

Q4 2020 Earnings Call

Company Participants

- Andrew Baglino, Senior Vice President, Powertrain and Energy Engineering
- Elon Musk, Chief Executive Officer
- Jerome Guillen, President of Automotive
- Martin Viecha, Senior Director, Investor Relations
- Zachary Kirkhorn, Chief Financial Officer

Other Participants

- Alex Potter, Analyst, Piper Sandler
- Ben Kallo, Analyst, Robert W. Baird
- Colin Rusch, Analyst, Oppenheimer
- Dan Levy, Analyst, Credit Suisse
- Emmanuel Rosner, Analyst, Deutsche Bank
- Gene Munster, Analyst, Loup Ventures
- Joseph Spak, Analyst, RBC Capital Markets

Presentation

Operator

Ladies and gentlemen, thank you for standing by, and welcome to Tesla's Q4 2020 financial results and Q&A webcast. At this time, all participants are in a listen-only mode. After the speaker presentation, there will be a question-and-answer session. (Operator Instructions) Please be advised that today's conference is being recorded. (Operator Instructions)

I would now like to hand the conference over to your speaker, Mr. Martin Viecha, Senior Director of Investor Relations. Please go ahead, sir.

Martin Viecha {BIO 17153377 <GO>}

Thank you, Sherry. And good afternoon, everyone. Welcome to Tesla's fourth quarter 2020 Q&A webcast. I'm joined today by Elon Musk, Zachary Kirkhorn, and a number of other executives. Our Q4 results were announced at about 1:00 PM Pacific Time in the update deck we published at the same link as this webcast.

During this call, we will discuss our business outlook and make forward-looking statements. These comments are based on our predictions and expectations as of today. Actual events or results could differ materially due to a number of risks and

uncertainties, including those mentioned in our most recent filings with the SEC. During the question-and-answer portion of today's call, please limit yourself to one question and one follow-up. Please press star one now if you like to join the question queue.

But before we jump into Q&A, Elon has some opening remarks. Elon?

Elon Musk {BIO 1954518 <GO>}

Thank you. So just to recap the year, 2020 was a defining year for us on many levels. Despite a challenging environment, we've reached an important milestone of producing and delivering 0.5 million cars. I'd just like to, once again, thank the people at Tesla for an incredible effort. We delivered almost as many cars last year as we produced in our entire history. So really an incredible growth rate and -- despite a very challenging 2020. So my hat is off; it's such an honor to work with such great people at Tesla.

So for the year -- so we achieved free cash flow of nearly \$2.8 billion after spending more than \$3 billion on building new factories and other expenditures. We've reached industry-leading GAAP operating margin in addition to positive net income and record cash flow.

Regarding capacity expansion, while we focus on execution, we continue to build a lot of new capacity. We started producing the Model Y out of Fremont and almost reached full production speed. We ramped the Model 3 in Shanghai to more than 5,000 cars a week sustainably and Shanghai continues to grow rapidly.

We introduced the heat pump to all our vehicles. We've ramped the single piece -- we started and we also ramped to volume production of the single piece castings for Model Y. This is where, for the first time in history, the entire rear third skeleton of the car is being cast with a single piece in the largest and most advanced casting machine ever made.

We built a Model Y factory in China from start to finish in one year. We're also building Giga Berlin and Giga Texas, which we expect to start production later this year. And lastly, we built a cell -- a battery cell factory in the Bay Area. And this -- even though it is a pilot plant, it is class as -- large enough that it would be in the -- probably the top 10 battery cell factories on earth, despite being a pilot plant.

Regarding the new Model X, S and X, we are launching the -- I'm super excited to announce that the new Model S and Model X Plaid are in production now and will be delivered in February. So we've been able to bring forward the Plaid Model S and X and -- sorry, Model S will be delivered in February and Model X a little later. The Model S Plaid, we're actually in production now and we'll be delivering next month.

So this is a tri-motor Model S with a completely new interior. There are actually a lot of great things about this. I'll do another call about the Model S later, but it's really a

tremendous improvement over the prior version. And the Model S will be the first -- this Model S Plaid will be the first production car ever that is able to go 0 to 60 miles an hour in under two seconds. So no production car ever has been able to get below two seconds 0 to 60. This is a luxury sedan that is able to go 0 to 60 in less than two seconds and will have the ability to seat up to seven people with the third row seats. So this is pretty nuts. This is fast enough to be quicker than any car. It's not like there was a different type of car, like a two-door sports car that was able to do that. It's the fastest accelerating car ever made that is allowed to go on roads in history. And like I said, we'll start delivering it in a matter of weeks.

And actually -- we'll obviously get into the details of what the Model S changes maybe later this week or next, but it's really better in many ways. We will be actually raising the price of Model S for this new model. So people -- you've got the old model, but the new model will be \$10,000 more, so hopefully people aren't too upset if they bought the old model last month, but this one is \$10,000 more. So yeah, we think it's probably the best car of any kind at any price available in the world today.

Then with regard to full self driving, we've made massive progress on full self driving as I recommend watching the videos of our public beta. So we've got, I think, almost 1,000 people in the beta at this point. And with each successive release of the beta, of the FSD software, it's really improving rapidly. It's not very common for -- I drive the latest build. It's very common for me to have no interventions on drives that I do, including drives to places that I've never been to. So these are not pre-planned routes. They're -- the cars have never been there before and it's not actually more -- it's more common than not for the car to have no intervention even on a complex drive. So -- and basically I'm highly confident the car will be able to drive itself with reliability in excess of humans this year. This is a very big deal.

