Barclays 38th Annual CEO Energy & Power Conference

This transcript presents the fireside chat with Dan Amman, President, Low Carbon Solutions, hosted by Betty Jiang of Barclays

Betty Jiang: Welcome to the third day of the 38th Barclays Annual Energy Conference. It's my great pleasure to introduce and welcome Dan Ammann, President and Head of Low Carbon Solutions at ExxonMobil. This is a business that's going to scale a portfolio of lower emission energy solutions that's driving forward the energy transition. And guys are spending more than $20 billion through 2027. So, we'll hear a lot more about that shortly.

Dan joined Exxon from Cruise, an autonomous vehicle company majority owned by GM, where he was named the CEO in 2018. And he also served as part of the senior leadership of GM since 2010. So, Dan, you will start with some prepared remarks and then we'll go into Q&A. A copy of the presentation is also available on Exxon's website. So, with that, Dan, thank you.

Dan Ammann: Thanks very much, Betty. Great to be here with everybody. Our mission at ExxonMobil Low Carbon Solutions is to help accelerate the world's path to net zero through large scale decarbonization, particularly in heavy industry. And at the same time, build a compelling new business for ExxonMobil. As Betty mentioned, we've been working on this for a bit over a couple of years now. We've made some significant real-world progress on that, that we want to share with you today. And it's worth pointing out, and I think acknowledging that in this space, there's been a lot more press releases than there have been final investment decisions. It's turned out a lot of these projects are challenging to do,

but I think it's also proven to us that ExxonMobil really is uniquely positioned to play a major role in developing these low-carbon solutions for the world.

We do have the obligatory forward-looking statement. Everything I just said and everything I'm about to say is subject to the safe harbor provisions noted here.

So, turning to just a quick overview of the business. As Betty mentioned, the corporation has allocated $20 billion of capital through 2027. About half of that is allocated to decarbonizing internal ExxonMobil operations, and the other half of that is allocated to growing the third-party business of helping other companies decarbonize their operations. Our goal has been to, and continues to be, to earn a mid-teens return on that investment. And we're feeling the further we get into these projects, the better we feel about the ability to earn a strong return on the capital allocated to this portfolio and for this portfolio to compete head-to-head with the balance of the ExxonMobil portfolio from a capital allocation point of view. And the test that we bring to that is we want to be very convinced that we're bringing real advantage to these projects, and we should be able to see that advantage in the returns that we expect to earn on these projects. So, if we have real capability and real value to bring to something, we should be able to extract that back through the returns that we earn on this portfolio.

So, we're focused on four main verticals that you can see along the bottom here, carbon capture and storage, hydrogen, lithium extraction – a direct lithium extraction from deep brines – and renewable fuels. Today, we're going to focus on slightly more detail on an update on our CCS activity and on our big low-carbon hydrogen project at Baytown in Texas.

So, before we get into those, let me just give you a quick update on both lithium and on the renewable fuels activity, since we probably won't come back to those in so much detail.

On lithium, we've just completed an appraisal drilling program in Arkansas on the acreage position that we have accumulated there. And what that has told us is that we have a very attractive resource, and you know that the concentrations of lithium brine there are compelling. And that that's an interesting resource that we have accumulated. The work that we're now doing on that program is to understand the cost profile of the balance of the plant that we need to build for the early around that and to make sure, again, that the advantages that we believe that we bring to the lithium business are showing up in the cost position on the supply curve and expected returns that we get out of that. So that's the work that's going on around lithium right now is making sure that we're... that we have a very strong foundation for that business before we take the next step forward

On the renewable fuel side, biofuels side, we have a 20,000 barrel a day renewable diesel project up in Strathcona in Canada that's on track to come online going into next year.

So just the last point on the slide, the areas of focus for us as we are focused on what we call the molecule side of the equation. So, if you think about the solutions that are going to help solve the energy transition, there are molecule-based solutions like CCS, like hydrogen. There are obviously electron-based solutions like renewable power. We see those both as gigantic markets and gigantic opportunities. But given the capability that ExxonMobil brings and the inherent advantages that we have, I don't think it'll surprise anyone that we're more focused on the molecule side of the equation. And so that's where our emphasis is going to

be and aligned with our capabilities in subsurface and hydrocarbon processing, large capital projects and so on.

