



NAVIGATING THE POST PANDEMIC FUTURE

VIDEO TRANSCRIPT

Muqsit Ashraf: ... and good evening ladies and gentleman. I am Muqsit Ashraf. I lead Accenture's energy practice globally. I'm honored to be hosting this featured panel with an exceptional group of speakers we have today. Our topic for discussion is navigating the post-pandemic future and with that, I'd like to start by introducing our panel. I'll start with Jeanne, who is the Director of CLP Research Institute, and also serves as a secretary for the World Energy Council, Hong Kong Members Committee.

Muqsit Ashraf: Next up Leo Birnbaum who's also the chair of the Studies Committee, and also the member of the Executive Board of the Council, and is part of the Executive Board of E.ON. On the right side then is Mike Howard who's the Vice Chair of the Social Responsibility for Innovation for the World Energy Council, and is also the CEO of EPRI. And then we have Ged Davis, who was the Executive Chair for Scenarios for the World Energy Council. Welcome, everyone.

Muqsit Ashraf: Let me start with setting the stage first. The COVID-19 crisis has had and is having in fact a huge impact on societies and economies. And energy's one of the most affected sectors. Global energy demand is expected to drop by more than 5% by most estimates, year on year, in 2020. With almost all forms of energy except perhaps renewables dropping anywhere between 2 and 10%. Renewables, as I said, might be the only bright spot. It may end up growing by the end of the year in the low single digit, which in itself is actually a drop from its trajectory and the projections that they've had for this year and for the years ahead.

Muqsit Ashraf: There's still a lot that we of course, don't know about the pandemic, including the impact of a potential second wave of infections. But given all of the uncertainty, I still commend the council for having done a great job of really setting a set of crisis scenarios and articulating them, and setting up tools that support the energy community with its recovery plans. What we do not know or what we do know is that in the period of great uncertainty, at least for many months, we have a lot to think about. We can say with a fair degree of confidence I must say, that the post-pandemic world, which is what we will be discussing, will look different.

Muqsit Ashraf: Different than the way people live, work, and travel. And that certainly has implications for energy demand. So, we can also say safely that energy supply will start to take a very different look. Especially in certain parts of the world that are placing a greater emphasis on accelerating investments in infrastructure, and in capabilities for low carbon energy system in the future. And the general belief in the energy community, of course, as it is across the rest of the world, is that if a reversible, what I call gray rhino event, like COVID-19, can cause the kind of disruptions we have witnessed, then the implications of an irreversible phenomenon like climate change could be truly devastating.

Muqsit Ashraf: While the uncertainty won't go away anytime soon, energy leaders really cannot wait and they need to act now. Countries and organizations are already taking different approaches to recover from the crisis, and so in the panel today we will cover the most



significant imperatives for energy in a post-pandemic future. We will cover how businesses, government, and societies can better prepare for that future, and then we would want to touch on whether the race to net zero continues successfully or will we see different ambitions for transformation and indeed sustainable development.

Muqsit Ashraf: With that, let me turn over to the panel. I want to start by getting some opening remarks from all of our panelist speakers here. Around the question of what has changed, and what stays the same as a result of the pandemic. And building off that, if you can all please provide a perspective on what are the three most significant imperatives for energy in that future. Let me start with Ged, and then we'll go around the table here. Ged, over [crosstalk 00:05:40].

Ged Davis:

Thank you, Muqsit. I think for starters, I'd like to give the audience the opportunity to see the scenarios that were developed earlier this year. If we could just see them please.

Speaker 3: COVID-19 has dramatically changed our world. The energy industry was already under strain. From economic, environmental, and social pressures. So, how will this pandemic impact the global energy transition? Questions around our ambition for the future. How much societies can trust one another and our ability to control the virus are shaping four different paths to 2024. In the two low trust scenarios, vaccine development is slow and the crisis is resolved through changes in societal behaviors. The rewind world turns away from globalization to focus on reviving local economics. Recovery's uneven, and overall progress towards climate change targets falls short of agreed goals.

Speaker 3: In a re-record future, societies, cities, and consumers create a human centered transition. New energy communities, hybrid energy markets, and net zero solutions for a circular economy start to emerge. In the high trust scenarios, cooperation on vaccine development enables control of the virus by the end of 2021. In pause, international cooperation aims at a return to the pre-pandemic normal. Energy transition is slowed, but there is progress on climate adaptation and carbon capture and utilization. In the fast forward scenario, a new era of collaborative innovation drives transformation. Governments are pursuing integrated recovery policies to deliver on goals. It's too early to know what will happen, but now is the time to prepare. How well are you positioned to handle these scenarios?

Ged Davis: So let me just say a few words about ... Remind you of how we treated COVID-19 in the scenarios. Essentially looking at a range between a vaccine being made available sometime this year, early next year, and being fully distributed. This view is a possibility from six months back is perhaps a little bit under question at the moment. The other approach which is really to look at a world where we would have to socially distance in a myriad of different ways, depending on the country and locality, with adaptation through to 2024.

Ged Davis: I'd like to just say a few words about what we've learned in the last few months. In particular, most of you of course, will monitor confirmed cases against deaths for COVID-19. I think in practice, of course, what really matters is rather is the true infection level. Not the confirmed cases. And there's been quite a lot of interesting work over the last few months on

that. The current view is that if you are going to get rid of the pandemic, you need to build up sufficient immunity through infections or a vaccine. And that has to be up to 55% to 80% of a population.

