Ford Motor Company | Credit Suisse Industrials | December 3, 2021

Dan Levy:

Great and I think we are live as we continue day three of Credit Suisse's ninth annual Industrials Conference, the Autos track of the conference. I'm Dan Levy. I lead Auto's research coverage at Credit Suisse and very pleased to have with us as we continue, Ford, who you all know quite well, and specifically Hau Thai-Tang, Ford's chief product platform and operations officer. I think we all know EVs are very top of mind right now, as we're really thinking about the secular narratives for Ford and other legacy automakers and I think this will be a really nice update, given especially what Ford discussed at their Investor Day earlier this year.

Dan Levy:

So, Hau is going to go through a brief set of slides and then we have a set of fireside chat style questions. Anyone who has questions, please feel free to email me Dan dot Levy, D-A-N.L-E-V-Y@credit-suisse.com and I'll try my best to weave in those questions anonymously, but otherwise, Hau, thank you so much for joining.

Hau Thai-Tang:

Thank you, Dan. Good afternoon everyone, really appreciate the opportunity to join you guys. I know you've had a busy week and we want to give everyone an update on the Ford Plus plan. This cover slide that we've got up on the screen here shows our Blue Oval City site. This is part of our big announcement that we made earlier in this year of our investments in terms of localizing, not only battery production in North America, but an all new assembly plant targeted to build full-size battery electric pickup trucks. So, this site is in Western Tennessee. We also announced two battery plants going into Kentucky as well. So, it's the latest proof point of our efforts to really accelerate the shift from internal combustion engines into battery electric vehicles. Let's go to the next slide.

Hau Thai-Tang:

Everyone knows the automotive industry is going through a huge transformation that's underpinned by not only the shift to battery electric vehicles, but also ubiquitous connectivity, and then increasing levels of autonomy and Ford, really our plan is to leverage our foundational strengths and that's in with our iconic brands that really dominate their segments in terms of pricing and market share, our leading market positions globally around the world in many major markets, and of course having our in-house, captive Ford Credit Financing company.

Hau Thai-Tang:

We believe that if we couple that with enhanced capabilities all around the technology stack, building on our expertise of integrating hardware and software together, leveraging connectivity and of course all of the data that we're collecting off of these connected vehicles in that very large vehicle park and using that information coupled with analytics, machine learning, artificial intelligence to help us understand how consumers are using our products and services and how we can make that better over the life of ownership. This is what we really mean by always on and we feel like, if we do this well, we can not only

thrive and create a very exciting future for Ford but actually fuel growth, both top line, bottom line growth and that's what Ford Plus is all about.

Hau Thai-Tang:

If you go to the next slide, I want to talk a little bit about our plans to really win with battery electric vehicles and it's rooted in five foundational pillars. The first one, as I mentioned is playing to our strengths, targeting our very strong, iconic name plates like Lightning and Mustang and Transit, and using that strong market position to command really good pricing, as well as building on our very strong, dominant market share position, coupling that with the modern tech stack. These are digital devices and again, with our scale over the business plan period, growing to over 30 million connected vehicles, we feel like this is scale that's unprecedented in terms of connectivity and creating that really powerful network effect.

Hau Thai-Tang:

We're not taking a one-size-fits-all solution and that's both for the battery electric vehicle architecture. We're targeting three. One is an unitized body architecture that will be underpinning our unitized body vehicles. We have one for full-size body-on-frame pickup trucks and utility, and then a third one for large commercial van vehicles. And by doing these bespoke flexible battery electric architectures, it allows us to really optimize the vehicle and the attributes for our customers, as well as optimizing the manufacturing bill, a process to build these vehicles in a much more efficient way in terms of labor efficiency, as well as capital usage. Of course, with our tremendous scale and our already announced plans to vertically integrate a large part of the value chain around battery electric vehicles, we will have very competitive cost structure, material cost, as well as investment and then of course, a large chunk of the cost of the vehicles, even with battery electric vehicles, is propulsion agnostic.