So, if we move on to CCS, our CCS activity initially is entirely focused or primarily focused on the U.S. Gulf Coast. Very good reason for this. Firstly, there's a huge concentration of CO_2 emissions on the U.S. Gulf Coast. So fully one third of all U.S. industrial emissions are on this map that you see in front of you here. So, across a span of a few hundred miles of the U.S. Gulf Coast, so it's a hugely concentrated area of CO_2 emissions or target rich environment, if you like. At the same time, there's also attractive geologic storage for CO_2 along the Gulf Coast. And then thirdly, we have a very advantaged position in terms of infrastructure through the pipeline system that we've that we acquired through the acquisition of Denbury that we closed last year. So now ExxonMobil owns about 1,500 miles total of our CO_2 pipeline in the US, the significant majority of which you see here along the Gulf Coast. And so that gives us access – very proximal access – to the emissions that you see represented by those circles on the map. So, if you were looking for the ingredients for a large-scale CCS business, the emissions are there or the storage side is there. And now we own the infrastructure that allows us to tie all that together. And so, we see an opportunity through that system to build a network that can handle more than 100 million tons a year of CO_2 emissions, which is very significant.

In terms of our own progress on that, we have signed up four definitive agreements for CO_2 offtake with large industrial customers, four agreements with three different customers. We have projects with CF Industries. We have two offtake agreements with the CF Industries around their ammonia producing assets. We have an agreement with Linde around industrial gases operation, and with Nucor in the steel sector. In total those represent 5.5

million tons a year of CO_2 emissions. And to give you a sense for what that translates to, that's the equivalent emissions reduction benefit of all the electric vehicles that have been sold in the United States to date. And so, with a small number of early-stage CCS projects, we can have a very large-scale emission reduction impact. So that's 5.5 million tons. As we said, we think the system that we're building here has a capacity for over 100 million tons for the full... a very significant growth opportunity ahead of us here.

Our first project, we expect to start up in the first half of next year. So that's we sign that agreement in 2023. At that time, a 2025 start-up seemed like far away, but it's right around the corner now. And so, the only thing... the primary thing that needs to fall into place for that project to successfully start up in the first part of next year is the Class 6 permit for the storage side, the storage wells for that project. But on the basis of that comes into place, then we should be starting our project up on time.

We do see significant growth opportunities from here. As we said, we have 5.5 million tons on contract. We have a lot more volume currently under discussion. And so, we're taking a leadership position, a clear leadership position in the CCS business. We have highly advantaged infrastructure through the pipeline system that we've acquired and that we're now building out from. And so, we're in a good spot there.

Moving to hydrogen, the hydrogen business is also underpinned, obviously by CCS in support of the Baytown project. The Baytown hydrogen plant is slated to produce 1 billion cubic feet a day of hydrogen. That will make it the world's largest low-carbon hydrogen production facility when it starts up, which is planned for 2029. We're aiming for FID of that project next year, ideally in the first half of next year and we need three things

to come together for that: the supply, which is well advanced, the demand which is coming together well in terms of offtake agreements, and then the supporting policy from 45V in particular needs to get finalized. And as those things come together, we will be in position to take the final investment decision on that project.

The carbon intensity of the hydrogen produced out of this project is very low. We'll be capturing well more than 98% of the CO_2 associated with the production of that hydrogen. And so, the emissions reduction benefit of this project will, to the customers that take the hydrogen, will be north of 7 million tons a year of CO_2 reductions or larger even than the CO_2 offtake that we have on contract for CCS there.

With four partners on board into this project, Air Liquide came on board as a partner to give us access to their hydrogen distribution network along the Gulf Coast. You see that in the red line on the map here. So not only do we have probably about of CO_2 infrastructure, we also have highly advantaged access to highly advantaged hydrogen infrastructure now.

You will have seen yesterday that we announced that ADNOC is coming into the project for a 35% equity stake. So that's going to be a major positive for the project here as well. And we announced JERA, heads of agreement with JERA, a couple of months ago for offtake from the projects, and so the momentum is really building around this project. And again, subject to getting the right rulemaking in place if we do that project into next year.

