S&P Global
Market Intelligence

Tesla, Inc. NasdaqGS:TSLA

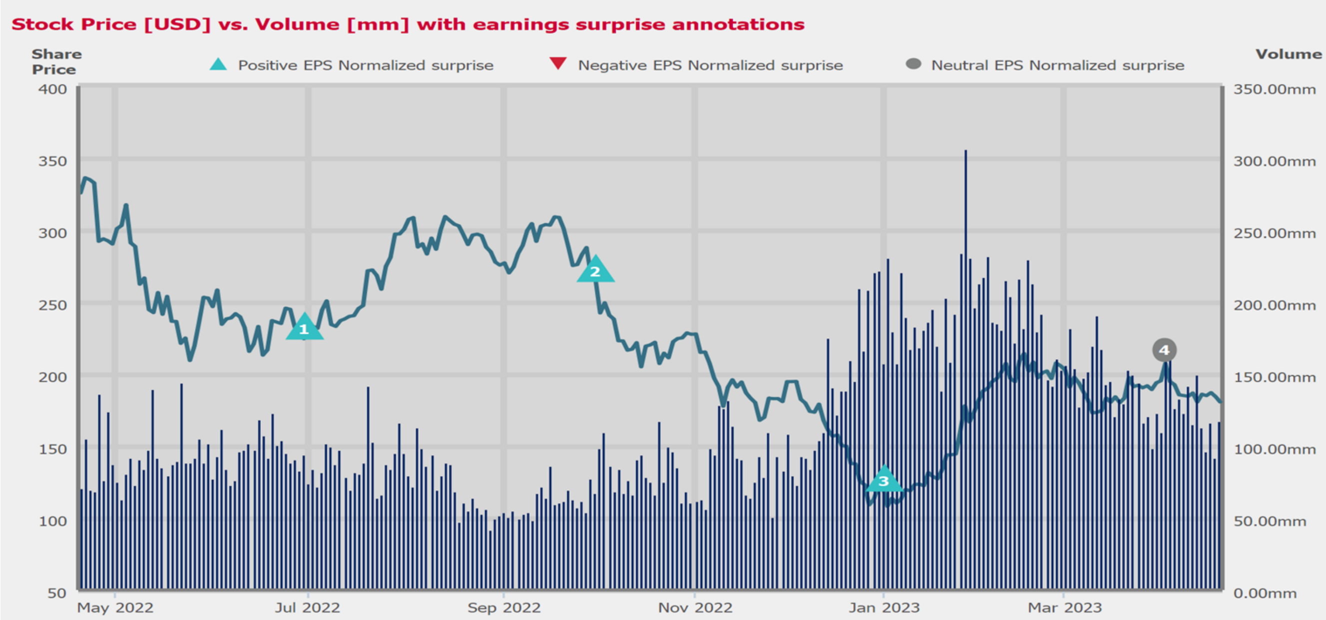
FQ1 2023 Earnings Call Transcripts

Wednesday, April 19, 2023 9:30 PM GMT

S&P Global Market Intelligence Estimates

	-FQ1 2023-			-FQ2 2023-	-FY 2023-	-FY 2024-
	CONSENSUS	ACTUAL	SURPRISE	CONSENSUS	CONSENSUS	CONSENSUS
EPS Normalized	0.85	0.85	0.00	0.92	3.95	NA
Revenue (mm)	23355.07	23329.00	(0.11 %)	24849.47	102499.69	NA

Currency: USD
Consensus as of Apr-19-2023 10:24 PM GMT



- EPS NORMALIZED -

	CONSENSUS	ACTUAL	SURPRISE
FQ2 2022	0.60	0.76	26.67 %
FQ3 2022	1.00	1.05	5.00 %
FQ4 2022	1.11	1.19	7.21 %
FQ1 2023	0.85	0.85	0.00 %

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EXECUTIVES

Andrew D. Baglino
Senior Vice President of Powertrain & Energy Engineering

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Technoking of Tesla, CEO & Director

Karn Budhiraj

Martin Viecha
Senior Director for Investor Relations

Roshan Thomas

Zachary John Planell Kirkhorn
Master of Coin & CFO

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Morgan Stanley, Research Division

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Piper Sandler & Co., Research Division

Benjamin Joseph Kallo
Robert W. Baird & Co. Incorporated, Research Division

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George Gianarikas
Canaccord Genuity Corp., Research Division

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Goldman Sachs Group, Inc., Research Division

Philippe Jean Houchois
Jefferies LLC, Research Division

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Wolfe Research, LLC

Presentation

Martin Viecha
Senior Director for Investor Relations

Good afternoon, everyone, and welcome to Tesla's First Quarter 2023 Q&A Webcast. My name is Martin Viecha, VP of Investor Relations, and I'm joined today by Elon Musk, Zachary Kirkhorn and a number of other executives. Our Q1 results were announced at about 3:00 p.m. Central 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. [Operator Instructions] But before we jump into Q&A, Elon has some opening remarks. Elon?

Elon R. Musk
Technoking of Tesla, CEO & Director

Thank you, Martin. So just a Q1 recap. Model Y became the best-selling vehicle of any kind in Europe and the best-selling non-pickup vehicle in the United States. And this is in spite of a lot of challenges in production and delivery, so it's a huge credit to the Tesla team for achieving these great results. The -- it is worth pointing out that the current macro environment remains uncertain. I don't think I'm telling anyone anything people don't already know, especially with large purchases such as cars.

And while we reduced prices considerably in early Q1, it's worth noting that our operating margin remains among the best in the industry. We've taken a view that pushing for higher volumes and a larger fleet is the right choice here versus a lower volume and higher margin. However, we expect our vehicles, over time, will be able to generate significant profit through autonomy. So we do believe we're like laying the groundwork here, and that it's better to ship a large number of cars at a lower margin, and subsequently, harvest that margin in the future as we perfect autonomy. This is an extremely important point.

Let's see. Regarding the Cybertruck, we continue to build Alpha versions of the Cybertruck on our pilot line for testing purposes. It's a great product, and we're completing the installation of the volume production line at Giga Texas, and we're anticipating having delivery event, a great delivery event probably in Q3.

