

Q3 2020 Vicor Corp Earnings Call

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Corporate Participants: James A. Simms Vicor Corporation - CFO, Corporate VP, Treasurer, Corporate Secretary & Director; Patrizio Vinciarelli Vicor Corporation - Founder, Chairman, CEO & President; and Philip D. Davies Vicor Corporation - Corporate VP of Global Sales & Marketing and Director

Conference Call Participants: Quinn Bolton, Needham & Company, LLC, Research Division - Senior Analyst; Hamed Khorsand, BWS Financial Inc. - Principal & Research Analyst; Richard Shannon, Craig-Hallum Capital Group LLC, Research Division - Senior Research Analyst; Jonathan E. Tanwanteng, CJS Securities, Inc. - Managing Director; Gus Richard, Northland Securities Inc.; Alan Hicks; and John Dillon

Operator [1] Good day, everyone, and welcome to the Vicor earnings results for the third quarter conference call hosted by James Simms, Chief Financial Officer; Patrizio Vinciarelli, Chief Executive Officer; and Phil Davies, Vice President of Sales and Marketing. My name is Annie, and I'm the event manager. (Operator Instructions) I would like to advise all parties that this conference is being recorded. And now I'd like to hand over to James. Please go ahead, sir.

James A. Simms, Vicor Corporation [2] Thanks, Annie. Good afternoon, everyone, and welcome to Vicor Corporation's earnings call for the third quarter ended September 30, 2020. As stated, I'm Jamie Simms, CFO. And with me here in Andover, Massachusetts are Patrizio Vinciarelli, CEO; and Phil Davies, Vice President of Sales and Marketing. After the markets closed today, we issued a press release summarizing our financial results for the three months ended September 30, 2020. This press release has been posted on the Investor Relations page of our website, www.vicorpower.com. We also filed a Form 8-K today related to the issuance of this press release.

I remind listeners this conference call is being recorded and is the copyrighted property of Vicor Corporation. I also remind you various remarks we make during this call may constitute forward-looking statements for purposes of the safe harbor provisions under the Private Securities Litigation Reform Act of 1995. Except for historical information contained in this call, the matters discussed on this call, including any statements regarding current and planned products, current and potential customers, potential market opportunities, expected events and announcements and our capacity expansion as well as management's expectations for sales growth, spending, profitability, all are forward-looking statements involving risks and uncertainties. In light of these risks and uncertainties, we can offer no assurance that any forward-looking statement will, in fact, prove to be correct. Actual results may differ materially from those explicitly set forth in or implied by any of our remarks today. The risks and uncertainties we face are discussed in Item 1A of our 2019 Form 10-K, which we filed with the SEC on February 28, 2020. We presented certain updated risk factors regarding the COVID-19 pandemic and our current construction project in our Form 10-Q for the second quarter filed with the SEC on July 31, 2020. Both of these documents are available via the EDGAR system on the SEC's website.

Please note the information provided during this conference call is accurate only as of today, Thursday, October 22, 2020. Vicor undertakes no obligation to update any statements, including forward-looking statements made during this call and you should not rely upon such statements after the conclusion of the call.

A replay of the call will be available beginning at midnight tonight through November 6, 2020. The replay dial-in number is (888) 286-8010, followed by the pass-code 78499292. This dial-in and passcode are also set forth in today's press release. In addition, a webcast replay of today's call, along with a transcript, will be available shortly on the Investor Relations page of our website.

I'll start this afternoon's discussion with a review of our Q3 financial performance, after which, Patrizio, Phil and I will take your questions.

As we did last quarter, I'll begin with a discussion of Vicor's response to the COVID-19 pandemic. Beginning in Q1, Vicor took steps to protect the health and safety of our employees following federal and local government guidelines for employee well-being. Using masks and practicing social distancing from the onset of the pandemic, we have continuously operated 3 shifts at our Andover manufacturing facility. With only a few exceptions, our engineering, sales and administrative personnel returned to our Andover offices in early Q2. I refer listeners to our pending Form 10-Q filing, which will set forth updated details regarding our response to the pandemic and the impact it has had on our operations.