Ged Davis: The current view of the number of infections to date, and I include also in this the view from the World Health Organization of yesterday, is that between 480 and 800 million have been infected. That's to date, 5-10% of the global population. If we're going to have a vaccine that solves the problem, then we have to look at where we are with the 44 clinical trials that are currently underway, 11 of them are in what is called phase three. Let me remind you, phase three is onerous. It requires tens of thousands of volunteers to be tested and it takes time to fully assess the risks and issues with a particular vaccine.

Ged Davis: I think it's probably not unreasonable to say that it's unlikely we would have a vaccine available and fully distributed globally in order to put the pandemic behind us, much before early 2022. Clearly if no safe vaccine is available, we would have to manage the infection for quite a significant period. So, I think that's something to bear in mind. It could be that we're dealing with a tougher situation than we envisaged when we did the initial analysis six months ago. What the implications are for the global economy, Muqsit has given us the sense, the IMF review, which includes a significant downside, was published last week.

Ged Davis: They're looking at around 5% decline in world GDP. It's very much the figure we had for fast forward and pause in our earlier work. Of course, this varies enormously across countries. In Europe and Latin America, we're

looking at situations where we're above 10% decline in GDP, and China is several points above zero. Going forward, some of the current studies indicate we may not get back to 2019 levels much before 2023-24, across Europe, Latin America. This is a tougher situation perhaps than we'd considered initially. And economic difficulty leads to social, and potentially political crisis, as publics get frustrated and annoyed that the sacrifice in one single lockdown nevertheless leads to a second or maybe a third or a fourth.

Ged Davis: The implications for energy. We've had, and I'll cover this quickly given Muqsit's remarks, we've had fewer markets, the lockdown has distorted the economy, it's impacted energy sectors differentially, mobility hard hit. Industry buildings. Maybe reductions in commercial uses of energy. Tourism, for example, way down. Flights way down. 90% below last year, at the end of the lockdown. And they've risen now to something like 50% below. This is a big hit. Many forecast oil demand not returning to 2019 levels much before 2022 to 2024.

Ged Davis: We've seen a reduced investment in energy, down about \$300 billion this year compared with 2019. And going forward, we could expect some major further disruption to the energy industry in the coming few years. All of this, in the decade which is critical for reducing carbon emissions. Our own world energy transition radar indicates that there's a lot of enthusiasm around the world, high ambition for addressing these issues. And along with, in addition the social agenda. But we need additional clean energy investment and we need it at a volume maybe 2-3 times the present level. If I go back to Dubai, where we raised



many of these issues, not of course COVID-19, there is an even larger gap between what we are prepared to do and fill possible today, and what we need to do and want to do to address perhaps the greatest of the problems of this century, climate change.

Ged Davis: So, what are the imperatives? Let me just cover them briefly. For me, a lot of these go back to the grand transition. This is happening regardless what else is going on. The first one is to focus on improving productivity. This is a world of much slower economic growth, in part because we've got much slower population growth. Productivity and leadership is absolutely critical. Secondly, get ahead of the ESG climate change agenda. We need leaders, and this is a real opportunity, to take an opportunity. And thirdly, and I guess I would say this, assess your risks continuously.

Ged Davis: These are now wider than just geopolitics, new technology, new players. They involve social agenda and a transformed environmental agenda. With that as starters, let me pass back to Muqsit.

Muqsit Ashraf: Thank you, Ged. I'll turn over to Leo to get a bit more of a corporate perspective, as well. Leo, your thoughts, please.

Leo Birnbaum: Thank you. Good afternoon over from my side, or good morning, good evening, wherever you are. I agree on the imperatives that Ged just said, but I would add a different flavor indeed. The first point that I would like to make is I do not believe that we as energy companies are one of the most hit sectors. Yes, we have seen large declines, but if you compare this with cruise ships, tourism, airlines, restaurants, catering,

some of the sectors producing luxury goods, whatever, I could probably name 40 sectors which are hit harder than us. Why? Because we provide essential services and therefore the decline in relative terms, even though big for us in historical comparisons, is actually smaller than others.

Leo Birnbaum: But I think we should be modest on that one and acknowledge that there are many others where actually hit harder. Now, second comment, energy doesn't equal energy. If you are actually like my company, mostly on electric and gas infrastructure networks, actually the hit is quite in comparison, quite small. It's actually significant larger if you are a generator exposed to wholesale markets where the decline of demand hits you much harder, or if you're an oil and gas company. We should be careful with general statements and we should be modest about how hard we are hit, in comparison to many others who are actually hit much harder.

Leo Birnbaum: Now, what I would say, some things have just remained the same, but they have increased in relevance. What has stayed the same? It was always essential that we never interrupt our services, no matter what. It's just not an option to interrupt, for example, our network infrastructure. And no matter what, because otherwise our societies can't function. So, that is unchanged. What is changed is the resilience of the systems and our ability to provide that security of supply, even in social distancing times, becomes more relevant.

