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**UNITED STATES  
SECURITIES AND EXCHANGE COMMISSION**  
Washington, D.C. 20549

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**SCHEDULE 14A**

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**UT Energy Week Panel – “Technology Pathways: Fork in the Road?”**  
**April 13, 2021**  
**Vijay Swarup, VP ExxonMobil Research and Engineering**  
**On a panel moderated by Benjamin Leibowicz, University of Texas**  
**Joined by Vivian Loftness of Carnegie Mellon and Ryan Wiser of LBNL**

**PART 1**

**INTRO to accompany slides: Vijay:** “Well, it’s great. Thank you then Vivian and Ryan. It’s an honor to be on this panel with you and I’m going to try to build off of what’s already been said and try to minimize duplication but what I do want to talk about is the future and the challenges we have. So advance the slide please. We’ve already talked a lot about this, but let’s keep this real simple. Energy is essential and while we take it for granted, there are many people in this world who don’t even know what access to energy means. And the chart of the left simply shows that which is UN Human Development Index on the Y axis and energy on the X axis and you can see that for the developed nations, we tend to be in the upper right and the developing nations aspire to be in the upper right. That’s part one of the challenge. The good news is, as you’ve heard from Vivian and Ryan, there’s lots of energy sources, which in itself is technology advancement—the ability to have oil and gas in the US, the solar, the wind, etc. Lots of technologies have been able to provide ample energy. The other half of the challenges is on the right, which is we want to do this while reducing emissions—this becomes the dual challenge. And you can see on the right side building off and Vivian and Ryan, you can see the various sectors and as they both already pointed out, these are not discrete sectors. There is huge overlap between the sectors and so the challenge which starts as a 2 by 2 dynamic becomes very complicated very quickly. And that’s what we called the dual challenge. How do we improve living standards while reducing emissions?”

And if you go to the next chart, this builds off beautifully off of what Ryan and Vivian have talked about this is work the... next slide, please. Thank you. Is work the IEA produced, which shows that the 40 technology areas that we think are needed, 34 are not on track. That doesn’t mean progress isn’t being made. It simply means that we are at that fork in the road. We are at the point where we need to accelerate technology development and you can see them across the various sectors. I won’t read them.

If you go to the next slide though, I’m going to postulate. What can we do about this? We need to start by saying, “How do we do it today?” As you all know, technology development and energy—the scale, the capital, the infrastructure translates to lots of time. What we need to do is on the front end of this is, we have to accelerate the development. We do things in a linear fashion today. We go from discovery to development to 1st deployment to deployment at

scale. That can take years, if not decades, to go from concept to scale. How do we do that differently? Next slide. We think collaboration is key. This is a tremendous panel. We have a national lab. We have a University and we have large industry. Those are really three of the key ingredients to get there. Universities spend a lot of time on fundamentals, understanding the principles. The national labs provide capabilities to go to the next scale. Smaller companies we work with like Synthetic Genomics and Global Thermostat. They can do first deployment. Companies like ours, large project expertise, large capital, ability to take things at scale. Now what we need to do is we need to start instead of linear we need to work in collaboration. So we want to work with universities. We want to work with national labs. We want to work with smaller companies, all with the point of how do we get there faster? How do we envision the pathway to scale? How do we shape the research to help us address the scalable questions? Which can often be identified early on, but are often not addressed until later in the pipeline, and that's the challenge. So we think as we hit this fork in the road, this is the technology gap. We need to accelerate technology. Everything Vivian and Ryan have already said. We need to change not just what we're working on, but how we're working on it and this slide here shows you ways that we can change the how, which I think is really critical to acceleration. So with that thank you Ben, I'll turn it back over to you to moderate the panel."

## **PART 2 – Q&A**

**Question: Regarding the energy transition on a global level, what are the prospects to leapfrog to less environmentally harmful technologies?**

**Vijay:** "That's a great question Ben. The first thing I would say to that is we have to remember that this is as technical an industry as there is. Energy encompasses every science and engineering at scales that are unmatched. So we are always on a technology evolution. So this concept of leapfrogging is as important as starting from where we are today and then moving forward and not starting with what was done in the past. So I do think as you look across all the sectors, there are opportunities to move faster. So if you think about the power sector, if you build a power plant and you incorporate carbon capture, you have already started, you're not retrofitting anymore. You're imagining what you need in the future as you think about the grid, you have to incorporate enough power, as Vivian pointed out, you have to be designing your power grid big enough to be able to handle all the additional power load that will come as you electrify cars, as you do those other things. The industrial sector, which is often not spoken about, which is a very large emitter, if you remember that chart that I showed. There you need to think about the role of hydrogen and the role of even electrifying the industrial sector, which requires new technology. So I think what you have to do is you have to start with the problem as we all know from University days, stating the problem is half the battle. So if the problem is we need to simultaneously do it, as you pointed out Ben, then we need to look at the technology gaps and we need to imagine by geography because the other thing about energy is it's a global challenge, solved regionally. And so you have to think about what the regional aspects are. Ryan did that very well for the US. It will be a different set of solutions for India and we have to think about that. Think about the technologies. Build off of where we are and then anticipate. So much of what we need to do in this space is anticipating and then driving the breakthroughs to close the gaps that we have. But that's exactly what needs to happen."