We are monitoring changing circumstances closely and may take additional actions to address COVID-19 risks as they evolve. Because much of the potential influence of COVID-19 is associated with risks outside of our control, we cannot estimate the extent of such influence on our financial or operational performance or when such influence might occur.

I'll now turn to consolidated results. As stated in today's press release, Vicor recorded total revenue for the third quarter of \$78.1 million, up 10.4% from the prior quarter. Advanced Products revenue rose 25% sequentially, reflecting higher shipments of power system solutions for AI acceleration and an increase in demand for our 48-volt direct-to-CPU solutions. Brick Products revenue rose 2.7% sequentially as shipments to China and an increase in our custom systems revenue offset continued weakness in North America and Europe. Shipments to stocking distributors rebounded for the quarter after the COVID-related decline of Q2. Turns volume declined sequentially.

Exports increased as a percentage of total revenue to approximately 73% of the total, reflecting booking trends. For Q3, Advanced Products share of total revenue rose for the fourth consecutive quarter to 39%, with Brick Products share correspondingly declining to 61% of total revenue. Our expectation is that Advanced Products sales will soon cross 50% of total revenues, given the high-growth profiles of segments we are targeting, in contrast to the maturity of the segments we serve with Brick Products.

Due to the ongoing impact of the pandemic on our supply chain partners, product mix challenges and high tariffs, our gross profit margin percentage for the quarter at 42.7% did not improve sequentially, despite higher unit volumes. Gross margin dollars did rise 10% sequentially.

I'll now turn to Q3 operating expenses. Total OpEx declined 3.7% sequentially, but the Q2 figure included a one-time noncash compensation charge of \$1.2 million for accelerated recognition of stock option compensation. As such, operating expenses were essentially flat quarter-to-quarter. The amounts of total equity-based compensation expense for Q3 included in cost of goods, SG&A and R&D, were approximately \$296,000, \$846,000 and \$498,000, respectively, totaling \$1,640,000.

We recorded operating income of \$6.1 million, representing an operating margin of 7.8%.

Turning to income taxes. We recorded a net provision for Q3 of \$651,000, representing an effective tax rate of 10%, which is in line with our expectations for the full year. Net income attributable to Vicor for Q3 totaled \$5.8 million.

GAAP earnings per share was \$0.13, based on a fully diluted share count of 43,743,000 shares, which includes 1,579,000 exercisable options.

Turning to our cash flow and balance sheet. Cash and equivalents totaled \$203.6 million, a sequential increase of 3.5%. Accounts receivable net of reserves totaled \$41.1 million at quarter end, down \$7.4 million, or 15%, with DSOs for trade receivables at 38 days, down from the prior quarter's 45 days, a level reflecting payment delays due to the pandemic in the prior quarter. All balances are current. Inventories, net of reserves, rose 4.6% sequentially to \$58.2 million, as we further increased raw materials in support of our outlook for increasing production. Annualized turns remained at 2.8.

Operating cash flow totaled \$11.6 million, reflecting a favorable swing in working capital. Capital expenditures for Q3 totaled \$8.1 million, representing the value of equipment placed in service during the period. At quarter end, we had construction in progress balance of approximately \$13 million and a total of \$76 million of approved capital projects. Our factory expansion is progressing on schedule as evidenced by the level of approved projects and the construction activity.

I'll now address bookings and backlog. Q3 bookings totaled \$90.5 million, a 3.4% sequential increase. The overall book-to-bill was 1.16, with Advanced Products at 1.18 and Brick Products at 1.14. Bookings for Advanced Products with Asian contract manufacturers were robust and notably so for Taiwanese CMs benefiting from the transfer of programs from Mainland China. Demand for Brick Products in China was sustained, reflecting the sharp recovery of Chinese industry. North American bookings recovered after two consecutive quarters of decline with balanced order flow across both Advanced and Brick Products. Conditions in Europe remain uncertain.

