BP's Journey to Net Zero - Capitalizing on Disruptions in Global Energy

An interview with Michael Cohen – Chief U.S. Economist, BP

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Brian Kessens:

Hello, I'm Tortoise's managing director and senior portfolio manager, Brian Kessens, with an interview as part of our ongoing Energy Evolution Educational Series. Today, we're delighted to interview Michael Cohen, BP's Chief U.S. Economist. This is particularly timely on the heels of BP's Capital Markets Week where BP outlined its long-term Outlook to 2050, and provided guidance on how the company plans to transition to better meet the needs of energy demand with cleaner energy supplies.

Michael, we certainly appreciate you joining us. To start off, can you talk about what's changed in the latest BP Outlook versus the Outlook from last year and maybe even five years ago?

Michael Cohen:

Sure. First off, Brian, thanks. It's an honor to be with you and all of your listeners on this podcast. I think it's an important role that we at BP can play in terms of educating the wider investor grouping about what we think is changing in the energy system and how that will affect each one of us individually. Obviously, the Outlook was meant to come out, and has been coming out the last several years, right around the same time in February. This last year we postponed it for several reasons.

Number one, the impact of the coronavirus was just starting to hit and we understood that this was going to have a major impact on the energy system. Number two, BP was undergoing a transition and a strategy reset. For those reasons primarily, we decided to delay the Outlook to be released in September. The major change I would say was primarily from the idea that the coronavirus is going to have a major impact on the energy system.

First of all, in terms of seeing a major impact to economic growth, especially in developing countries, additional behavioral changes, mainly from the idea that people will be working from home more and obviously, that's going to have more of an impact, disproportionate impact on oil. The other key point that we've seen in terms of change from last year to this year is that renewables' penetration actually didn't really change much at all and I think that underlines the point that renewables are less cyclical and so, that affects the overall ability for natural gas to penetrate into the energy system. If renewables being less cyclical through this disruption continue to improve in their penetration into the energy system, it means that the penetration of natural gas actually has come down, especially as we move out into the latter years of the energy outlook.

The other change last year to this year is that we extended our Outlook to 2050. Whereas many of the other Outlooks that you see, even the IEA's Outlook that they published in the World Energy Outlook that came out last fall only goes out to 2040. I think that the key point between 2040 and 2050 is a lot of the technologies that were only a pinprick or a drop in the sand in prior year Outlooks when we extended out into 2050 and see what has been happening over the last two to three years in terms of the cost of renewables and the cost of batteries, it starts to end up with a far larger impact by the end of the Outlook than what we had ever seen before. That's just a snippet of some of the major changes from last year.

I'd also urge you to take a look towards the end of the Outlook, where we show a bunch of the changes that we see in terms of shares of primary energy from before and GDP growth assumptions, emissions assumptions, versus prior years. All of that is in the Outlook itself.

Brian Kessens:

Thanks Michael. You mentioned renewables and looking at this year's Outlook significant renewables growth is apparent. Aside from maybe the cost that you mentioned, what do you think is just driving the tremendous growth that you're forecasting for both solar and wind?

Michael Cohen:

I would say two things. Number one, the starting point. We've seen much more rapid deployment in certain countries in the last year and a half. That means that the starting point for any projection is much higher. The second point that I would make is just that the cost reductions that we've seen have come down or have increased even more. In this last edition of the Energy Outlook, we assume that the cost of solar declines between two and a half to over 3% per year, and the cost of wind generation also comes down somewhere around 1% per year, depending on the scenario.

What I should say, just taking a step back here, is that all of these scenarios, we are very clear that in all of these scenarios we'll be wrong. What we are trying to do is build a range of possibilities and make sure that our business and the way that we understand how the energy system will evolve is robust to any of those scenarios. When we think about renewables just as whatever we think about other common themes across all of these scenarios, one of these common themes is that in any of the scenarios, the deployment of renewables increases.

It increases at an exponential pace in some of the scenarios, the rapid and net zero scenario, which is the scenario where we are trying to keep the overall emissions profile in line with the two degrees scenario or a 1.5 degrees scenario, respectively. But, even in that business-as-usual scenario where we see similar to the prior trends, even in that business-as-usual scenario, the cost continues to decline and renewables makes important headway into the overall energy system.

