S&P Capital IQ

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Tesla, Inc. NasdaqGS:TSLA

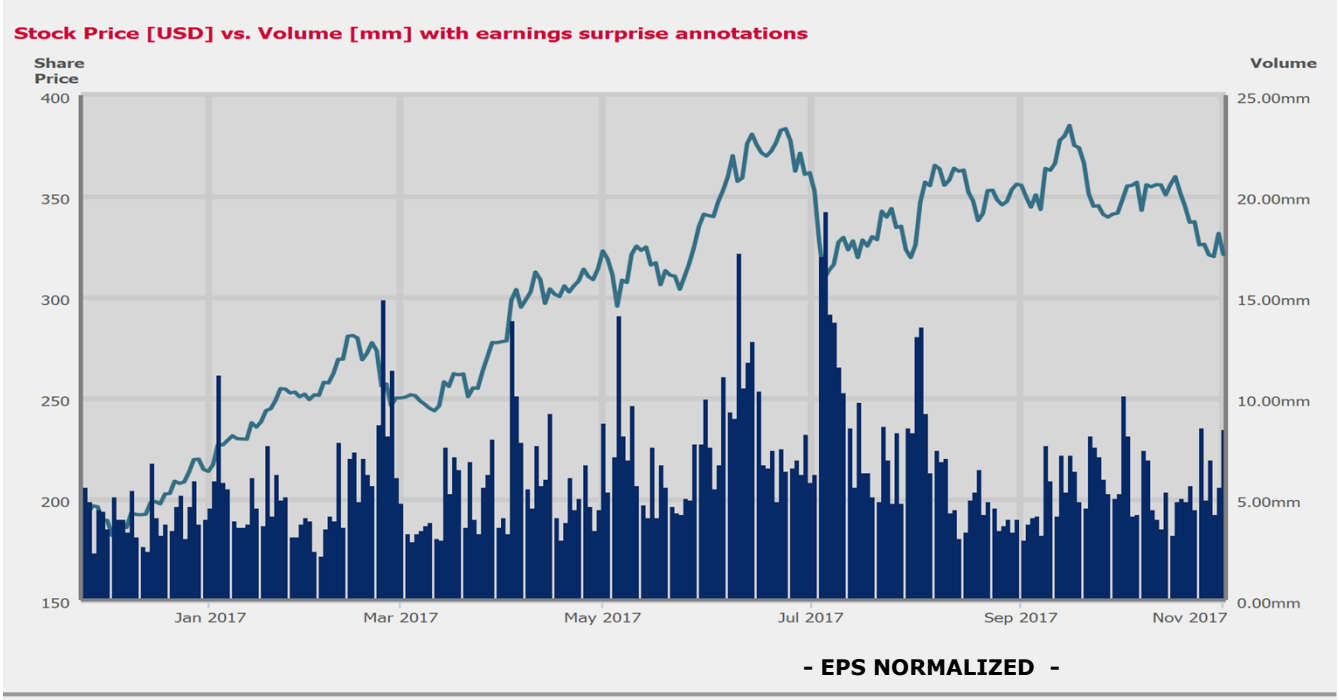
FQ4 2017 Earnings Call Transcripts

Wednesday, February 07, 2018 10:30 PM GMT

S&P Capital IQ Estimates

	-FQ4 2017-			-FQ1 2018-	-FY 2017-		
	CONSENSUS	ACTUAL	SURPRISE	CONSENSUS	CONSENSUS	ACTUAL	
EPS Normalized	(3.15)	(3.04)	NM	(2.56)	(8.67)	(8.66)	
Revenue (mm)	3260.65	3288.25	0.85	3574.88	11635.03	11758.75	

Currency: USD
Consensus as of Feb-07-2018 9:53 PM GMT



- EPS NORMALIZED -

	CONSENSUS	ACTUAL	SURPRISE
FQ4 2016	(0.53)	(0.69)	NM
FQ1 2017	(0.80)	(1.33)	NM
FQ2 2017	(1.92)	(1.33)	NM
FQ3 2017	(2.29)	(2.92)	NM

Call Participants

EXECUTIVES

Deepak Ahuja
Chief Financial Officer

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Jeffrey B. Straubel
Chief Technology Officer

John Douglas Field
Senior Vice President of Engineering

Martin Viecha

ANALYSTS

A.M. Sacconaghi
Sanford C. Bernstein & Co., LLC., Research Division

Adam Michael Jonas
Morgan Stanley, Research Division

Brian Arthur Johnson
Barclays PLC, Research Division

David J. Tamberrino
Goldman Sachs Group Inc., Research Division

James Joseph Albertine
Consumer Edge Research, LLC

John Joseph Murphy
BofA Merrill Lynch, Research Division

Philippe Jean Houchois
Jefferies LLC, Research Division

Rod Avraham Lache
Deutsche Bank AG, Research Division

Romit Jitendra Shah
Nomura Securities Co. Ltd., Research Division

Ryan J. Brinkman
JP Morgan Chase & Co, Research Division

Tyler Charles Frank
Robert W. Baird & Co. Incorporated, Research Division

Presentation

Operator

Good day, ladies and gentlemen, and welcome to the Tesla Inc. Fourth Quarter 2017 Financial Results Q&A Conference Call. [Operator Instructions] I would now like to turn the call over to Senior Director of Investor Relations, Mr. Martin Viecha. Please go ahead, sir.

Martin Viecha

Thank you, Andrew, and good afternoon, everyone. Welcome to Tesla's Fourth Quarter 2017 Q&A Webcast. I'm joined today by Elon Musk, J.B. Straubel, Deepak Ahuja and Doug Field is on the line.

Our 4Q results were announced at about 1 p.m. Pacific Time in the update letter 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. [Operator Instructions]

Before we jump to Q&A, Elon would like to have some opening remarks. Elon?