Leo Birnbaum: Digitization of networks, cybersecurity, resilience of our operation system, that becomes more important. So, unchanged, but more relevant now. Second thing is, and I agree to the point that Ged makes, we always have to make sure that we provide the services which society needs at least cost. Productivity becomes more of an imperative you just said. What I would say is innovation becomes critical, because we cannot deliver the services, not to speak about an energy transition, without even more deploying innovation to the benefit of our customers. Innovation has been an imperative before, but if anything, it's even more important now.

Leo Birnbaum: Now, I agree also on the risks then point, and here I think we need to differentiate. I think here the picture has changed, and it's not the same anymore. I believe that COVID has accelerated significantly a trend which we might have seen anyway, especially when it comes to oil and gas. The move towards e-mobility I would put the hypothesis on the table that we will see a faster decline of consumption than we would have seen without COVID, and we will see probably a faster transition towards alternatives. That obviously means that companies that are outright exposed to conventional generation or conventional oil and gas, which are outright exposed to commodity markets, they actually see an acceleration of the trend which was there before and they must react to that.

Leo Birnbaum: Whilst for infrastructure companies, and probably also renewable energy companies, we might actually see even beneficial effects in the long term, even though we clearly have short term challenges. I think it's a bit of a mixed picture depending on where you

are, and now, but I'll leave that to Jeanne, I think also everything I just said depends a little bit also by the region which you are in, because the answers again for network operators wanting gas companies and so on might change as you move around the world into different regions.

Muqsit Ashraf: Excellent. I'm sure we'll pick up on the contradiction or the paradox, rather, in the second half of the discussion. But with that, over to you Jeanne, to provide a bit of a perspective perhaps from more an Asian developing economies growth markets perspective. Take it away.

Jeanne Ng: Sure, thanks. In the Asian context, I guess in terms of changes there are probably two points I wanted to make. The first one really being that as usual, the most vulnerable end up being impacted the most and so what's happened is the disparity, I think before and after COVID, means that that disparity between the haves and the not haves has increased even further, at least in some parts in Asia. Secondly, the fact that some countries, so as Leo had mentioned, not even ... There's the difference in terms of the different power sector, oil and gas, but in different countries, depending on what your economy's built on.

Jeanne Ng: So, in Asia of course we have a lot of manufacturing and construction. Now, of course, in this case that means COVID did impact us quite a bit in the countries that had very much a lot of their GDP tied to these kinds of activities. So, in fact, I think one of the concerns that I think from an environmentally minded person I would have, is once COVID is over, there's going to be this mad scramble to get back to work and even double up and the issue is that emissions and GDP are tied, unfortunately. They're coupled together. There.



might be even a rebound of emissions afterwards, but in any case, I think that drop in demand hasn't ... It's not going to be a lasting change. That's something that's more temporary, whereas I think the disparity between the haves and not haves is something that's even more long lasting.

Jeanne Ng: In terms of the three most significant imperatives, a bit riding on those changes. First of all, since I think in developing Asia in particular, the fact that there is no 100% access to reliable electricity or power right now, that even that point of continuing to make sure that that is solved, that that is resolved, that we do ensure that there is reliable energy access being proliferated. As Leo mentioned, the thing about COVID, and actually even before COVID, the push towards decentralization, decarbonization, there were more and more technologies that were allowing I would say off grid or those that are going to be very hard to connect, they can actually have access to energy.

Jeanne Ng: I guess one of the silver linings that hopefully that can play out, is that these communities that don't have power today, there's more probability of them getting it. Ensuring reliable energy access is key number one. Secondly, increasing the efficiencies of current operations and assets, because when there's this mad rush to go back and start going back to your GDP machine again, again you're going to be going back to what you have now, as opposed to building new things which can't generate revenue streams right away.

Jeanne Ng: I think that's why the point about change leading to transition, that during this transition that means all existing assets, there's a huge opportunity for those to be more efficient and AI, digitization, robotics, all of that will really help in that area. The third thing, we need to continue to press on with the energy transition pathway, that we need to decouple emissions from GDP. If anything, if you look at COVID, this is exactly the situation that we love the cleaner air for countries that used to be manufacturing and they stopped. But if we don't decouple, this relationship that growing the economy or developing economy means that there's going to be emissions, will continue to exist.

Muqsit Ashraf: That's great, Jeanne. That's great perspective. Mike, I'll turn over to you to bring in both a North American and perhaps a deeper power or utilities perspective on the changes and the imperatives.

Mike Howard: Okay. Thank you very much and really appreciate being here on this panel. Some just really excellent points and it's hard to add to what's already been said. Maybe I can just emphasize a few points from my perspective. I think clearly an imperative has got to be a focus on safe, reliable, and affordable energy, and I would say it's not just those three, but with the issues around natural disasters that we're seeing throughout the world, I would also add more resilient energy systems. So, those are some of the key imperatives.



Mike Howard: Unfortunately what COVID has done is created really significant social disruptions. Not only just socially in terms of a broader perspective, but also in individual lives. I don't think this is going to be over anytime soon. Even if we have a vaccine, I think it's still going to be around for a while, and we're going to have to figure out how to live with it, adapt to it, and so on. Vaccines and other medicines will certainly help but the social disruption is going to be with us for a while.

Mike Howard: And kind of thinking about what are the major trends, I think there are three that I'm seeing. I just wanted to point these out. Some of these have already been mentioned. But I think Leo was the one that mentioned that these trends that we're seeing were already happening. It's just when COVID happened, it caused them to accelerate. And those three, one is what we're doing right now, the virtual interaction that we're seeing. So, virtual is going to continue to accelerate, it's going to happen. We're seeing it at EPRI, we're seeing that we used to have dozens of utility folks that would attend our classes to talk about some of the new technologies and so on.