Brian Kessens:

That makes sense. Clearly we're going to see growth in renewables. You touched on this a bit, but what role then does natural gas play in the energy evolution? Does it continue to grow?

Michael Cohen:

Look, I mean, in our view, it does. It depends on the scenario to what extent. I think we have to first recognize that the significant impact that coal to gas switching has played in terms of preventing an even faster growth in emissions. That's been especially the case in the United States. We think that in any scenario, gas has a role for decades to come and increasingly though the way that that natural gas is used in some of the deep decarbonization scenarios that we look at, gas takes on an increasingly decarbonized form.

What I think the challenge that we face right now, or the challenge that I should say natural gas faces in the future, is that that will not always be the case in certain geographies because in certain geographies, the system is newer. The coal plants that have just been put in place are newer and they won't retire as quickly as they might have in the case of the United States. The benefits that we see in terms of decarbonization that are provided by natural gas have to be weighed against the risk of locking that future natural gas related emissions in for two/three decades to come.

That's the problem when we look at natural gas penetration in China. What I would say is that in India there are some charts in the Outlook that show no matter what scenario you pick, natural gas actually retains a pretty static share - growing, but it's also importantly not falling. Even when you look at the total amount of fuel mix, when you look out into the 2040 and 2050 timeframe, even in that rapid scenario, natural gas maintains a pretty static role in the overall mix. So, it's an important fuel in terms of balancing renewables. It obviously provides that peaking power in some cases and in another cases, baseload power when the wind is not blowing and the sun is not shining.

Brian Kessens:

You mentioned decarbonization, how much of a role do you think carbon capture and sequestration has to play for us to be successful in reducing CO_2 emissions?

Michael Cohen:

Obviously when we look at the deeper decarbonization scenarios in our Outlook, these are the scenarios called rapid and net zero, we have to assume that some technologies like CCUS (carbon capture utilization and storage, or sequestration) and as well, hydrogen, and I would add a third one, biomass and biofuels. Also, the use of both biomass and biofuels along with CCUS, which is something that can actually reduce emissions even further. I would add a fourth one, which would be natural climate solutions. We're talking about forestry, land offsets and other such technologies. We're not treating any of those technologies as playing a massive role to get to net zero. The way in which we get to that low emissions profile is just through improved energy efficiency, reduction in consumption and rethink of how the world might work in that world. I would say that there's a very, very wide range of debate around the extent to which CCUS can be used. Even in the IPCC (Intergovernmental Panel on Climate Change) scenarios, you see anywhere from eight to 18 gigatons of CCS being used. That's roughly a quarter to a half of all the carbon emissions from energy use that is being admitted today.

It's a massive amount of employing of CCUS of technology that has not been fully scaled up and used broadly. It's increasingly used by many modelers as a catch-all, "Oh, we can't achieve that net zero world. Let's rely on CCUS to fill the gap." In our scenario, we only see it reaching roughly five gigatons, so slightly less than that range of IPCC scenarios. I think it is possible to achieve net zero without CCUS, but the question is then, at what cost? Most of the studies that we've seen they try to minimize the cost of an energy transition, have to ensure that CCS to some extent is part of that solution.

We could, of course redefine a scenario with fossil fuels, for example, and blue hydrogen, so hydrogen from natural gas are replaced by bioenergy and green hydrogen. In this scenario, in addition to cost, you're going to have a problem with the ability and speed to build up that other infrastructure. So, it's complicated and I would say just as an aside, when our team comes together and tries to put together these scenarios, it's relatively easy to put together a business-as-usual scenario and it's relatively easy to put together even the rapid scenario to see a meeting of the carbon constraint in that below two degrees Celsius world, but things got a little bit contentious between all of us when we're trying to get to net zero. That's part of the process, right? Because every single sector lead and fuel lead said, "Well, I've done everything that I can" and it's really hard to get to net zero and it requires all of the fuels and sectors moving a little bit and relying on things that are really not at commercial scale to meet that constraint of getting to net zero emission.

Brian Kessens:

Shifting gears, electric vehicle growth is likely to only continue and likely to displace internal combustion engine vehicles. How do you see EV as impacting crude oil demand in the future?

