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SPEAKERS

Gayathri Prakash, Ricardo Gorini, Michael LaBelle

M

Michael LaBelle 00:04

Beyond Paris iryna delivers our 2050 energy pathway, Episode 34. Welcome to the my energy 2050 Podcast, where we speak to the people building a clean energy system by 2050. I'm your host Michael LaBelle. This week we speak with Ricardo gorini and Gaia three Prakash from the remap team at the International Renewable Energy Agency iryna. arena published this summer the world energy transition outlook 15 degree Celsius pathway. Our conversation today is about the report. Yes, we get a little technical, but we also learn about the reason for the report. This is not your usual climate and death report. Rather, it's an ambitious challenge to world leaders to actually deliver the goods by 2050. As the report makes clear, business as usual, even in a Paris scenario doesn't deliver the goods. The perspective we gained by having a conversation with members of the team that put the report together makes us or lists at least me appreciate the importance of the findings even more. We learned from Gaia three that the reason for the report is not just to demonstrate that renewables are the cheapest and smartest way to save the planet. We know or at least many of you listening to this episode do. What we find out is that the recent youth pressure for countries to do more to fulfill the Paris Climate Agreement was the reason to push for 1.5 Celsius scenario. Because as the report states and it's kind of long, but hang on, quote, current plans fall woefully short of a 1.5 Celsius goal based on existing government energy plans and targets. The policies in place will do no more than stabilize global emissions. End of quote. The basis of the report starts with the knowledge that governments are not doing enough and we need to be much more

ambitious, ambitious to make it happen. The report I really like because it maps out the measurable progress we need to make each year to realize a profound shift in technologies and practices personally, and I have to say professionally speaking, the report delivers a clear path forward as Gayathri states Every Day Counts, and she is not exaggerating. As I stay in each episode of The my energy 2050 podcast. The purpose is to highlight the people spreading the knowledge about the energy transition. This episode delivers a homerun on this account, we get a bit technical at times. So on the surface some of our discussion as well technical, but as you will hear throughout the episode, the justification and understanding of what technological and policy solutions are on the short term horizon, such as green hydrogen, these can deliver rapid and affordable energy transition. A big thanks go to arena for approving this interview. And it follows Episode 11 where I speak with Luis de Janeiro and Sean Collins about their roadmap or the agency's roadmap for Central and Southeast Europe. In short, this episode delivers an in depth discussion on the pace of change, but also the path of technological developments and the tremendous potential we still have to unlock because renewables are already cheaper than fossil fuels. So let's start working on the transition and leave fossil fuels for the fossils. And now for this week's episode.

M Michael LaBelle 04:03

The audience of the my energy 2050 podcast is very lucky this week, we have two key contributors to the World Energy transitions outlook, the 15 degrees Celsius pathway published by the International Renewable Energy Agency. Today we have on Ricardo gorini, the senior program officer in the renewable energy roadmaps team, who has who's been there for almost four years. We also have Gary three Prakash. She's an Associate Program Officer also in the renewable energy roadmaps team. She has been there for almost five years with Rena Ricardo and Gary three. Welcome to the my energy 2050 podcast.

R Ricardo Gorini 04:43

Thank you. Thank you very much for the introduction. I mean, we're very pleased to be here. Thank you.

M Michael LaBelle 04:49

Thank you. And I really want to say thank you for coming on because I think the report is is really excellent. Before we begin, maybe Ricardo could you provide a brief description of what I read, actually, on the pronunciation of IRENA, and and what it does?

R Ricardo Gorini 05:08

Yes. So we eat in an arena is the International Renewable Energy Agency. So we are, you know, a very global organization, it was stablished. Since 2011. We have two offices, you know, actually the headquarters in Abu Dhabi. And we have, where we are now the bond office here in Germany, the innovation and technology center. And as I said, we have a very broad, I would say, number of countries, it's 164, with another 20, in ascension, so it's really, really global. And that makes us very unique. And that says, this is good to, to, you know, to have this possibility. And our membership is very active. We what we do we know, what's our word, right. So we have this role to support the member states, in all the topics that are related to renewable energy, energy transition, in general. So basically, we work as a platform to facilitate discussions, you know, a center of excellence in many areas, I can name for instance, you know, the technology and innovation aspects, the policy and knowledge augments that we have, you know, all together working to develop these proposals and solutions to bring energy transition further. And many more, I mean, I invite you all to go to our website, we have the reports, they're all free for download. So it's really something you can just go there, click the button, and you will, you'll be able to reach out our studies. And yeah, we're very happy to discuss here, a little bit of one of our main products, that's the word and it has its own outlook. So the window, we too,