Mike Howard: Now we're seeing that go virtual, and I think we're going to see that happening more and more. What that means is that the global focus on increased bandwidth, internet connection and so on, is going to be of immense importance around the world. That's one. Second is digital. Now, digital means a lot of things to different people, but I think here when I think about it, it's basically being able to see in real time the health and condition of your electrical assets from end to end. From generation to transmission, to distribution, to end use.

Mike Howard: By seeing and understanding what's the condition of the assets, you're in a much better position to manage them and manage the disruptions which really gets at I think one person mentioned this, reliability, resiliency's imperative, and that means we have to be able to have a digital system that can see, understand, use artificial intelligence and so on to gather information about the system in real time, to understand its health. Digital is a second. The third has to do with clean. We've talked about this a lot, but I do think what we're seeing is, and we were starting to see this trend already at various scales around the world, but imperative to focus on cleaner energy.

Mike Howard: Now, that certainly includes the cleaner electricity production, and using that clean energy on the end use devices. We call them electro technologies or electrification. For example, electric vehicles, so using cleaner electricity to be able to use it in a way that is more efficient, more reliable, and certainly using technologies around electro technologies. Above all else, what will get us through this, and I think Jeanne mentioned this right at the end, is technology innovation. Imperative. We've got to be able to invest, focus on investing in technologies that will help develop the technologies to help address these issues we just talked about. Let me leave it there. Again, it's a privilege to be here and on this panel. Thank you very much.

Muqsit Ashraf: Thank you, Mike. We will shortly get into questions from the audience, as well, but I want to pick up on a few of the threads. I think there are clearly a lot of themes that resonate, whether those are around innovation, resilience, of course sustainability and trust and so on. I want to bring this back to



you, Leo. I think you put out a good challenge in terms of the impact that's been had on the energy system or the energy industry at large. I agree there is a dichotomy between different types of players. One would argue that some parts of the energy industry, oil and gas in particular, are actually getting the wrong end of the stick so to speak, right?

Muqsit Ashraf: I mean, they are one of the worst hit, especially when you look at it from a captive markets standpoint. But that being said, many of the things we heard about have been talked about for a couple of years at least, right? That the energy industry at large is accelerating its agenda around digital, around innovation, around sustainability. What's your sense for also given the increased uncertainty, what's your sense for what exactly now needs to happen? What is happening? What does the industry need to do more of and perhaps do less of to now really push ahead in a more impactful fashion than it has in the past perhaps?

Leo Birnbaum: I will answer this question from a perspective of European utility, because otherwise I would probably need to go through the regions. Give me the privilege of just answering as a European utility, and I would say we need just to be much faster in what we do. We need to continue what we do. The first thing is we always say the imperative is to keep our people safe, and I fully agree. But if as in the beginning we talked about, COVID is going to stay around for two years if we're lucky, five years if we are unlucky, it's not an option just to go with the home office. We need to continue our operations even if COVID is still not away.

Leo Birnbaum: My company has actually very early on thought ways of how can we continue? And I can tell you that we have invested actually even above the budget that we had in place for this year, into our networks. We have never really interrupted our investment processes. We have socially isolated and social distancing in our operations, and we have figured way how to continue to do what we did in the last year, also this year. I think it's an imperative for every utility to find ways to do that, because it's just not an option to stop investing for 3-4 years. You can stop investing for six weeks, for maybe four or five months, but you cannot do this in a middle of a transition.

Leo Birnbaum: First imperative very operational, just get on and get the job done no matter what. And find a way to do that which is acceptable for your employees. Because the alternative is not acceptable for society. That is number one. Number two is if you look at what happened this year in Germany, it's basically we leaped forward 10 years. We had 40% renewables, then the pandemic came, actually what happened is that obviously the coal stations were shut down, because the spreads became negative, and we have seen an average production above 60-70% renewables with all the volatility and the stress on the system and so forth already this year.

Leo Birnbaum: If you want, we just time warped 10 years. Now we still have the backup, but what this tells us, we need to accelerate to get our systems in place to be able to control such systems as we will have them in 10 years. Also, the decommissioning of conventional



power generation has accelerated, and there's just no option rather than to do that in the environment which we're in. Which again means we have less time to do what we thought we would have more time. I think this is what I alluded to in the beginning. I think we need the innovation to be able to ... The digitization is part for me of innovation, to actually control those systems in a resilient way, in a cybersecurity way, and this is what we all need to do. If you ask me, we need to get our job done but even faster and under more difficult circumstances than we thought a year ago.

Muqsit Ashraf: Excellent. Let's take that back, Jeanne, to your point around the impact in terms of Asia. I mean, from signals around the world and leadership conversations, we're seeing different ambitions and different ambitions for transformation and transition across countries. What's your perspective on how COVID is reshaping, if I could call the Asian energy landscape, and/or the Asian response in terms of changes on policy, on societal stuff, on business fronts, and then also on the technology front? Technology and innovation front.