Hau Thai-Tang:

These are things like the sheet metal, the instrument panels, the electrical wiring, harnesses. All of those things, we are sharing across all of our vehicles regardless of propulsion system and we're leveraging the scale efficiencies there to drive the cost down. And then the last one is capitalizing on our 120 years of manufacturing expertise and using that to deliver high quality products at scale and driving the cost down.

Hau Thai-Tang:

Okay. If you go to the next slide, I'll show you just some of the early proof points. It's early days yet. We're just bringing to market some of our first three vehicles, but one of the messages we wanted to get across is, all of these vehicles are launching with a new, for Ford we're calling it Blue Oval Intelligence, for Lincoln it's Lincoln Intelligence system. These are our modern technology stack. It's the embedded hardware and software in the vehicle plus the cloud connectivity, as well as the ability to control and interact with our products and services through your smartphones with FordPass and the Lincoln Way Apps.

Hau Thai-Tang:

This is now going across the board with all of our new vehicles. We have advanced battery technology. Our BEVs are launching with the highest energy density in terms of nickel, cobalt, manganese chemistry and that's enabled through our partnership with Blue Oval SK, the joint venture with SKI.

Hau Thai-Tang:

And then, as many of your listeners know, we made a previous investment in Solid Power. We think they are leaders in the solid-state battery space. They made all of the functional and safety requirements, but most important they're able to manage and deliver manufacturing, feasible cells in large energy format that's suitable for automotive. And we're partnering with the other key OEM investors, BMW and we're both working over the next year to really try to test out this new battery technology and drive for a migration at some point over the next decade towards solid-state batteries. The new products we've launched have been super well received, not only by analysts like yourselves, but also the media, the dealers, but most importantly, with our customers. The demand has been threefold, but we've planned for it. We're working very hard to increase capacity to meet the really strong demand.

Hau Thai-Tang:

Next item is something that's very important to help accelerate the cost glide path, which is creating a closed loop and a local bat raw material supply chain in North America. This is so important. We feel like the future of battery technology and battery costs is going to come down to augmenting the, I'll call it [geomine] raw materials with recycled materials. This is why we partnered with Redwood, but a second part of that partnership is Redwood is investing to create active cathode material manufacturing in North America, so that we're no longer reliant on companies in Asia and we can avoid a lot of the logistics costs of shipping this raw material and the refined material around. So, this is going to be a huge enabler for sustainability, as well as driving the cost down.

Hau Thai-Tang:

And the last item we touched on already is world class manufacturing, efficiency, and quality. So, the announcement we reference Blue Oval City, as well as the battery sites in Kentucky. It's creating 11,000 jobs in the US, building on our leadership as the number one employer

Hau Thai-Tang:

Care of US labor. We're planning, Jim Farley announced earlier this year, given the very strong demand for our new products, we're planning to get to 600,000 annual battery electric vehicles within 24 months and breaking those key constraints to really satisfy the natural demand that we're seeing. Okay. Next slide. Talking about the strong product reception. Here are the three examples with the Mach- E, the F-150 Lightning and the E-Transit. You can see Mach-E even with the semiconductors constraints, really strong sales, 22,000 year-to-date since we launched it earlier this year. We think the global natural demand is on the order of 200,000 vehicles between China, US, and Europe. 70% of the customers buying the Mach-E are new to Ford. So the high levels of incrementality, we're not substituting with other Ford products. The F-150 Lightning, really strong order bank. Again, 200,000 new reservations. 75% of those customers are new to Ford. The majority of them have never considered a pickup truck before. So it just shows you the appeal of the product and how we're attracting customers who are very technology-centric.