So, as we look ahead in terms of the future growth opportunities for the LCS business, we think about this really in three phases. The phase we're in today is the first phase you see on this graphic, which is we're building these foundational projects for the Gulf Coast CCS

network, the Baytown hydrogen project, the lithium project, the others that we've mentioned here... These are all things that work with today's policy, today's infrastructure and today's technology. So, there's not a lot of brand-new invention that's required... fundamental invention, but there is a lot of building of new value chains, new business models, new commercial constructs and so on to get these projects off the ground. And then, most importantly, building and developing new markets, figuring out how do supply and demand work together in markets that don't yet exist and then we're trying to build.

At the same time that we're getting those foundational projects off the ground, we are investing in new technology, which will be critical to bring the cost of abatement down for – as we get into the next stage of growth – the next stage of growth going forward. So right now, we're focused on getting these foundational projects off the ground and investing in new technology to bring the cost of abatement down going forward. And when we execute the investment plan we have ahead of us, we end up with a business that generates billions of dollars of revenue even at this early scale.

To go to the next stage, what we need to see come into place is more what we refer to as market forming policy. So, the policy that's in place today is mostly policy that will enable a particular project. 45V will enable a hydrogen project. 45Q will enable a CCS project. What we think we need to see for the next step is your broader policy that that creates a market for carbon abatement and will drive a more market-driven approach to the growth of these markets. So that'll be a necessary step. And then the thing that's more in our control is we need to bring the cost of abatement down to make it more affordable, to open up the market opportunity to projects that don't... that aren't economic today, but that can become economic as we get to lower cost. And then so in that stage, we can

envisage a business, tens of billions of dollars business.

In the final stage, and this is obviously going to play out over an extended period of time, given the size of the market opportunity, we see the scope and the potential for a very large business to evolve here, but that's going to require transition – a full transition to market forces driving the market for carbon abatement, building on that market-forming policy that we think we need in the second stage there. So broad transition to market forces, significant cost reductions through technology, and finding ways to significantly reuse existing infrastructure and not have to build out significant new infrastructure will be important in terms of making this cost effective.

So just to recap, it's early days and a very long journey, but we have real-world projects that we're making real progress on, and we're doing that in a very thoughtful way: focused on the fundamentals, building a foundation for the long term, but at the same time creating a leadership position for ExxonMobil in what we believe has the potential to become a very large and very significant business, and very profitable business for the corporation.

So, with that, back to you Betty.

Betty Jiang: Great. Thank you so much, Dan. It's really scalable solutions that's solving some of the most challenging problems. Maybe back to the beginning, I'd love to get a bit of color on the background of how Low Carbon Solutions as a division started with Exxon and how it's run within Exxon. You joined in the early days of that division, so what was your objective at the time?

Dan Ammann: So, the background was, as ExxonMobil was working through plans for decarbonization of our own assets came to the realization that there's a lot of inherent capability in the corporation to do large-scale industrial decarbonization. And if we can do it for ourselves, then perhaps there's an opportunity to do it for others as well and to build a business around doing that. So that was the genesis of it.

I joined about two and a half years ago now at the very early stages of that, and I think at that time there was the view was that this was going to move very quickly and there were a lot of projects already under development in the industry. And I think what folks have found since that time is it is very challenging to build on time new value chains. And the thing that's proven out for me that I anticipated as I came into the corporation was that if you were to make a list of companies that have the capability and wherewithal to pull something like this off, ExxonMobil is probably at the top of that list. And I think the evidence to date would was beginning to bear that out in terms of the progress that we've been able to make on some of these projects.

Betty Jiang: Yeah. So, Darren talked a lot about in order for the low carbon venture to compete for capital, it needs to show competitive returns and also needs to scale. These are two objectives that's been challenging for a lot of these businesses to achieve in this space. What gives you the confidence in what you are seeing in the market today that you can... that the initiatives that you're working on today can meet that?