**Question: Regarding carbon capture utilization and storage—we have had federal policy to deploy it. What are main barriers and applications?**

**Vijay:** “Yeah, that’s a great question. If I could summarize what Vivian and Ryan have been saying to point, it is this is a scale challenge. It’s a technology challenge. It’s a policy challenge. It’s an infrastructure challenge. And to answer your carbon capture question, there is technology. It requires infrastructure. It requires policies around the infrastructure. It requires encouraging the investment because again, as Ryan and Vivian pointed out, the capital requirements for this are pretty intense and again and then you have the challenge about the retrofit versus new, to Ryan’s point. One additional thing I’ll say on carbon capture to build off of what Ryan and Vivian said is, at some point you a negative carbon technology is likely going to be needed and there’s a lot of research going on in direct air capture, ourselves included, because direct air capture of course takes the CO<sub>2</sub> out of the air. Now as you know, concentrations in the air are much harder, so it needs different types of materials and different types of process engineering, but I think one of the things that’s coming out of this panel loud and clear, is that this is there is no singular solution. You need a long technology array. A large array of options. Those are going to be geographically dependent. They’re going to be dependent on infrastructure and policy as well, and in research you know where we’re focusing on is options. And what we’re trying to do Ben, is we’re trying to accelerate the speed at which we can take options to scale. And I think that’s one way to close this gap. There’s no singular way to close the gap. One way to close the gap is to get technologies all faster on whether you use Ryan’s words whether you getting them on the experience curve, get them on the deployment curve. Or in my world, which is how do you get them ready to be deployed faster? Both are going to have to be needed, and you know these panels are very encouraging because we’re having that the right discussion. This is a discussion about inclusion about including ideas and advancing ideas rather than prematurely kind of picking a single idea because it won’t be a singular solution here.”

**Question: How should we think about the embedded emissions in the products we use? Do we need a system for the understanding the carbon footprint of different energy pathways?**

**Vijay:** “You know Ben, that is so critical that we have a system to be able to understand the full lifecycle and full CO<sub>2</sub> footprint of an energy pathway. And while that sounds easy, it is actually as you point out, is quite complicated because. We often talk about just one subsector of the entire pathway. And every piece has to be accounted for. And in fact there is some outstanding work being done at places like MIT, where they are developing energy pathway lifecycle tools.

Ryan, you know that within the national labs there's several energy pathway tools. And I think what we need to do is we need to really start speaking a common language when it comes to systems of measurements and start talking about the full life cycle assessment of an energy pathway. Because that is the only true way to do it, and its engineers and scientists, which I think is what you largely have on this—certainly on this panel and probably in this room. It is also something that we can relate to. This is a material balance that you have to go from, you know whether you want to use well to wheel or cradle to grave or whatever phrase you want to use. But what that does is it not only allows you to understand the true carbon footprint of your options, but quite frankly, it informs some of the things that you've been talking about, which is where should we focus our innovation? What are the areas where we have technical solutions and it's and it's a factor of deploying? OK, that's one set. Where do we have the technology gap and how do we drive innovation to close that energy gap? These tools, these lifecycle assessment tools can really drive that. We strongly believe in that. There's a lot of good work, like I said, going on at MIT and other places and I think that can really underpin the research and the gap closure we need to do. That's a great point."

**Question: What about the harder to decarbonize areas?**

**Vijay:** "We spent a lot of time talking about power. Which is electrons. And I think Ryan pointed out when you mentioned biomass, is, the other thing that's needed for energy is a carbon hydrogen bond. And so you need both. You need CH bonds and you need electrons. And the question really that you've been asking in various forms is, 'Where you going to get your electrons and where you going to get your CH bonds? And it's going to be the integration of those two that I think is critical. So biomass obviously is a route as Ryan points out. To get the CH bonds, to get the energy density you need for the harder to decarbonize areas. And the other thing that Ryan pointed out, which I think is really important is, these are not singular solutions. So there is now combinations. So biomass plus CCS, to power. That's the other thing that we need to think about as we rethink about how we innovate and how we drive technologies, we have to look at the intersection of various sectors in various technologies."