And thinking about like how does one justify the value of the company being where it is, and I think there is a way, just with back of the envelope math, to potentially justify it where if Tesla ships, let's say hypothetically, \$50 billion or \$60 billion worth of vehicles and those vehicles become full self driving and can be used in robotaxi -- used as robotaxis, the utility increases from an average of 12 hours a week to potentially an average of 60 hours a week if they are capable of serving as robotaxi. So that's like roughly a 5x increase in utility.

But even if you say like, okay, let's just assume that the car becomes twice as useful as -- not 5 times useful, but nearly twice as useful, that would be a doubling again of the revenue of the company, which is almost entirely gross margin. So it would mean -- it will be like, okay, if you made \$50 billion worth of cars, it will be like having \$50 billion of incremental profit basically from that because it's just software.

So -- and if that was the case, then (inaudible) on that, it's like \$1 trillion, the company is still in high growth mode. So I think there is a way to sort of like justify the valuation of the company where it is, using just the cars and nothing else, cars with FSD. And I suspect at least some number of investors are taking that approach.

So in conclusion, while 2020 was a turning point for Tesla in terms of profitability, we believe this is just the beginning. We think 2021 is going to be even more exciting -- and you don't know what to expect in a given year obviously. Last year, we did not expect many -- many things we did not expect, but I assume that '21 is a relatively normal year from an external standpoint. I think it's going to be a great year for Tesla.

We've got a ton of -- many great new products coming out. We've got factories that are -- advanced factories that are going to start up production. It will also make it easier having a factory in Berlin, one in Texas that can -- just from a logistics standpoint, Texas can help supply the eastern half of the US and Berlin can help supply Europe and there is just fewer cars on boats, much less capital tied up with the cars that are on boats or going -- being transported to customers. And I think the fundamental efficiency of the company will be much better with the factories or at least having factories on each continents and having two factories in US. So I'm super-excited about the future and, yeah, we look forward to making it happen. Thank you.

Martin Viecha {BIO 17153377 <GO>}

Thank you very much. And I think our CFO Zach Kirkhorn has some opening remarks as well.

Zachary Kirkhorn {BIO 20940148 <GO>}

Yeah. Thanks, Martin. As Elon mentioned, 2020 has been an extremely successful year while managing through many unforeseen and unexpected challenges. On cash, we continued to generate strong free cash flows, reaching a record \$1.9 billion in Q4 alongside growth in investment for future programs. Additionally, we've been able to reduce our use of debt and various working capital lines, including settling \$2 billion of convertible debt in Q4, which will continue into Q1.

For net income, we achieved our first calendar year and six sequential quarters of profitability. In addition, auto gross margin excluding credits improved from 2019 to 2020 despite reductions in ASPs and inefficiencies from new product launches and transitions.

On Q4 specifically, this was a noisy quarter, so let's unpack a few things. Stock-based comp increased, part of which is driven by the rise of the stock price over the course of our 2020 employee performance grant process and a portion of which is unique to Q4 only. The impact of SBC increases is seen across both COGS as well as operating expenses.

Automotive gross margin in Q4 was primarily impacted by two things. First, we invested in improving our products built in Fremont, including converting over to the new Model S and Model X, launching the single piece castings on Model Y, and introducing heat pump on Model 3. Second, logistics and labor costs were impacted due to supply chain instability and pandemic inefficiencies. Adjusting for items such

as these as we do in our internal management views, we saw an improvement in auto gross margins.

Our services and other P&L was impacted by many of the same factors just mentioned, including onboarding costs associated with new service capacity. However, what's most important here is that we've accelerated the growth in service capacity and will continue to drive capacity expansion as fast as possible.

On energy gross margin, we saw an impact from Solar Roof related ramp costs and typical seasonality in the lease PPA business.

OpEx as a percentage of revenue continues to reduce despite impacts from items mentioned as well as increased investment in development of future products.

Finally, the early settlement of our convertible notes resulted in an additional \$100 million of interest expense for the quarter. All that being said, nothing has changed about our view that operating margin will continue to grow and remain industry-leading.

As we look forward, 2021 may be our most meaningful step forward yet as we see the benefits of long-standing investments in capacity and technology. The range of possible outcomes this year is wide, given the magnitude of launches. Thus a few things we should keep in mind. We continue to expect a long-term volume CAGR of 50%, of which we may materially exceed this in 2021. As we increase production rates, volumes will skew towards the second half of the year and ramp in efficiencies will be a part of this year's story and are necessary to achieve our long-term goals.

Specifically, for Q1, our volumes will have the benefit of early Model Y ramp in Shanghai. However, S and X production will be low due to the transition to the newly rearchitected products. Additionally, we are working extremely hard to manage through the global semiconductor shortage as well as port capacity, which may have a temporary impact.

We will continue to invest heavily in supercharging and service capacity while driving reductions on cost, including OpEx as a percentage of revenue. Global demand continues to outpace production and we're moving as quickly as we can with a focus on the long-term. I look forward to providing updates on progress throughout the year.

Questions And Answers

A - Martin Viecha {BIO 17153377 <GO>}

Thank you very much. And now we can jump straight into questions from, say, technologies. The first question from institutional investors is, what is currently holding Tesla back from being the market share leader in solar.