At quarter end, one-year backlog totaled \$140 million, an increase of 9.8% sequentially. Only a small portion of this backlog consists of orders rescheduled from Q2 into Q4.

Turning to the outlook for the fourth quarter. We expect continued revenue growth given our backlog and production outlook. We are making progress in addressing the sources of past gross margin pressure and are forecasting improvement in product-level profitability. Further, we do not anticipate any meaningful increases in operating expenses. As such, as shown this quarter, we expect incremental profitability to flow to EPS given the scalability of our operating model.

With that, Patrizio, Phil and I will take your questions. (Operator Instructions) Annie?

Operator [1] The first question is coming from Richard Shannon.

Richard C. Shannon, Craig-Hallum Capital Group LLC [2] Maybe I'll address the bookings commentary. I think you said there were some increasing breadth within bookings for Advanced Products. Maybe you could help us understand where that's coming from and categorized by source like HPC or AI accelerator or hyperscale or if you'd like to detail it, but I'd love to understand the extent of that breadth.

Philip D. Davies, Vicor Corporation [3] So, Richard, it's Phil. So, the increase in bookings on Advanced Products came across the market segments, actually, that you mentioned. So, we started to see bookings start to begin now for our HPC customers here in North America. They've been delayed by the COVID virus, but that's really starting to pick up. So, we got some bookings in Q3 for those new programs. We expect that to ramp in terms of bookings numbers

for Q4 and beyond. And then on the hyperscaler side, hyperscaler customers have been relatively quiet in Q1 and Q2 but came back quite strong in Q3 for a new high-performance Intel processor that they were transitioning to. So, we had increased bookings there in Q3. And then just in the GPU, if you like, the AI side of the business, we saw increased bookings there as well. So, basically, across all three market segments that you mentioned in the sort of the cloud area, if you like.

Richard C. Shannon, Craig-Hallum Capital Group LLC [4] Okay. I appreciate that, Phil. And maybe a follow-up for me. Sorry, I've got a cold. In terms of gross margins here, we saw another tick down here in kind of the low levels we've seen last year. And obviously, we're going through a manufacturing transition, which I assume that the supply chain dynamics is what you're referring to. Can you help us out in understanding the time frame by which you expect those supply chain issues to kind of get over with and sunset for good? Is this something that's going to happen this quarter or early next year? Help us understand the time frames to think about there.

Patrizio Vinciarelli, Vicor Corporation [5] So, with mix as well as supply chain issues, Q3 was challenging. We expect Q4 to be less challenging. ASPs from some of the products are trending up. Yields are getting better with respect to those Advanced Products that were ramping and initially challenged in the start of mass production. So, all of those factors play into what we expect to be improving gross margins. Economies of scale are also going to be a factor, right, as we get to high capacity utilization, even before we get to the expanded factory and the vertical integration in that expanded factory, we're going to see improvements in margins.

Operator [6] The next question is coming from Jon Tanwanteng.

Jonathan E. Tanwanteng, CJS Securities, Inc. [7] Great job on the quarter there. If you could, I was wondering if you could talk about how bookings are tracking so far in October and where you might think they end up by the end of the year, and if there's a mix component in that as well.

Philip D. Davies, Vicor Corporation [8] So, this is Phil. So, the bookings are remaining strong. We see another good quarter ahead of us right across the board, basically. I think that data center AI continues to grow. And we're also getting some really nice penetration in the mass market with some of our other Advanced Products that we don't talk about so much. So I think that we're not just a one-trick pony. It's not just data center. We've got a lot of new design-ins in robotics, in UAVs and order...

Patrizio Vinciarelli, Vicor Corporation [9] A pony with too many tricks.

Philip D. Davies, Vicor Corporation [10] That's right. So, I think there's a lot of stuff that we've been working on for a couple of years that really now is starting to come through. So, I think on the bookings front, I still think Q4 is going to be a good quarter for us.

