had, in 2018, power regulator policies. In comparison to this, only 70 countries had that in the transport sectors, and only 20 countries had policies in heating and cooling. So, you already see that one of the challenges here is the lacking policy intention in the energy sectors which are heating and cooling and transport. Obviously, there is also the common pricing policies which are driving renewable uptake, as there were 44 countries which had common pricing policies.

Another aspect—when we're looking into the targets, we do see another difference here, which is—in the power sector, the targets are much more ambitious. So, when you're looking in the low part of the presentation of the slides, you will see that there are 100 per cent renewable targets or high shares of targets already on quite short timelines—so, we're talking about 2020-2030 here—whereas, when you're looking into heating and cooling—so, on the upward slide—A—there is not many countries which have targets. 45 and 47 countries compared to 162 in the power sector. But also, they are not as ambitious. So, again, policy action and vision is crucial.

So, carbon pricing—I will jump over this and come to another aspect which is really important. When we're talking about policy indications, signals, policy frameworks, unfortunately—and the situation still is—that 115 countries have fossil fuel subsidies. And even though renewable energy today is, in many countries—in particular, in the power sector—the least cost option, they're operating in markets where they need to compete with subsidized fossil fuels and nuclear. And this is, basically, not sending the right signals. We see, from these 115 countries, that 40 countries have started revisions of their fossil fuel subsidies, but when we're looking at the overall in subsidies in fossil fuel, in 2017, \$300 billion US have been spent on fossil fuel subsidy, which is an increase of 11 per cent compared to the year before.

So, obviously, this is something which is critical and, in a broader policy approach, needs to be addressed. So, all in all, where are we? There's hope, but the world is not on track when you're talking about limiting global warming and achieving the SDG7 goals. There is a clear need to accelerate the transition from fossil fuel to renewable energy, and even though I was very positive on what is happening in the renewable electricity sector, very clearly, the uptake and the needed acceleration here is not happening either. So, I will come back to this point, but we also wanted to see what the leading regions are because these can partly also be inspiring, I guess.

[Inaudible], so, here are some top five countries. Investment and renewable power and fuels was driven, still, even though there was a significant reduction, by China, followed by the US, Japan, India, and Australia. I will not go through the different technologies here, but you see that China appears a lot, the _____ a lot, and when we're looking, however, at these installed capacities put in relation to the populations, we do see that many European countries appear. So, for renewable power—excluding hydropower or not

including hydropower—we have Iceland, Denmark, Germany, Sweden, Finland. Solar PV capacities were kept in Germany, Australia, Japan, Belgium, and _____.

Wind power capacities were kept—Denmark, Ireland, Sweden, Portugal. And even in the heat sector, when we're looking here, we have Barbados leading for solar and water heating, followed by Austria, Cyprus, Cyprus, Israel, and Greece. So, this is really underlining how important it is to set up a policy framework and through—send real clear signals, having stronger, longer-term visions and objectives, and translate them into a supporting frameworks and definitions of market rules. On the investment side—I promised you that I would come back to this slide, so, here is part of it, with a focus on Europe. So, you see that since 2011, compared to 2017, the investment had gotten dropped by 60 per cent, actually, but has increased now from 2017 to 2018 from \$44 billion to \$61.2 billion US for renewable power and fuels.

Europe accounted like this for 21 per cent of global investments. And the main drivers for these have been, again, solar PV and wind. So, when we're looking at them on a hydro capacity, the European union represented 27 per cent of the installed capacities. When we're looking specifically at solar PV in Europe, 8.3 gigawatt were added totally 150 gigawatts, and Europe is really placing—in the regional ranking—second place, with leading countries in Germany, the Netherlands, France, and Italy. When we're looking at the wind power sector, 10.1 gigawatt have been added, reaching a total of 179 gigawatts.

And what is interesting—I've mentioned this before—2.10 gigawatt of offshore wind has been added in Europe. The market, in general, in the wind power sector, has, however, been down compared to 2017 by 35 per cent, and this was mainly due to reductions or a consequence of reductions in Germany and the UK. Also, pushback in terms of acceptance and the change, in particular, of regulated frameworks which—and this is an example again—that they're not only talking about feed-in tariffs and the hydro tariff, but also the rules and markets. So, in Germany, there are two major regions which have reviewed or increased the distance between the wind generation and the closest buildings, and this has reduced, significantly, the amount of potential projects, in some regions, by 80 per cent. Where's Europe leading elsewhere is we do see clearly the role of corporations moving up of the investment sector—also, finance, insurances, et cetera. Corporate sourcing has doubled in Europe compared to 2017.

And another, when we're talking about the energy sectors again, heating and cooling—Europe was leading in bio-energy consumption; higher shares of renewable in district heating—so, at least 8 countries in Europe had—over 8–40 per cent; and there was also an increase in the heat pump market. So, this is, again, linking renewable energy to efficiency. There is clearly an opportunity within European decarbonization's framework to increase the sector integration between power heating, cooling, and transport and practice. What is very clear here—so there are targets. There's this policy framework.