A - Elon Musk {BIO 1954518 <GO>}

Yeah. So we've actually seen tremendous growth in solar quarter-over-quarter last year and we had our best quarter since, I think, 2018 in Q4. So we do actually expect to become the market share leader in solar and then go far beyond it. It's -- unfortunately there were a few years there where we had to devote the whole company to Model 3 production and building -- we actually -- basically take the whole company's capacity were on solar, haven't worked on cars, but now the available bandwidth we're putting a lot of attention on solar and it is growing rapidly. So I think it will not be long before Tesla is by far the market leader in solar.

A - Zachary Kirkhorn {BIO 20940148 <GO>}

Another really important part of the solar strategy is achieving an industry-leading cost structure, which then allows us to have industry-leading pricing. And so that's something that we've accomplished over the last year in terms of getting the cost structure in the place that it needs to be. And as Elon mentioned, this is a really important part with industry leading pricing to become the leader in the space.

A - Elon Musk {BIO 1954518 <GO>}

Yeah. And actually important part is achieving better integration between the Tesla Powerwall and the Tesla retrofit solar and Tesla Roof and we're confident we'll have excellent integration with the Powerwall and Tesla Solar whether it's retrofit or the Tesla solar glass roof before the end of the year. So it's really -- I think we've got a good strategy. As Zach mentioned, we're focused on reducing the amount of time and the complexity of the infill and we're making great progress in that regard. And I think we'll have something that's really dialed this year.

A - Martin Viecha {BIO 17153377 <GO>}

Thank you. The second question is, could current owners get ability to transfer their FSD to their next vehicle? This would be huge for loyalty and overall increased sales of vehicles offering more FSD sales on used vehicles?

A - Elon Musk {BIO 1954518 <GO>}

Unfortunately we are not considering that at this time. We do actually offer an increased -- a higher price for a car with FSD than the one without FSD. And I do think that the market currently undervalues -- or the consumer market and arguably the stock market does probably undervalue the -- just how good FSD is going to be, but we are not currently planning on offering or allowing it to get transferred.

A - Martin Viecha {BIO 17153377 <GO>}

Thank you.

A - Elon Musk {BIO 1954518 <GO>}

We will be offering subscription pretty soon, in the next month or two, but that should address a lot of people's concerns with being able to get it.

A - Martin Viecha {BIO 17153377 <GO>}

Thank you very much. And the third question is, can you give us a progress update on dry coating of the battery electrodes? At the Battery Day, Elon said I would not say this is completely in the bag yet as the yields were low.

A - Elon Musk {BIO 1954518 <GO>}

Andrew?

A - Andrew Baglino {BIO 21161872 <GO>}

Yeah, sure. It's true the in-house cell manufacturing system we revealed at Battery Day contains new processes and equipment. So we did expect some unknown unknowns and technical challenges to arise through the production ramp. The Kato team, however, has been able to solve each manufacturing problem presented to date and continues to improve yield and rate week over-week and month-over-month as we move up the production S-curve. At the same time, the cell engineering teams refined designs and deepened understanding has reinforced our confidence in the drive process and 4680 design meeting our performance and cost targets.

And from a capacity perspective, we have 10 gigawatt hours worth of equipment landed at Kato. The production staff is nearly all hired, our material supply chain is established, and the team is on track for full production ramp this year. Meanwhile, we've developed enough engineering confidence with our 4680 design and the production process and equipment to kick off manufacturing equipment and facility construction to support our 100 gigawatt hour 2022 goal.

A - Martin Viecha {BIO 17153377 <GO>}

Okay. Thank you very much. The next question is, why are you confident Tesla will achieve Level 5 autonomy in 2021? And why is Dojo not necessary to get there?

A - Elon Musk {BIO 1954518 <GO>}

I guess, I'm confident based on my understanding of the tech roadmap and the progress that we're making between each beta iteration. Yeah. As I say, it's not remarkable at all for the car to completely drive you from one location to another through the complex intersections. It's now about just improving the corner case reliability and getting it to 99.99% reliable with respect to an accident. Basically, we need to get it to better than human by a factor of at least 100% or 200%. And this is happening rapidly because we've got so much training data with all the cars in the field and the software is improving dramatically.

The -- we also write the software for labeling and I'd say it is quite challenging. We're really moving towards video labeling. So it's all video labeling, full video inferred. And so there is still a few of the neural networks that need to be upgraded to video training at the (inaudible) and really as we transition each net to video, the performances become exceptional. So this is like a hot thing, the video -- the labeling software that we wrote for video labeling making that better and has a huge

effect on the efficiency of labeling. And then of course the Holy Grail is auto labeling. So we're doing a lot of work into having the labeling tool be more efficient when used by a person as well as enabling auto labeling where we can.

Dojo, it's about sort of training super-computer and we believe it will be -- we think it may be the best neural net training computer in the world by -- possibly in order of magnitude. So it is a whole thing in and of itself and this is something we can offer potentially as a service to somebody -- if others need neural net training. We are not trying to keep it to ourselves. So this -- I think Dojo could be a whole line of business in and of itself and then of course for training vast amounts of video data and getting the reliability from 100% to 200% better than average human to 2000% better than average human further will be very helpful in that regard.