As with all new products, it will follow an S curve, so production starts out slow and then accelerates. So the Cybertruck is no different. So it's -- there's tremendous amount of demand for the product, obviously. And it is my view, a fantastic product, a hall of famer. But as with all new products, it takes time to get the manufacturing line going. And this is, really, a very radical product. It's not made in the way that other cars are made.

So let's see, with regards to Megapack, we're making great progress. Our energy storage deployment reached nearly 4 gigawatt hours in Q1. This is, by far, the strongest quarter ever. And this growth was achieved thanks to the ongoing ramp at our Megafactory in Lathrop, California. There's still some way to go to reach the full run rates of 40 gigawatt hours per year. And then we additionally announced the start of a new Megafactory in Shanghai. So we're -- as we've expected, the stationary storage growth actually will significantly exceed the vehicle growth.

Regarding Autopilot and Full Self-Driving. We've now crossed over 150 million miles driven by Full Self-Driving beta, and this number is growing exponentially. We're -- I mean, this is a data advantage that really no one else has. Those who understand AI will understand the importance of data -- of training data and how fundamental that is to achieving an incredible outcome.

So yes, so we're also very focused on improving our neural net training capabilities as is one of the main limiting factors of achieving full autonomy. So we're continuing to simultaneously make significant purchases of NVIDIA GPUs and also putting a lot of effort into Dojo, which we believe has the potential for an order of magnitude improvement in the cost of training. And it also -- Dojo also has the potential to become a sellable service that we would offer to other companies in the same way that Amazon Web Services offers web services, even though it started out as a bookstore. So I really think that, yes, the Dojo potential is very significant.

In conclusion, we're taking a view that we want to keep making and selling as many cars as we can. Despite this being an uncertain macro environment, this is a good time to increase our lead further, and we'll continue to invest in growth as fast as possible.
Once again, I'd like to give a huge thanks to all Tesla employees worldwide who are doing an incredible job again. And yes, super appreciated.

Martin Viecha
Senior Director for Investor Relations

Thank you very much. And Zach has some remarks as well.

Zachary John Planell Kirkhorn
Master of Coin & CFO

Thanks, Martin. I want to start by congratulating the Tesla team for record vehicle production and deliveries. And I also want to congratulate our energy storage team for record volumes as well.

There are 3 main points I want to make. First, automotive gross margin and operating margin reduced sequentially. But as Elon mentioned, these remain at healthy levels. In particular, automotive gross margin was impacted by a few factors since our discussion on the last earnings call, which include additional action taken in the second half of the quarter to improve vehicle pricing and onetime items, most notably, warranty adjustments on older S and X vehicles as well as increased deferred revenue for certain Autopilot features as we transition technologies.

Progress on vehicle cost reduction continued in Q1 with meaningful improvements on logistics and the beginnings of some commodity cost reductions starting to be realized. Per unit cost for Austin and Berlin improved as well, driven by record volumes. However, these factories still provide a margin headwind and will likely continue to do so until after we reach and stabilize at our intended volumes.

Note that Q1 was our third quarter in our multi-quarter plan to move to a more regionally balanced mix of build and deliveries. As I've mentioned previously, this results in lower deliveries and production within a quarter due to a higher volume of cars in transit at the end of the quarter and has an associated impact on quarter-ending free cash flows. This was particularly prevalent in Q1 for S and X as we begin exporting cars for international deliveries.

Second, our storage business is starting to take shape, and this is exciting to see after many years of investment and focus. This business is growing as a percentage of the businesses of the company's revenue and reached its highest level yet in Q1, driven by an increasing rate of deliveries for our Megapack products. We are also making progress on storage profitability, generating our highest gross profit yet in the quarter.

Third, I want to reiterate the philosophy by which we're operating the business this year. Our approach is to grow volumes as quickly as possible in both our vehicle and energy businesses. We plan to continue to invest heavily into our future plans, which include the Cybertruck next-generation platform, in-house cell production, energy storage business and our Autonomy and AI-enabled products. And we plan to do this while keeping the business financially healthy and industry-leading. To accomplish this, we need to remain focused on cost efficiency and working capital, and in particular, unwinding the strategic inventory buildup left over from the pandemic.
I want to conclude by thanking the Tesla team again as well as thanking our suppliers and our customers.

Question and Answer

Martin Viecha
Senior Director for Investor Relations

Thank you very much. And let's go to investor questions on say.com. The first one is what is the process to make auto pricing adjustments? What variables do you consider? How frequently do you review pricing?

Zachary John Planell Kirkhorn
Master of Coin & CFO

Do you want to take that, Elon, or do you want me to take that?

Elon R. Musk
Technoking of Tesla, CEO & Director

My apologies. Sorry, I was on mute. Yes, I think this is not something that we can really talk about. It's just -- we do our best to evaluate the production output, macroeconomic conditions, and we make a decision. But it's -- yes, unless there's something you'd like to add, Zach.

Zachary John Planell Kirkhorn
Master of Coin & CFO

I think that's right. I mean, as a team, we review where we stand globally on a weekly basis and certainly, I can't get into the details of the reasons why certain decisions are made. But it is something that's very actively managed by a subset of the leadership team.

Martin Viecha
Senior Director for Investor Relations

Thank you. The second question is, do you still believe Tesla Energy will be bigger than auto? And when will you provide more formal guidance on Megapack and overall Tesla Energy?

Elon R. Musk
Technoking of Tesla, CEO & Director

Yes, I should just clarify, like, bigger than auto from the standpoint of, like, total gigawatt hours deployed. So it's possible automotive revenue may be higher, but gigawatt hours, I think, will be probably higher with stationary storage. If you just look at the -- what's needed to transition the world to a sustainable energy economy, there is more stationary energy storage needed than there is mobile energy storage. So -- and we are seeing growth of our stationary storage well in excess of automotive, so that is in line with expectations.

Zachary John Planell Kirkhorn
Master of Coin & CFO

Yes. And on the guidance part of the question, and maybe, Martin, we can combine this with the next question, which is on guidance for margins, just have a single comment there. I think we are -- we will get to the point where we, as a company, provide guidance on the storage business.

I say storage as a combination of both the Megapack business and the Powerwall business. Relative to total revenues of the company, it's still fairly small. And the business has a lot of volatility currently, both in terms of volumes as well as financials, just given the small volumes and kind of diversification of the customer pool there.