Jeanne Ng: Sure. I think for Asia, again, the developing context is obviously a little bit different. In fact, there's recently just all these articles saying, "Well, South East Asia is this really going to push things faster or is it really happening?" And to be honest, there was a reason why it was slow in the first place, and those reasons have not gone away. The conditions have just gotten even harder. So, in that sense, there is this bit of a tension between will there be a bit more a fossil fuels happening in the short term, because that's quick, easy, fast, cheaper?

Jeanne Ng: Versus the longer term build out of renewables, storage, waiting for better grid technologies, for example. I think there is that tension, so I would venture to guess that the pace is not going to be that much faster. Perhaps there's going to be more technologies, as long as there's more technologies that will be commercialized fast enough then that pace can change. Because basically everyone's waiting for those technologies to come to the forefront. That's one point I think on the Asian context, in terms of the COVID impact.

Jeanne Ng: I think also the other really important thing I think to really take note of is China's carbon neutrality target by 2060. Their target is probably one of the biggest commitment, I guess of any party, that's committed. It is estimated that such a commitment can shave about .2-.3 degrees off the global warming increase, which is not insignificant. And again, everyone questions, "Oh, well it's one thing to make the commitment, but is this really going to happen? Because they're still building coal and there's still going to be some fossil fuels going on."

Jeanne Ng: Again, yes, I think in the short term you're still going to see some of the fossil fuels happening, but in tandem, and especially in China where they are already one of the biggest investors and producers of renewable energy equipment, batteries, they've got the most electric buses in the world basically. Half of the EVs are probably in China, as well. They have the solutions. I guess the question is how fast are they going to transition towards all of these new solutions and making that the new future and moving away from fossil fuels?

Jeanne Ng: I think the fact that President Xi actually made that commitment. Typically, they make commitments that they will pretty much overperform or they will outperform, so I think it is a very positive signal. I guess the last point to make from that was there's one of the questions that I also saw just out the corner of my eye was regionalization. I think in the scenarios, I think basically you have the existing order and the new order which is the scale of globalization or localization and I think in Asia, total localization obviously won't work. But globalization, given all the strife that's going on right now, we know that also that has a lot of challenges.

Jeanne Ng: Therefore, the regionalization seems to be the spot where I think Asia will have to operate on. I would hesitate but I would say a country like China that has the financial backing, it has the technologies, it could be that they can help lead this area. But again, the politics make it maybe socially very difficult for it to happen. Even though technically the belt and road was one of those concepts that they can help the region. But of course, again, we'll have to see the social acceptance side of how that will happen and also China within its own country, how it will make that change and swap towards more cleaner energy.

Muqsit Ashraf: That's great. I mean, I think another aspect that would be interesting is certainly we've seen historically a strong correlation between energy intensity and economic growth, as well. Of course, Asia at large, and as you rightly pointed out, it's perhaps a tale of at least two types of regions within it, has a fair bit of catching up to do. It doesn't mean it has to get to the same level of intensity to achieve that same levels of GDP, but it would

be interesting how that balance is struck over time. I want to then turn over to you, Mike, again. The impact of the crisis, as you were also alluding to, is different on different sectors, and for utilities, the immediate priority would be to meet all of the critical energy need.

Muqsit Ashraf: It is also a sector that even almost pick any scenario, unlike fossil fuels, there's a significant growth expected, right? Up to 50% over the next few decades. What do you see as the long lasting impact on utilities and the priorities as the world emerges from this crisis?

Mike Howard: So, probably the most important is making the transition from significant fossil fuel generation to really kind of net zero carbon by some future date. That is a significant transformation that is occurring, and I think certainly has to occur. I also would say this is not just a ... This is really a global change that we're seeing. It's not particularly regional. The different scale and different scope regionally, certainly, and even within the US you have different scales and scope, depending on the current mixture of generation assets.

Mike Howard: But overall, a movement toward significant reduction in fossil and more sustainable forms of generation, which certainly includes renewables and nuclear. And certainly more energy efficient in the manned response, technologies. I think you're going to see that increase. Almost it seems like every day a new utility is coming out and saying, "We're committed to net zero" or something close to there, by some particular date. Whether that's 2035, 2040, 2050, or 2060 or whatever it is, but just a commitment is enough to focus



legislators, regulators, employees, and society in general to say, "Okay, it's really time to do something about this." I would emphasize again that this is a global issue, it requires global commitment, it requires global innovation, and it really requires the globalization of people working together. Try to solve this difficult problem. At the end of the day, we're going to get through this by innovation.

Muqsit Ashraf: That's great, Mike. I'd like to then link back to Ged, your view in terms of scenarios. How do you see the impact of the crisis on the attainment of the net zero objective, if you could call it that? As you look your long term scenarios.

Ged Davis: If we look at the longest term we've looked at to around 40 years when we did the 2016 work. You've got to simply accept the fact that when you look out 40 years, you do have pandemics, you do have wars, there's a whole set of phenomena which get taken up in the analysis. Not always explicitly. I think one of the question marks which is still in my head is, is COVID-19 a once in a generation phenomenon, or is it really a once in 100 years? We do have to really go back to the first World War and Spanish Flu, and is it sufficiently disrupting the base to make a difference.

Ged Davis: My view is that it may. But I think it's probably worth looking at the fundamental assumptions behind the scenarios, and do it very quickly and see what's happened. Because there are things that have happened beyond just COVID, but COVID has been the instrument. The first one really is around international

governance and geopolitics. We've seen everything from countries working with others to find solutions, to at another extreme, focus on your own country, the resolution or even vaccine nationalism with the connotations around that.