M Michael LaBelle 07:02

will refer to it as the window. I'm just really impressed. Okay, I'm impressed by all the reports, but I'll just say the, the weed to report really encapsulates and I think brings in local knowledge and national knowledge and, and it and it shows, can you describe a bit more to about the modeling work and the policy work and, and your yourself? Could you describe your background,

R Ricardo Gorini 07:28

maybe I can start and then maybe guys who can can compliment. So in terms of these skills, right, and background? First, I think it's important to say that, what once as we need to really change a lot in this pathway, so the transformation is really systemic, it's really holistic, if you like, all the skills are needed. What once once we understand that we're talking about changing all levels of society, economy sectors, and we can name a few here, I mean, we need to change transport, we need to change buildings, how we live and how we, we, we consume energy, we need to change how we produce goods and services, you know, everything related to industry. So this is all inclusive, if you like, you know, we can call that. So basically, we need all the skills myself, I can give an example. I'm economist, so I've been working for for many, many years now on this topic. Thank you, Ricardo. Guy, you

M Michael LaBelle 08:35
three the same question for you.

G Gayathri Prakash 08:37
Sure. Yeah, from my side, I, well, I did my undergraduate study on Electrical and Electronics Engineering. And I worked for a bit in India, focusing more on the power system design. And at some point, to be honest with you, I was so bored the topic. Of course, I had this fascination towards the electricity sector, but I wanted to do something else a bit broader. So I mean, it's also a personal thing that, you know, in back home in India, we do face this frequent power cuts every day. And it's quite annoying, in many, many sense. So I wanted to do something to kind of mitigate this issue and to kind of address this problem. And that's when I begin the research to do like, Okay, what can I explore further as a focus area, and I got to know quite a lot is beyond electricity sector, what we are talking about here, and that's something that was very, very interesting for me to explore. So that's the reason why I was trying to find sort of solution to address different interlinked problems. So that's the reason why I chose to do a Master's study in renewables in Germany and Germany was leading in terms of the education and knowledge that they could share for young students to know about this topic and to kind of explore the career for further in this field. So yeah, that's how my career evolve, and I did my masters in renewables. And it's it's timely that you know, towards the end of the course, that's when the Paris Agreement was signed. So that was like, even more, you know, further objective for me to work on this topic. And I cannot be so proud that I joined iryna, five years ago, and it's a perfect platform, as Ricardo already explained how important we are in terms of driving the pace of the transition. So that's, that's the overall my motivation and background. And here, I we work on this topic quite a lot. And especially on the edge scenarios, more related to the Paris climate goals. We call this us energy transition scenarios. And we do work on this for last five to six years, we have launched six annual reports so far. And the especially the veto is more special, because it's the most challenging scenario one can even imagine. So that's, that's the overall objective. And I'm quite interested. And it's challenging day by day. But it's interesting.

M Michael LaBelle 11:03
You mentioned that we too, we toe is the most challenging one. Could you describe in more detail why why it's so challenging, or why it was so challenging for you to produce it?

G Gayathri Prakash 11:14

Sure. So as I mentioned, we do we worked on this energy transition topics. And Irene has already developed a scenario, which is a well below two degree scenario three years back. And we kind of thing that even that scenario is quite ambitious as compared to current plans and policies. So countries do have ambitions, and they are raising their ambitions every year. But it's not really enough in the climate context. So we fall, we develop this two degree scenario. And now with more pressure from the society and from the youth community to address this big climate crisis, there is a need actually, for us to explore further on limiting the temperature rise towards 1.5. And that's the most ambitious goal, one can say, because every single day counts here if we are to meet that pathway. So when we develop this pathway last year, and we already see that there are a lot of sectors that we need to address, that a lot of, of course, the in terms of technology and solution, most of the technologies that are available. But if you think about the scaling of these technologies, it's really daunting. It's compared to what is really happening now. And we are we are not really talking about the technologies, we are talking beyond technologies, the way we live and the way we need to adapt to the climate, everything needs to be changed sustainably. So when we and of course, there are many aspects that's beyond numbers, right, we need to think about the frameworks, we need to think about the regulations, and the behavioral aspects, the structural aspects. So for us, when we were doing this scenario, it was quite challenging in the sense when we were How could the world transform in the next 30 years, and we see the need to transform immediately. And this 10 years or this decade is crucial. If you're not acting, now, we're not doing this in our pathway, we're not going to be in this pathway. So that's why every single year for us is quite crucial. And the decision we make the right decision that we make right now will lead us to the pathway.

M Michael LaBelle 13:11

And it's really well said, thank you so much with that it is every day that that is is so important. And then the 2030 goals, which are kind of out there, but what are slipping, we can see in the assessment for many countries that were what what they have as goals are not going to be met or haven't been met. And could you could you maybe a guy just stick with you for this this question is what kind of future steps will enhance the transition, though? What, what are some practical aspects that are outlined in the report?