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Right, thank you. So 2017 was also a big year for Tesla. We launched the Model 3, which was our first mass production vehicle, and it's a huge step change for Tesla. A lot of challenges but I think we made tremendous progress on that front.

We also designed and installed and got into operation the world's largest battery in Australia, the largest battery by a significant margin. And that battery is exceeding its performance targets significantly. We also unveiled the Tesla Semi, which is a super heavy-duty truck, maximum load semi truck, and the next-gen Roadster, which we believe will exceed gasoline sports cars on every dimension.

And we also achieved record production and deliveries of Model S and X. And overall, I think, while there were challenges associated with Model 3 ramp at the -- we were in a deeper level of hell than we expected. So a few levels deeper than we'd like to be but swiftly exiting, I think. And so it's really, I think, on balance, a phenomenal year. And I'd like to thank everyone at Tesla, who should be very proud of the work they've done. This is incredibly difficult. I'd like to thank everyone for their hard work and contribution to 2017 being a really good year for Tesla.

I also want to thank our suppliers, particularly those involved in Model 3, as they've shared the vertical struggle we've had in ramping our production, and they've really burned the midnight oil, spent weekends and taking a lot of risks and suffered alongside us in the challenges associated with the ramp. So I'd like to thank them for supporting us through this difficult time with Model 3.

As well, our customers and Model 3 reservation holders, you're going to love your cars, and we are working to get them to you as quickly as we possibly can. As for Model 3 production, we continue to make significant progress every day, and we are targeting a weekly production rate of 2,500 vehicles by the end of March and 5,000 by the end of Q2.

And as what's been -- or you've seen in the letter, the quarter-over-quarter production of Model 3 is rising exponentially. So I hope we'll -- that people think that if we can send a Roadster to the asteroid belt, we can probably solve Model 3 production. It's just a matter of time. So -- and really the error bars on the timing are really quite small in the grand scheme of things.

So it's -- 2018 is likely to be a very big year for us. At some point in 2018, we expect to begin generating positive quarterly operating income on a sustained basis, operating 5,000 a week of Model 3 production. And I am cautiously optimistic that we will be GAAP profitable. It's not certain, but it's -- I'm cautiously optimistic that we will actually be GAAP profitable with no asterisk.

Martin Viecha
Thank you, Elon. Andrew, let's go to the first question.

Question and Answer

Operator

I'm showing we have a question from the line of Rod Lache with Deutsche Bank.

Rod Avraham Lache
Deutsche Bank AG, Research Division

Congratulations on the launch yesterday. Wanted to just ask a couple of questions. One is just to get a little bit more color from you on Model 3, what the production run rate is at the moment. Maybe if you can just provide us with a little bit more color on where the challenges are at this point? On the last call, you talked about, I think, 2 of the 4 zones at Gigafactory that were still kind of an issue in manual operation. Have those been resolved? And once you get to 2,500, is the ramp to 5,000 -- does that just merely involve increasing line speeds?

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Sure. I'll try to give as much color as possible. I am reminded of -- I think it may have been Churchill's line about sausage. If you like sausage and respect the law, you should watch neither being made. And just to me, that is true of a production ramp. So I wouldn't read too much into the day-to-day battles of this or that, but I'll give you the color, but don't like -- don't read too much into it. So yes, there are 4 zones in module production. Module production is fundamentally the limiting factor on Model 3 output, which is ironic since battery modules really should be the thing we're best at. And I think in part, we were probably a little overconfident, a little complacent in thinking about this is something we know and understand and put a lot of attention on other things, not -- and just got too comfortable with our ability to do battery modules because we've been doing that since the start of the company. And of the 4 zones, 2 of them, which is subcontracted to -- the production system is subcontracted to other companies, flat out, didn't work, it turns out. Like I mean, we were promised they would work, and it just didn't work. So we had to do what would normally be maybe an 18-month development cycle for a production system of that scale and complexity and tried to do that in basically 6 months, maybe a little -- 6 to 9 months. And we've tackled that on multiple levels, so we have a design that is nearing completion for a new automated system for zone 1 and 2. That is being led by a Tesla ground team. It's an excellent design. All the other work that they've done has been -- has performed to spec. And we expect a single Tesla ground line to be equivalent to 3, if not 4, of the current lines that we have and be smaller, which is, for me, kind of amazing. And then we have what we call a semiautomatic line, which is a series of small automated stations manned by people. And they've actually been remarkably effective. It has sort of renewed my faith in humanity that the rapid evolution of progress and the ability of people to adapt rapidly has -- is quite remarkable. Our semiautomatic -- our sort of semi-manual, semiautomatic line is exceeding all 3 of the automatic lines right now. So -- and that is something that we're able to scale quite rapidly. I mean, J.B., is there additional color you'd like to add on that?

Jeffrey B. Straubel
Chief Technology Officer

Sure, that's a great summary of it. I think much has been made about the manual production of modules. That's really not very accurate. These are, as Elon said, semiauto lines where we have people there moving materials perhaps between the machines that are actually performing the operations. But there is still a degree of automation doing the operation.

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Right. It's not artisanal.

Jeffrey B. Straubel
Chief Technology Officer

Exactly. And this is what has been ramping quite effectively in the last -- in the first half -- the first part of this year. So we're continuing to expand that, the semiauto lines, and that is effectively bridging the gap as we redesign the full automation and bring that online.

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Yes. And it's pretty -- it's a small thing. So actually, I think it's probably worth providing some tours for investors that are interested, so you can actually see it first-hand. I think a lot of it is like if you see it first-hand, you will understand exactly what's going on. And so I think let's arrange for some new tours for investors that are interested because I think you can really get a feel for what it is. Otherwise, it's just some words that are kind of hard to put -- hard to imagine.