Jonathan E. Tanwanteng, CJS Securities, Inc. [11] Great. And then, just as a part of the gross margin issues that you've been having, you've been talking about tariffs a lot. Obviously, there might still be more issues in terms of U.S.-China relations. First of all, can you talk about the ability to claw back tariffs that you've already paid, number one? And number two, how you're kind of positioning yourself for future tariffs and/or regime change, if that does happen in the White House and the Senate?

Patrizio Vinciarelli, Vicor Corporation [12] So, the cumulative tariffs paid are substantial, over \$10 million. We expect to be able to claw back about 2/3 of that. We have been in queue to get attention. As you can imagine, we're not alone with respect to this kind of an issue. And the responsiveness with respect to the government agencies that take the money and have to give

it back isn't being stellar. But we have seen some progress recently and expect to be getting close to starting to get some of our money back. I'm told that once that begins to happen, the rest of should flow relatively quickly. Most of the challenge has been, in effect, getting set up with the proper processes, procedures to account for all of the relevant tariffs that we paid on components that ended up being exported outside of the U.S. So, that's fundamentally the fraction of total components for which we're entitled to refund.

Regarding how we are protecting ourselves from uncertainties relating to further tariffs, I suggested in earlier meetings, we have been pursuing other sources outside of China, have been making good progress even though it is a challenge. It takes time. I think with respect to some of the key components, so a third, the more significant items in our BOM, we're about to see some more significant progress. I would say that it is a process that's not going to come to full fruition for probably another year. But I think some conversion to vendors outside of China will begin to bear fruit in the interim.

And needless to say, we can't forecast what may happen in general with respect to the Chinese market. Demand there is quite robust. Our products, generally speaking, don't fall into categories that are subject to severe importation restrictions. And Phil can tell you a little bit more about that. And the new products that provide Advanced Product performance are attractive enough and unique enough in terms of the technical merits that Chinese open sources aren't available, and they're not going to be available for a long time. So we think we are positioned relatively well given the general challenges and uncertainties in that part of the world.

Operator [13] The next question is coming from Quinn Bolton.

Quinn Bolton, Needham & Company, LLC, [14] Congratulations on the nice results. First, just maybe a clarification on the Advanced Products. It looks like Advanced Products bookings might have hit a quarterly record. Wondering if you could confirm that. And then within Advanced Products, as you look into calendar '21, can you give us an update on the progress you're making with the vertical power-on package opportunity? And then I've got a follow-up.

Patrizio Vinciarelli, Vicor Corporation [15] Yes, so, we have -- I'll take the second part of the question first, and then maybe Phil can give you some comments on your first -- the first part of your question. So, on vertical power delivery, we're making progress on three fronts with three key customers. The IP in vertical power delivery products represents the very forefront of technology. They are complex products. In one case, they involve stacking of two layers of converter stages. In two other cases, they involve the stacking of three layers. So our packaging technology, which is quite unique when it comes to this, handles these vertical power delivery products through manufacturing processes. They entail the separate manufacturing first of each of two or three layers. They're stacking at the panel level.

These developments are inherently complex. I would say this is the most complex implementation of our technology. And not surprisingly, we've had some challenges bringing it all together. But we're getting there. We recently got initial functional yields for triple stacks, which bode well for not just other triple stacks with other customers and applications, but also for the relatively simpler double stacks.

So in terms of a production ramp for these products with a couple of the customers of the triple stacks, the forecast is for ramps somewhere in the middle of '21. The third one is a bit more uncertain. But generally speaking, the demands of ASICs, as lithography nodes get finer and voltage nodes get lower and currents get past 1,000 amps, drive this kind of technological development. And we are in a unique position with respect to it. We were pioneers in developing this technology. We have a multiplicity of patents, both some issued and some pending. One

actually just recently within the last few days allowed with additional claims and look forward to having a very strong position in that market.