G Gayathri Prakash 13:44

Sure. Um, so for us, I think we already see some sort of progress in energy transition that's happening right now, especially in the context of competitiveness, renewables are already cost competitive most of the technologies in many markets, we have seen the tremendous

cost reduction for solar PV, for instance, it fell by 85% in the last decade. So we also see that the falling cost of actually motivated or dominate have led the renewable power technologies to dominate the electricity generation additions. So we see there is a kind of progress that's happening last year was a record year for renewables, especially where we added around 260 gigawatts globally, despite the pandemic. So there are there are things happening. But we see that these progress is not really enough in the climate context. And that's the main objective of the report. And the report already highlights that the progress is happening, but it's not really enough. And it gives us kind of some scaling factors, we need to increase the level of deployment in all the sectors. So just to highlight few in terms of technology, we see that for instance, I said that renewable generation capacity We added last year to 60 gigawatts. But when in a 1.5 scenario, we would need around 840 gigawatts every year for the next 30 years. And that's almost fourfold as compared to the additions that was that were made last year. And in terms of, for example, the energy efficiency improvements, we also see that there is something that's happening in the line, but it's not really up to the scale. So the energy intensity improvements in the last decade was around 1.2%. And if we are to meet the climate goals, we also need to think about the efficiency improvements in the Indian side. So here, we almost need a doubling in energy intensity improvements at the global scale. And if you think about the sectors like transport, for instance, how Ricardo mentioned, is also quite important, where he see her gaining momentum for electrification, let's say electric mobility. And the sales are quite increasing the last year's but PC that the electric vehicle sales should kind of amplify from around 4%, now to almost 100%. And that means we would need at least let's say, over 1.8 billion electric vehicles by 2050. So in I think we need a kind of scale up in all the technologies and hydrogen is one of the hot topic as well. So I think we the report clearly highlights this, the scale. And also we say that this is quite a daunting challenge. But we do see it's feasible, if you start putting the right policies, if we start with a diverting the investments away from the traditional conventional fossil fuel technologies towards these energy transition technologies,

M Michael LaBelle 16:41

exactly what you just said, so that the challenges are there, but it's feasible, I would just and I just wanted to mention at the very beginning of your answer, but I want to go back and just ask you again. So renewables are not more expensive than fossil fuels. Could you? Could you maybe address the general price level? Because a lot of people think that renewables are quite expensive.

G Gayathri Prakash 17:03

No, actually, if you think about renewable power generation capacity, like solar and wind,

they are already cost competitive in most of the markets. We iryna launches every year, a sort of costing report that updates the costing is based on the number of projects that we receive, let's say installed every year. And we see that there is a tremendous cost reduction that happened in the last decade. And as as we already highlight, I highlighted that solar PV for instance, we had the the cost reduction for solar PV, which is around 85%. And we are almost in the range of six cents or so I need to check the numbers Exactly. But I think the solar PV had the highest cost reduction as compared to other the technologies. But we also saw the onshore wind and offshore wind also saw quite a lot of cost reductions. But I think more in terms of competitiveness, I would not say all the technologies are competitive enough, I would say hydrogen is quite expensive. Now, it's almost two to three times higher than the reproduction of green hydrogen, especially is two to three times higher than the traditional blue hydrogen, which is coupled with CCS. And we say that from our analysis that almost that we we can achieve the price parity with increasing innovation and reduction in the cost of electrolyzers. And by 2030, we already see that the cost of green hydrogen will be competitive enough to make this scaling increasing rice in the in the deployment. So I think yeah, that's so I'm not, we will not be convinced if he said and he will say expensive now because they are competitive enough. And we are seeing everywhere. The auctions, especially happening in solar PV in Abu Dhabi, or in the nation in Asia, especially. So I think the technologies have proven to be cost competitive, and they are already ready to be deployed at the largest scale. I think the challenges right now we face are quite different in the national context, more related to the planning are more related to the regulation that needs to be cleared.

M Michael LaBelle 19:13

Excellent. And maybe I turn to Ricardo and provide some of that context about I would say we kind of get ahead of some of the questions here both the policy and regulatory outlook, what does the report provide in this area?