But as this business grows and smooths out, I don't think we're that far away from it. I think including these volumes on our day 2 production and deliveries release is something that we'll start doing and then we can talk more formally as a business about our expectations over the coming year. I think it'll be a few more quarters before we get there.

Martin Viecha
Senior Director for Investor Relations

Thank you. And the next question, as you said, was already answered, so let's go to the battery question.

Zachary John Planell Kirkhorn
Master of Coin & CFO

Sorry. Just one other thing I wanted to mention on margin. While we're not providing specific guidance there, I mean, just to set expectations of where we think this business will go in terms of margins, probably generally in the ballpark of what we've seen historically on the vehicle business. We generally look to mid-20% gross margins for any program that we launch. And so we're not there yet on this business, but that's what we're working towards.

Elon R. Musk
Technoking of Tesla, CEO & Director

We're hopeful to get there later this year, but that's not a promise. That's an aspiration.

Martin Viecha
Senior Director for Investor Relations

Thank you. The next question is, how well are 4680 cells meeting the expectations described on the Battery Day? How long will it be until the cells meet those goals? Drew?

Andrew D. Baglino
Senior Vice President of Powertrain & Energy Engineering

Yes. So on Battery Day, we established a cost-down roadmap through 2026 across 5 areas of effort. There was the cell design we discussed, anode and cathode materials, the structural pack concept and the cell factory itself, and we've been making progress across all of these aspects since then.

For the cell factory, the Texas 4680 factory, we are partway through building and commissioning and selling and operating, will be 70% lower CapEx per gigawatt hour than typical cell factories when fully ramped, in line with what we described on Battery Day. And we're continuing to further pursue densification and investment reduction opportunities in future factory build-outs like in Nevada. On the cell design, we're in production with not only the first generation tabless cell we unveiled in Battery Day, but a second more manufacturer version in Texas today.

On the cathode materials side, we have a number of activities underway per the Battery Day roadmap. For lithium, our Corpus Christi Lithium refinery breaks ground this May. Our goal is to start commissioning portions of the facility before the end of the year. The refinery uses the sulfate-free spodumene refining process with reduced process costs, no acid or caustic reagents, lower embodied energy. It actually produces a beneficial byproduct that can be repurposed in construction materials. We discussed all of these concepts on Battery Day.

Same with cathode precursor, we've successfully demonstrated lower process cost, zero-waste water precursor process that we described on Battery Day at both lab and pilot scale and are in the detailed design phase for incorporating this technology into the front end of our Austin cathode facility.

On cathode production, we are 50% equipment and 75% utilities installed at our new cathode building in Austin with our goal to begin dry and wet commissioning this quarter and next quarter with a target to produce first material before the end of the year.

Structural pack, we saw big improvements with pack manufacturing with the 4680 cell and the structural pack concept, 50% lower CapEx and 66% smaller factory for the same output in gigawatt hours per year. We do believe structural as a concept is a good one. It's simpler. We'll continue to structurally load the cells and use the pack as the floor of the vehicle while iterating the design to closer to B-level execution of this A-level architecture in future programs.

And zooming out for the 4680 team, Q1 was all about cost and quality. We made significant improvements in both areas. Texas production increased 50% quarter-over-quarter through yields, increased 12%; in Kato peak rate increased by 20%; and through yields improved by 20%. Altogether, the team accomplished a 25% reduction in COGS over the quarter, and we are on track to achieve steady-state cost targets over the next 12 months. And going forward for the rest of the year, the priority one is yield in cost for the 4680 program as we steadily ramp production ahead of Cybertruck next year.

Martin Viecha
Senior Director for Investor Relations

Thank you very much. The next question is, what do you anticipate 2023 automotive gross margins ex credits will be at the company's current pricing levels?

Zachary John Planell Kirkhorn
Master of Coin & CFO

Yes, I can start off on this one. This is a difficult environment to make a projection like this. There's a lot of macro uncertainty. There are also headwinds and tailwinds. And this is basically a question, I think, that's asking about viewpoint and where costs will go. And within costs, there's a set of costs in which we do control the set of costs in which we're kind of subject to what's going on in the macro world.

Within the bucket of things we control, the most of the cost down that we're working on is around ramping our Austin factory, stabilizing that and then doing the cost optimization work once we get to our intended volumes there. And a part of the cost journey in the Austin factory is, as Drew mentioned, the 4680 cells, which is an input into our Austin COGS. And so as the 4680 program improves over the course of the year on cost, as Drew mentioned, and then the noncell portion of the factory improves, we see a pretty good trajectory in the Austin facility.

A similar story exists in the Berlin factory. It does not have 4680 as an input, but for that factory, the journey to complete localization is still ongoing. And so over the course of this year, as volume increases, more localization occurs, we do see a good path to cost reduction in the Berlin factory as well. In existing factories, too, we talk about this on every call, so I don't need to rehash it, but the expectation is that every existing factory improves all of their key metrics, and we continue to see the progress there.

There's also a handful of other costs in which we have influence, but the philosophy here is that we're aggressively going across every cost bucket that we can. Within the world that we don't control, the 2 major costs there being logistics, which fortunately is moving in our favor, and I think our supply chain team has done a great job, both on logistics optimization and taking advantage of reduced spot rates where they can, so thank you to our supply chain team.

And then there's the commodities world, which has been a huge pinch point in our cost structure over the last, say, 2 years or so, and we're still kind of at the maximum of pain for commodities in our cost structure. It kind of maxed down in the second half of last year. We did start to see, in Q1, a little bit of improvement. We think there'll be a little bit more improvement in Q2, but...

Elon R. Musk
Technoking of Tesla, CEO & Director

Lithium has dropped a lot. It's worth mentioning that the price of lithium has dropped significantly.

Zachary John Planell Kirkhorn
Master of Coin & CFO

Yes. And that's the piece that we expect to see more impact from in Q2. And generally, as a company, we do expect commodity prices to come down and have a more meaningful impact in the second half of the year.

Elon R. Musk
Technoking of Tesla, CEO & Director

Yes.

Zachary John Planell Kirkhorn
Master of Coin & CFO

So this is our approach. How that nets out, I mean, just is a lot of risk, and we'll have to see how the year progresses.