A - Martin Viecha {BIO 17153377 <GO>}

Thank you. The next question is, what is Tesla's current gigawatt hour run rate of the 4680 cell production? How do you see this run rate evolving by mid-2021 or end of 2021?

A - Elon Musk {BIO 1954518 <GO>}

I think we kind of talked about that through. I mean, essentially what we're saying is that the number to think about, first one is like we've got a 100 gigawatt hour total Tesla cells produced in 2022. It's not that important to look at the run up to that because it's -- these things tend to improve exponentially, but we are installing capacity for it -- in 2022 for 200 gigawatt hours a year. And we think probably we should be able to achieve 50% of targeted design capacity in 2022.

A - Andrew Baglino {BIO 21161872 <GO>}

Yeah, yeah. I agree with Elon, and as you've said before, with the S-curve of production, you can be off a little bit on the initial part of the S-curve and that makes a difference in absolute capacity by quite a bit one month to the next. So yeah, I mean, we are progressing up that S-curve as fast as we possibly can.

A - Elon Musk {BIO 1954518 <GO>}

Yeah. And we don't see any showstoppers, so.

A - Andrew Baglino {BIO 21161872 <GO>}

Yeah.

A - Martin Viecha {BIO 17153377 <GO>}

Thank you very much. And one more question from retail investors. What is Tesla doing to improve service experience? Tesla had a reputation for outstanding customer service. Now it's impossible to even call a service center and appointments are scheduled weeks out. Jerome?

A - Jerome Guillen {BIO 17525057 <GO>}

Yes. Well, first, best service is no service. So we spent a lot of effort trying to improve the quality and the reliability of our cars. In the last two years, the frequency of service visits are reduced by one third. So people have to -- customers have to come less frequently in the service, which is really the goal. No service. And if service has to take place, we're trying to make it as painless as possible. One big effort there is to increase mobile service, which is now more than 40% of all visits in North America. We're trying to push that to 50% this year. And 50% of service visits last less than two hours. So we're trying to service the cars very quickly, so people can get their vehicles back on the road.

And in terms of service appointment, it continues to improve. We have about -- we have actually 140 service centers right now in North America. For 100 out of those 140, you can get appointments in less than 10 days and we're going to make sure all service centers are -- have short wait time. We're accelerating, as Zach mentioned earlier, the pace of opening. In North America, we opened 11 centers in December and we have plans to open 46 in the first half of this year. So that's what we're doing to improve service.

In terms of phones, our emphasis is on the app. Really we want all communications to go through the app, the Tesla app, and we're trying to move away from the phone. The app is much better than the phone. It can spot directly -- alerts directly from the car and schedule a service appointment and there is a written record of all communication between the customer and the service team. You can have pictures in there. You can take care of your payment without entering the credit card and doing all that stuff. You get updates on the service and there is even more features that are going to come in the coming months in the app, and that I think everybody will be happy, including the ability to spot where your service technician is and how far it is to come in from your car and what's going on there. So we are investing everything on the app, I think just like much other companies as well and that's the way of the future.

A - Martin Viecha {BIO 17153377 <GO>}

Thank you very much. Now let's go to institutional investor questions. The question number one. What are the key milestones we need to achieve in order to evolve current FSD to a commercial Level 4, Level 5 ride sharing solution?

A - Elon Musk {BIO 1954518 <GO>}

Yeah. So it's really back to what I was saying a moment ago, which is we need to transition all the neural nets in the car to video, and in order to do that, the whole stack has to be changed to video. That means gathering video clips; then using -- and this is actually surround video. So you've got eight cameras operating simultaneously with synchronized frame rates. So you've got basically eight frames surround video -- eight camera surround video and then you've got a label, basically everything in that video snippet and then train against that and then have those neural nets operate the car.

So -- and this is coming from the past where we would label, the neural nets would be a single camera, single frame. So no video and not combining the cameras. And

then we went from single frame, one frame at a time, one camera at a time neural nets to surround camera neural nets. It would look at -- it will be just all eight cameras, but only one frame at a time and now to where we include the time dimension and that's video.

So really to see this as a question of getting work done. We're getting it done and you can see the results in the rapidly improving FSD betas that are released -- we're also going to be expanding the FSD beta itself to include more and more people. So from my standpoint, it looks like a very clear and obvious path towards a vehicle that will drive 100% safer than a person. Yeah. I really do not see any obstacles here.

A - Martin Viecha {BIO 17153377 <GO>}

Thank you. Thank you. And the second question from institutionals is, does Tesla plan or expect to license any of its software applications, FSD and Autobidder in particular to third party OEMs?

A - Elon Musk {BIO 1954518 <GO>}

I think we're very open to licensing our software to third parties and we've had some preliminary discussions about licensing Autopilot to other OEMs. So this is something we're more than happy to do and -- but I think obviously we would like -- we need to probably do a little bit more work to prove that Tesla Autopilot is capable of full self driving, which I think will become obvious later this year and then we're more than happy to license that to other car companies. We're definitely not trying to keep it to be a Tesla exclusive situation. And I think that probably the same goes for Autobidder. We haven't thought as much about Autobidder, but the Tesla philosophy is definitely not to create walled gardens. We're going to allow the companies to use our supercharger networks and yeah, using our autonomy software and Autobidder and perhaps other things would be fine too.