Hau Thai-Tang:

We're on track to launch the Lightning in spring of '22. I'm very excited to bring that product to market. And an E- Transit, again, really strong demand. This is a completely different customers as we have pilots underway with Penske and National Grid to really understand the duty cycles that commercial customers put our products through. We're also in the middle of launching this product, now industrializing it in North America, in Kansas City, as well as in Europe. And then this is a cornerstone

product for our Ford pro-business that Ted Cannis is running. Okay. And then the last slide is just to show you the level of investment in terms of vertical integration. We announced, as part of our capital markets day, that we're putting in 240 gigawatt hours of battery cell capacity globally, more than half of that is in North America. You can see 140 gigawatt hours. The announcements that we've made to-date covers almost all of that. There's a remaining 10 gigawatt hours or so that we have to still finalize, but that's well underway and it just shows you our ambitions. So if you put this all together, our goal is to lead in battery electric vehicles. We want to become the clear number two global manufacturer of battery electric vehicles within the next couple of years. And then once we do that, and once this investment comes along, our goal is to work towards the number one spot. So this is something that Ford really believes in and we're working very hard to accelerate. Of course, we're going to do this in a very profitable way. So with that, Dan, love to turn it over to you, go through some of your questions. Thanks.

Dan Levy:

Great. Thank you, Hau, very, very helpful overview. Let's actually start something that's not on the slides, but a bit more near-term in nature. Something that's been very top-of-mind with really everyone. And that's just sort of the near-term production supply chain situation. Maybe you could just provide us with if there's any update on where the production schedules are. Are they in line with what you expected when you last communicated during the time the third quarter call, visibility, anything you can tell us on the nature of production and the volume outlook right now, just given the lumpy supply, or the supply chain disruptions that we've seen.

Hau Thai-Tang:

Sure. So the key constraint all year has been semiconductors as everyone knows. The way we think about it is if you look at the second quarter and the third quarter, we had some, I'd call them one-off black swan events. The second quarter was really dominated by the Renesas fire at the Naka facility in Japan. Ford was very exposed to that just because of our sourcing patterns. So we were hit pretty hard in the second quarter, in terms of constraints. In the third quarter, it really became this issue with the coronavirus Delta D, the Delta variant in Malaysia and other Southeast Asian countries. That was really impacting, not so much wafer manufacturing, but the back-end assembly and testing of semiconductors. We had less exposure to that than some of our competitors. Again, it comes down to the individual sourcing patterns of each OEM.

Hau Thai-Tang:

The fourth quarter is sort of, you're now seeing the stabilization of you're eliminating those one-off black swan events. And you're back to the inherent, underlying constraints that we're seeing with wafers. So it's running about what we had anticipated and what we had signaled with our Q3 earnings call. And we're working very hard all the way through the supply chain with our tier ones, with the chip makers, with the wafer manufacturers, to maximize all of the production between now and year-end, as well as clearing out all of our vehicles on wheels. So we'll have more to say when we do our earnings call next, in February.

Hau Thai-Tang:

The second item, I think you alluded to it, is [crosstalk] omicron. It's early days yet, we do have really good insights because we, as you know, we have a manufacturing plant in South Africa. We have a powertrain plant. So far, while there's been a high number of new cases, what we're hearing is there

have been no changes to the operating pattern. The country of South Africa is still at level one, which was the prior status for COVID ahead of this discovery of this new variant and no new restrictions. So, so far things are operating the way they were before the announcement of omicron around the Thanksgiving timing. So we're all keeping an eye on it. And obviously we're starting to hear about it being expanding into other regions and markets. So it's early days yet, but so far, no discerning changes to operating patterns that as far as we can see.

Dan Levy:

Great. Thank you. So let's get to, I think, the topic and theme of your slides, which was really a holistic plan, but I think almost the emphasis is more on the supply side at the moment because the demand almost seems like it's there. So let's just address supply. And I want to start with a big picture question. That's a famous industry participant who came from a large EV automaker a couple months ago, made a comment, something about, that everyone needs to do the math when it comes to your supply chain surrounding some of these grand announcements. We've seen a number of your competitors, you and others making large announcements on EV volumes. So give us a sense on how you're thinking about the supply chain and each of the different components. And what's your confidence that supply chain won't be a constraint for you over time in meeting EV volumes?