Martin Viecha
Senior Director for Investor Relations

Thank you. The next question is, how has global order intake tracked since the most recent round of price cuts?

Elon R. Musk
Technoking of Tesla, CEO & Director

I think the overall thing we can say is that orders are in excess of production.

Martin Viecha
Senior Director for Investor Relations

Thank you. And maybe the last question from investors, can you give updated specs and pricing for Cybertruck and any new features that will make it to production?

Elon R. Musk
Technoking of Tesla, CEO & Director

Well, I think we'll save that for the Cybertruck handover, which will hopefully be around the end of Q3 this year. And one thing I am confident of saying is that it's an incredible product, it's a hall of famer, I think. And a product like this only comes once in a long while, so you will not be disappointed at all. It's amazing.

Martin Viecha
Senior Director for Investor Relations

Great. Thank you very much. And let's go to analyst questions. We'll start with Alex Potter from Piper Sandler.

Alexander Eugene Potter
Piper Sandler & Co., Research Division

Can you hear me?

Martin Viecha
Senior Director for Investor Relations

Yes.

Elon R. Musk
Technoking of Tesla, CEO & Director

Yes.

Alexander Eugene Potter
Piper Sandler & Co., Research Division

Okay. Perfect. So first question was on Lathrop. Obviously, that's -- it's great to see the growth there. Just wondering when you think that facility might be closer to full utilization? Are you just sort of deliberately working your way up the S curve there? Demand, obviously, isn't the limitation. So what are what are the steps, I guess, to unlocking full utilization there?

Andrew D. Baglino
Senior Vice President of Powertrain & Energy Engineering

Sure. There are some classic factory ramp aspects of what's going on in Lathrop. We actually had 2 phases of the CapEx there, replaced some of the general assembly parts of the facility. But in addition, we also have ramps with our suppliers that we are following, so both on the sell side and on the power electronics side. And we will see that unlock in the latter half of this year with -- as well as those inputs. So the overall facility was phased with the second phase of CapEx coming up on towards the end of this year.

Alexander Eugene Potter
Piper Sandler & Co., Research Division

Okay. Great. And then I guess my second question is on your ability to serve other markets out of Shanghai. Obviously, the facility in Berlin should be opening up your ability to, I guess, allocate more vehicles to Southeast Asia, Australia, other areas. I'm just wondering what other regions do you think you're maybe not yet serving effectively. What are your time lines for addressing some of those gaps in your regional exposure?

Elon R. Musk
Technoking of Tesla, CEO & Director

Yes. That's a good question, because there are still many parts of the world that we do not yet serve with respect to vehicles especially. So we do expect to open up new markets around the world. And while those markets are not necessarily individually gigantic, they do add up a whole bunch of markets. They do collectively sum up to something significant. So it's high time that Tesla offer these cars to the rest of the world, and that is something that we intend to do.

Martin Viecha
Senior Director for Investor Relations

Okay. Thank you very much. Let's go to the next analyst, George from Canaccord.

George Gianarikas
Canaccord Genuity Corp., Research Division

I was wondering, first, if you could discuss your FSD take rates and whether you've seen any significant positive or negative change there? And also, given that you've reduced the prices for your vehicles, do you think you need to do that for FSD as well?

Elon R. Musk
Technoking of Tesla, CEO & Director

Well, to kind of answer the details on the FSD take rate, but the -- it's a tricky pricing question because the value of a car that is autonomous is enormous. So in a way, the price right now is an option value on an autonomous vehicle. And that value is -- will ultimately be very significant. And it's really -- yes, I mean, for those that are using the FSD beta, I mean, you can see the improvements are really quite dramatic. There'll be a little bit of 2 steps forward, 1 step back between releases for those trying the beta. But the trend is very clearly towards full self-driving, towards full autonomy. And I hesitate to say this, but I think we'll do it this year. So that's what it looks like, yes.

George Gianarikas
Canaccord Genuity Corp., Research Division

Maybe on the dramatic change we've seen in EV-related commodity prices. Do you think it's a reflection of any recent overcapacity in mining and refining? Or is that sort of a coincident indicator on global EV demand? And how do you expect those prices to kind of track over the next several quarters?

Elon R. Musk
Technoking of Tesla, CEO & Director

Man, I wish I had a crystal ball to answer your question. I don't know if we can provide a question (sic) [an answer] that would -- with -- that would have any value really. I think we're in uncertain times. And if somebody got a crystal ball they can lend me, I'd really like to borrow it. But these are uncertain times.

My guess is this -- it's economic stormy weather for about a year or so. And then if we hold roughly 12 months and then -- but this is my guess. It's just pure speculation. Stormy weather for about 12 months and then, provided there are no major geopolitical wildcards that show up, that things start getting sunny around spring next year.

Andrew D. Baglino
Senior Vice President of Powertrain & Energy Engineering

The only thing I would say on the, like, EV materials markets. They're not all super liquid and some of them, for example, like, less than -- like, single-digit percentage of the market is actually traded on the spot market. And not only are they not super liquid, there's not -- like, storage isn't particularly facile for all of materials. So, like, small mismatches in supply and demand drive, like large price swings, not really -- real price swings, but just like temporarily large price swings. So it's hard to read into those price wings. I don't know, Karn, if you want to add anything.

Karn Budhiraj

Yes. Well, this is Karn, by the way. We are seeing, as Elon mentioned, quite a bit of softening in the lithium carbonate market. This was -- 6 months ago, we were trading at like $85,000 a ton, and today's spot price is about 26%. So there's been a dramatic decrease in that. Of course, we were able to take advantage of low lithium pricing earlier on with fixed-price contracts. And we find that this is going to be another opportunity -- opportune moment to basically extend that into the later half of the decade.

But we -- at the quantities we're procuring, we're not as impacted by the spot market because we have all those contracts in place, and we're just going to be going and doing more of that. The other thing that's happening is because of the price spike. A lot of the companies that are in this business are becoming more ambitious about finding more upstream resources and exploring locations in Africa as well as South America. So that's also helping the macro situation with pricing.