Philip D. Davies, Vicor Corporation [16] Yes, Quinn, this is Phil. That was a great question. That keeps me on my toes just remembering quarters gone by. Actually, if you look back to Q3 of '18, we had quite a large Advanced Product quarter there. And I'm trying to think back to what that was. And I think it was the ramp of one of the big GPU guys. We got a very big order in that quarter to set us up. But this quarter, we've been consecutively climbing on the Advanced Products. So, this quarter is only about \$4 million or \$5 million off that great quarter we had back there in Q3 '18. So, that's going to continue to trend up. So, I think we'll -- maybe next quarter, we'll get to that.

Patrizio Vinciarelli, Vicor Corporation [17] So, the last time around at comparable levels, we did not have the -- it was a very strong dependency on one or two unique projects. And now we have a more diversified base of applications, of customers in complementary portions of the cloud market and computing. So, both in terms of the makeup of the bookings and the progression, we see this sustainable. And that's the reason why we anticipate before too long having Advanced Products cross past the 50% mark as a percentage of bookings as a whole, while Brick Products hold their own in their mature markets.

Quinn Bolton, Needham & Company, LLC [18] Great. And then I guess the follow-up question is the last couple of quarters, I think your bookings were \$87.5 million and \$90.5 million sequentially. I think in the past, you've kind of said that bookings lead revenue by one to two quarters. I'm just wondering if I might be able to put any kind of range for expectations of revenue growth in December. Do you think we could see revenue up 5% to 10%, which would seem to be sort of supported by the orders you've seen in the June and September quarters? Or can you make any further comments about revenue expectations in December?

Patrizio Vinciarelli, Vicor Corporation [19] Yes, I would say that, without getting pinned down too specifically, at times where we still get to worry about COVID and all kinds of unpredictables, that I think a reasonable expectation would be for a step-up in revenues on a percentage basis, commensurate with what happened in the last quarter. The bookings more than supported, to your point, they lead the revenues. And the book-to-bill has been very strong. I think in the past quarter, it was 1.16, right? So we see bookings this quarter being higher than the prior quarter, and we see revenues stepping up to catch up with the bookings.

Operator [20] The last question is coming from Hamed Khorsand.

Hamed Khorsand, BWS Financial Inc. [21] I just wanted to talk a little bit more about the gross margin. In last quarter, you were talking about the inefficiencies were diminishing. Were there new challenges that you saw this in Q3? Or was this in the gross margin purely reflective of just getting rid of old inventory and then the gross margin starts to move up as now you have better yields going forward?

Patrizio Vinciarelli, Vicor Corporation [22] So, I would say that the third quarter was, to a significant degree, characterized by a major ramp with a program that has a significant multiplicity of different ChiPs. It's not one device. It's a number of different devices, each presenting their own unique tooling and process requirements. They're not all the same, and each involving outside processing, at another partner. As you may recall from prior discussions, we have embarked on an expansion of the factory to vertically integrate these processes. We're still six to nine months, in some instances for a minor portion, maybe 10, 12 months away from the level of integration that is going to shorten cycle time and improve efficiencies and avoid some of the bottlenecks that we've had to work around, particularly in Q3. We're not done with those kinds of challenges, but we see that over the next three to six months, there's going to be

significant progress. I mean, part of it is just getting to a high level of maturity with respect to these individual products that are ramping in very high volume. Part of it is getting, with that, to yields in the 90s and the high 90s that are appropriate for mass production devices. And part of it is getting further along with the production rates of these kinds of products, where, over the last several quarters, we were reviewing some charts this morning, we made major progress.

So, to some extent, the challenge with margins has had to do with inefficiencies associated with the mix of products. And these are all Advanced Products, what we call ChiPs or “converter housed in package,” that have plating steps that are performed, again, through a partner supplier. And those have been somewhat painful from the cost perspective. But we're making good progress. There's going to be further progress in Q4 and as we get closer to beginning to benefit from vertical integration. With respect to some of the process steps, in particular, on vertical power delivery in this morning's report, we referred to the -- as early as the end of April, we're going to be able to install in our expanded facility, the equipment necessary to manufacture VPD products. And that, in of itself, is going to provide a great deal of relief to the operations team that has had serious challenges with manufacturability and production ramps with unique new products.