**Question: How do we advance these technologies?**

**Vijay:** "You have to accelerate the experience curve. So you have to you have and you have to understand whether the experience curve is being driven by numbering it up by making more of the same thing, or by making it bigger and then trying to understand the technologies and the technology gaps and drive that – I'm biased towards technical, but getting the technologies on the map and the experience curve decline so that we can get to where we need to get to."

**Question: There are some sub sectors where electrification seems particularly challenging, what do you see as the most promising strategies?**

**Vijay:** “There is no singular strategy. I think you have to recognize that, as I said earlier, an electron, and a CH bond. Those are the things you need. And for some of these harder to decarbonize sectors, what you really need is energy density. As you all know. And that comes from a liquid hydrocarbon. So now the question is, how do you get the liquid hydrocarbon and how do you take the CO<sub>2</sub> out of liquid hydrocarbon. And so there’s a couple of approaches that I’ll postulate. One is a bio forward approach, which again, I understand the challenges around the availability of the feed, etc. But a biomaterial will get you the carbon hydrogen bond. Things like algae and other things that can be grown at scale can get you a biofuel. And then of course there’s the other side of the equation, which is the CO<sub>2</sub> out of the air, which is the direct air capture or the natural sinks, which I think Vivian referenced earlier. So either of those can get you that on the back end. I think it’s a question of understanding the sector demands. What type of energy is required, so you have a demand array? Understanding your technology array, what technologies can meet that demand? And then, working the iteration between the two so that we can understand what’s going on? And I think what you’re going to find early on, as I pointed out in the slide where showed the technologies that are behind the deployment rate, is we have technology gaps. And then let’s bring it full circle and say that’s where we need to direct our innovation. We need to close the gaps where the gaps are the biggest and those are the ones that can be done through collaboration through different mechanisms to inspire the innovation that is going to be required.”

**Q: Final Question From moderator to all panelist – are you optimistic or pessimistic that we can actually get to net zero emissions by 2050, and why?**

Vijay Swarup: “I remain optimistic as well, but I’m also a realist. I think I’m optimistic because I think we can drive it with technology. I think we need to innovate. I think we need to collaborate in ways we haven’t done before. But I’m realistic that this is a decades-long problem. In particular, if you think about this problem globally we have to be pragmatic in the scale and the capital and the time that is going to be required. What we need to do first is focus on technology. That’s the fork in the road. We need to get the technologies on the pathway, and then we need to move as quickly and as expeditiously as we can.”

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**Important Additional Information Regarding Proxy Solicitation**

Exxon Mobil Corporation (“ExxonMobil”) has filed a definitive proxy statement and form of associated BLUE proxy card with the U.S. Securities and Exchange Commission (the “SEC”) in connection with the solicitation of proxies for ExxonMobil’s 2021 Annual Meeting (the “Proxy Statement”). ExxonMobil, its directors and certain of its executive officers will be participants in the solicitation of proxies from shareholders in respect of the 2021 Annual Meeting. Information regarding the names of ExxonMobil’s directors and executive officers and their respective interests in ExxonMobil by security holdings or otherwise is set forth in the Proxy Statement. To the extent holdings of such participants in ExxonMobil’s securities are not reported, or have changed since the amounts described, in the Proxy Statement, such changes have been reflected on Initial Statements of Beneficial Ownership on Form 3 or Statements of Change in Ownership on Form 4 filed with the SEC. Details concerning the nominees of ExxonMobil’s Board of Directors for election at the 2021 Annual Meeting are included in the Proxy Statement. **BEFORE MAKING ANY VOTING DECISION, INVESTORS AND SHAREHOLDERS OF THE COMPANY ARE URGED TO READ ALL RELEVANT DOCUMENTS FILED WITH OR FURNISHED TO THE SEC, INCLUDING THE COMPANY’S DEFINITIVE PROXY STATEMENT AND ANY SUPPLEMENTS THERETO AND ACCOMPANYING BLUE PROXY CARD, BECAUSE THEY CONTAIN IMPORTANT INFORMATION.** Investors and shareholders can obtain a copy of the Proxy Statement and other relevant documents filed by ExxonMobil free of charge from the SEC’s website, [www.sec.gov](http://www.sec.gov). ExxonMobil’s shareholders can also obtain, without charge, a copy of the Proxy Statement and other relevant filed documents by directing a request by mail to ExxonMobil Shareholder Services at 5959 Las Colinas Boulevard, Irving, Texas, 75039-2298 or at [shareholderrelations@exxonmobil.com](mailto:shareholderrelations@exxonmobil.com) or from the investor relations section of ExxonMobil’s website, [www.exxonmobil.com/investor](http://www.exxonmobil.com/investor).