Dan Ammann: Yeah. Darren has been very clear and is expectation that the business needs to show attractive returns and to be able to compete in the portfolio. And I think that discipline has been a real asset for the way that we've approached the business. And we've had a very

clear focus on this question of do we bring fundamental advantage to this? And if we believe we do, we should be able to see that in the economics of the projects and the returns. And just having that in front of us all the time has been a real asset, actually, as we've been going through this. And it's forced us to be very clear on where we believe we have advantage, where we may have a gap that we want to fill. But, if we're going to play a role in the value chain, then just being very clear on what we bring, how we're going to monetize that.

And I think the other perspective is a more macro one on the returns question, which is: in order to scale the business to the kind of potential that this has, and in order for the world to decarbonize to the order of magnitude that it needs to, it's going to require a tremendous amount of capital. And the only way you're going to attract that kind of capital is to have it earn an attractive return. Otherwise, you're not going to get there. And I think having that very clear perspective and the discipline and focus on that from the very outset, I think has been very healthy for where we are. And I think this has shaped the way that we're approaching these projects and shaped the way that we've constructed them. And I think it's giving us the confidence in the return picture that we see.

Betty Jiang: Yeah. And talking about the returns put out on the slide, that expected return of 15%, is that something that you could achieve like from day 1, or something that you can sort of get to over time? And then perhaps just talk about how we think about the materiality for Exxon over time.

Dan Ammann: So, the goal is to earn a return in that range really from the outset. Now, is every single project... are there going to be things that we learn along the way that turn out

differently than we expected and so on? Sure. But we factor that into the way that we think about the returns that we're aiming for in these projects. I mean, the projects we're talking about are already large-scale projects, based on hydrogen project is a very big project, even in the Exxon context. And so, projects of that magnitude need to earn the kinds of returns that we're talking about here.

In terms of the scaling, it's really that last bit of graphic that I had up there, which is, we see a business... we're deploying $20 billion near-term, half of that into growing the third-party business. That's through 2027. That's still pretty early days. And we see opportunity obviously well beyond that.

We're very focused on what's going to unlock that opportunity. So, the two main drivers that will unlock that are, do we move into more of a market-forming policy construct and are we effective in bringing the cost of abatement down. And I think if those two things happen, it will get more of a market for carbon abatement on the one hand, and then on the other hand, we're able to bring the cost of abatement down. That's what'll really cause the market to grow at a rapid rate.

Betty Jiang: Yeah. Maybe moving down into the projects a bit. I think some might be surprised at how the blue hydrogen project Exxon is working on is the largest low-carbon hydrogen project in the world today. Can you just talk about what are the milestones you need to see before reaching FID? And then one of the things that's been challenging is just building the offtake agreements on the demand side of that equation. So how is that coming along?

Dan Ammann: There's really sort of three legs to the stool on this project and on the

others we're working on. Figuring out the supply side, so designing the project, selecting the concepts during the engineering, understanding the cost, understanding the optimum, how to optimize the project. Second, as you pointed out, is on the demand side, like where are the customers and where is the offtake, and are they willing to pay what's required to be paid to generate the kind of returns that we're looking for. And then the third piece is the is the supporting policy in our particular case, the 45V policy. And so, as those three things come together, and when they come together, you have a basis to FID the project.

So quickly on each, I'd say on the supply side, it's very advanced now. At this stage, we know very much what we have with the project. On the demand side, we're making really good progress, a lot of traction in the market on that, both on the hydrogen side and on the ammonia side. So, we're seeing good interest there, various heads of agreements getting signed. We announced one with JERA for about half the ammonia out of the plant a few months ago. There's others in the works, as you'd imagine.

And then on the policy side, we've been very clear with the administration as to what we're looking for. We're looking for technology-neutral policy based on carbon intensity, and that is the legislative intent of IRA was to have that. And we wanted to make sure that the rulemaking that's going on, the specific rulemaking follows that legislative intent that we have technology-agnostic policy that is focused on the carbon intensity of the product. And we made a lot of investment to have this be a very low-CI, low carbon intensity project, including all the way into the upstream and the decarbonization of our Permian operations and having low-CI gas feedstock coming into the project. And we're looking for that to get recognized on a technology-neutral basis under 45V. And we're being very clear with everybody on that. So, assuming those three things come together and we feel very good

about the ones that we're more in control of, on the supply and demand, it will be in a position to, FID this project next year.