What will be critical here is how the member countries will translate vis-a-vis, this European framework at the national level. So, with the need for having clear, _____ targets and all this framework. Now, I will—I will not go into detail here, but I think that being in Europe—and when we're looking at the European market, obviously, it's also important to see what happens in the regions close to these markets. And we do see that renewable energy represents a key role, also, in expanding energy access in developing country, and this is something which is particularly crucial for Africa, which is a region with the least access to electricity, and the least access, also, to clean cooking facility. Here, we see that 150 million people across Africa and Asia benefit from energy access through off-grid solar systems—5 per cent of the population in Africa.

So, it's very clear that renewable energy are an opportunity here for a more inclusive [Inaudible] in transitionals and economic development of these [Inaudible]. I will jump, just for time reasons. So, what are the overall conclusions here? And I don't have it in one completing slides, but some nice concluding graphics. Renewable energy is powering the world, and this is not going to change.

But this has been driven in a strategic way in the past. So, I'm not going go in detail, but we can learn from this. When we're looking into the other sectors, it means we need to create a level playing field and phase out fossil fuel subsidies and adopt carbon pricing, because the sectors like the heat sector, the cooling sector, and transport rely heavily on fossil fuels, which is subsidized. There is a clear need to align sector integration more. And considering the fact that, in particular, the heat sector is quite local markets when we're looking where renewable heat or where heat consumption's taking place, it is, on the one hand, mainly in industry; on the other hand, in cities.

It's very clear that sub-national government and cities play a major role. So, for making this electricity transition become an energy transition, there is a need to also align the policy framework at the regional, national, sub-national, and municipal level. It is very clear, again, that in these sectors—so, in general, but in these sectors in particular—a strong link between the reduction of energy demand, efficiency, and renewables, is fundamental. So, all in all—and I promised you a positive message—the transition is possible and renewable power shows that it is possible if we really align the different players, the different visions, and set the right rules. So, that's positive.

And this should be showing the way. Leadership from national governments is fundamental, and this is something which is lacking today. Cities and sub-national governments play a role, and what we also see is that really, the private sector plays a major role here. Over 1,000 organizations totaling 8 trillion of managed assets have committed to divert from fossil fuels. This is driven very much by some finances, but, in particular, insurances and pension funds, and they are not driving it lightly. They are driving it because they are aware of the fact that continuing to invest in fossil fuels represents a major risk.

And we also see that the energy consumers can be a driver for renewable energy because the private sector, for instance, industry, is moving to renewables not only for problem reasons, but for cost reasons and, in particular, also for resilience reasons, for energy security reasons. So, I take the example—so, Argentina. We had a real issue. And so, there was a—how do you say this—a breakdown of the electricity system over the weekend. This have major economic impact.

And I take the example—there was a lot of feedback—of transport players, because all trains and metro lines, et cetera, were basically stopped. So, we do see how fundamental energy security is for these energy sectors, and this is a key driver from these sectors and corporations to [Inaudible] to this. So, I'm coming to my end slide and invite you all to join us in this collaborative effort. And so, my colleague, Duncan—he was part of the research direction team here at REN21—and myself are now available to answer your questions. Thank you very much for your attention.

Kamyria

Thank you so much, Rana, for your outstanding presentation. At this time, I would like to introduce Duncan Gibb, whom will assist in the question and answer session. Duncan is a project manager for REN21 on the research direction team. So, at this time, I'd like to remind our attendees to please, submit any questions using the question box at any time. We will also leave up these several links on the screen throughout the referencing—for referencing—where you will be able to find information about upcoming and previously held webinars and how to take advantage of the Ask an Expert program. Awesome.

Let's continue. The first question we have is—beside policy support, what is needed to make sure that we continue this renewable energy transition?

Rana

So, very clearly—so, the policy part is key. Increasing the awareness is key. And better communication about this. We still see that many decision makers are not aware of the solutions which exist and are not aware of the risk they are taking by not facing that. Now, this said, it is very clear that policies have a driven force here.

When we're looking at the renewable energy technology development, we see that there are some areas where research and development is still needed. So, I'm looking, particularly, in the heavy-duty vehicle, aviation, shipping sector where there are identified entry points. So, like, as I mentioned, the electro-fuels, renewable-based hydropower—sorry, hydrogen, ammonia, can really be developed, and there are some leads, I guess, also from demonstration processes to develop this, but there's also some technological developments. When we're looking into the grids and this move of an electricity moved to an energy move, the sector integration is fundamental. And this means that maybe we all need to get out of our _____ that inter-ministerial commissions on infrastructure planning, on investment and policy design, are fundamental.

So, this is not directly policies, but it is the way we're shaping the energy markets and systems.

Kamyria

Awesome. So, our second question is—what are the roles of corporations and how can we improve integration between the sectors?

Rana

So, the roles corporations are clearly—corporations, they have—so, historically, corporations have driven renewable energy deployment/decarbonization very much for social—corporate social and environmental responsibility. No. Corporation social responsibility. Sorry. Apologies.