Michael Cohen:

For the EV effect, I think there's a couple of different ways to approach this issue. Number one, I think important to understand that almost all of the fuel used in transport is oil. Something like 90/92% of all the transport fuel used is oil-based. The second key point to make is that around half of oil demand today is used in the transport sector and half of that transport sector use is for road transport. When you look at the breakdown of that road transport, almost as much of the oil used for personal vehicles is used in trucks according to 2018 data.

Now, when we look out into the future, some of the offset to the current amount of oil demand is coming just from improving efficiency, and some comes from the electrification of new vehicles that are sold. By and large, when we think about how to break down the overall Outlook, the first half of the Outlook is dominated by the efficiency stories. We have stringent emissions standards and efficiency measures that are being adhered to in our assumptions, well in USA and in China and in Europe, especially in Europe.

Arguably as those industrialized economies are selling more and more efficient vehicles than the stock that ends up going to developed countries, even the used car stock is also more and more efficient. By and large, when you're thinking about how this dynamic is going to affect oil demand, it's an efficiency story for the first half and much more an electrification story in the second half of the Outlook.

The targets for ICE bans (internal combustion engine) and targets for increasing the share of sales ramps up in our outlook and over the course of the subsequent 10-15 years EVs achieve a similar share of the overall stock of electric vehicles.

The other important way that we see electrification having an impact is through shared mobility. This is taking a big back seat because of coronavirus, but going forward we see that automation and shared mobility along with electrification really allows you to save a lot of emissions and also, achieve the pollution requirements that we see are driving many cities across the world to institute new bans and also on your ability to access the centers of cities. All of that is taking place and in our view is driving higher electrification.

OEMs or automakers are choosing to meet those efficiency targets by offering customers an electrified model over investment in the efficiency of their systems that they're offering. 90% transport fuel use being oil goes to roughly 80% in the business-as-usual case, 40% in the rapid case, and to about 20% in the net zero case. That means that in a net zero and rapid world, less than half of what is used for mobility, for passenger use and transport use is coming from fuels that are not oil-based. That's a big shift that we expect to happen in those scenarios.

Brian Kessens:

That makes sense. That's a really, really challenging forecast as you allude to. Generally, I understand first it's going to be more about efficiency and then electrification. Obviously a lot of it is dependent upon policies that may be put in place, but may not be put in place between now and 2050. I guess staying with that a little bit, and you talked earlier about the challenges of getting to net zero by 2050. How much of the future changes in energy supply do you think are going to be driven by government policies versus the fact that renewables are simply now cost competitive with traditional fuels?

Michael Cohen:

I would say first in the transport sector, we see significant new regulations being adhered to, almost 38% reduction in emissions from the early part of this decade out to 2030. That's for the EU. For the U.S., we assume that there's going to be more aggressive consumer uptake because in certain states there are zero emissions vehicles or low emission vehicle mandates that are taken up. For the renewable scenario in the U.S. or the renewable story in the U.S. is the same thing.

You have states that are implementing clean energy standards or renewable portfolio standards. If anything, even irrespective of what happens in an election you're going to have states taking it on themselves to implement the strategies that their populations want. Same thing for India. There's going to be, to a lesser extent, policymakers are still going to implement I would say a more stringent regulation on the types of vehicles that are offered there. Globally speaking, when we think about the way in which the renewables' penetration occurs, we either explicitly or implicitly are assuming that carbon prices play a role. Those carbon prices are essential to put a price on the externality of emitting carbon. Eventually, we think that carbon pricing is one way among many or one way, at least in concert with other policies that will ensure that our economy is on the right path in terms of decarbonization. We make very clear that the carbon prices in rapid and net zero ramp up quite quickly, and that is how you facilitate the change in the energy system that we think is needed in those scenarios.

Brian Kessens:

That makes sense. You mentioned hydrogen a bit ago, and we've seen many announced hydrogen investments this year. How do you see hydrogen making a difference in the supply of energy over the coming decades?