A - Martin Viecha {BIO 17153377 <GO>}

Thank you. The next question is key differences in product, customer preferences, FSD strategy between China and the rest of the world. Do we need to do things differently to win the Chinese EV market?

A - Elon Musk {BIO 1954518 <GO>}

Well, we currently are winning the -- we are currently the leader in the Chinese EV market. So I think we must be doing something right if we're the best selling electric car in China. That said, very few of our customers in China, I think, maybe as low as 1% or 2% actually have selected the FSD option. This is much lower than rest of the world. So we definitely need to make it work well in China. I think as soon as it works well in China, then we will have a grade 4 FSD. I find the customers in China -- Tesla owners in China are among the most discerning in the world. Their attention to detail is incredible. So they -- I am confident that they will buy FSD as soon as it is working well in China and hopefully that is later this year.

A - Martin Viecha {BIO 17153377 <GO>}

Thank you. And the next question is, is it fair to argue that the best way to think about the company's long-term earnings power is tied to profit per unit of battery capacity? 3 terawatt hours target from Battery Day implies half of long-term battery capacity goes to storage depending on what you assume for pack size on Elon's 20 million vehicle units goal.

A - Elon Musk {BIO 1954518 <GO>}

Yeah, it is. So the fundamental limit on electric vehicles right now in general is availability of cells, what is the output of battery cells in gigawatt hours. And you can't grow faster than that. Now, at Tesla, we improve the efficiency of our cars dramatically such that you can actually get pretty good range even with the standard range battery pack. It's in the high -- it's approaching -- for Model 3, it's approaching the sort of high 200s and with some slight continued improvements, we'll start to get to 300 mile range with the standard pack and -- on order of 500 kilometers. So the efficiency improvements in the car, but fundamentally the growth is dependent on cell production.

And there is obviously a lot of other companies that want to -- that have the need for cells, so -- but the reason Tesla is doing its own cell production is in order to accelerate the growth. It is not to make less use of our cell suppliers. In fact, I want to be really clear Tesla wants to increase purchases from cell suppliers. And we've been very clear with our cell suppliers, whether it be CATL or Panasonic or LG, that we will take as many batteries as they can produce, so -- and we urge them to increase their production and we will buy as much as they can send to us.

Now, obviously there are some price limits on that because the cars will need to be affordable, but I'm just trying to be as clear as possible that our goal with making our own cells is not to disintermediate our suppliers. It is to supplement our suppliers and we want our suppliers of cells to increase their production, and in addition, have our own production that is simply taking up the amount beyond which they are either unable or unwilling to increase their production. So it's an acceleration over and above what -- the most that our suppliers say they can produce for us. And so while we -- since the cell output drives vehicle output, the -- and I mean -- probably the board buster value of Tesla is just what's the cell output, that drives vehicle output and then at least double that for autonomy revenue, probably one level and that's how you figure out the value of the company I think long term.

A - Martin Viecha {BIO 17153377 <GO>}

Thank you very much. The next question is about 4680 cells, which we already covered in the retail section of this call. So let's go straight to the last question from institutional investors, which is where are you in Cybertruck development? What are your expectations for Cybertruck deliveries in 2021?

A - Elon Musk {BIO 1954518 <GO>}

Right. So we finished almost all of the Cybertruck engineering. So we're no longer iterating at the design center level or design level. We've got the designs fixed. We're getting to an order of the equipment necessary to make the Cybertruck work. We're actually going to be using even bigger Tesla machines for the rear body of

Cybertruck because we've got -- obviously it's a bigger vehicle and you've got a long truck there that goes with a lot of load. So we'll be using an 8,000 ton casting press for the rear body casting as opposed to 6,000 ton for Model Y. So 6,000 ton was the biggest casting press in the world. 8,000 ton must be quite a bit bigger than that. And I think it's going to be an incredible vehicle. If we get lucky, we'll be able to do a few deliveries towards the end of this year, but I expect volume productions beginning 2022.

A - Martin Viecha {BIO 17153377 <GO>}

Thank you very much. And now we can start with questions in the queue.

Operator

Thank you. Our first question will come from Colin Rusch with Oppenheimer. Please go ahead.

Q - Colin Rusch {BIO 15823117 <GO>}

Thanks so much guys. Could you talk a little bit about the regulatory environment for FSD and how you're seeing that play out? Obviously it's a bit of a moving target right now and you guys are leading the way here, but I would love to understand how those conversations are going and how you see that impacting the rollout of FSD throughout the balance of this year and into next year.

A - Elon Musk {BIO 1954518 <GO>}

Okay. Zach, do you want to start that or -- Zach and Jerome?

A - Zachary Kirkhorn {BIO 20940148 <GO>}

The -- what we're seeing right now in the US, for example, is pretty dynamic space, but it's overall not particularly limiting on a rule basis, but what we're going to expect is to have to work with regulators to demonstrate really, really high reliability, as Elon said before. The rest of the world is fairly dynamic. In Europe, we see a general slowdown, generally not reaching past Level 3 right now with some impetus to start working on new working groups to reach past that. And China has showed an interest in working on Level 4 or even Level 5 later this year. So we expect a pretty dynamic 2021 in the regulatory space with leadership in the US looking for manufacturers to demonstrate really good launches and really high reliability before releasing to wider and wider groups.