Betty Jiang: Great. Looking forward... very much looking forward to that. On the lithium side, you talked about seeing encouraging results off of the appraisal well so far. What should we expect next?

Dan Ammann: As I mentioned, the work we're doing now is to take that and say, okay, where does that... can we build a project that is highly competitive on the cost of supply curve, both in terms of where the market is today, but also more importantly, where we see the market going with the supply/demand equation that we see over time. There's been a lot of talk about EV slow down and this and that. We've taken a very... a much more sort of fundamental longer-term view on the EV transition. Our EV transition... our corporate view on the EV transition was out of consensus low, a year or two ago, it's looking more correct now, I would say, going forward. But our view is that under any scenario, there's going to be significant growth in lithium demand. EV sales by the way, were up 11% year to date, which maybe... around the world. We're certainly on that trajectory and growing towards that. But we see that fundamental demand. The question now is can we be at a competitive point on the cost curve relative to where we see that next round of supply getting catalyzed to come into the marketplace? So that's the work that's going on right now.

Betty Jiang: Got it. Great. Shifting on the capex side, so $20 billion now through 2027. Can you talk about how you guys decided that was the right number? And then, how should we be thinking about the cadence of spending from here?

Dan Ammann: Yeah. That was very much a bottoms up number, which is what are the projects we see in front of us? What do we see the timing of those projects being? What's some ranges around how those things could unfold? I mean, obviously, there are things we do control and there are some things we don't control on project timing, so that was a bottoms up estimate.

One of the questions I get quite often is, well, if this is so attractive and the returns are there, why not a bigger number and why not more? And the simple answer to that is the limiting factor in the equation for the growth of this business is not the availability of capital. If we had more projects, we have more capital available to fund them. The limiting factor is actually pulling these projects together, and that's why, it's going back to the beginning – you've seen a lot of press releases; we haven't seen that many FID final investment decisions – that's because these projects are very challenging to pull together. And you need to figure out the supply and the demand and the policy and all those things to happen all at once. And that's a lot more difficult than it looks. But I think we're in a pretty interesting position with the projects we have going to get to that point. And I think as we land these initial projects, there will be some amount of flywheel effect that I think will start to take hold as well, which is, we can demonstrate that they work, we can demonstrate that we're starting to build these new markets to figure out where supply and demand clears on some of these new value chains. And I think you'll start to see some momentum build on the back of that.

Betty Jiang: Yeah. No, that makes a lot of sense. Bit open ended... so if we look out three to five years, where are you most excited? Where do you think the market will be finding most surprise on the low carbon business?

Dan Ammann: So interesting... five years in the context of energy transition is actually a very short period of time. But I think your five years from now will be in 2029, I guess. So ideally at that point in time, the CCS business on the Gulf Coast will scale quite significantly by that point, given the progress we've made already, the network that we've built... And so, I think there'll still be a lot of emissions there, tens of millions of tons of emissions getting captured and transported on the system by that point in time. Baytown hydrogen project will be started up at that point in time. Assuming we've proved out our cost competitive position on lithium, we will have started up first projects there. And so, these foundational projects will be operating, generating profit, generating revenue, generating a profit, generating returns. And I think that'll be an important that'll be a significant achievement in and of itself.

At the same time, hopefully, we will have made significant progress on our technology programs that we're running today that are focused on bringing the cost of abatement down to the next generation of projects. And so, we'll have these early projects started up and hopefully we'll have new technology that we can bring that lowers the cost of abatement, which will open up the market for that next step. And then ideally, we will have had some evolution on the policy side to start to move to more of a market-forming policy construct to create a true market for carbon abatement, which we think is necessary also to get this going. So, I don't think that's an unrealistic sort of picture of what this will look like five years ago. If you went back two and a half years ago and said, "where would you hope to be a couple of years into this?" that's roughly where we are today. So hopefully when we're sitting here five years from now having this chart will be reflecting back and we'll be in a similar position.

Betty Jiang: That's great. Well, I'm glad to have Exxon leading and pioneering a lot of these new markets and creating new market dynamics that could scale, and look forward to what we could see the next five years and beyond. So, thank you so much for your conversation.

Dan Ammann: Thank you very much. Appreciate it.

Betty Jiang: Yeah. Thank you for being here.