Jeffrey B. Straubel
Chief Technology Officer

I also just want to add, I think it's fair to say that this maybe degree of complacency that happened at the end of last year has been pretty thoroughly replaced by an intense focus from a huge portion of the Tesla team. And there are a lot of different initiatives and teams, whole teams, targeted at this area. So as Elon opened with, it's not a question of if we will get to the production rate, it's just a question of the matter of time.

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Yes, absolutely.

Rod Avraham Lache
Deutsche Bank AG, Research Division

If I could just clarify, what's the run rate now with semiautomation? And when are you expecting the fully automated line to come on?

Jeffrey B. Straubel
Chief Technology Officer

Well, it's probably a level of granularity that is not productive to dive into in terms of exactly what is coming from which operation. But we do expect the new automated lines to be landing and starting out at the Gigafactory in just the next -- well, the landing in sight within this quarter.

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Yes, expect the new automated lines to arrive next month, in March. And then it's already -- it's been -- it's working in Germany so that's going to tracked -- going to be disassembled, brought out to the Gigafactory and reassembled and then go into operation at the Gigafactory. It's not of question whether it works or not. It's just a question of disassembly, transport and reassembly. So that's kind of -- yes. So we expect to alleviate that constraint. That -- with alleviating that constraint, that's what gets us to the roughly 2,000 to 2,500 unit per week production rate. The next constraint would be material conveyance at our Fremont vehicle plant. And that's a very sophisticated automated parts conveyance system. We think it's probably the most sophisticated in the world or at least we're not aware of one that is more so. And the software for that is quite complex. So that would be the next constraint on production to get to 5,000, is the conveyance system in Fremont. So that also appears to be on track. So we feel like the error bars around the unit volume predictions are getting smaller with each passing week.

Operator

And our next question comes from the line of Adam Jonas with Morgan Stanley.

Adam Michael Jonas
Morgan Stanley, Research Division

I also want to add my congrats for the launch yesterday. The twin Falcon landing was probably the sickest thing I've ever seen in my life. First question is for Deepak. Deepak, a question for you. Given the negative trade cycle, your negative working cap, some of the modeling analysts are doing kind of simulating when you get to 2,500 or 5,000 or maybe somewhere in between that, that some of the arrangements you made with your suppliers who have been very helpful, that you might temporarily run enough negative working cap to even have operating cash flow exceed CapEx. Is that something that's possible? Or again, I know there's execution behind that clearly, but is that something out of the question or barely even?

Deepak Ahuja
Chief Financial Officer

I think we got to look at it from a full quarter perspective. The negative working cycle is amplified by the rate at which we ramp our production. Given our present plans of getting to 5,000 by end of Q2, it's a fairly gradual -- it's exponential from where we started, but it's not going to create a situation where our cash flow from operations will exceed CapEx.

Adam Michael Jonas
Morgan Stanley, Research Division

And just as a follow-up, Elon, your kind of compensation -- long-term compensation plan obviously got a lot of attention and raised some questions, however long term from now, on succession. Just want to ask, do you see your successor as CEO of Tesla someone currently within the company right now or from outside the company? Kind of how do you see that?

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

I mean, there's no actual search going on or there's not even -- or passive -- active or passive search going on for a new CEO because I expect to remain CEO for the foreseeable future. But at some point, if there's somebody really spectacular inside or outside the company who could take on that role and who'd want to have that title and that role, that would be fine with me. And I would focus on product development, which is designing and engineering, which is what I like doing best. So -- but there are no plans to make change at the time.

Operator

Our next question comes from the line of Tyler Frank with Baird.

Tyler Charles Frank
Robert W. Baird & Co. Incorporated, Research Division

I guess, Elon, bigger picture and looking out a few years, you had mentioned a couple of quarters ago that the 1 million car target for 2020 was still there and that you would need to introduce the Model Y by then. How do we connect from where we are today to getting to 1 million units a year? And what should we look for this year in terms of ramping production or building a facility for the Model Y?

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

We are going to make some capital investments towards the end of this year related to Model Y. I don't exactly count on those, but I think we've got a good plan. I'm pretty excited about the -- how we're designing Model Y. It's really taking a lot of lessons learned from Model 3 and saying how do we design this thing to be easier to manufacture instead of how to manufacture, more difficult really. So I think it's going to be -- I really think it's going to be pretty great and pretty scalable for Model Y. But we are going to, as you suspect, need to make some capital investments in the second half of this year, really late, late Q3, Q4 for Model Y. And -- but I think we want to wait until -- wait probably 3 to 6 months before announcing any further plans on production location and the details associated with that.

Tyler Charles Frank

Robert W. Baird & Co. Incorporated, Research Division

Is that 1 million unit target still in play?

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Yes.

Tyler Charles Frank
Robert W. Baird & Co. Incorporated, Research Division

Perfect. And then just one quick follow-up. How should we think about the Tesla Semi and investments needed there? And what are you guys thinking you can hit from an annual run rate in the next, let's say, 2 to 4 years?

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Well, a great difference between 2 and 4 years. Tesla -- I've said I think a few years ago, I think Tesla is going to kind of grow at an average of roughly 50% a year, which is a crazy average growth rate for a company manufacturing complex products at scale. So 2 versus 4 is a huge difference. But if you say like -- and it's much easier to predict, especially, this production, because they look like an S curve, where you have an initial exponential, which -- the exponential appears -- it seems people naturally tends to extrapolate on a straight-line basis. An exponential always appears -- the predictions are conservative in the beginning, and then the exponential takes off, and then it becomes linear, and then it becomes logarithmic. So it's easier to predict -- far easier to predict the endpoint or the steady state of the S-curve than anywhere on that exponential -- or log curve. So if you say 4 years, I think 100,000 units a year is a reasonable expectation. Maybe more but that's the right -- roughly the right number, I think.

Tyler Charles Frank
Robert W. Baird & Co. Incorporated, Research Division

For the Tesla Semi?