Ged Davis: One of the phenomena that we won't discuss much today but important, is how international governance changes. Can it provide a working framework that genuinely involves all? I think that question is in some ways slightly more in question than it was a year ago. The pace of innovation or productivity, we've heard from colleagues on the panel. I think this is something, one gets the sense that we have moved more quickly. That opens up perhaps an appetite, a confidence, an ability to move much more quickly in areas which relate to climate change and other elements of the ESG agenda.

Ged Davis: A serious commitment to climate change I think we're reaching the point where it's no longer should be acceptable to essentially look at 2050 or 2060 as the target. We should recognize we have a turning point to achieve before 2030, globally. If we don't do that on emissions, we will have an enormously challenging, much more challenging two decades beyond, if 2050 is the target. I think governments should begin to commit to achieving 2030 targets. Comprehensively, all involved, and move away from just 2050-2060. And to monitor much more carefully what's going on. And tools for action, we haven't discussed yet, but I suspect much of what we've talked about on the public health side, climate

change [inaudible 00:48:23], is about the development of a new global public good, or set of public goods, and we need to talk about the competence and efficiency of governments in their ability to address some of these problems. Both framing for the private sector and direct commitments themselves. I think things are changing. It will be interesting one or two years on to ask ourselves what has changed enough to change the scenarios we have?

Muqsit Ashraf: That's great. Thanks, Ged. We've got a few very good questions from the audience, and we'll go in a bit of a rapid fire. I request that we get 30 second answers, as well. Leo, I'll start with you. There's a question around the fact that [inaudible 00:49:09] and sectors are now playing an interesting role in the transition. I actually would slightly reword it and say the transition would only happen if there is cross-sectorial efforts, right? What's your prospective on how best to accomplish that from a private sector standpoint?

Leo Birnbaum: I think we are seeing our cross-sector transitions. E-mobility is one of the focus topics of this week. What I would just say is we need to understand that no single company, no matter how big, can build the future energy system across all areas by itself. When you're talking network, storage, e-mobility, eating, industrial uses and so on. We need to build partnership and networks. In the past, we as utilities, especially when we were operating in actual regional monopolies, we tended to do everything ourselves with integrated utilities. This will not work. The acknowledgement of this one and then building partner ecosystems. I think that's the way forward, also to accelerate.

Muqsit Ashraf: Great. I'll take another question which I think is really interesting, which is what one action could we take right now to accelerate the energy transition? I'll go to you, Mike. I know you talked about the shift towards more of a renewable centric grid, but beyond that, what one action would you think about within the power sector context or beyond that, as well?

Mike Howard: Oh, boy. One action? There's so many. One action is well, this transition is going to be expensive. It's going to impact everybody, but it's imperative that it gets started. It's already started, but it's got to be more rapid. I think commitment to capital, focused commitment on deployment of capital, with an eye on the future, that can make the difference. Because it's not going to be cheap, but it's something we have to do, and it comes down to certainly innovation, but also capital deployment.

Muqsit Ashraf: Great. Jeanne, I'll put another one for you. Regional solutions, it seems like our audience believes may be the best forward, as well as the panel talked about it. When you take the context again of organizations in your region, which ones are best placed to drive those types of solutions? You could almost say more in the public sector, private sector, combination of both. Where do you think the biggest push would come from or could come from?

Jeanne Ng: I think that's where the complication lies. It's actually not in any one organization, or even one sector. If you think about how energy works, you've got your customers, you've got your regulators, and so I think when we think about even with

regionalization, there definitely needs to be coordination amongst governments, but then I think also the conversation with the companies who have the solution, the society, hearing what the society wants. I think that's one interesting topic is the changing role of society, the fact that I think as a power sector usually thinks of society as probably a passive consumer, or maybe a slightly selective consumer.

Jeanne Ng: But the concept of prosumer, the fact that there's this changing evolution of all the different players in the room. The unfortunate, not simple answer to that is no, I don't think there is one organization. It will require not only cross-governmental collaboration or agreement, but cross-sectorial dialogue and co-development of the right regulations and policies, as well as the right solutions and technologies that can come forward.

Muqsit Ashraf: I'll throw one your way, Leo. We talk about the crisis bringing forward social agenda, right? And so how should energy leaders reconsider the role of society and the energy transition?

Leo Birnbaum: I think the energy transition is actually driven by the desire of society. The political support for the energy transition comes from the support for [inaudible 00:53:58] in society, and innovation and the societal trend which is linked with each other. The question is we as energy leaders, we just need to understand that we cannot act independently from what society tries to achieve. We are by nature, political industry, and we are by nature, tied to society. This is because we are so important to modern societies that nobody can accept us doing our thing independent of what society wants.

Leo Birnbaum: We need to recognize that. If we recognize it, it means we need to deliver society to society, what society needs. What society needs is reliable, sustainable energy at low cost. For that we need to think not how we can deploy the max capital to maximize return to our shareholders. That's something which we do as a side product. What we really need to do is we need to provide the services for society in the best way we can, so that customers see that they are getting actually what they need. We will get the good regulation if we are seen to deliver what society wants. We cannot ask for good regulation otherwise. I think we need to have a clear productivity return mindset, but we need to acknowledge the fundamental political nature of our industry.