Elon R. Musk
Technoking of Tesla, CEO & Director

Yes. But just on the lithium front, to emphasize, the choke point is more -- much more on refining capacity than it is on mining. Lithium is actually -- is very common throughout the world, including in the U.S. and, really, it's just a very common element on earth. It's lithium. So it's much more a question of where is the refining capacity and can the refining capacity keep up. That's really what matters more than where is the lithium ore. It's everywhere basically.

I think that same question also extends to refining of the cathode, and to some degree, refining of the anode. And this is why we -- at Tesla, we're building our lithium refinery capability at Corpus Christi and our cathode refinery outside Austin.

It's worth noting, like, I hope other companies do the same thing. We will have, by far, the most lithium refining capability and the most cathode refining capability in North America, I think, probably more than everyone else combined by a lot. So can other people please do those work? That would be great. We're begging you. We don't want to do it. Can someone please? Like, instead of making a picture-sharing app, please, we're -- try in lithium, mining and refining, heavy industry, come on.

Karn Budhiraj

It's fun. It's actually fun.

Elon R. Musk
Technoking of Tesla, CEO & Director

Yes, yes. Exactly. For real.

Zachary John Planell Kirkhorn
Master of Coin & CFO

We're a customer. We're here, ready to buy.

Elon R. Musk
Technoking of Tesla, CEO & Director

Yes. That's right. I just want to emphasize, Tesla is not doing this because we want to do it. We have a lot of fish to fry, obviously, but we're doing it because others aren't doing it, and we wish others would do it.

Martin Viecha
Senior Director for Investor Relations

Awesome. Thank you very much. Emmanuel Rosner from Deutsche Bank.

Emmanuel Rosner
Deutsche Bank AG, Research Division

Can you hear me?

Martin Viecha
Senior Director for Investor Relations

Yes, we can. Yes.

Emmanuel Rosner
Deutsche Bank AG, Research Division

Maybe a first question for Elon, on your pricing strategy. So if I understand your message, you're saying Tesla feels it's worth maximizing the volume, increasing the size of the fleet as fast as you can because you'll be able to monetize this over the life cycle of the vehicle. Could you be a little bit more specific around ways you would be able to monetize sort of, like, this existing fleet in the future? Obviously, I think Autonomous seems to be a big piece of it, but my understanding was that robotaxi would probably be for the next-generation vehicle, not the existing one? So I guess in which ways would you monetize it?

Elon R. Musk
Technoking of Tesla, CEO & Director

Sorry, the robotaxi terminology can be a bit confusing, because that's sort of like a generic term for our next-generation vehicle. And we obviously are working on next-generation vehicle. That's going to be very compelling. This is just not the time to talk about it in details, the product. So we internally call it robotaxi.

But really, all of the vehicles that have Hardware 3, which is the vast majority of our fleet, we believe will achieve full autonomy. So there will be a -- like, a Model 3 or Model Y would be a robotaxi, a robotic taxi. So yes, that's -- to the best of my knowledge that -- we believe the current hardware can achieve full autonomy.

Emmanuel Rosner
Deutsche Bank AG, Research Division

Understood. And then maybe a question for Zach. Back on the automotive gross margins. So I think, I guess, a few months ago, even after major price cuts, you felt pretty strongly that 20% automotive gross margin was still probably a reasonable floor.

Obviously, the macro has gone worse and additional price cuts have happened. Is there anything else that has changed in terms of the outlook? Is it just the macro deteriorating? Is it the competitive landscape? Anything else that's sort of, like, makes you think differently around the full year? And is there a way, therefore, to frame a floor?

Zachary John Planell Kirkhorn
Master of Coin & CFO

Yes. About half of the miss against that previous conversation last quarter is attributed to adjustments we made in pricing in the second half of the quarter. I mean, I guess you could argue that, that lowers the floor in a sense. We've also made pricing adjustments so far this quarter. So that brings it down further.

About the other half of the miss in Q1 was attributed to things that are nonrecurring. So I mentioned these in my opening remarks. It's a warranty adjustment for cars that were previously produced but not part of the pedigree of cars we're building now and some autopilot-related deferrals as we make some technology changes here that this deferral should get recognized once some of the software catches up. So those 2 things are nonrepeating. So hopefully, that helps answer your question.

Elon R. Musk
Technoking of Tesla, CEO & Director

Yes. I mean, there are really 2 macro factors that are tricky, the biggest being the interest rate. So if there's a very high Fed rate or interest rates are very high, that -- that is -- every time the Fed raises the interest rates, that's equivalent to increasing the price of a car. It makes the cars less affordable because people are able to buy cars as a function of what they can afford on a monthly basis. So that's -- so it's just almost directly equivalent to a price increase is any kind of interest rate increase.

Then the other factor is whenever there is uncertainty in the economy, people will generally postpone new -- big, new capital purchases like a new car. This is natural human reaction. So if people are reading about layoffs and whatnot in the press, they're like, well, they might be worried about -- they might be laid off. So then they'll be, naturally, a little more hesitant than they would otherwise be to buy a new car. Now this is just the nature of the auto industry. But there is -- there will be a tremendous amount of pent-up demand for new cars, so -- but it goes through cycles.

Martin Viecha
Senior Director for Investor Relations

Thank you. Let's go to Ben Kallo from Baird.

Benjamin Joseph Kallo
Robert W. Baird & Co. Incorporated, Research Division

When you talk about many fish to fry, you talked about Dojo being a product that you can sell outside of Tesla. How do we rank all the things you have going on and then -- in the economic environment? I mean, like heat pumps and everything else you have going on versus investing in the vehicle business? Or is that not the right way to look at it?

Elon R. Musk
Technoking of Tesla, CEO & Director

I'm not sure I fully understand your question, but I'd look at Dojo as, like, kind of a long-shot bet, but if it's a long-shot bet that pays off, it'll pay off in a very, very big way. But potentially -- yes, potentially in a very, very big way, like, in the multi-hundred billion dollar level. But the thing with, like, still put it in the long-shot category, but long shot with a multi-hundred billion dollar potential outcome. And so it's a bet worth making, but not one you can sort of say, like -- or take it to the bank type of thing. Although these days, take it to the bank, it's maybe not as secure as it used to be.

So obviously, we're big believers in heat pumps. And that is on our list over time is to do a really good heat pump for homes and commercial offices and stuff. And we have the technology that's really good. But it's still -- it's a back burner item.