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Yes. I think we might be able to exceed the specs that we unveiled last year too, which is pretty exciting. I know there's, like, speculation that we might not meet them, but I think we're going to exceed them. So -- and I made this comment before. It's like -- feels like I gloss over these comments, but I really take these to heart. The competitive strength of Tesla long term is not going to be the car. It's going to be the factory. We're going to productize the factory. And really this is the lesson that is kind of obvious in history because the Model T wasn't a product. It was River Rouge. The Model T is a very simple car. Anybody could have made that car, but not anyone could make River Rouge. And that's really what would be Tesla's long-term competitive advantage. We'll have a great lineup of great products, great design, great engineering the product itself in the vehicles and autonomy and all that sort of stuff. But the factory is going to be the product that has the long-term sustained competitive advantage, in my opinion.

Operator

And our next question comes from the line of David Tamberrino with Goldman Sachs.

David J. Tamberrino
Goldman Sachs Group Inc., Research Division

Elon, on your autonomous vehicle strategy, why do you believe that your current hardware set of only camera plus radar is going to be able to get you to fully validated autonomous vehicle system? Most every competitor noted that they need the redundancy from LIDAR hardware given the robustness of the 3D point cloud and the data it's generated. What are they missing in their software stack and their algorithms that Tesla's able to obtain from just a camera plus radar? Further, what would be your response if the

regulatory bodies require that level of redundancy and that's really needed from an incremental LIDAR hardware?

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Yes. Well, first of all, I should say there's actually a 3-sensor systems test. There are cameras, redundant forward cameras. There are -- there's the forward radar, and there's -- there are the ultrasonics for near field. So a third is also -- a third set is also important for near field stuff just as it is for humans. But I think it's pretty obvious that the road system is geared towards passive optical. We have to solve passive optical image recognition extremely well in order to be able to drive in any given environment and a changing environment. We must solve passive optical image recognition. We must solve it extremely well. At the point at which we have solved it extremely well, what is the point in having active optical, meaning LIDAR, which does not -- which cannot read signs? It's just giving you -- in my view, it is a crutch that will drive companies to a local maximum, that we'll find very difficult to get out of. If you take the hard path of a sophisticated neural net that's capable of advanced image recognition, then I think you'll achieve the goal maximum. And we combine that with increasingly sophisticated radar, and if you're going to pick active photon generator, doing so in 400 to 700-nanometer wavelength is pretty silly since you're getting that passively. You would want your active photon generation in the radar frequencies of approximately around 4 millimeters because that is occlusion penetrating. And you can essentially see through snow or rain, dust, fog, anything. So it's just -- I find it quite puzzling that companies would choose to do an active photon system in the wrong wavelength. They're going to get a whole bunch of expensive equipment, most of which makes the car sort of expensive, ugly and unnecessary, and I think they will find themselves at a competitive disadvantage. Now perhaps I am wrong, in which case I'll look like a fool. But I am quite certain that I'm not.

David J. Tamberrino
Goldman Sachs Group Inc., Research Division

Okay. And as a follow-up, if I may, can we talk about the trajectory for the Model S and X margins? 3Q '17, I think the company was saying you're in the low 20% range. I think you took another step down per the report today, so I'm assuming it's probably at 20%. What's the path to recovery from here? And can you frame us through how you're going to get to that margin expansion?

Deepak Ahuja
Chief Financial Officer

We feel very good about the recovery of S and X gross margin to -- in 2018 to a level which we have seen in the past. And it's a combination of a variety of things. It's increasing the mix of the larger batteries, the higher option content. And then also we have a very good and a robust manufacturing cost reduction road map. We will achieve a lot of manufacturing efficiencies which continue to occur on S and X, so we feel really good about it.

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Yes. I mean, we -- our internal plan, whether we meet this or not, I don't know. But I think we will. Our internal plan calls for turnaround of 30% to 32% cash gross margin on S and X by the end of the year and probably 25%, maybe 26% GAAP gross margin on S and X towards the end of this year. And then Model 3, maybe not by the end of this year but not far behind it.

Deepak Ahuja
Chief Financial Officer

Right. And just as Elon said, internal road map and internal plans, things sometimes get delayed, they don't work out exactly. But I think you get a sense that we feel really good about the improvement that's ahead.

Elon R. Musk

CEO, Product Architect, Chairman & Co-Founder

Yes, we have a clear path to that goal.

Operator

Our next question comes from the line of Romit Shah with Nomura.

Romit Jitendra Shah
Nomura Securities Co. Ltd., Research Division

It sounds like from the letter that you could do more than 100k S and X in '18 but you're constrained by the 18650s. And I'm just curious, what would it take to see the 2170 cells in these vehicles?

Jeffrey B. Straubel
Chief Technology Officer

Well, this is J.B. It's something we've, of course, contemplated, but it's quite a large change to the architecture of the module and the battery pack overall. And while the 18650 supply is somewhat of a cap at about 100k units per year, even just a few months ago, we didn't feel that expanding and making some long-term bets on expanding that supply with Panasonic in Japan was really the right risk. It's something we could consider, but right now, we're pretty happy with that balance, and it matches our other production capabilities and our other investments.

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Yes, it's also like -- for any given complex manufactured item, in order to go past the target capacity, you really need to move the whole supply chain in cadence. So you really have to then shift everything to say, okay, if you want to make 20% more S and X, everyone has to make 20% more, there have to be investments in new lines or it's going to require overtime, which negatively affects gross margins. We [didn't] design the manufacturing machine for it [to break], and then you'd have to redesign the machine or go redline. And so I think we feel pretty good about the 100k a year for S and X, and we want to focus on just improving the efficiency of production and the gross margin of the group.

Romit Jitendra Shah
Nomura Securities Co. Ltd., Research Division

Okay. Yes, makes sense...

Jeffrey B. Straubel
Chief Technology Officer

[Keeping, of course,] the Model 3. I mean, that's really where the majority of the effort is.