Muqsit Ashraf: Absolutely. I agree with that perspective. I guess the other side of it is the fact that there has to be some reshaping of societal ways of living, working, traveling and so on, and one can argue what role does the energy industry truly place in shaping some of that, right? I mean, we have seen cases where even reduction of subsidies hasn't really played out well. There has to be how do you respond to society, then also how do you shape the societal expectations and hence the consumption of energy as a result?

Leo Birnbaum: Can I say one word on that?

Muqsit Ashraf: Sure.

Leo Birnbaum: I agree. I think we would need to help, especially our customers, to be more efficient in energy consumption, to help them to reduce the demand, reduce their bill in the end. I'm very careful to say that we as utility executives have an idea how society and

individuals should behave. I'm very modest with such claims. I think that's a dangerous territory. I happen to leave it to others.

Muqsit Ashraf: Good.

Jeanne Ng: Sorry, I just had one point, though.

Muqsit Ashraf: [crosstalk 00:56:45].

Jeanne Ng: The role of the regulator is extremely important. I think at least from the power sector, it's such a regulated industry, and I think there's a difference that in Asia, the regulators may not be as used to all of this kind of change and the fact that the different roles as I said, are all changing, even the regulator themselves they need to actually be able to keep up with all the changing expectations and the roles that are happening all around them. I think that really is quite critical, at least in the Asian part of the world.

Muqsit Ashraf: Yeah, excellent. Well, Mike, you were going to say something?

Mike Howard: Yeah, just going to say it. I absolutely agree with the comments about the regulators. That's been an important debate and certainly in the US. I think one of the things that the regulators can do is emphasize more on demonstrations of technologies, allow the utilities to invest in the demonstration of technologies, and thereby giving customers a better assurance of the viability of the technology, and that it will really work. You can't force it on them. You have to show them and make sure they understand the value of it. The best way to do that is through demonstrations, and regulators play a very, very important role in helping to encourage that, and give the utilities a chance to invest in those technologies.

Muqsit Ashraf: Excellent. All right, I'll try and bring this now to a close with closing comments from all of you. I just ask you keep it to less than a minute, just so we can then round it out nicely. Mike, let's start with you. Your final thoughts.

Mike Howard: So, this energy transition to a cleaner, hopefully, well certainly more affordable, safer system is going to be tough. At the same time, you've got this, the whole COVID. But its going to take everybody working together, with a commitment and a focus, and I just hope that we can all come together, participate in events like this, participate in the World Energy Council, and have these discussions so that we can figure out the best way forward that works for everyone. Thank you.

Muqsit Ashraf: Excellent. Ged?

Ged Davis: Yeah, when we have problems, we can bring a lot of funds to bear quickly. If you look at COVID-19, estimates that it's going to cost at least 10-15 trillion dollars, and we haven't finished yet. When we look at the energy transition, we may be needing as much as a trillion dollars a year in additional investment. Clearly it's not exactly like for like. How do we, within the coming few years, move to a position where we can intelligently spend the money we need, right across the world, to achieve the objectives of energy transition? We have a long way to go on that.

Muqsit Ashraf: Over to you, Jeanne.

Jeanne Ng: Well, first of all I think the four Ds are at hand. Despite COVID, the fact that you've got your decarbonization, decentralization, digitalization, and demand centricity, which we really should be looking at. But the fact that

events like COVID, and if even I look at Hong Kong, the social demonstrations, so the fact that there's going to be more disruptions, disruptive events that will continue, therefore we must design and plan and operate so that that becomes the new norm. That every few months some big thing that has never happened before, becomes a crisis, but maybe it's no longer a crisis because it ends up being planned into our assets, our processes.

Jeanne Ng: I guess one final word is really the only way for us to have or come up with a lot of these solutions, we can't do it alone. We've got to do it together. And therefore an organization like the World Energy Council really can have a great role to bridge the different sectors, and also cross-country, as well. That's my final piece.

Muqsit Ashraf: Excellent. Thank you. Leo, over to you. I think you're on mute, Leo.

Leo Birnbaum: Sorry. Apologies. I think it has all been said. We just need to get the job done in a faster way, in a more resilient way, in a more innovative way, and actually discussions [inaudible 01:01:42] are unique and can help us in that respect.

Muqsit Ashraf: Great. I agree with those messages. I mean, it's really clear the kind of change that we have to navigate requires society, businesses, innovators, and of course governments and regulators to come together. There's a major aspect of private and public sector collaboration. What I also heard were if I were to take all of your comments, in terms of the imperatives, the industry needs to become certainly much more resilient to system wide shocks like the one we have recently witnessed, to ensure energy supply and security. It also

needs to take another step forward perhaps in terms of enhancing its competitiveness and that varies across different parts of the energy value chain.

Muqsit Ashraf: So it can drive affordability, as it was said, and also earn the investor's trust for the trillion dollar or more of additional investment. Mind you, I mean there's already a couple of trillion dollars of investment that the industry needs to begin with. And it has an imperative to elevate not only the focus on sustainability, but also on trust, to maintain its license to operate, applies more in certain parts of the energy value chain again.