R Ricardo Gorini 19:27

So the report tries to be very comprehensive in terms of bringing insights for for all the sectors. So the content of the report as Gary was explaining, we have this technology Avenue explanation there, where you recover, transport industry buildings, how with hydrogen plays a role how bioenergy plays a role, you know, biomass in general. How Of course, all the renewable energy penetration plays a role in terms of electricity. So the main, the main idea is electricity, energy efficiency renewables. So this is our, our drivers that will bring the energy transition further and emissions down, we have quite a challenge to bring that emissions down. So, in terms of the specific policies, for into the case of the power sector, we can see there, for instance, some some insights in how we

will, we will do this coupling solutions, you know, consumption, supply together to match the needs. So, we need a lot of variable renewable energy, for instance, solar wind, you know, that's kind of flexible in that sense. And we need to change the way we operate the systems in a sense that we count with the digitalization aspects that are there, we count on managing the load, you know, all the batteries, how it coupled those 1.8 billion cars, that guy was mentioned, to bring this source of flexibility to the grid, you know, and all these innovations that are bringing new concepts of really dispatch and operation all together. So we really bring new insights there in terms of policies and new regulations, market design, if you like, that will be needed to change to deliver that, you know, possibilities. So we have a lot of, I would say, expectation in terms of this penetration of renewable energy, electricity, especially. So reach levels, further than 80%. So it's very important that we get that right. Very, very important. But of course, we have all the different types of policies. So yeah, different sectors. But

M Michael LaBelle 21:48

it's, it's let me make a joke at a guy at three's expense. So she, she, she left India, because she wanted to get away from the market system. But what you're actually saying is that the market and how its operating is actually one of the key areas that needs the investment in need needs to be much more Actually, I'll just say creative, even though that's the wrong term to say how a power system is managed. So it needs new ways, and much more flexible ways to manage.

R Ricardo Gorini 22:19

Yeah, yeah. Yeah, that's, that's one important, I would say, adjustment, right, in or enabling, I would say, adjustment to get these levels of variable renewable energy. So we, as we move into higher levels of variable, renewable energy, we need to get, of course, the infrastructure. Right. And, and the market design and regulations properly set. So we can have all the benefits that are related to such kind of structure. So that's what I mean, you know, and of course, the, I would say, the, the difficulties related to to the operation, maybe guide, you can explore that further. They are diminishing over time, you know, because, you know, the the new technologies are there already. So there is a huge opportunity in that sense. Yeah.

M Michael LaBelle 23:17

And maybe I'll just stick with you. Right now, Ricardo, can you describe that and actually go through it. She She also mentioned about the reallocation of capital. And is this already happening? How is this playing out?

R Ricardo Gorini 23:30

Yeah. Well, that's that's also a very interesting insight that we have in the report. I mean, basically, we also tried to assess all the investment numbers, right, that that would be needed in terms of the transformation covering all the sector. So we were talking about 133, Indians. 130. That's, that's correct. Not the wrong number. So it seems a lot, right. But basically, we're talking about the whole transformation. So including infrastructure, you know, including, of course, new capacity needs, and in all the sectors, including building renovation, etc. So that's, that's the level of challenge that we bring there in the report, but we also have this angle, opportunity. So the investor, they look at this, and they say, Wow, that's a nice market to have, you know, so for the coming decades, who is going to take that pace, right. And basically, we need to change a lot the energy mix, of course, from fossil to renewables, right. So that's, that's where we understand that there are a lot of new possibilities, even for fossil fuel companies to start looking at this renewable market and to see, oh, I can do this. I can do that. You know, so there are a lot of synergies that they can just move into their energy companies. They're not labeled necessarily as far so they can you know, they have a lot of skills that are needed, as We talked before right to develop that energy transition as well. So of course, they have a lot to start with their own production and trying to change, you know, their their own emissions. But of course, they should also and they are doing to be honest that they are starting to do that, looking at the different opportunities and start to, to know in them and to start to really bring money there. And of course, if you look at the, the renewable energy attractiveness in terms of, you know, investment, this is already there, got to mention that we had the record year, right 260 dziga. And the resilience is, is increasing. And it's amazing, because, last year, we had, of course, and we still are in this pandemic situation, but, you know, we had the record. So what I mean here is, if we look at this systemic and comprehensive understanding of the benefits of renewable, this attracts investment, you know, it's not just, you know, the, the comparison of different high profit possibilities, but you must understand that we're looking at this medium and long term strategy position as a company, and of course, as countries and the whole world. So, we can discuss a lot about this, how renewables are really competitive, and how good they are now, because basically, if you look at a couple of decades ago, I mean, we did not, we didn't have the technologies available for the energy service. Now, if you look, we have renewables for all the markets, you want renewable go there, there is a technology that you can use, right. So basically, we are there in that that point, we have all the, you know, the skills in terms of, you know, a lot of build with people with a lot of skills that could could and are willing to work in this market, you know, so you have the supply chain well established. So, you know, you have the counties with all these pledges as policy support. So what we see is this system transformation that's bringing, you know, the whole momentum into the, into the play, and the financial market, of course, is aware of that, they're all looking at the situation, and the banks, you know, multilateral banks are discussion that that kind of

thing, you know, ESG, all this stuff. And also, you know, the, what we call these,