Michael Cohen:

First off, I would direct you back to some of the materials on BP's website about the role that hydrogen will play in our strategy. From a macro perspective, there's clearly lots of different uses, either direct or hand-in-hand that hydrogen can play in the energy system, either with other biocarbon or with nitrogen. You can see it, for example, in heavy-duty vehicles. You can see it taking a role in the marine sector. You can see it taking a role in the electricity and rapid electrification that we see in some of these scenarios, because it can be used in industry for high temperature processes. It can be used for transport as I mentioned for trucking. Most importantly, in electricity systems, we can typically solve this issue of balancing the increase and decrease of load and increase and decrease in supply from renewables when we're talking about minutes and seconds. We really have difficulty dealing with the challenge of days and weeks or months.

Hydrogen can be stored far more easily than electricity and so we think that hydrogen will play an important role in helping meet that challenge of trying to ramp up other lower carbon sources in a future net zero or rapid type energy system. We see hydrogen accounting for around 7% of total final consumption in the net zero scenario. It should be understood that in a business-as-usual scenario, it accounts for barely anything more than what it accounts for today, so very, very little.

I think it's important to understand even for our strategy that we have to be making investments and energy systems may not evolve in that rapid or net zero fashion, and may be a business-as-usual scenario, and then you don't see that hydrogen taking nearly as much of a share.

Brian Kessens:

Got it. That makes sense. You mentioned the investments at BP may be shifting a little bit. I guess, how does your Outlook tie to BP's new strategy pivoting away from fossil fuels and toward renewables and electricity?

Michael Cohen:

As I said at the start, the Energy Outlook has always been a key document for BP strategy. What I would say though is that this year, both because of the massive changes that are shaking the energy system, and because of what's going on in terms of climate advocacy and the changes that we see are required to put the world on a more sustainable path, BP made the decision to change its strategy. When our strategy changed, why not look inside to the Energy Outlook to see how we see the pace and speed of the energy transition going?

The point has been very clearly made by our leadership team that the Energy Outlook helped inform the strategy, not the other way around. I look forward to future Energy Outlooks where we'll be able to test our projections, but I would make the point that strategy needs to be robust to all scenarios. That's the key way in which we undertook this reboot and the way in which we designed our scenario this year.

Just to highlight, number one, in any of these scenarios, we see a decline in fossil fuel use. It's 85% or so in the BAU, or sorry, in the net zero scenario, down to something like 20% in the BAU scenario. In all of these scenarios, we see an increase in variable renewable energy, and in all of these scenarios, electricity, as a share of final consumption grows. That results in a major shift in the structure of the energy system and in our view, an integrator like BP, companies like ourselves, is needed in order for that system to be able to emerge in a cost effective manner.

Brian Kessens:

I guess maybe I'll ask you to look into your crystal ball a little bit more, if you could forecast, I guess what the BP Energy Outlook looks like five to 10 years from now, what do you think are going to be the key areas that we're talking about?

Michael Cohen:

It's an interesting question. I'm glad you asked it. I think that some of the work that we've put into trying to understand what a net zero energy system looks like, I think that we'll get a lot of focus in coming Energy Outlooks. I think more of a

focus in terms of energy storage and batteries and the way in which an increasing amount of battery electric vehicles are used to balance the system, is one thing that I think we'll see a lot of focus.

I think also energy models tend to be very country and fuel-focused. But, on the first in terms of country focus, I think the ability to really build out renewables and take advantage of the energy resources across the map requires longer distance transmission, at least including transmission systems in a bigger way than I think what we've done. I think transmission would be another one. And then just in terms of fuels, there's a broader systems approach in how to achieve net zero that may see increasing focus in the years to come.

There's a whole host of different issues that we cannot cover in the hundred some pages in this report, just because of space and because of the time that we have. But I'm hopeful that after this comes out, that we'll have a chance to breathe and hopefully that we'll be able to put COVID behind us at some point in the next year and a half, and be able to look at what the system looks like when we've come out the other end.

Brian Kessens:

I think we're all looking forward to that.

Brian Kessens:

Michael, that was really terrific. We really appreciate your insight on the energy transition.

Michael Cohen:

No problem.

Brian Kessens:

Not only how it impacts BP, but certainly us as both investors and consumers, frankly. We'll look forward to seeing continued updates as you at BP provide them. Really thanks for your time today.

Michael Cohen:

No problem. Thanks. Pleasure to be here.