Muqsit Ashraf: And in doing so, really fulfill its obligation to drive sustainable human development. So, there's a big opportunity, as challenging as the pandemic has been, I think the post-pandemic world will offer the energy industry a chance to rethink and reset its trajectory in some cases, to achieve these imperatives. And the opportunity at hand is simply too significant to not take advantage of for the greater good of the world. With that, I want to thank this esteemed panel and the speakers and all of the audience for being a part of this dialogue. Thank you very much. Have a good rest of the day.

Mike Howard: Thank you very much.

Leo Birnbaum: Thank you.

Jeanne Ng: Thank you.

Arthur Hanna: Muqsit and panel, thank you very much indeed for your insight, your views, and perspectives with regard to navigating the



post-pandemic future. Angelo, we heard different perspectives there. What did you take away from that?

Angela Wilkinson: I think what struck me most were the contrasts that I heard. I heard the contrast between we're picking up signals of high ambition across the world and at the same time we're understanding that we're in a much tougher situation than we thought six months ago. I heard something around the speed of Europe and the potential inertia of Asia. I heard something around the need for resilience about integration, much more about the resilience of people and supply chains and at the same time, much more about the disparities.

Angela Wilkinson: And the fourth contrast I heard was still this confidence that technology innovation is going to lead and yet we're in the middle of a social disruption, and we really don't understand behaviors and what society is going to want to do.

Arthur Hanna: Yeah, and I think I would agree with that. I think one of the things that also came up in terms of some of the contrasts was certainly when I've been talking about transitions, is the recognition of legacy. Because each energy system is a legacy system, as of today. And each energy system as of today will have to transition in some way. And the legacy of a German grid system is very different from potentially the legacy of a South East Asian grid system, which needs different solutions and different pathways for it to consider.

Arthur Hanna: I think that for me highlighted as well that navigating will have multiple parts, multiple maps, multiple ways forward, because

of those issues in terms of the contrast, but also because of the very real issue of legacy. I think the other thing, I'd be interested in your thoughts, is it also highlighted the accelerants, as well, that a COVID world, as Ged highlighted, even though we did the scenarios on COVID-19 a few months ago, we don't know as of today. It isn't perhaps as V shaped as some people were calling it, let's say three months ago. That's unlikely to be happening in most economies.

Arthur Hanna: We don't know where it's going to go. But there are certain things that have been, were there, and will continue to be there. The virtual world that Mike talked about, the way in which we're interacting now. This is likely to be here, and therefore change the way we network potentially in the future. That might contribute to the way we think about transition, or do you think it's just another addition?

Angela Wilkinson: Well, I think it comes back to some of the points Ged was making about to get to those accelerants, to get them to work, we actually have to think about the global governance system. It's not just a question of individual firms and cybersecurity, the question is who has access to energy user data? Where are the data commons if you want to move into a digital energy future? There's new governance challenges that come up around enabling those accelerants to go to scale at a global level, I think that we're just beginning to hint at. We aren't really discussing in totality.

Angela Wilkinson: The legacy issues I think are incredibly important and one of the reasons the World Energy Council exists is that you actually have to engage regional diversity as a strength. You have to understand the regional energy systems are very different and you have



to understand that the social dynamics are different in those regions, as well.

Arthur Hanna: I think one of the things that you mentioned there was regulation, and I also felt in the previous session, we talked about the sectorial coupling and there was a little bit mentioned on that. I think it was Leo who mentioned that, in terms of again, one of the changes for me has been that we thought about energy, or you'd be in conferences 10 years ago, energy was energy. I remember before I retired doing a session in Beijing, an energy conference, and the health minister was on my panel. For me, this was maybe six or seven years ago, but I was just one, surprised, but then when I look back on it, why would I be surprised?

Arthur Hanna: Because ultimately energy is contributing to the pollution effects that we were seeing in Beijing. That was having a huge impact on primary healthcare in China, and therefore the minister actually had something to say, and wanted to talk to the energy industry. Do we see more of that? I mean, events like this where we can all agree that we need to come together and talk, agriculture with energy with water uses, et cetera. Is that happening? Or, is there much more that we need to be doing?

Angela Wilkinson: I think the conversation needs to get deeper and much more real. I mean, it's very difficult for different silos of expertise to even listen to each other, nevermind talk to each other. They have to have that common vocabulary. We've used the work sector coupling. What does that actually mean? I mean, Leo was talking about electric mobility-

Arthur Hanna: E-mobility.

Angela Wilkinson: ... as electrification, and the reason for that is because when you look at energy transition in terms of where societies are trying to think about mobility, we now have the ability to travel in virtual space, right? Total Recall is not such fiction anymore. You might go on holiday virtually one day. But this idea is not that energy sorts itself out and then the vehicle manufacturers sort themselves out, and cities somehow sort themselves out. Now you have to have this new ecosystem and that ecosystem has to be not just the generators and producers, and not just the distributors and the transmission, but it has to involve the users and the demand side disruptors more. Because those are where the real constellations of innovation are happening.

Angela Wilkinson: We're changing our uses and our behaviors and our wants and needs, and that's going to drive back up the system. Old king energy has a court which is insisting on democracy or a voice at the table, and I think that's the challenge. The challenge is how actively and how well can energy listen to the other voices that are now driving energy transition?

Arthur Hanna: No, very good point. I think that will be critical in the context of the navigation that the team talked about.

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