Q - Colin Rusch {BIO 15823117 <GO>}

Thanks, guys. And then just a quick follow-up around inflation on some of the materials markets. Obviously there is a lot going on as low interest rates flow through the basic material space. Can you talk a little bit about the supply chain and how you are migrating some your exposure around some of your raw material costs?

A - Jerome Guillen {BIO 17525057 <GO>}

And this is Jerome. Yeah. For supply chain, the first priority now is to deal with the disruptions from COVID and shipping in particular both between Asia and North America, but we're also looking forward to pricing and we're watching this very closely for all the components. We are entering a series of long-term agreements with the preferred suppliers to ensure that not only are we going to have enough quantity to support the growth, 50% CAGR as Zach mentioned earlier, but also good pricing with appropriate sharing of the risks.

Operator

Thank you. Our next question will come from Dan Levy with Credit Suisse. Please go ahead.

Q - Dan Levy {BIO 17519730 <GO>}

Hi. Good evening. Thank you. Two questions. One on '21 and just one on capital. First on '21, any expectations for what we should see on regulatory credit sales? And then the second question is on capital. Obviously you raised a lot of capital in 2020. What should we think about the use of those funds beyond just covering some of the maturities? And can you just give us a sense of what the elevated liquidity does and doesn't buy? Meaning, to what extent does elevated capital enable you to accelerate plans on building capacity or expanding vertical integration, accelerating timing on full self drive features? So those are the questions. Thank you.

A - Zachary Kirkhorn {BIO 20940148 <GO>}

Sure. On the regulatory credit sales side, this has been always an area that's extremely difficult for us to forecast. 2020 regulatory credit sales ended up being higher than our expectations, and it's difficult to give guidance on that. I mean, what I said before is that in the long-term, regulatory credit sales will not be a material part of the business and we don't plan the business around that. It's possible that for a handful of additional quarters, it remains strong. It's also possible that it's not. Most of our regulatory credit revenue from Q4 was not lined up prior to the beginning of the quarter and these were discrete deals that were struck over the course of the quarter. So I wish I could give you more on this, Dan, but it's a space that's extraordinarily difficult for us to forecast.

On the second side with respect to capital, a couple of things that we're thinking through there. So as I mentioned in my opening remarks, debt reduction is an important thing that we're focused on now. Early conversions, these are things we don't have a choice on. We did around \$2 billion of that in Q4. We currently have \$1.4 billion that we expect to go out in Q1. As a result of early conversions or conversions on convertible debt, that number may increase. And so debt reduction is important. That's helpful on interest expense as well.

We are also using the money with respect to our investments in future capacity. And so what we're able to do now that we haven't had the opportunity to do in the past is, as we're building capacity particularly in Austin and Berlin, we can build that capacity with the expectation of what the end state of capacity will be, pulling forward some of those investments rather than incrementally adding capacity as we

go along. And so this is an important part in terms of capital efficiency that we haven't had the luxury to do in the past. And it's great to be able to have the liquidity to focus on that.

And then more broadly, as Jerome was touching on, service expansion is really important to the future strategy of the company. So as you saw in our Q4 numbers, the expansion of service centers and mobile service from Q3 to Q4 increased quite a bit and was also quite a bit higher than the first part of the year. And so we're able now to make investments there and also in the supercharging network to get ahead of future demand, which will cost us more in the near term, but is what the right long-term thing is for our customers and the company.

Operator

Thank you. Our next question will come from Alex Potter with Piper Sandler. Please go ahead.

Q - Alex Potter {BIO 16150582 <GO>}

Great. Thanks. I was wondering, you mentioned how you'd like to increase your purchases of cells from suppliers. Does this require them to also have the capability to build structural 4680 cells of the sort that you're putting in these newer iterations of vehicles?

A - Elon Musk {BIO 1954518 <GO>}

No, it does not. Although -- we are talking with them about making the 4680 form factor, but they -- it is not required. For example, the new S currently uses the 18650 form factor, so that's just more advanced, so -- and we think we'll continue to use that form factor for at least a few years, but we will over time be retiring the form factors and try and go to a consistent form factor, so -- but it is not our plan as -- that would replace one of our suppliers because it would just result in fewer sales. So it's better for us to deal with the complexity of different cell form factors than insist on a single form factor for our suppliers today. Like I said, over time it will make sense to have a consistent form factor.

Q - Alex Potter {BIO 16150582 <GO>}

Okay. Makes sense. And then one additional maybe qualitative question on capacity expansion. You've mentioned in the past, I mean, access to dollars is one thing, but access to human beings that are sufficiently qualified is another. Have you run up against any issues on that front that would potentially limit your growth in any way? Thanks.

A - Elon Musk {BIO 1954518 <GO>}

That is one of the things that limits focus -- it's -- or limits the growth rate. It doesn't limit the ultimate size. It limits the growth rate, which is what's the rate at which we can onboard great people and get them trained in the right areas.. You simply can't like instantaneously, if you've got a factory that has 20,000 employees, you can't just

hire 20,000 people instantly that are usually doing something else. So they've got to transition from whatever they were doing or move from some other part of the country. And so there is a certain amount of time required for that.

I mean, that said, we do think that we can maintain a growth rate in excess of 50% per year for many years to come. And at least like the -- yeah, at least 50% per year for many years to come. I think this year, we may track to a fair bit above 50%, but we don't want to commit to that, but at least that's what it would appear and the same again next year. It appears to be meaningfully above 50%.