Today, they are driving this for different reasons. As I mentioned, there's a cost factor. The other factor is energy security. And we're seeing that they also—or many corporations—are doing this shift today because they see that they need to do this shift to A—continue in the business model—so, we have examples of utilities, really, moving away from fossil fuels to renewables, and even key players like MG and ML—so, big players—doing this shift. We also see that they do this because they need to do it to attract human resources.

That's really a trend we see in many countries—that young people, today, do not want to engage in fossil fuel anymore, for instance. So, this is a role of corporations. Now, on the integration—as I said, I think it's really going out of our _____, so it's important that energy players go to transport events. It's important that efficiency players go to renewable events. It is important to look into overall self-_____ technologies.

Like digitalization can play a major role here. And very clearly, the way budget decisions are taken—it's fundamental.

Kamyria

Awesome. So, our next question is—can you say something about mechanisms used by local governments/urban governments engaged in global renewable energy policy development? Do they engage via their national governments? Or to what extent do they engage as a sector that is linked together globally and directly?

Rana

Hm-hmm. So, there are different ways for local governments to engage, and this depends very much on the authority they might have on energy. So, there are countries where the national framework allowed a local government to really have a big influence on their energy consumption, but also, the generation. There are other countries where the energy sector is clearly managed by the national government, and here, for the local government, there is still a ways to advance the transition, but it's more challenging, because they cannot always take a direct influence here. The way local governments can do this—A—it's by really defining targets, and we do see a clear push here—or development here—that local governments are driven very much by local air pollution often more than a climate.

In some country, they're also driven by climate, because the urban centers are very heavily affected by climate impacts. Different ways to do this for local governments is, for instance, public procurement. So, it's local governments deciding, for instance, about their public transport systems. So, here, they can decide to move to electric buses or to bio-fuel buses or biomethane. They can

also have, for instance—we see this very often in the building sector—to have obligations.

So, building codes, which are driving the transition not only on the renewable side, but also in efficiency. And interestingly, we see that local governments are driving this also for economic development opportunities but are also driving community energy for a stronger citizen's involvement and an energy democratization. Obviously, as I said, the national framework will define very much how far local governments can go. We see, with the engagement of the networks, basically—or there are many city networks which are driving the transition in a way that they're really bringing together the different cities to—because cities do not operate in an isolated way. The whole idea here is to bring the cities together and really influence, also, the national framework and made themselves heard.

On [Inaudible] side—and I ask you for a bit of patience—in September/October, we're going to launch the first edition of the Renewables in Cities Global Status Report, which is actually looking more in detail in what is really ongoing. Because one thing which is not very clear is to what extent the _____ and the announcement is really translating into installed capacities. So, I hope to see you online again in September/October.

Kamyria

Awesome. One more question we have is—what is causing the decrease in renewable energy integration? Is it a technical or mainly policy and the economy?

Rana

So, the decrease in renewable—so, it's not about the generation or the—it's not the integration, On the contrary, the integration of renewables is rising as we see when we're looking through variable renewable electricity in the grid. It's the share is increasing a lot. The general uptake is really—is not a technological problem. It's not a market maturity problem.

It's a fact that policy and regulator frameworks have been revised or the right policy and regulated frameworks are not set up. As I mentioned—fossil fuel subsidies is an aspect in countries with high share of nuclear electricity, for instance, this is locking at variable renewable electricity in the grids. We see that investment decisions which are taken today—take the example of Asia where there is 200 gigawatt of coal-fired power plants which have already been commissioned—so, basically, phasing these out will create stranded assets. And these are obviously—there are players. There are vested interests which are influencing a lot of renewable energy and acceleration.

Kamyria

Thank you, again, Rana, for this informative Q&A session. For any questions that we did not have time to answer, we will connect with those attendees offline after the webinar. Rana, I'd like to provide you with an opportunity to offer any additional or closing remarks you'd like to make before we close the webinar.

Rana

So, the closing remark is that take this information, spread it, and be part of the players who are increasing—accelerating the transition, but also, informing about the solutions which are out there. I think there's a real need

to increase the pressure of policy makers today to take action and be strategic, and give them the mandate to sometimes take decisions which might not always be easy decisions to take, but we don't have time to lose and there is a real emergency, and we need to act now [Break in audio]. Thank you for this opportunity.

Kamyria

Great. Thank you so much again. On behalf of the Clean Energy Solutions Center, I'd like to extend a hearty, "Thank you" to Rana for her presentation and to our attendees for participating in today's webinar. We very much appreciate your time and hope, in return, we provided some valuable insights that you can take back to your ministries, departments, or organizations. We also invite you to inform your colleagues and those in your networks about Solutions Center resources and services, including our free Ask an Expert service.

I invite you to check the Solutions Center website if you would like to view today's slides and listen to a recording of the presentation, as well as review previously held webinars. Additionally, you will find information on upcoming webinars and other training events. We also post webinar recordings to the [Clean Energy Solutions Center YouTube channel](#), but please allow one week for audio recording to be posted. Finally, I invite you to take a moment to complete the short feedback survey that will appear when we end the webinar. Please, enjoy the rest of your day and we hope to see you again at a future Clean Energy Solutions Center event. This concludes our webinar.