Operator

Good day, and welcome to the Seagate Technology fourth quarter and fiscal year 2023 conference call. [Operator instructions] Please note this event is being recorded. I would now like to turn the conference over to Shanye Hudson, senior vice president, investor relations. Please go ahead.

Shanye Hudson -- *Senior Vice President, Investor Relations and Treasury*

Thank you. Good afternoon, everyone, and welcome to today's call. Joining me are Dave Mosley, Seagate's chief executive officer; and Gianluca Romano, our chief financial officer. We posted our earnings press release and detailed supplemental information for our June quarter and fiscal year 2023 results on the investors section of our website.

During today's call, we'll refer to GAAP and non-GAAP measures. Non-GAAP figures are reconciled to GAAP figures in the earnings press release posted on our website and included in our Form 8-K that was filed with the SEC. We've not reconciled certain non-GAAP outlook measures because material items that may impact these measures are out of our control and/or cannot be reasonably predicted. Therefore, a reconciliation to the corresponding GAAP measures is not available without unreasonable efforts.

Before we begin, I'd like to remind you that today's call contains forward-looking statements that reflect management's current views and assumptions based on information available to us as of today and should not be relied upon as of any subsequent date. Actual results may differ materially from those contained in or implied by these forward-looking statements as they're subject to risks and uncertainties associated with our business. To learn more about the risks, uncertainties and other factors that may affect our future business results, please refer to the press release issued today and our SEC filings, including our most recent annual report on Form 10-K and quarterly report on Form 10-Q, as well as the supplemental information, all of which may be found on the investors section of our website. As always, following our prepared remarks, we'll open the call for questions.

I'll now hand the call over to Dave for opening remarks.

Dave Mosley -- *Chief Executive Officer*

Thank you, Shanye. And hello, everyone. We appreciate you being here with us on today's call. Amid a tough business environment, Seagate delivered fourth quarter revenue of $1.6 billion, while holding non-GAAP operating margin at 3.5% to narrow our non-GAAP loss per share to $0.18.

These results demonstrate financial leverage and our focus on returning to profitability. Importantly, we continue to generate positive free cash flow, achieving $168 million for the quarter and $626 million for the fiscal year, reinforcing Seagate's solid operational and financial execution amid the business backdrop we have seen in fiscal 2023. This past fiscal year has been shaped by macro and end market conditions that have tested our resilience in addition to our financial performance. I'm proud of our team's perseverance and execution.

As a result of our proactive actions, we've lowered our cost structure by more than $350 million on an annualized basis. We've enhanced balance sheet flexibility taking out nearly $800 million of debt funded largely by monetizing nonmanufacturing facility assets. We reduced production output by approximately 25% compared with peak volume in order to drive better supply/demand dynamics and enhance profitability as the markets recover. And all of these accomplishments were made while delivering on our 30-plus-terabyte HAMR product development and qualification milestones with volume ramp on track to begin in early calendar 2024.

Looking ahead, we expect the macro end-to-end market conditions that we have flagged throughout fiscal 2023 to continue weighing on demand through at least December. Consistent with our track record of managing what is within our control, we are taking additional measures to weather the near-term business environment. First, we are adjusting pricing, which we believe will help to ensure a healthy industry supply chain for our customers over the long term. And second, we are carefully managing our manufacturing capacity through a build-to-order approach for certain areas of the business to align our future production output with customer qualifications and demand plans.

It will take time to bring production capacity and associated support resources back online. Therefore, it is crucial that we balance lead times for mass capacity products with our ability to reramp production. We expect these efforts will enable Seagate to efficiently manage supply for our customers as demand improves. I'll now share some perspectives on near-term demand factors, in particular in the mass capacity markets, starting with our business in China.

As expected, sales in China improved sequentially off of the March quarter lows, driven by increased demand in the VIA markets and certain regional cloud and enterprise OEM customers. While these trends are pointing in the right direction, sales are still well below historical levels. Since the strict COVID protocols were eased last December, the pace of economic recovery in China has been uneven. For now, we are forecasting sales into China to remain relatively stable for the balance of the calendar year.

We are encouraged to see Chinese authorities begin to inject more stimulus to reaccelerate economic growth. Based on customer input, economic improvement is expected to catalyze e-commerce, drive cloud-related ad revenue and spur new smart city projects. Seagate's VIA and nearline products are positioned to benefit from these anticipated improvements in the end market demand. Outside of China, nearline demand from enterprise OEM customers has remained soft.

CIOs continue to operate under tighter budgets in response to near-term macroeconomic uncertainties, ongoing efforts to optimize existing workloads, both on-prem and in the cloud, are helping enterprise customers defer mass storage deployments. These trends have slowed the pace of inventory absorption among most of our U.S. cloud customers. We have significantly reduced shipments to several large cloud customers in order to accelerate inventory absorption and protect our financial returns.