Operator [23] The next one is coming from Alan Hicks.

Alan Hicks [24] On the new facility coming up, when do you expect production to begin there? Mid next year?

Patrizio Vinciarelli, Vicor Corporation [25] Now, on VPD products, we're going to be in production, we expect, in the second quarter. The equipment is going to be installed in April, and we expect to start vertically integrating those processes in -- towards the end of Q2.

Alan Hicks [26] So a new facility will be producing in Q2 of next year?

Patrizio Vinciarelli, Vicor Corporation [27] Well, I think that's where the vertical power delivery products will start. That's a time frame in which they're going to start. And as I suggested in answering an earlier question, that's where the operational team has had the greatest challenges working remotely with a faraway partner, right, particularly in the time of COVID, where there have been a variety of issues, particularly at the partner. So the second quarter activity isn't going to amount to significant production either in terms of number of units or revenue. It's going to be production in our own facility with VPD products. So, leading the way by the third quarter for mass production for other products, what you might view as more mundane ChiPs, still involving plating steps, but on a single layer as opposed to involving two or three layers. Okay.

Alan Hicks [28] And how quickly do you expect that to improve gross margins once it gets up and running?

Patrizio Vinciarelli, Vicor Corporation [29] So, to be clear, we expect to see a significant uptick in margins this quarter and then another one next quarter. We're not waiting for vertical integration, a new facility, to bring about relief on the margin front. I think a variety of initiatives, starting with much better yields that we're now getting and involving again, greater utilization of our capacity, amortization of these costs, that's having an impact. I think what we saw in the third quarter, where margins were essentially the same, slightly lower than the prior quarter, was the bottom. And I expect to see an upward trend that will be significant starting this quarter and become more significant as we get to leverage the efficiencies of vertical integration with respect to our very advanced packages.

Operator [30] The next one is coming from Gus Richard.

Gus Richard, Northland Securities Inc. [31] I just want to understand on the Advanced Products. Is that a high mix, low volume? Or is it still dominated by a couple of customers? And sort of the follow-on to this is how much customization is required for each customer in implementation? Are there some standard products? Or is it a unique process flow for each customer?

Patrizio Vinciarelli, Vicor Corporation [32] Yes. Those are very good questions. So, there is considerable number of different devices that are involved, as I suggested earlier, both in some instances with one customer and one application, and across a multiplicity of customers and applications. As you might have heard from prior discussions, the packaging technology, it affords a great deal of scalability and configurability. And now we've leveraged historically that to be able to support unique requirements more and more, we are focusing with further advances in the technology, particularly with the structure of our current multiplier cell, getting more advanced and more dense and more efficient. We're looking to leverage that through an array of standard product offerings that leverage the cell methodology, where in effect, instead of engineering a device for an application, we deploy the multiplicity of cells that best suit that application. And both from the electric and engineering perspective, from a design, from a test methodology, from the operational perspective in terms of the types of components to be used, and in particular, in terms of the bills of material and multiplicity of components to be sourced, that brings about scalability and efficiency that, again, will play into improved margins and facilitate giving customers the range of capabilities they need without burdening our operational teams with too complex a mix of products.

As you might have heard me say in the past, chips are made in panels. And one of our greatest flexibilities, and this is a very proprietary aspect of our technology, that brings to power converters the economies of scale and scalability and flexibility of semiconductor wafer processing, is that, just as with semiconductor chips that are made on a certain wafer size with a certain set of processes and might involve, depending on the particular requirement, a larger or smaller multiplicity of smaller or larger chips within the wafer. Likewise, with our converters housed and packaged in a panel or, in case of vertical power delivery, a multiplicity of two or three stack panels, we have a consistent process flow where these devices are made, depending on their size, in a different multiplicity but using the same power methodology. So they go through the same process steps. And on that basis, we can manufacture, let's say, a converter for a 50-kilowatt automotive application on a panel just as well as we can manufacture on a panel going through the same process steps a multiplicity of 50 or 60 relatively low power, much smaller devices.