Our focus is very much on vehicles, autonomy, stationary storage, basically solving sustainable energy and solving autonomy, which would be, like -- solving autonomy, if we're able to have a fleet of several million vehicles that -- with a software update can be potentially worth several times their original value, that's -- that will be -- if that happens, that will be the -- and I think it will happen, that will be the biggest asset value increase in history, I think.

Benjamin Joseph Kallo
Robert W. Baird & Co. Incorporated, Research Division

In sort of pricing, but a lot of pundits talk about the pie and losing share or gaining share. But how do you guys look at pricing versus the fee these -- or the price [of the] vehicles? Or does that not come into the equation? Sorry to ask about pricing again.

Elon R. Musk
Technoking of Tesla, CEO & Director

No, it's really just like -- every day, we get a daily real-time update of how many cars were ordered yesterday, how many cars were produced yesterday. We must have -- if there's a company that's got more real-time data than Tesla -- I'm not sure there's any company on earth that has better real-time data than Tesla, except maybe SpaceX Starlink.

So -- because, like, we don't have to -- for the other car companies, they will make the cars, send them to the dealers, then the dealers will sell the cars. And then it takes quite a long time for them to get the data back to actually figure out how many cars were sold. Whereas we know how many cars were ordered yesterday throughout the world. So our fingers on the pulse is real-time and does not have latency, whereas the other car companies have a lot of latency in their data.

As does the government, the government has a lot of latency in the data. So we're just looking at it and saying, okay, what does it take to achieve a clearing price for our vehicle production? And then we'll make a pricing change, and we see what happens immediately and adjust course.

So we're adjusting course and we're thinking about it literally every day, 7 days a week. Every -- 7 days a week, I look at that e-mail and so does the rest of the team. And we try to make the least dumb decision that we can. And on balance, I think our decisions are pretty good. Sometimes they'll be down, but on average, they're, I think, better than the rest of the industry.

Zachary John Planell Kirkhorn
Master of Coin & CFO

Just to add on the question about EV market share or ICE. This comes up a lot. I think a lot of the public debate is around this concept of EV market share. We don't look at it that way. I mean, we look at it as on picture of cars. It's a car market and not the EV market. And actually, the mission of the company requires internal combustion engine cars to be switched over to electric vehicles. So that's what we pay attention to.

Andrew D. Baglino
Senior Vice President of Powertrain & Energy Engineering

Yes. I've said that last time, too. We got -- you guys got to stop looking at it as the EVB, EV market. It's how many cars are we selling. Just start looking at it that way.

Elon R. Musk
Technoking of Tesla, CEO & Director

All cars will be EVs. It's going to -- I've said this for a long time. We'll look back, I don't know, assuming civilization is still around in 20 years, we'll look back on internal combustion engine vehicles the same way we look back on external combustion engine vehicles, which is, like, the steam engine. A steam engine is an external combustion engine vehicle. And there's still a few around. They're kind of quirky and kind of cool collectors' items. That's how gasoline cars will be in the future.

Martin Viecha
Senior Director for Investor Relations

Thank you. Let's go to Colin Rusch from Oppenheimer.

Colin William Rusch

Oppenheimer & Co. Inc., Research Division

Can you talk a little bit about how much of the actual cost structure is variable on these vehicles? And if you could give us a range on plus or minus the lithium cost within those contracted volumes that you're seeing?

Elon R. Musk
Technoking of Tesla, CEO & Director

Well, I think -- again, would really love to have a crystal ball here, but we don't have it. Depending on what time scale you're looking at, most of the cars are variable -- so -- most of the car cost is variable. So -- and probably, if I were to guess, I think we will see improved costs from suppliers. Yes, I think we will -- that is our expectation.

Andrew D. Baglino
Senior Vice President of Powertrain & Energy Engineering

And we're already starting to see that, Elon, I think you had mentioned before that we anticipated a crash in the lithium prices and some of that has flowed through by way of lithium carbonate reductions into battery cost. And the same thing will happen with lithium hydroxide. The length of the supply chain matters also because what we're talking about is very far upstream.

So by the time it makes its way into the battery that slip in a car, it'll be several months. But beyond just commodity pricing, as Zach mentioned earlier, we're also very focused on other metrics that make production very efficient. So for example, detention and demurrage, error expedites. I think our error expedites are down 90%. Detention and demurrage is down 93% from the peaks. That can be hundreds of thousands of dollars per vehicle. So we're sort of attacking all vectors and becoming very efficient.

Colin William Rusch
Oppenheimer & Co. Inc., Research Division

Okay. And then my follow-up is really around stationary storage demand on the utility scale. I mean, obviously, there's a gigantic queue for interconnection in the U.S. And can you talk about the volume of quotation you're seeing at this point around stationary storage for the renewables SKU on a global basis? And how much of that is converting into actual sales?

Elon R. Musk
Technoking of Tesla, CEO & Director

Drew, do you want to take that?

Andrew D. Baglino
Senior Vice President of Powertrain & Energy Engineering

I mean -- yes, I don't -- that's also not exactly how we look at it, really. We're not like -- yes, we're not engaged in the interconnection queue. Like, we're focused on ramping Megapack as quickly and efficiently as we can, and we have visibility into the pipelines of a variety of different renewable energy and just pure stationary storage developers and we also develop our own projects. And we're mostly just -- we're being selective in trying to pick the products -- the projects that best fit our mission and our objectives.

Elon R. Musk
Technoking of Tesla, CEO & Director

Yes. This -- again, this is not a product call, but we'll have something -- I mean, this -- we're making improvements on many fronts, including Megapacks. So I think some of those improvements will improve the speed at which you can connect the Megapacks to the grid.

Martin Viecha
Senior Director for Investor Relations

Thank you. The next question is from Mark Delaney from Goldman Sachs.

Mark Trevor Delaney
Goldman Sachs Group, Inc., Research Division

Do you still see 2 million units as an upside case for volume this year? And is the gating factor for reaching 1.8 million or 2 million units in 2023's supply chain, as was mentioned on your last conference call? Or is it more about demand at this point?