R Ricardo Gorini 27:30

you know, setting kind of rules to sustainable investments, you know, as, as this is a very important aspect that we must get it right, because, of course, that will allow a lot of, you know, projects to have special, I would say conditions as well. So, what we see is a confirmation of changes that are really bring in some conversions. And the financial market, of course, are looking at that. And if you look at some indicators there, especially the, the profit, or the share, you know, and we have that in the report the shares, price, over time comparing to, let's say, the overall market, we see that those sustainable sector that you like, they have higher performance. So, we are all aware what what must be done, and investors, of course, are part of all of this. And they, they see that as opportunity. And we look at this much more in the in the near future. So, I mean, we're very confident of this tipping point, if you like,

M Michael LaBelle 28:38

others other some regions that the report identifies as doing better than other regions in how companies we could say fossil fuel companies are readjusting.

R Ricardo Gorini 28:49

Actually, we have also another paper that is also available in the web, that's this oil company's strategy, on this energy transition, in what we understand there is that the European companies are moving faster than the American companies, for instance, you know, this strategy is, is really a battery in that sense of looking at the possibilities in terms of new niches and new markets related to renewables and transition. So, to give you an idea, I mean, oil company can can look at the short term market as very similar to what they do on this drilling thing, you know, so, of course, offshore wind, you know, if you have your platform there, you can also, you know, have a lot of synergies there in terms of the skills that are needed, you know, bioenergy, they already they're playing this role in bioenergy. We see a lot of strategy into this electrification work. So even buying green So they they own greed or even, you know, in the, in the distribution fathoming selling directly to consumers. But of course, there are also a generation side, as I said, so, I think this is this is a good indication of how those companies are really looking at this this market as opportunity, they need to move faster they need to to really jump into this new game. But of course, they all are aware of that. And, and the shareholders, of course, they have a role to play there, you know, shareholders, they look at the share this okay, I mean, short term, I may get more profit here, perhaps, but immediate term, is that really, or I'm facing too

risky position? So, shall I restructure my portfolio here, you know, this is what people started to realize, and to think, and, you know, if you're late to the game, you will be facing a lot of all activity, your price. So, we need to be all aware of that.

M Michael LaBelle 31:00

The shareholder one is a good point. And I'm sorry, I didn't I didn't read the report. But does it make a comparison between because European oil companies have more, I'm totally talking off the top of my head, may have more state ownership oil, European oil companies have more oil and gas companies may have more state ownership compared to American oil and gas companies. And so they've been prompted to kind of shift their focus as well. You mean, the

R Ricardo Gorini 31:29

reasons? Right? Well, well, we may may consider maybe a combination of reasons. Definitely. You know, Europe is taking the lead on the energy transition, you know, so of course, the the countries they, and they are pushing harder. I think us recently also, you know, brought into this discussion, a nice, a nice proposition to 2050. Right. So, I mean, you guys is back to the game in that sense. But I understand that the European countries are really bringing pledges Do you know, policies? So what you see happening in Europe, Europe is quite interesting in that sense. Now, I mean, there are some reasons that's difficult to drive a diesel car, you know, so this is this is really affecting our, our, our daily lives in that sense. So we need to adjust. And maybe the oil companies are looking at their own market, you know what I mean? And they see, okay, so we need to change faster, you know, so maybe this is one reason. Yeah,

M Michael LaBelle 32:32

right. So sorry, I just get, yeah, of course, because the Europe is, and now the United States, but definitely Europe is committed to phasing out diesel, for example. And also internal combustion engines, both the government's and the car companies themselves. Thus, it's going to prompt the oil companies. They've got to change their focus as well. Definitely. Yes, yes. So it kind of kind of builds on. I think both both you and Gaia threat, Gaia, were saying was that the momentum is there, right? The momentum that has been built up in the renewable energy technologies like solar and wind at the cost has come down. And now it's just playing out. And actually, I want to kind of shift back to that guy throw about what Ricardo mentioned about renewable energy. And this was actually, if I can kind of reframe it a bit. So we talked about companies and global oil and gas companies, but I really like to focus on the people on the ground and their access to non

grid, renewable energy. How is that playing out? And where are the projections for the future? Yeah,