So, to some degree, there is a complexity to the packaging technology and what it implies throughout the enterprise, from the engineering to the operational level. But in other ways, there is the inherent scalability that we have carried over from the precedent of semiconductor fabs in semiconductor wafer processing. And as we get further along with respect to scale and number of panels we process per week and then numbers begin rapidly escalating, the more efficient we're going to be. Again, we're getting yields now in the 90s with products that are in mass production. And we're going to be able to enjoy the benefits of flexibility and broad support for customer requirements with the scalability and repeatability and predictability that is necessary in order to deliver strong financial performance.

Gus Richard, Northland Securities Inc. [33] I understand. I appreciate it. And then just in terms of the -- in the Advanced Products has -- how much is the customer base diversified?

Philip D. Davies, Vicor Corporation [34] So, I would say the diversification really started about two years ago, when we started to introduce the lateral power delivery technology. Many of the companies that compete with NVIDIA in the AI space, across North America and also in Asia

and even in Europe, and Israel as well, that there are a number of companies there developing some very impressive AI chips that -- that diversification started a while ago. And today, we're at 10-plus customers into this and growing. And for example, in Asia, we've got a new list of customers of about eight to 10 new chip ASIC GPU company start-ups that are working on technologies in that neck of the woods.

So, yes, it's been continually growing, and this is going to be very strong into the future. And then moving to vertical power delivery that Patrizio talked about, those companies will transition there eventually as their current levels increase in their products.

Operator [35] The next one is coming from John Dillon.

John Dillon [36] Congratulations on a great quarter. It's really good to see. My question is geared towards Phil, and it's on autos. And Phil, I'm just wondering, are you shipping any small production runs to some specialized auto companies currently? And then how many different companies do you have engineering engagements with? And how many do you have design wins with?

Philip D. Davies, Vicor Corporation [37] Good question. So we're not shipping production units yet to the big automobile industry. We have some niche plays off of that in different types of markets. But in terms of that particular activity, we've seen continued success. So we have three engagements right now with three major companies around the world, one in Japan, one in Europe and one in North America. And we're engaged with eight others on putting together proposals for products that are going to be required.

And Patrizio talked a lot about scalability. This is the big advantage of a modular power component methodology, where we can attack power levels in different vehicle platforms with the same component. So, we're working with different car companies on doing that. But we're at the "A Sample" stage. We're actually -- a good question. We didn't ship production, but we did ship our first A Samples to those three customers. And that's still a very exciting story for us, John.

Patrizio Vinciarelli, Vicor Corporation [38] So we're still two...

Philip D. Davies, Vicor Corporation [39] Yes, two years away...

Patrizio Vinciarelli, Vicor Corporation [40] Away from...

John Dillon [41] Yes. No, I know it's a ways away. Do you have any real design wins? Or are these the design wins that you're talking about? Or the same engagement [therein]?

Philip D. Davies, Vicor Corporation [42] Yes. We have three wins, John. They're significant. And we've got about, as I said, seven or eight in the pipeline that we're actively working now.

Patrizio Vinciarelli, Vicor Corporation [43] Yes. There's more coming this quarter, quarter after that. And these companies are parting company with substantial NREs in order to get chips to their requirements. And thus far, they've been extremely impressed with our work. Our prototypes have performed in their system. So, we have one European customer that has assembled a system with tens of kilowatts of power capability. And they're extremely impressed with the ability to configure an array of our modules to support those kinds of power requirements with great efficiency. Extreme power density, it takes a lot of weight -- it will take a lot of weight out of the vehicle, both by reducing the volume and weight of the power converter, but also, importantly, by removing the need for duplicate battery systems. Because with our products, and we have IP on this, it's possible to fundamentally eliminate duplicate battery systems because the converters have the traits that are necessary in order to enable that. But in terms of insulating across safety boundaries, and doing so with the requisite speed with the bandwidth that allows a battery system to be eliminated. I mean, fundamentally, in a vehicle,

there's only a need for an energy storage at one node, wherever it needs to be most efficient. And with our converters from that battery node, you can generate derivative voltages, distribute them efficiently throughout the vehicle in a safe manner, thus simplifying what is otherwise a very complex landscape. And in the process of doing that, you can also get rid of heavy wiring that takes up volume and weight, particularly on legacy 12-volt systems.