Romit Jitendra Shah
Nomura Securities Co. Ltd., Research Division

Okay. The other thing you guys mentioned was upcoming autonomous coast-to-coast drive, which we're really looking forward to. Could you give a little bit more color on time frame, when something like that would be available for customers?

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Yes. So we actually -- I've been meaning to address this but -- because obviously, I missed the mark on that front. Our focus is very much on Model 3 production, so everything else kind of took a second place to that. But the -- we could have done the coast-to-coast drive, but it would have required too much specialized code to effectively game it or make it somewhat brittle in that it would work for one particular route but not be a general solution. So [although] you would be able to repeat it, but just not any other route, which is not really a true solution. I am pretty excited about how much progress we're making on the neural net front. And it's a little -- it's also one of the things that's kind of exponential, where the

progress doesn't seem like -- it doesn't seem like much progress, it doesn't seem like much progress, then suddenly, wow. That's been my observation generally with AI stuff. And you look at, say, something like what people at DeepMind did with AlphaGo. It went from not being able to beat even a pretty good Go player to something that could beat the European champion, then it could beat the world champion, then it could thrash the world champion, then it could thrash everyone simultaneously. Then they made AlphaZero, which could thrash AlphaGo, where it's just winning against itself, was better than all the world's human experts. It's kind of going to be like that for self-driving. It will seem like, well, this is a lame driver, lame driver, like, okay, that's a pretty good driver, like, holy cow, that driver is good. It will be like that. I mean, timing-wise, I think we can probably do a coast-to-coast drive in 3 months, 6 months at the upside.

Romit Jitendra Shah
Nomura Securities Co. Ltd., Research Division

And then is it available for customers immediately? Or is there a lag?

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Yes, that would be something that's available for customers. [We currently have done it, do tests on it].

Operator

Our next question comes from the line of Ryan Brinkman with JPMorgan.

Ryan J. Brinkman
JP Morgan Chase & Co, Research Division

As you put solutions in place one by one to unclog Model 3 production bottlenecks in Fremont or at the battery module line in Reno, are you finding that the ultimate solution is more or less expensive to implement than your original plans, which called for a 25% gross margin on the vehicle? Do you feel any differently now about the cost to manufacture the Model 3 or its gross margin potential versus prior to the start of production last July?

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

I think we feel good about that. I think we're probably able to exceed that next year, probably. Like, our understanding of manufacturing has improved dramatically. We can think of a huge number of ways to make it far better, far more efficient. I'm really excited about how much we're learning about manufacturing. That's why I said I think the long-term strength of Tesla will be the manufacturing plant, essentially productizing the Gigafactory, which is like the world's biggest product basically, like, make a nuclear aircraft carrier look pretty small by comparison.

Jeffrey B. Straubel
Chief Technology Officer

Yes. Maybe just to add to that, I mean, the products bill of materials cost and the embedded labor cost is -- I think, that's where there's opportunities. And we are simplifying and we're finding ways to improve the design incrementally as we go through the ramp. If there is some small increases in CapEx, that doesn't directly -- it will be overwhelmed by the improvements in simplicity and some cost savings in the product itself.

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Yes, I think the bottom line is we feel really optimistic about the long-term potential for gross margin on Model 3 and especially on Model Y.

Deepak Ahuja
Chief Financial Officer

Yes. We haven't seen anything that particularly changes our view.

Ryan J. Brinkman
JP Morgan Chase & Co, Research Division

That's very helpful. And then just for -- yes, and then for my follow-up. I see the guidance in the letter about the quarterly operating income turning positive at some point in 2018. That's great. I'm just curious what your thoughts are with regard to when you also might generate free cash flow. Is that less of a medium-term focus as you prefer to invest operating cash flows from the Model 3 into the Semi truck, Roadster and Model Y?

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Yes. We could be positive cash flow, I think pretty significant positive cash flow probably in like third quarter, which is like 4, 5 months from now. But we think it makes sense to invest in Model Y and -- yes.

Deepak Ahuja
Chief Financial Officer

Future growth of our energy products, Model 3, future growth of that so...

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Yes, the opportunities we see are -- we see really good opportunities there.

Deepak Ahuja
Chief Financial Officer

Yes. It makes good business case and business sense to invest.

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Yes. Silver bullets for me, in fact, can't emphasize enough. And what I find sort of interesting is that our competitors -- well, the car industry thinks they're really good at manufacturing. And they're actually -- they are quite good at manufacturing, but they just don't realize just how much potential there is for improvement. It's way more than they think. I went through this math, I think, on a prior earnings call, but like it sounds like some of the -- the fastest car factories produce a car maybe every 25 seconds. It sounds fast. But if you think about a 5-meter long car including gap, a 4.5-meter car with 0.5 meter gap or something, that's only 0.2 meters per second. Like grandma with a walker can beat the speed of the fastest production line on earth. So really not that fast. Walking speed is 1 meter per second, so 5x faster than the fastest production line on earth. Why? It should at least be jogging speed. I mean, in the limit, companies should start caring about the aero drag in the factory, which -- that's maybe around 20 or 30 miles an hour or "30 kilometers an hour, 40 kilometers an hour." It's like stuff should be moving at that speed.

Operator

And our next question comes from the line of Toni Sacconaghi with Bernstein.

A.M. Sacconaghi
Sanford C. Bernstein & Co., LLC., Research Division

You commented in the shareholder letter that capital expenditures for 2018 were expected to be a bit higher than 2017. I'm wondering if you could tell us what exactly is in that, call it, roughly $3.5 billion. Are you going to get to full like 10,000 car per week capacity? Is that in the $3.5 billion? What will Gigafactory production be? And in the slightly more than $3.4 billion, is that also including the investments, Elon, that you mentioned on Model Y? So where exactly is this level of capital spending going to take us in 2018? And I have a follow-up, please.