Hau Thai-Tang:

Yeah, I think you're referencing the quote that the former Tesla CEO, JB Straubel made, and we know JB quite well. We've invested in Redwood Materials, his company. So he's spent a lot of time with us. So I think what JB's saying is look, when OEM's are making announcements, like by this date X percentage of our fleet will be battery electric vehicles, he's basically saying, hey, make sure you guys have done your math and translated that to what are your requirements on batteries? And then working that all the way through the value chain. So you understand not only how many kilowatt hours and how many sales, but what does that mean in terms of kilotons of cobalt, lithium, manganese, depending on the chemistry and that you have secured those supply chains, right? That's the message. And certainly that's the way we've been working. So you've heard a share with the slides, this 240 gigawatt hours, this ties with our stated goal of 40% battery electric vehicles by 2030, but then we're working all the way back through the value chain. Understand, what does that mean in terms of all the way down to the mine level in terms of kilotons of raw materials now, and then working very closely with all of the players in those various nodes to have offtake agreements, those types

Hau Thai-Tang:

Types of things for us to secure not only the raw materials but the right cost structure, because one of the things that's going to be very volatile is how the cost of that material changes over time. That work that we're doing. Clearly we'll have more to say when some of those in the announcements are, are firmed up. Redwood materials is a great example. That collaboration is very much an outcome of the way we've approached this looking through it. In the near terms, some of the things you're hearing and you heard Jim say that we're working very hard to break constraints to get to 600,000 battery electric vehicles.

Hau Thai-Tang:

That's not so much of a restriction in raw material supply. That's just the fact that we underestimated the very strong demand for new battery electric vehicles. We didn't put in enough capacity and now we have to break those constraints. So that's not access to materials or anything like that. We had planned

for a certain volume it's coming in two X, in some cases, three X higher. Now we have to work with our supplier partners to add in more capacity and break those constraints. And we're doing that as fast as we can.

Dan Levy:

If we had to break down that supply... As you're building up the supply to support that, is there one particular component that is going to be the key determinant? Is it just cell manufacturing, cell assembly? [crosstalk] It sounds like that's what it is.

Hau Thai-Tang:

Typically, when you're trying to break constraints, it comes down to which items are a long lead in terms of industrialization and which ones are capital intensive. Those tend to be the ones that you focus on. So certainly battery cell assembly is going to be one of the long lead items and that's one we're working on and we'll have more to share but, as you know, in this first phase, or Jim calls it inning one, we're buying batteries, for example, for the Mach E from LG. So we're working with them to try to improve supply. But, we have a different supplier partner in China so, we're working with them as well. And that could help us with some incremental relief in the near term. Then it starts getting into other long lead items like the battery pack itself, the structural casting that the cells and arrays go into. That's another example of a long lead item. Motors and inverters. So it's working our way through that list. And again, our plan is to break those constraints and get to 600,000 vehicles a year by 2023.

Dan Levy:

Let's address another aspect of supply that's semis. And I think you had a, a recent announcement or, strategic collaboration with Global Foundry. Maybe you can talk a bit more about that? And just big picture, how is Ford approaching supply chain today versus what it's done in the past? Because, it seems like you're going much deeper into the supply chain taking a much more proactive approach.

Hau Thai-Tang:

Yeah. I think this is something that the issue we've seen with the semiconductors has really highlighted that we as an industry, it's not just Ford, we need to rethink how we deal with commodities like semiconductors. Because, historically, most OEMs, we were employing a just in time inventory process, we are reliant on our tier one suppliers to supply key modules into our vehicles. We didn't have enough visibility into the printed circuit boards that were inside those modules. For example, if I'm buying a body control module, it shows up in my bill of material as one part number. Within that part, if you open up the black plastic casing of a battery control or, of a body control module, you'll find a printed circuit board with a bunch of semiconductors, integrated circuits, transistors, resistors, we didn't have that visibility in terms of billing material, let alone who was supplying that, and then working that all the way back to a wafer foundry.

Hau Thai-Tang:

First area of improvement in terms of our approach is much greater visibility, all the way down to the wafer source across all the electronic components in the vehicle. Step two then is working through with each of those nodes in the supply chain. So which chip maker where they're getting their wafers from and then, how do we secure that supply? How do we improve the robustness? In some cases, we're asking them to have dual sources. "Mr. Chip maker, please show me that you're getting your wafers for

that chip from two different sources rather than just one." That type of thing. The example of Global Foundry is they're wafer manufacturers. They supply chip makers.