Operator

Thank you. Our next question will come from Joseph Spak with RBC Capital Markets. Please go ahead.

Q - Joseph Spak {BIO 17457170 <GO>}

Thanks. Elon, back in 2018, you tweeted about electric vans and how it could be interesting to work with Daimler on the Sprinter. We haven't really heard of anything since, but in the meantime, we're seeing a lot of activity in that electric van and last mile space from a number of established players and startups. So I know you have a lot of projects in the table, but can you provide us an update of your thoughts on this market and is it something you're interested in?

A - Elon Musk {BIO 1954518 <GO>}

I think Tesla is definitely going to make an electric van at some point. So the thing to bear in mind is that there is fundamentally a constraint on battery cell output. If you're -- (inaudible) in manufacturing, it's really hard to appreciate just how hard it is to scale production. It's the hardest thing in the world. Prototypes are easy; scaling production is very hard. So -- but big part of the reason -- the main reason we've not accelerated new products is, like for example, Tesla Semi is that we simply don't have enough sales growth, like we -- if we were to make the Semi like right now, which we could easily go on to production with the Semi, but we would not have enough sales growth right now. We will have sales growth -- enough sales for Semi when we are producing the Tesla 4680 in volume, but for example, Semi would use typically five times the cell -- number of cells that a car would use, but it would not sell for five times what a car would sell for. So it kind of doesn't make -- it would not make sense for us to do the Semi right now, but it will absolutely make sense for us to do it as soon as we can address the cell production constraint and the same would go for a van.

Q - Joseph Spak {BIO 17457170 <GO>}

Okay. Thank you. And then maybe if I could dig into your past on one more item about, two years ago, at the Autonomy Day, you stated that you're working on the next-gen Tesla Chip, which was about two years away. So is there any update on that front?

A - Elon Musk {BIO 1954518 <GO>}

Yeah. To be clear, we are still not -- the software still does not fully use the capabilities of the FSD version one computer. It is really just an incredibly powerful computer and I have -- I'm personally certain that you can achieve full self driving with a safety level far in excess of a person just using the full self driving version one computer. The version two, we expect to be about three times as powerful and this sort of needs to be paired with high resolution cameras. And so it's quite as -- it requires a bunch of things to change simultaneously, but we have not been rushing the version two of the chip. It's coming along well and it's in good shape, but -- since we can achieve FSD, full self driving with the current system, it would actually be a distraction right now if we would introduce the full self driving -- the Tesla FSD chip 2 because it would set us back quite a bit on software and software is the critical path to full self driving. So I wouldn't worry too much about that. That's not a -- that's an improvement, but not a game changer, the FSD 2. Getting the software to work and getting all the neural nets to be video, that's the game changer.

Operator

Thank you. Our next question will come from Emmanuel Rosner with Deutsche Bank. Please go ahead.

Q - Emmanuel Rosner {BIO 16323493 <GO>}

Thank you very much. My first question is about your in-house cell manufacturing effort. So in addition to building up capacity, some of the goals you highlighted were to cut the pricing or the cost by about 50%, boost the range by about 50% over a number of years. So wanted to know if your initial efforts are trending in that direction, what is sort of like the timeline to achieve these goals. And maybe related to this, how are you thinking about the timeline for the cheaper Tesla, the entry model eventually?

A - Elon Musk {BIO 1954518 <GO>}

I think we feel very confident about achieving those targets, let's say, over a three-year timeframe. Andrew -- it's not like year one. So three, maybe four years, give ourselves more room, but for three or four years, I'd say. Yeah.

A - Andrew Baglino {BIO 21161872 <GO>}

We put together the trajectory in the Battery Day and we're on that trajectory still. I think that's probably the best reference for the cost trajectory that we are on.

A - Elon Musk {BIO 1954518 <GO>}

Yeah. We are aspiring to do better than what was presented at Battery Day, but we are confident of at least doing what we presented at Battery Day.

Operator

Thank you. Our next question will come from Ben Kallo with Baird. Please go ahead.

Q - Ben Kallo {BIO 16897436 <GO>}

Hey, guys. Thank you, Elon. Congrats to the whole team. So we're trying to put together all the bread crumbs. If I remember correctly, going back 10 years, you talked about when you have a mass market car in the road that you'd step down as CEO and be a Chief Architect and then we have -- you go until Hawaii to see Larry and the (inaudible) and I'm trying to put it all together. There is a lot of questions there. Thank you.

A - Elon Musk {BIO 1954518 <GO>}

Sure. Well, I expect to be CEO of Tesla for several years. So I think there is still a lot that I'm super-excited about doing and I think it would be hard to leave a lot of these great projects halfway or like partway done. So I do expect to be around the company for several years into the future. Obviously, nobody is or should be CEO forever. So I don't expect to be -- the sheer amount of work required to be CEO of Tesla is insane. And I think I do probably more -- I definitely do more technical work than is typical for a CEO. So it would be nice to have a bit more free time in my hand as opposed to just working day and night, from when I wake up to when I go to sleep some days, it's pretty intense. But I think the mission isn't over yet and we've still got a long way to go before we can really make a dent in the world on accelerating the advent of sustainable energy. I think the goal of Tesla from beginning has been to accelerate sustainable energy. But if you say like, what percentage of cars on the road are electric today, it's still very, very tiny, like on the order of 1%, or I think less than 1% of the total fleet worldwide. So that's still hell of a long way to go for -- go on the order of 1% of the fleet is electric as -- also tremendous way to go on solar power, although it's exciting to see the advent of very cost competitive wind and solar and geothermal.