Deepak Ahuja
Chief Financial Officer

Sure, I mean, our biggest -- at a very high-level sort of breakdown, our biggest investment is obviously in the Model 3. And that includes completion of the payments that we still have to make on the capacity we are putting in place now as well as significant investment in -- or required upfront for the next phase of Model 3 production to 10,000-plus per week. So that's, I would say, overall more than 50%, really more than 50% is Model 3. And the rest is all the many other things we talked about, whether it's energy storage, whether it's...

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Primarily Y and energy storage.

Deepak Ahuja
Chief Financial Officer

Right. And then our infrastructure spend, superchargers, stores, service centers. We want to significantly increase the service capacity, want to significantly increase our supercharging capacity. So all of those pieces then add up to the total spend.

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Yes. The -- just to give you some sort of flavor for our optimism on Model Y, I think. Model Y, I think, we might aim for something like maybe capacity of 1 million units a year, something like that, just for Model Y alone. And I think we'll be able to do that for CapEx that is less than the Model 3 CapEx at the $0.5 million. So probably -- I think we can probably improve CapEx by a factor of 2. It's not a promise, but that's my gut feel on Model Y CapEx, just to give you a flavor for my level of optimism on improvements on the manufacturing front.

A.M. Sacconaghi
Sanford C. Bernstein & Co., LLC., Research Division

That's helpful. And just so is the $3.5 billion and the greater than 50% to Model 3, is that going to complete all the required equipment to get us to 10,000 a week at the end of the year? Or are we still going to have incremental capital expenditures? And then separately, on my second question around Model 3 gross margins, I think you had said that you expected them to be breakeven this quarter. Obviously, volume was lower, and so you didn't get there. But for next quarter, you're suggesting that they're going to be negative again despite the fact that I think Q1 volumes are much higher than what you would have anticipated originally for Q4 when you thought that margins would be breakeven. So can you help reconcile the apparent enthusiasm you have about the gross margin trajectory with the fact that your guidance around gross margins in the near term actually appears more cautious than it was guided at the time?

Deepak Ahuja
Chief Financial Officer

Can you hear us?

A.M. Sacconaghi
Sanford C. Bernstein & Co., LLC., Research Division

Yes, I can hear you.

Deepak Ahuja
Chief Financial Officer

Yes, no worries. Yes, to sort of finish off your first part of the question, no, we will still have further investments in the 10,000 per week capacity of the Model 3 happening next year as all of that will be

concluded next year. There's always a lag in our cash outflow while we continue to test the equipment and verify it. So that'll continue in '18 -- in '19. And then in terms of the Model 3 gross margins, our expectations earlier were of a much steeper ramp than what we are projecting here. We were targeting, as you well know at one point, hitting 5,000 by the end of '17. And now that's 6 months later. So -- but that's slower ramp. We just know we'll have inefficiencies. We have the full capacity, so the depreciation of all that equipment and the operating costs are hitting while we're not producing as many cars. It's actually pretty simple. And it's only temporary. It doesn't imply anything fundamental.

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Yes, exactly. The problem is like when you've got a machine where most of that machine, I mean that overall production and supply chain machine, is at a 5,000-unit capacity but then 10% or 15% of it isn't, then you got this massive load on a small -- on a way smaller production volume. Then as that production volume -- as you fix that remaining 10% or 15% of the production machine, you're able to get to that target production, and then things improve dramatically. It's sort of like having a car that's operating at a fraction of its -- let's use a gas-themed analogy. We've got a 4-cylinder car operating on 1 cylinder. It's like, okay, it's not so great, one full -- or suppose it is -- machines were -- it's just like a big machine essentially, yes.

Operator

Our next question comes from the line of Philippe Houchois with Jefferies.

Philippe Jean Houchois
Jefferies LLC, Research Division

I have a slightly -- nonrelated to earnings about the electric truck, the Semi. In the past, Mr. Musk, you have spoken about supercapacitors as a way of generating energy and/or storing energy. And particularly in the application of heavy trucks, I would expect that the surge of energy in slowing down or braking in the truck would be too much for a battery to absorb. Are you considering supercapacitors as an application for the Semi? Or what is your kind of general thought on that technology, and the implications to make that industrially viable?

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Yes. I mean, ages ago, I was going through basically applied physics and computer science degree, a Ph.D. in capacitors. So I'm a big fan of capacitors. I just don't think -- I think that the lithium ion chemistry is so good at this point that capacitors will not be needed. There's a certain power-to-energy ratio, and once you have a huge amount of energy, which is needed for range, then you automatically have the power you need for absorbing -- for being able to do rapid acceleration and braking.

Jeffrey B. Straubel
Chief Technology Officer

Yes. It's maybe not intuitive, this is J.B., but the power-to-energy demand on the battery in the heavy truck is actually generally less than in our sort of performance vehicles. It's definitely less also, in most cases, than even the high rate of discharge energy products. So as Elon said, you have a lot of energy, so you end up with a lot of power, actually more than you need.

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Yes. And the way that chemistry works is that you're able to actually extract, for short periods of time, extract very high power from lithium ion cells as you sort of have ion migration right on the surface. And then the sustained power for lithium ion is conservatively less than the power over, say, the course of several seconds or minute. But the several seconds power for lithium ion is remarkably good because you're essentially using ion migration from the outer surface. It's like if you have a parking lot, all the cars

in the front of the parking lot can just exit. But once you start getting cars from deep in the parking lot, it takes a while for them to wind their way out.

Operator

Our next question comes from the line of Brian Johnson with Barclays.

Brian Arthur Johnson
Barclays PLC, Research Division

Yes. I'd like to talk, follow-up a little bit on the first question around some of the manufacturing roadblocks as well as the comment about building a machine to build the machine, which I believe was the title of a 1990 MIT book about Toyota. Could you maybe give us some more discussion really on the managerial culture, the process level, how you would benchmark yourself, for example, against the Toyota factory, which seems to be able to launch new product in about 3 or 4 months, to ramp up? Or at the other extreme, because I know Mr. Field came from there, kind of what Foxconn does in its goal to replace humans? But in particular, talk about the managerial processes, not so much the robots you're putting into place.