Elon R. Musk

Technoking of Tesla, CEO & Director

Well, if you have a crystal ball you can lend me, back to the crystal ball situation. These are volatile times. From a production standpoint, if things go well, we've got a shot at 2 million vehicles this year. But that is an upside case. And we feel comfortable with 1.8 million. And we'll just have to see how this year unfolds.

Mark Trevor Delaney
Goldman Sachs Group, Inc., Research Division

That's helpful. And then the company had spoken at the Investor Day and then for the past conference calls about opening up its vehicle charging network. Can you speak to some of the feedback you've been getting from both Tesla owners and non-Tesla owners? And how the ramp of the charging network may progress from here?

Elon R. Musk
Technoking of Tesla, CEO & Director

Drew, do you want to take that?

Andrew D. Baglino
Senior Vice President of Powertrain & Energy Engineering

Yes. So as you may have seen, we opened our V4 post in Europe and our Magic Dock post in North America in Q1, and that is indicative of the direction we're heading with universal compatibility for all vehicles, no matter where the charge port, et cetera, in all major markets, and we're going to continue to roll out those sort of improved offerings as we build new stations.

We're always balancing, like, our ability to serve our own customers with our ability to serve new customers when doing that. I think we've been able to balance it rather well. For example, in Europe, 50% of all of our supercharging stations are open to all EVs, and we've been able to do that without any increase in wait times at all for anybody. So we're going to continue to take a similar approach as we do this in North America and China over the coming quarters.

Martin Viecha
Senior Director for Investor Relations

Okay. Thank you very much. Let's go to Rod Lache from Wolfe Research.

Rod Avraham Lache
Wolfe Research, LLC

I just wanted to, first, just follow up on your comments in your letter about leveraging your cost position as others struggle with unit economics and also taking into account the lifetime revenue, actually in a way that most other automakers will never see just given your service network and supercharging and other attributes.

Can you just maybe give us a sense of how far you'd be willing to take this? Are there brackets around the range of initial margin that you'd be comfortable with? And again, any color that you might provide on the updated range of margins that you'd expect in the auto business?

Elon R. Musk
Technoking of Tesla, CEO & Director

I think we may have answered this question or tried to answer this question a few times. But it's difficult to say what the margin will be. It depends on what the macroeconomic environment is like. So for example, if the Fed were to lower the rates, that would be super helpful for demand. If they raise them, that just raises the interest costs that buyers have to pay for to buy a car. So it reduces affordability and therefore, reduces demand.

So it's -- but if -- like, if we look past, say, this year or, like, go sometime next year, middle of next year, so I think things are looking really -- I think, like I said, we'll weather through if there are some major geopolitical wildcard that turns up. But in the absence of that, I think I would be very optimistic about middle of next year, end of next year.

Zachary John Planell Kirkhorn
Master of Coin & CFO

Just to add to Elon's comments, just 2 other points. What's really important for us this year in addition to just managing the day-to-day of the business but is also investing in, as Elon mentioned, what 2024 and 2025 will look like. And so using the cash generated from the sale of products today and reinvesting that, this is very important for us.

And I think that what happens to margins over the next couple of quarters that only matters in the context of what that means for our ability to reinvest into 2024 and 2025. And we have a lot of space before that becomes something that we have to revisit, our investment plans. And so we're planning to keep the business healthy. But I just want to caution folks about reading too much into what happens over the near term here, because we're very focused as a company on making sure that when we exit this macroeconomic situation, this company is positioned in the best possible way.

Elon R. Musk
Technoking of Tesla, CEO & Director

Yes, exactly.

Rod Avraham Lache
Wolfe Research, LLC

Just to elaborate on that point though, the revenue the long-term lifetime revenue that you're targeting from each vehicle is massive. So if you took that to the extreme, it would seem that you'd be comfortable with a relatively low initial margin. Am I misinterpreting that? Or is that exactly right? And just…

Elon R. Musk
Technoking of Tesla, CEO & Director

Correct. That is exactly right.

Rod Avraham Lache
Wolfe Research, LLC

Okay. And the -- normally, in a recession, when consumers feel less financially secure, actually price elasticity deteriorates. Just based on your pulse taking of the consumer, do you have a view on elasticity of demand?

Elon R. Musk
Technoking of Tesla, CEO & Director

Well, I can't emphasize enough the whole -- just fundamental question of affordability. For most people, their ability to buy a car is a function of can they make monthly payment or not. And so like I said, if interest rates are really high, like they are right now, in some cases, people can't get a loan at all. So it's -- I think probably banks are pretty -- not leaning forward in providing loans, I expect, these days.

So that's -- but, like, the -- there is quite a powerful story here when you -- going back to something that as alluded to a moment ago or mentioned a moment ago that Tesla is in a uniquely strong strategic position. Because we're the only ones making cars that, technically, we could sell for 0 profit for now and then yield actually tremendous economics in the future through autonomy. No one else can do that. I'm not sure how many people will appreciate the profundity of what I've just said, but it is extremely significant.

Martin Viecha
Senior Director for Investor Relations

Thank you. Let's go to Adam Jonas from Morgan Stanley.

Adam Michael Jonas
Morgan Stanley, Research Division

So first, Elon, good luck with tomorrow's launch of Boca Chica. Break a leg.

Elon R. Musk
Technoking of Tesla, CEO & Director

Thanks. We definitely -- you can't have too much luck in the rocket business, that's for sure.

Adam Michael Jonas
Morgan Stanley, Research Division

Incredible. So now that you've gotten to know the Twitter architecture kind of intimately well over the past 6 months, what can you tell Tesla stakeholders about how an X.com or Super App could be potentially accelerative to Tesla's business model?

Elon R. Musk
Technoking of Tesla, CEO & Director

Well, I don't know. I guess it could make it potentially make it easier to buy cars. So -- our string is somewhat off topic here because this is Tesla's, but I think there are some benefit. I think, probably, there's some benefit, yes.

Adam Michael Jonas
Morgan Stanley, Research Division

I get it, Elon. So just as a follow-up on manufacturing, you're a student of history. And you'll note that back in 1913, Henry Ford introduced the moving assembly line in Highland Park, Michigan. And the price of a Model T, which had already been undercutting cars around the time, fell another 70% or 80%, and hundreds of rival car companies went bust. I'm wondering, if history is repeating itself here, Elon, and that the recent pattern of cuts with you is way ahead of the cost curve compared to competition, is this -- it seems like it's a calculated strategy, not just in reaction to competition or changing supply-demand in the market, but your -- could we catalyze some Darwinian forces in the EV market?