G Gayathri Prakash 33:47

I think as I mentioned before, there are different drivers for this energy transition is not just about the climate change is also the opportunities that it brings right. So here energy access or universal energy access is one of the key element especially in the context of 2030. And we do have strict sustainable development goals of achieving this. So, here, again, off grid renewable solutions have emerged as a as a mainstream solution to kind of extend access to modern energy services. So we have seen in the last decade or few years, the deployment of standalone or mini grid systems have witnessed tremendous progress, mainly due to the technological development and the reduction in cost and also the innovation in different deployments and also the financial models that have been picked up. So here we also see a kind of involvement from diverse set of stakeholders could be local entrepreneurs, or could be the international private sector, or the financial institutions that they are all engaging quite in in providing this important element taxes to clean electricity and clean Cooking. So I think it's Despite all these things, of course, the share of people with access have grown in the last decade, but we still have around from the last statistic, I could remember 750 million people or so without access to electricity, and around 2.6 billion people without access to clean cooking. So on the financial side, obviously, the investments have grown. So we see that the commitments to upgrade renewables in all the emerging and developing countries have increased to almost like tenfold compared to the last decade. But we still see that these investments are sort of not enough or more concentrated in few regions. And it's not really happening in the region where we see a huge gap in the access example, Africa. So here, we can see that Africa will be the forefront, we lead the forefront efforts to reach the objective. And we see that offered solutions are quite important. And here, renewables pay a key role in providing the services like lighting or the clean cooking, because the cooking is also related to some of the harmful effects of health. And here, renewables are the technologies are already available in sort of mitigating the local indoor air pollution effect, and also increasing the availability of the source. So I think, here, yeah, as I said of renewables, they we do see a lot of solutions there. Maybe in terms of isolated grids, or in terms of solar lights, or solar home systems. The only thing we need to do here is to accelerate the pace again, and to we need a kind of dedicated policies and regulations to make this really happen in this decade. And I just would like to highlight Irene is doing quite a lot in this platform. We all have different sort of collaboration, capacity, building activities and knowledge products, to bring out the best experiences and best practices to kind of and also to come up with some enabling policy measures and financial financing schemes to to deploy the large scale, standalone system or more mini grid systems with

renewables.

M Michael LaBelle 37:11
Could you describe some of those the financial schemes that are available or could be,

G Gayathri Prakash 37:16
I think it's quite a lot, it depends on the region. But here we see in terms of isolated net, the pricing mechanism is one of the thing, straightforward debt billing mechanisms. And we see quite a lot of projects that's already happening in Asia, for instance, in Naipaul, in India, where we have seen a lot of lead building mechanisms such as that's happening with respect to the off grid solutions. And this is something is quite attractive. And there are a lot of startups that they are kind of kind of involving in this distributed generation sources. And a lot of incentives are given both to the government side and also for the private sector. So I think is is already happening enough, mostly in Asia, but it's also replicating in Africa, with a lot of new new startups focusing on these kind of off grid solutions with net building and incentives that the customer consumers can get. But also, I think, in terms of policies, we do really need a kind of strict policies for specific regions. And to kind of highlight what kind of policy support can actually enable this sort of penetration of distributed generation. So I think that's an element which is crucial, and to be discussed and to be accelerated in the next years.

M Michael LaBelle 38:32
Yes, yes. And I just say that actually, you have a really good risk assessment. In here. I'm just, let's hear this is page 109. And it really does look at the different risks. And so I think this is really important when thinking about, because what's described in the report is very good. It has all the technical details and the modeling work, and the numbers of how this can be achieved, compared to the business as usual approach. But what I also like and what we were getting into is the risks or why why things are not happening. And I just wanted to highlight when it comes to grid and transmission risks, or the counterparty risks, the power of taker risks, who's participating in why they may not want to participate, or the it gets into the area of regulatory certainty. And the policy designs that are necessary to prompt the investors into a region we could say maybe off grid, but also into centralized grid and bringing these newer technologies or ensuring that the investments for example into hydrogen are realized over the longer term. So I just want to say it, the the when we haven't spoken about, but what's underlying in the discussion is the risks risks that are there. And I think the framework that you develop nicely illustrate the risks that may be holding back others from participating more or investing So that's that. That's

quite quite good. I just want to say that the risk analysis is very good. I wanted to maybe shifted a little bit and really look at the 2015. year. And actually, we've talked about a little bit about the different scenarios that plants plant energy scenarios can the business as usual, as I just mentioned, but also there's the 1.5 degree Celsius scenario as well. My question use Can you describe for Ricardo, can you describe how the national pledges for net zero are assessed into the planned scenario? Or the 1.5 degrees scenario?