And of course, we need large volume with stationary battery packs. I mean, basically the -- I mean, the three legs of a sustainable energy future are sustainable energy generation via solar, wind, geothermal and hydro and a few others. And I'm actually not against nuclear fission. Actually I think nuclear fission is -- with a well-designed reactor in a situation that is not subject to bad weather or seriously bad weather is actually -- it is a good thing to do, so. And then -- but then the second thing you need is you need stationary storage, you need batteries, because the most renewable energy is intermittent. It doesn't -- the wind doesn't blow all the time; the sun doesn't shine all the time. So you need a lot of batteries and they need to be very long lasting and high cycle life. I mean, you need electric transport. And if you have those three things, we've got a very bright future with respect to energy and the environment. So still a long way to go on that and so I'm still very much fired up to work on that.

A - Martin Viecha {BIO 17153377 <GO>}

Fantastic. And let's take the last question, please.

Operator

Thank you. Our last question will come from Gene Munster with Loup Ventures. Please go ahead.

Q - Gene Munster {BIO 2013219 <GO>}

I was happy to see the update on the timing of Semi and I had a couple of related questions. And first, since Semi trucks typically travel predictable highway miles, will Tesla Semi be the first to achieve full autonomy?

A - Elon Musk {BIO 1954518 <GO>}

I think that's quite likely, yes. Yes. I can't imagine -- I'm not sure who would be number two, but yeah, it seems highly likely. Yeah.

Q - Gene Munster {BIO 2013219 <GO>}

Okay. And then my...

A - Jerome Guillen {BIO 17525057 <GO>}

It's the exact same part numbers on the Semi that is on the Tesla car. It is no different.

A - Elon Musk {BIO 1954518 <GO>}

Yeah. That's true. Yeah. As it's -- we need to modify the parameters, software parameters changed for Autopilot or full self driving because it needs to know if it's in a Model 3, Model Y, Model X or Model S. And so this is -- we're just to inform the vehicle -- or inform the full self driving brain that it is now in a semi truck.

Q - Gene Munster {BIO 2013219 <GO>}

We need to retrain them as part of that?

A - Elon Musk {BIO 1954518 <GO>}

No. I think there will be -- you have different control functions because there are turns that you could do in a regular car that you cannot do in a Semi. Like you don't want to -- you don't want to try to parallel park this thing on the street and so that -- at least to know its limitations being a giant truck.

Q - Gene Munster {BIO 2013219 <GO>}

Makes sense. My follow-up question was related to, if you can just help explain why battery electric will win versus hydrogen cell fuel tech.

A - Elon Musk {BIO 1954518 <GO>}

Yeah. I mean, honestly I've had this question a million times for just for regular vehicles even back in the early Roadster days. Even before we had the Roadster out, people were saying that somehow hydrogen is going to be a better means of energy storage in a car than batteries. And it's like this is just really not the case. Hydrogen is a very -- it's number one in the periodic table. It's got very low density.

It's got low density as a liquid, like styrofoam level density as a liquid. And then it's only a liquid very close to absolute zero. So you have to have a -- it's really not realistic to keep it as liquid. You want to have it as a high pressure gas that has even lower density. So you need a gigantic fuel tank volumetrically and it's got to be very high pressure. It's a big pain in the ass basically.

If somebody is going to use an alternate chemical energy storage mechanism to hydrogen, I'd say they should use propane or something like that or methane or -- those would be way better than hydrogen and then having it be -- a fuel cell just adds even further complications to the situation. It's just crazy basically. And we're extremely confident that we could do long-range trucking with batteries. The amount works out. You don't -- if you could just like take, say, watt-hours per kilogram of currently available cells and say, okay, how might -- what way would you need to go, let's say, 500 miles and to what degree does that affect your payload and it's like, okay, you could do this. If you do it right, you basically have no effect on your payload or almost nothing and you can have a long-range truck. I mean, Jerome, do you want to add to that?

A - Jerome Guillen {BIO 17525057 <GO>}

No. I agree very (Technical Difficulty) and we see also an increase on the regionalization of trucks. And I think it will be perfect, the Tesla Semi would be perfect for it, yeah. And I'm very -- I'm looking forward to having some additional ones on the road very soon.

A - Elon Musk {BIO 1954518 <GO>}

Basically we do not see any issues with creating a compelling long range truck with batteries apart from the cell supply. Cell supply is the only thing.

A - Jerome Guillen {BIO 17525057 <GO>}

Yeah.

A - Elon Musk {BIO 1954518 <GO>}

Cell supply is the -- yeah.

A - Jerome Guillen {BIO 17525057 <GO>}

It's going to be awesome.

A - Elon Musk {BIO 1954518 <GO>}

Yeah.

A - Martin Viecha {BIO 17153377 <GO>}

All right. Thank you very much. And unfortunately, that's all the time we have today. So thanks for all of your great questions. And we will speak to you again in about three months. Thank you and goodbye.

A - Elon Musk {BIO 1954518 <GO>}

All right. Thanks so much. Bye.

Operator

Ladies and gentlemen, this concludes today's conference call. Thank you for your participation. You may now disconnect.

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