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Well, I'm pretty sure Toyota cannot ramp up any of their products in 3 months. In fact, I'm 100% certain about that. Deepak spent many years at Ford before joining Tesla.

Deepak Ahuja
Chief Financial Officer

Yes. I mean, generally, companies including Toyota take anywhere from 6 months to a year when they come up with an all new product.

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

And all new is like that's -- there's still -- it's not really -- the amount of technology that changes, not that much.

Deepak Ahuja
Chief Financial Officer

It's a major platform so it's not all new as a Model S or an X that we've done. So it is longer.

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Right. There aren't fundamental new technologies.

Brian Arthur Johnson
Barclays PLC, Research Division

Okay. But within that then, what are the differences though in the way you're going to be managing the factory?

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

The most fundamental difference is thinking about the factory as -- really as a product, as a quite vertically integrated product.

Jeffrey B. Straubel
Chief Technology Officer

It's treating it as more of an engineering and a technical problem as well instead of just a...

Brian Arthur Johnson
Barclays PLC, Research Division

Right, which is the Toyota production system.

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Yes -- we don't think so.

Jeffrey B. Straubel
Chief Technology Officer

I think that generally, it's treated more as an optimized operational problem, being extremely lean and really managing the flows of materials and the supply chain. They're great at it, but this is, I think, a different approach, looking at it really from deep technical lens in terms of automation, robotics, process.

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Yes. Imagine like if the Model S was -- or the way you design a Model S, design your factory like it's a car. You still have a lot of workers. You still have a lot of people. I mean, just like with Model S, say, we have a large service organization. There's scheduled maintenance. There are things that break. There are crashes that need to be repaired. There are technology upgrades. But you don't actually ship people with the Model S. That would be weird. That's not like hanging people in the car. So you have -- we expect that the Tesla factory has people -- a lot of people around the factory but very few people in it.

John Douglas Field
Senior Vice President of Engineering

I also think that the degree with which we have -- this is Doug. The degree with which we have product development and manufacturing development integrated is unique. And Model 3 already is a dramatically simpler car to build than the Model S. And even many people in operations who have worked their career in volume manufacturers say the Model 3 is a huge step forward from anything that they've built. So as we go forward, Elon mentioned Model Y, a big part of our manufacturing capability is going to come from how simple we make our products.

Brian Arthur Johnson
Barclays PLC, Research Division

And how do you manage the people in the interim?

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Yes, it's actually [indiscernible] thing. It came from -- you have Apple and then Ford -- Ford and then Apple.

John Douglas Field
Senior Vice President of Engineering

Yes, the model at Foxconn was very different where very quick product ramps and very high scale was achieved through manual processing of also what is fundamentally a product whose simplicity is orders of magnitude below ours. And iPad is less complicated than our center screen in many ways. So it's a very different order of magnitude in terms of the kind of product you're building, and it's extremely manual because that is the way that you have to ramp very quickly and then end the life of our product and bring up a new one.

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Actually, one thing we forgot mention is Jon McNeill, who is heading up our sales and service group, is departing the company. We wish him well in his future career. And going forward, I will be having the sales and service report directly to me. There are no plans to search for a replacement.

Operator

Our next question comes from the line of John Murphy with Bank of America.

John Joseph Murphy
BofA Merrill Lynch, Research Division

Shockingly, I want to follow up on the production of the Model 3, so it seems like that's going to remain a hot topic here. Do you have enough experience with production of the Model 3 outside of the issues you're facing in the Gigafactory that you're confident once those problems are solved, you can get up and running? Or is there sort of a contingency here that once you get that worked out, you'll be ramping up in 3 months, and there might be some other hurdles that are discovered? I'm just trying to understand if there are some -- any incremental kinks that might come in the production process as you ramp up. And then also as we think about the step from 5,000 to 10,000, is that something that can be done inside the Fremont factory? It sounds like you're confident that your density is much higher than what even Toyota and GM were producing out there potentially on capacity. But just curious on those 2 [things].

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Yes. There's really -- there are only 2 things that I'm aware of that are constraints in production of any significance: the module being the most significant; and then the parts conveyance, basically, the automated conveyance system that brings parts to the lines. The way the Fremont factory is set up is that there's actually, on the ground floor, we actually created 2 levels. The bottom level is all parts conveyance, so parts coming from the warehouse where the parts are sort of automatically sorted and then are transferred through an automated conveyance system all the way to the line on the conveyance system being on the ground floor and then raised up to the line, which is actually on kind of an artificial mezzanine. And I think we can get 10,000 vehicles a week out of Fremont without a significant -- without creating really any new buildings of significance in the existing space. We will need to bring up the south paint shop, which is what we actually were using for S and X paint, and so we upgraded north paint to do S, X and 3. But with relatively small CapEx, way less than we spent on north paint, we're comfortable we can bring south paint up to achieve the approximately 600,000 vehicles per year rate to combined 100,000 S and X, 500,000 3, which would be 20% to 30% more than Toyota and GM produced in the same facilities. And we're a lot more vertically integrated as well.

John Joseph Murphy
BofA Merrill Lynch, Research Division

Literally and figuratively, right?

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Yes, [exactly].

John Joseph Murphy
BofA Merrill Lynch, Research Division

Just as we think about that though, Elon, is that sort of an asymptotic limit in that plant? Or based on what you're really talking about, could you get more out of that plant? Or as we look at the Model Y and there's million units capacity, we're definitively looking at a new facility?