R Ricardo Gorini 40:41

Yeah. Yep. So definitely, we have in this first assessment of this planet, and it's an idea included those plans. So as you said, is a kind of business as usual, right. So it's basically we understand what are the plans for the next decades, and also, some of those pledges. So this planet energy scenario does consider that. So that's there, but it's not enough. Right? So basically, this scenario, we still reach the same level of emissions as today. And what does it mean around 3637 Giga tons per year of emissions, and that is not sustainable. In that sense. We're not aligned, you know, with his 1.5 C, Paris Agreement, just to give you an idea, we need 500 we still have remaining carbon budget 500 Giga tons. So this is the challenge. So we need to reduce to net zero as soon as possible without really changing that overshooting you know, so, having a lot of emissions further down further, as as, as I said, So basically, what we do in this 1.5 is really to try to keep that normative approach bringing emissions faster down as needed, according to this five gigatons carbon budget compliant with Paris Agreement. So, and you saw the numbers, right is quite challenging all the sectors, we need to, to really move faster, this decade guy pointed out very well, this decade is a decade of action, right? So we need to educate, and we will be of course, very, we will know if this is doable. This decade is not that we will see the near future mean that the next years are very important. So this cop 26, I think we must say that here, we need really to, to bring into the agenda, you know, all and everything, all the kind of effort that are needed to give a nice message to the, to the stakeholders to the public in general that we really need to move faster, you know, so of course, there is this discussion related to, to mining, right, budget, finance flows, etc. But we need to get that right, in order to bring all this, you know, urgent actions in other sectors as soon as possible to remove this emissions that we have. So I think that's, that's a very important statement that we bring in the report. I would like to, to also mention here that, you know, the, there is also an effort that we are starting to develop regional energy tradition outlooks. So you saw the wayto, the global one, and we are doing this kind of thing, thing as a regional analysis. Right. This is also something our director general is, is, is really looking for. So the idea is to, to bring the context, and the specific recommendations, as you saw in the global to the regions. So that's, that's our ongoing work now, and hope this will come soon. I mean, of course, a lot of reasons. We'll start, you know, a set of publications soon, so

M Michael LaBelle 44:20

yeah, great. I can't wait because I really like breaking Yeah, the world. I think this report is great, because it's global in scope, but also the the national we can always access to national and there's usually reports available on national levels. But it's these regional levels that I find I'm a geographer, so I that I find really useful, because the there's Yeah, there are regions and usually there's similarities and so that we can start to understand, I mean, just living in Europe, Western Europe, Eastern Europe all have their own different challenges by region, I would say more than even by, you know, the EU as a whole. So I think and actually you have the Can I call it the Balkans, the southeast. Europe with it. That's the kind of, of granulite that we're working for now. Exactly. Yes, yes. And I and I actually had two colleagues on to discuss that report, because it was so good as well. So I'm definitely looking forward to further reports. I just have, I think, two more questions before wrapping up. And, and one, I don't want to have not asked this question. But you explained the interconnection between energy intensity and emissions. And I really like this, this is goes to some of the research I'm doing right now, too. And in this area, can you identify? Well, actually, Ricardo, could you just explain what why is it important to understand and to break down energy intensity and emissions? And then what are the solutions to that, to break that? to decouple it?

R Ricardo Gorini 45:53

Let me let me try to start with this concept, right. So energy intensity, and then how we link that with emissions, I mean, so energy intensity, just for for our our understanding, we are talking about, you know, consumption of energy over time versus GDP, right. So, basically, the Advent, so all this, you know, I would say, benefits that you bring as as economy, you call that GDP, and then we have all the consumption. So one over the other, you have this energy intensity, right? So basically, the idea here is, how would you are in using energy to produce added value and benefits for, for all of us. I mean, that's the, the concept. So, of course, as we grow, in terms of population, we would consume more energy, as we increase our GDP. Everything, set the spiders, as we say, in economy, we will, we'll see, you know, energy increasing as well. So this in principle is in principle, however, now, we need to decouple a bit, the understanding of energy services, and energy fields and energy consumption if you like, right, so what we consume at the end of the day is the service is not energy would not eat energy, right? We do as food, but not energy, like fuel, you know what I mean? So, of course, services are the key, we need services, lighting, heating, cooling, that's it, displacement of goods, services, people etc. So, the good news or bad, we are inefficient. So basically, as a society, in general, we are using energy very badly, you know, so we should increase, we should improve ourselves a lot. And of course, another good news is we have a lot of new technologies that are more efficient that we could install and substitute old stuff. So, basically, this is what we would like to see

coming, right. So as substitution of, you know, bad behaviors and substitution of old technologies for new technologies that will bring the fuel consumption down, keeping or even increasing the energy service. And I can give you an example, if you look at a V's electric vehicles, they are much much more efficient than internal combustion engines, if you look at,