Elon R. Musk
Technoking of Tesla, CEO & Director

Well, I mean, we're not trying to, say, take pricing actions in order to be deliberately -- to deliberately undermine competitors or anything like that. We really don't think about competitors that much. We just look at, do people like our cars, how can we make the product better, can they afford our cars and the sort of -- the things, like, improving service and whatnot.

But I'd say, we do have this unique strategic advantage that we have -- we're making a car that, if autonomy pans out, and we think it will, where that asset is actually will be worth a hell a lot more in the future than it is now. So it is technically be possible to sell it at 0 profit, but still have the net present value of future cash flows associated with that asset, very significant.

Adam Michael Jonas
Morgan Stanley, Research Division

And service and charging and insurance and all of these other ongoing revenue streams that other companies don't have.

Elon R. Musk
Technoking of Tesla, CEO & Director

Yes.

Andrew D. Baglino
Senior Vice President of Powertrain & Energy Engineering

Certainly, we want all EVs to succeed, too. We just want to say that we're not like some malicious attack to try to discourage everybody.

Elon R. Musk
Technoking of Tesla, CEO & Director

Definitely not. We're like opening up superchargers. We've made our patents available for free. So it's like -- we're trying to be helpful here. So we're not out to destroy competitors or anything like that. We're trying to help competitors, frankly, in any way we can.

Martin Viecha
Senior Director for Investor Relations

Thank you. Let's go to Dan Levy from Barclays.

Dan Meir Levy
Barclays Bank PLC, Research Division

First question, you're ramping supply at Austin and Berlin, so wanted to understand just how critical it is to further increase volume at those plants just to get the vertical integration benefits in the face of the sort of market with some demand questions. And just broadly, should we -- I mean, historically, you've been operating at the pace at which your supply allows you to produce as opposed to gauging to demand.

Should we generally expect that you're going to continue to produce at your -- whatever the max capacity that you're allowed within your supply constraints, regardless of what the broader economic environment is just to continue to get that volume out there?

Elon R. Musk
Technoking of Tesla, CEO & Director

So that is -- yes, I mean, there could be, like, obviously a macro shock that is so severe that people just stop buying cars for some reason. But in the absence of that, we will continue to grow output at a rapid clip.

Dan Meir Levy
Barclays Bank PLC, Research Division

Great. And then just on the margins associated with Austin and Berlin. You mentioned Austin and Berlin have a margin drag until you reach intended volumes. I don't know if you can disclose what those volumes are. And then maybe you could just remind us of what the margin profile of Austin and Berlin will look like versus Shanghai once you get the vertical integration benefits in place.

Elon R. Musk
Technoking of Tesla, CEO & Director

Well, probably 1/2 will be quite as good as -- Shanghai is hard to -- as a very efficient cost structures, obviously, our lowest cost structure in the world. But we do expect to be -- make significant improvements in Austin and Berlin and continue to make improvements in Fremont as well, so, yes.

Roshan Thomas

We've increased -- this is Roshan, by the way. We increased our localization efforts. So that will then drive down our days and on-hand requirements. We've made 10% quarter-over-quarter improvement in days, Elon and, so we'll continue that path as the localization improves.

Martin Viecha
Senior Director for Investor Relations

Okay. Thank you very much. And our final question comes from Philippe Houchois from Jefferies.

Philippe Jean Houchois
Jefferies LLC, Research Division

It's slightly longer term. I completely agree with your comments that we should look at Tesla in terms of auto market share and not EV market share. But I'm just wondering, as you build up the market share globally, is there a limit to the direct selling business model as you practice it? And should we think about -- going forward, you need to look into the agency or using importers to basically develop market share more smoothly, I guess, globally? And so in other words, is there kind of tell-by date for the direct business model as you practice it today?

Elon R. Musk
Technoking of Tesla, CEO & Director

It seems to be working well so far.

Philippe Jean Houchois
Jefferies LLC, Research Division

Because we hear different feedback from customers who miss the human interaction or unhappy with the service, and I'm just wondering if you're seeing some growth pains in there that would lead you to change. You're not seeing that?

Elon R. Musk
Technoking of Tesla, CEO & Director

Well, I mean, there are -- since we're always going to have some growing pains where at times -- and it depends on which geography we're talking about where sometimes service is behind sales, sometimes it's ahead of sales. This is -- I mean Tesla's growing, I believe, faster than any company in history that makes a large complex manufactured object.

So these are -- as you try to max -- it's always difficult to match exponentials. So -- but I think it is helpful to have the feedback loop with a service, because that means we feel the pain of service, and then we can adjust the design to make the car need less service. And I think that gives us the right incentive structure, like, because the best service is no service. The car doesn't break.

And whereas if you have, say, a dealer network that is reliant upon services revenue, then you arguably have a misalignment of incentives where they're making money on service. But actually, we want to -- the best thing for the consumer is the car doesn't need servicing, so.

Philippe Jean Houchois
Jefferies LLC, Research Division

Yes. And then last one, if I can follow up. Have you worked out, I mean, for many of your traditional competitors, a fair amount of profits for them comes from selling spare parts and servicing? You don't have that in your profit structure. And have you looked at the deficit you have compared to your peers?

Elon R. Musk
Technoking of Tesla, CEO & Director

Yes. Actually, this one -- assuming I could wax on about for a while, because, really, people didn't understand that the best short-selling argument against Tesla for the longest time was the fact that Tesla does not have an existing fleet and that the auto industry, the reason incumbents succeed and newcomers fail, the biggest reason is that the incumbents have a large fleet, and they're able to sell new cars at close to 0 margin and then sell spare parts at a very high margin, sort of razors and blades type thing.

And so the only way to actually succeed, for a newcomer to succeed is to have a product that is so compelling that people are willing to pay a premium over the incumbent product. And in the absence of electrification and autonomy, I don't think a newcomer can succeed.

Martin Viecha
Senior Director for Investor Relations
Thank you very much, everyone. Unfortunately, that's all the time we have for this quarter. We'll see you again in 3 months from now. Thank you.