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

I'm pretty excited about the Model Y stuff, and I think I want to present that in a more cohesive fashion. And it's probably not the next earnings call but call it 6 months from now. But I'm really excited about the Model Y manufacturing and the design manufacturing. Like essentially, how do we design out all the pain that we're currently going through? We do not want to experience it again. It's just really a lot of pain. The pain level is extremely high. I mean, I was in the factory -- I was in the Gigafactory on Thanksgiving Day as were many other Tesla people. It's like it's hardcore, okay? Seven days a week, don't have a vacation. So we don't want to repeat that.

John Douglas Field
Senior Vice President of Engineering

The material flow delivery Elon mentioned as we develop very high density and velocity lines, the limit starts to become how we get material to that line. We'll solve that for the Model 3 line. But eventually, within Fremont, the limit to production may be how many trucks we can get in, how quickly, of material, in order to build cars.

John Joseph Murphy
BofA Merrill Lynch, Research Division

You'd use the Hyperloop for that.

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Yes. Actually, we are looking at building tunnels using The Boring Company or something because we have, for example, our seats production is at a separate building on Page. And we have a bunch of trucks moving seats back and forth between the primary Fremont production and the seat factory. And we actually get constrained on how many trucks can we dock at the -- dock and undock at the seat factory, which is only 0.5 mile or 1 mile away from the vehicle plant. So it'll be pretty easy to just have a tunnel, doing automated conveyance probably from seats to the factory. And there are, I mean, things we can do where we can build subsystems and then transport subsystems to Fremont. These things get increasingly difficult, but they're all doable. But I can see a path where we get to, say, 600,000 Model 3 production and 100,000 S and X, so maybe 700k. We should be like almost 50% more than GM and Toyota get out of the plant. I think that seems achievable.

John Joseph Murphy
BofA Merrill Lynch, Research Division

Can I just sneak one in for Deepak? I apologize. You did a great job of working capital in the quarter. I mean, I think some of us might kind of throw stones and say it might not be repeatable. But you did it, you got the cash in the door. So it's done and it was -- you did some pretty good work here. How repeatable do you think the benefit from working capital is going forward? I mean, is this really just the benefit of negative working capital and as you ramp up, you'll get this cash inflow? And then also as we look at the customer deposits and the ZEV credits, those were 2, I think, apparently large cash inflows. I mean, how repeatable do you think those are in the future as well?

Deepak Ahuja
Chief Financial Officer

Yes. Some of those are not repeatable. We significantly reduced the finished goods inventory of S and X in Q4, which will not repeat itself going forward. And that was a huge impact to our working capital. Customer deposits may not be as well, as you pointed out. However, the -- as the Model 3 ramp continues, the negative working capital needs for that, which essentially creates extra cash for us, will be repeatable. And we'll continue to keep very tight controls on our accounts receivables and everything else we do to manage cash to make sure we are being efficient.

Martin Viecha

Thank you very much. Unfortunately, we're not going to be able to get to everybody, but maybe one last question, please.

Operator

Our last question comes from the line of James Albertine with Consumer Edge.

James Joseph Albertine
Consumer Edge Research, LLC

A topic that doesn't get asked, I think, a lot or as much as it should but we believe is maybe one of the reasons why the Model S and X demand remains so high after many years of production is sort of the over-the-air updateability of these vehicles. I'm just wondering, it had been several quarters ago kind of pre Model 3 questions we're hearing more about software you were rolling out to existing customers. Just wondering if you can give us some color on what level of uptake you're seeing. And I would imagine we're not seeing that in the upfront Model S and X margins, but potentially, there are some sort of -- those are vehicles that are earning assets for you in the future sort of customer ownership. So if you could kind of talk a little bit about what trends you're seeing there or elaborate a little bit on that, that would be helpful.

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Yes. I think probably the biggest item is as we get the software right, people upgrading to full self-driving capability of S and X, and anything with Hardware 2, which is like the 8 cameras, more advanced op sights and improved compute capability, I think, will be capable of the full self-driving. The full self-driving -- the Hardware 2 set is also capable of doing an easy swap out of the computer. So if it turns out we need additional computing capability to meet the regulatory standards for self-driving -- particularly like we think with the current compute hardware, we can get to better than human. But the standard for regulators may be that you need to be 5x better than human or something like that. But we believe that is solvable purely with compute hardware. And it would be a relatively minor expense to do that. So I think probably that's the biggest opportunity.

Deepak Ahuja
Chief Financial Officer

And along the same lines, not all customers pay for enhanced autopilot too, and as people hear more, we can see an uptick on that. But it's all around autopilot, to your point.

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Yes, exactly. And that -- some of the sort of semiautomated driving definitely doesn't require any hardware upgrades than that $5,000, that's essentially a software product with 0 cost -- 0 marginal cost and so it's 100% margin. And then where full self-driving is available, we can probably -- that's more than a $3,000 increment. It's maybe a $5,000 increment or something like that.

James Joseph Albertine
Consumer Edge Research, LLC

Is there any data you can provide us though today in terms of the percentage of consumers that are upgrading or opting in, just to get a sense of kind of the order of magnitude that, that -- what that business could look like over time?

Deepak Ahuja
Chief Financial Officer

Yes, well, not many people are opting in at this time.

Elon R. Musk
CEO, Product Architect, Chairman & Co-Founder

Well, the full self-driving system doesn't actually work. Essentially, people are buying an option on it working in the future. So that's a very [nice] thing, [that the prices] are very low. There's also the automation part, things that we expect to operate kind of a shared autonomy fleet, where it has like --

kind of like combination of Uber or Lyft and Airbnb, I guess, where you can opt to have your car enter a shared fleet or not, and then Tesla can also operate its own fleet in places where there's not enough people sharing their vehicles. So that's a pretty significant opportunity.

Martin Viecha

Okay. I think that's unfortunately all the time we have today. Appreciate all your great questions, and we look forward to talking to you in the next quarter. Thank you very much and goodbye.

Operator
Ladies and gentlemen, thank you for participating in today's conference. This does conclude the program. You may all disconnect. Everyone, have a wonderful day.