R Ricardo Gorini 48:27

you know, like a diesel car, or a gasoline car and an Eevee Eevee would consume less fuel in general equivalent, then any an internal combustion engine. If you look at the same kilometers that you you do, you know, so I think that gives us the idea of this energy intensive comp concept. So what you mean is, of course, what we say in the report, we should try our best to keep the same level of consumption of energy today, and how we'll do that, we'll do that enhancing the energy intensive indicator. So, basically, we need to keep this energy efficiency investment. So, we will reduce this indicator meaning that we will be more effective and more efficient, you know, in the use of energy. So, what is this in terms of an issue? Well, if we do that, if we do the consumption, and if we keep using fossil fuels, we will reduce them issues, because you know, the fossil fuel that we will be needing. And, of course, we are not using that anymore. We will, you know, reduce the emissions, the equivalent emissions from this amount. So this is the first I would say drive of emission reduction. 25% that's what we explained the report 25% that is efficiency, energy efficiency related. So it's not enough I mean, why What we need is to change the energy mix, right? Not just energy efficiency, not just energy intensity down, but we need really to change the energy mix as well. And this is the whole part of the whole story. That is the electrification aspect, you know, the direct renewable use. So, you know, instead of heating my home with natural gas, I would use district heating or biomass, you know, pellet, stuff like that. So this is the direct use of renewables in the energy service. Or also, we could also talk about, of course, the datafication aspects of this. But basically, renewable energy penetration, including indirect electrification of your hydrogen, as Kathy explained, you know, so this is the main bulk of combination efficiency and renewable energy, direct indirect, to bring emissions down. That's very important. That's very important. Hope I've managed to explain that, you know, this link. That's very important.

M Michael LaBelle 50:58

Right, right, right. Yeah, exactly. So so. So by the energy intensity, you can reduce by energy efficiency steps, but also, by choosing technologies that are actually more efficient to produce heat or power, rather than I mean, even coal fired power plants right there, maybe 50% efficient, they have a 50% efficiency rating. I mean, they're quite quite bad.

Actually.

R Ricardo Gorini 51:24

That's also another another interesting. So when you look at the supply of electricity, or all these transformation centers that are needed to, you know, to change one way of fuel to another, that's what we at the end use in our, in our stars, basically, you use a lot of energy, so you consume a lot of energy. And you're right. I mean, if you look up a wind, or hydro power, versus a fossil fuel generation, even natural gas, the level of efficiency of the primary energy that you need to transfer to transform into useful energy feel like it's much more much more efficient. So it's basically you use less the nature, you know, so you're more efficient using the nature to have the same services. So that's, that's, I think, very important. Also to bring here. Yeah, good point.

M Michael LaBelle 52:26

Thank you, Ricardo. That brings us to my last question. And and it's, it's kind of opportune, because your scenario looks at 2050. But my question I always have for guests, the last question is, what is what is the energy system look like to you in 2050? So so maybe I'll ask gotra. First, what is the energy system in 2050 look like for you.

G Gayathri Prakash 52:50

In 2050, I think is going to be more smarter, more interconnected. And yeah, more digitalized says kids come Sunday smarter. But also, I think it would be more efficient, as Ricardo explained. So I think we need to head towards the energy system of the future, basically, with it is clean, sustainable, which is also efficient and reliable. And yeah, so I think I am a bit optimistic, but only Yeah, of course, I'm not sure if we are with a ci 1.5 or two degrees, but I see some sort of progress, at least we will transform from the energy system we are today and towards 25th.

M Michael LaBelle 53:30

Great, thank you. And Ricardo,

R Ricardo Gorini 53:32

I'm very optimistic on this transformation, ongoing, what I think I would like to bring this angle of people's reaction. So I will see that our homes, the way we live, will will change a lot, you know, the way we we move things and we displace ourselves. So basically, we will

see a very, very deep behavioral transformation in that sense. And the role of technology and innovation is key, it will be very important, you know, because, of course, this is all about efficient, as we discussed, but it's all about, you know, the possibility to keep the energy services playing, working. And that's how we will see the innovation plays an important role in you know, buildings, transport as well as industry. So we have a lot of challenges, as you know, in the hard to decarbonize sectors and also, still there segment still, you know, how will the carbonized those sectors and this is going to also play an important role in terms of innovation and technologies. So we'll see a different society. You know, that's, that's good news.

M Michael LaBelle 54:45

I'll go further than both of you. And I'll just say, I think in 2050, the world will look exactly as you outline in your report. That's great. That's gonna be the exact Well, we'll come back in a few years time, right and Do a check in in 30 years. See See if we were right. Okay guy. That's right. And Ricardo, I want to thank you very much for coming on today. Thank you very much very nice questions to you. Thank you for joining us. For this episode, we produce the my energy 2050 podcast to learn about cutting edge research, and the people building our clean energy system. If you enjoyed this episode or any episode, please share it. The more we spread our message of the ease of an energy transition, the faster we can make it. You can follow us on LinkedIn where we are the most active on the my energy 2050 web page or on Twitter and Facebook. I'm your host Michael LaBelle. Thank you for listening to this week's episode.