Hau Thai-Tang:

So, we're working with them to help them understand what our future technology roadmap looks like which technologies featured nodes we want to use with our battery electric vehicles as we move towards driver assisted systems, as we do more of our tech stack, Then working with them to ensure that we have enough capacity in those technology node. Then going to more of a directed sourcing approach, where we would go to a tier one supplier and say, "Ford is now going to take the lead on designing this driver assisted technology system.

Hau Thai-Tang:

And we're okay with sourcing new elements of that but we want you to use this technology node coming from this wafer manufacturer that we already have an agreement with." That's an example of how we're working differently. Global Foundry is just one example. We're doing the same with power electronics, driver assisted technology, infotainment areas that are going to be very key in terms of being brand differentiating and more bespoke to the needs of Ford.

Dan Levy:

That's quite the shift. Your comments about the depths of sourcing. It almost reminds me of the very roots of Ford where the rouge, they would actually be the steel itself.

Hau Thai-Tang:

Yeah. A great example, in the early days, Henry Ford was growing soybeans and using the beans to make body panels. I think you'll see more of that. So the discussion we just had around the value chain for battery electric vehicles and cells is very similar. There are a lot of similarities there with semiconductors. You'll see, I think, more of that. Especially in the areas that are going to be differentiating for the OEMs going forward.

Dan Levy:

Great. Let's talk a bit more on the battery side. I think that in past conversations it's been referenced that you could integrate LFP, lithium, iron phosphate chemistries using NMC right now. We know we all know LFP is lower energy density. How widely are you looking at LFP? And as we think about the potential to integrate LFP, what are the other drivers that you are looking at to extract adequate range from the vehicle? Is it aerodynamics? Is it a better motors? Is it things down to tires? Is it everything?

Hau Thai-Tang:

Yeah. A great question, Dan. If I take you back to our capital markets day, we talked about the fact that we wouldn't take a one size fits all approach, and that extended to battery cell chemistry. We talked about the needs of some customers, especially commercial customers that we think they're different. Their drive cycles are more repeatable. They tend to be in city centers. They tend to return with a lower state of charge and they want a full charge every day versus a retail customer who may use only 20% of their 300 miles a range. And they're just topping it off every day. So all of those things in terms of understanding the duty cycles helps inform which battery chemistry works best for that duty cycle. We think LFP is very attractive for some of those duty cycles. Yes, it has lower energy density than NCM or NMC, but it has other performance

Hau Thai-Tang:

Performance advantages, it's thermally very stable, it can charge quickly, it can take a lot of repeated charge cycles without deteriorating over time. So it has an inherent advantages. So if you take a look beyond just the energy density at the cell level, and you look at it as a pack in a vehicle, when you coupled in the improved thermal stability performance, the fact that it can take more frequent charge cycles, you can offset some of those penalties and recover some of the disadvantages at the cell levels in terms of energy density.

Hau Thai-Tang:

So we think not only is it a lower cost option, it reduces our reliance on things like nickel and cobalt because it doesn't use those things. So there's more inherent advantages beyond just the cost initially. And of course, given the performance towards some duty cycles where it's actually more optimal. So we're looking at it very, very closely, and it will play a key part in terms of our strategy with battery electric vehicles.

Dan Levy:

Great. I know we're running up on time here so I'm going to ask you a question on sort of platform and capacity, and then we'll wrap with one on Europe. So first there's an audience question here, and this is just a question on what... As we think about your capacity, we compare and contrast where you were at the end of say, a year or two ago, you have roughly five million units where you're going to be by 2024, roughly what the implied numbers are 600,000 units are for BEV. I think that implies something like, call it 12% of your capacity. But maybe you could just imply, what's the implied number of capacity that you'll have for EV that you're planning for? And then just more broadly on the platform side, how are you thinking about the, you're talking about three different platforms... Is there potential over time to merge this into one larger platform? Or is there always going to be an advantage to doing three separate platforms and specifically with E transit, what's the benefit to using an ice platform instead of a bed specific platform? So I know there's a lot there.