John Dillon [44] That's a great answer. It's really exciting. The follow-on would be, I understand that your Gen 4 front ends would be used in autos but also in other applications. So I'm just wondering how the Gen 4 front ends are coming along.

Patrizio Vinciarelli, Vicor Corporation [45] It's coming along quite well. We have -- actually, very recently we got a controller that we developed. It's fully functional. We have powered up the power stages. We have a lead customer in the very high-end computing realm, where we've been supplying a first generation of MCD, MCM-type solutions that actually happens to be a vertical power delivery system but implemented, in effect, with lateral power delivery components. For that customer, we are developing and we basically have got first functional units of a triple stack DCM to, in effect, double the current capability for each of the reticles of a large multiplicity of reticles across the wafer. And for that same customer, we've been developing a front end, which, in increments of 20 kilowatts, would provide a much more compact, efficient and flexible front-end power system. So we expect to ship initial samples of that front end, which is a 4G front end, using a proprietary topologies and power system technology towards the end of Q1.

Operator [46] We have one more question on the line. This is the last one. It's coming from Richard Shannon.

Richard C. Shannon, Craig-Hallum Capital Group LLC [47] Just one question for me. Again, on the topic of the gross margins. Based on the last answers, you're kind of looking at kind of a two-stage gross margin improvement cycle here over the next several quarters, one being more mix than manufacturing, when we get the new equipment into the new fab here. I guess I'm wondering if you could quantify the degree to which we see -- where we see gross margins without the kind of the supply chain issues that we see today. If we look at the model here, we've got gross margins last year at 46, 47, 48 range, now we're down to 42s. Would we be in that 46, 48 range without these issues? Or can you help us just kind of understand where we'd be without those?

Patrizio Vinciarelli, Vicor Corporation [48] So, even before we get to the new factory and vertical integration and the benefits that will bring in terms of manufacturing efficiencies, we see an opportunity for several points of margin improvement resulting from the factors that were described earlier. First of all, major improvement in yields, like tens of percentage points on yields for Advanced Products as they transition from early production to a more stable, more advanced production rates. So that's a contributing factor. ASPs have been going up. That's a factor. So, before we get to the new wing at Federal Street and new equipment -- and needless to say, we should point out the new equipment will need to get depreciated, right? -- so, that's something that needs to be taken into account.

But we keep close track of how each process step and equipment that will be part of the new factory factors into the cost, our cost per panel, which is, again, the counterpart of wafer processing. And we see very favorable trade-offs there, meaning that with vertical integration, we're going to be able not only to make our life, or the lives of our folks in operations, a lot easier. But we're going to see, for many of the process steps, a reduction in cost per panel. So, let's save, in effect, those opportunities for later because as discussed earlier, they're not really going to come about until Q3 of next year. And I wouldn't expect that in the first quarter production in the new facility, we're going to have instant economies, right? We should all

assume that there, too, there's going to be an initial phase where it will still be for a little while inefficient.

But leading up to that, in this quarter and the next couple of quarters, we're still dependent on outside sources for some of the key process steps. There's several points of improvement in margin that are, I would say, low-hanging fruits that we believe we will capture starting this quarter. But to your point, I think -- yes. Just one final comment. I think it's good to look at this, the margin opportunity as comprising two phases, right? There's a phase between now and about this time next year, and then there's another phase after that.

And thanks very much. We'll be talking to you in February.

Operator [49] Thank you so much, everyone. That concludes your conference call for today. You may now disconnect. Thank you for joining, and enjoy the rest of your day.