Hau Thai-Tang:

Yeah, a lot to unpack there, but really good question. So again, on our capacity, we've said at our capital markets by 2030 end of the decade, 40% or greater Bev mix. So what we're talking about now in the numbers of Jim's quoting is just how fast, how quickly we get there. Right? So, and I think given the strong demand for our products, we think we're going to get there faster than what we said previously. So probably our plan previously was more of a hockey stick as we brought in more and more battery electric vehicles. Now we're seeing, you know what battery electric vehicles are different. We don't need to change them as frequently. A lot of the 369, sort of cadence in terms of product freshening that we're used to in the industry is really grounded in the emission cycles.

Hau Thai-Tang:

You have to do an emissions program every three years to be compliant. If you do that, you might as well change the vehicle so you can get some pricing. We no longer have to do that because these vehicles have no emissions. So I would just sort of say 40% or greater, that's still our goal. We're just trying to go faster. And that's what we're doing with this 300,000 by 2023 on the strategy... The way I would tell the audience is today with our five million vehicles in the ice world, we have at least five global architectures. So if our goal is to serve the same diverse set of customers globally with battery electric vehicles, we don't think we can do it with one architecture. We think three is a good starting

point and the reason is the needs of a truck customer with their payload towing off road requirements dictates a body on frame architecture.

Hau Thai-Tang:

You can't do that with [inaudible] We don't believe, especially as you start to get into the heavy duty use cases and really off road use cases. And then for our van, those customers, especially for goods, movement require low, low floors, the ability to step in and out. So that drives another architecture, so we think three is a number that will meet most of our requirements around the world. The transit and the lightning are using existing architectures primarily to help us be investment efficient and get the market quickly. And because those architectures allow us sufficient space to package large enough batteries to meet the range requirements in the near term. So that's why they are, we're using them for the E transit and lightning, but going forward we think the optimum answer is to get to more of a bespoke Bev architecture, which is the strategy we're moving to with those three that I mentioned.

Dan Levy:

Great. Let's wrap on one and it's specific to Europe. We know that your strategy, it's almost like a global strategy, but also a very regional strategy as well. In Europe, we know that you've signed on for plans to use Volkswagen's MEB platform. I think what we've seen since that agreement is you've taken a much more proactive, much more aggressive approach on bringing Bev capabilities in out. So a maybe you can just give us an update on your plans, visa V working with VW on MEB. I think that was a 2023 timing on the product. And has the approach on Europe shifted at all? Given, since that announcement, you've taken a much more aggressive approach on bringing capabilities in house.

Hau Thai-Tang:

Yeah. I'm a big fan of globalization. And I recognize that there's a lot of convergence in terms of market requirements, but the one thing that hasn't changed in Europe is the roads, in most big cities go back to the Roman era. So that dictates a certain size of vehicles. And as you guys all know in Europe, it's predominantly B and C size vehicles and so that's very different than north America or China, which tends to be more centered around CD and larger vehicles.

Hau Thai-Tang:

So this is why we think for Europe, a partnership with VW and leveraging their MEB battery electric vehicle architecture. That's really designed around that sweet spot of a sea size vehicle makes a lot of sense with us. It gives us the investment efficiency and allows us to leverage that combined scale and that market for products beyond that size, we will use how one of our three global architectures, right? So for sure, the unitized Bev architecture, and then of course the van commercial van architecture, to be determined if our full size pickup truck makes sense for Europe, it may be too large but that's basically our strategy. It's just Europe is unique from the rest of the world because of the road infrastructure dictating smaller footprint vehicles. And in that case, it makes a lot more sense for us to leverage the scale and the might of VW and their MEB.

Dan Levy:

Great. We're over time so we'll leave it there. Hau, thank you very much, very insightful. And we've been hearing a lot on the EV narrative at Ford. It seems like the team is putting out a new announcement every other week. So we look forward to hearing more as the story continues to unfold.

Hau Thai-Tang:

Thank you, Dan. Appreciate you having us on, take care.