We project it will take another couple of quarters for inventory levels to normalize. We also believe the timing for demand recovery could be affected by spending priorities focused on accelerating the build-out of compute-intensive AI infrastructure. While AI and ML have been around for quite some time, generative AI has quickly emerged as the next megatrend. This megatrend makes us as excited as ever about the long-term growth drivers for Seagate.

In addition to the ongoing migration of workloads to the cloud, which we believe is far from over, gen AI is expected to be a catalyst for data creation, underpinning future demand for mass capacity storage. In today's earliest stages of gen AI development, you're seeing the necessary first steps of building and training of AI models. These efforts require significant investment in compute architectures, and we're seeing that investment ramp today. The next stage of development will yield enterprise-specific use cases that leverage trained AI models to convert data into value-enhancing applications.

As this phase plays out, cost-effective mass storage will be critical and we see HDD as a long-term beneficiary. We are already seeing examples of content creators generating high-definition images from text, which is growing in use as evidenced by four of the top services totaling 20 million images each day. Development is well underway to create data-intensive videos and animations simply from voice commands. The adoption of AI-generated video bodes well for mass capacity storage.

For context, today, nearly 4 million videos are uploaded daily to YouTube and their file sizes can be thousands of times larger than a single image. Additionally, we believe that predictive AI will lead to advances in many fields, including science and healthcare. For example, predictive AI can be used to analyze large collection of medical images, many created by Gen AI to provide insight for early detection, prevent disease progressions and develop patient-specific treatments. Mass capacity data storage will remain both an enabler and beneficiary of these trends working in harmony with flash and DRAM memories to bring AI applications to bear.

While flash will continue to feed high-performance compute engines, mass capacity HDDs will remain the most cost-efficient storage media to house the enormous volumes of data being generated and used for predictive analytics. Even in today's unsustainably low NAND pricing environment, HDDs are still roughly five times more cost-efficient and comparable flash solutions on a per-bit basis, and we do not project that gap to close in the next decade. This level of conviction is due in large part to our leading technology road map. Seagate is leveraging magnetic recording technology innovations such as HAMR across our mature 10-disc HDD platform, positioning us very well to meet increasing demand, including from data-intensive AI applications.

Given the current business climate, Seagate is focused on product development, execution and helping our customers qualify next-generation drive capacities. We are executing well on both fronts. We continue to deliver areal density and TCO advancements through our conventional PMR hard disk drive products. Development efforts on what may be our last PMR product are nearing completion and will extend drive capacities into the mid- to upper-20-terabyte range.

As mentioned earlier, our 30-plus-terabyte product launch plan is fully intact and initial customer qualifications are progressing well. We are on track to begin volume ramp in early calendar 2024. We are also preparing qualifications with a broader number of customers, including testing for lower capacity drives targeting VIA and enterprise OEM workloads. While there's always work to do, I am pleased with the progress the product development teams have made during fiscal year 2023.

Overall, Seagate has consistently demonstrated the ability to quickly adjust and execute at a high level on every factor within our control. We remain diligent in managing through near-term business conditions. At the same time, I'm excited by the tremendous long-term opportunities ahead brought about by existing and emerging megatrends underpinned by data. Cost-effective mass capacity storage is a critical enabler and Seagate is poised to deliver with strong technology road maps and improving financial leverage.

I'll stop there and hand it over to Gianluca.

Gianluca Romano -- *Executive Vice President, Chief Financial Officer*

Thank you, Dave. Amidst the current industry down cycle, we delivered results that demonstrate our ability to maintain disciplined production output and strong cost control measures. For the June quarter, we reported revenue of $1.6 billion, in line with our recent public commentary and non-GAAP loss of $0.18 per share, slightly better than the midpoint of our guided range. Total hard disk drive revenue declined 14% sequentially to $1.4 billion, with shipment of 91 exabytes.

Mass capacity revenue declined 20% sequentially to $1 billion, reflecting softer demand in the cloud nearline market, partially offset by an improvement in the VIA business. Shipment into the mass capacity markets totaled 75 exabytes, compared with 104 exabytes in the March quarter. Mass capacity shipments as a percentage of total HDD exabyte was roughly 82%, compared to the March quarter 88%. The expected slowdown in our cloud business led to nearline shipments of 55 exabytes, down 37% sequentially.

As Dave outlined earlier, we anticipate that it will take a couple more quarters for CSPs to consume inventory and demand to improve. Specific to the VIA market, revenue was up sequentially from what we believe was a demand drop in the March quarter. We expect a relatively stable VIA demand environment in the second half of the calendar year, although still below the run rate before the downturn. Within the legacy market, revenue was $401 million, up 8% sequentially, reflecting higher demand for mission-critical products.

The client and consumer markets were down slightly quarter over quarter, typical for a June quarter. Finally, revenue for non-HDD business decreased 15% sequentially to $218 million. As anticipated, current IT spending behavior in light of economic uncertainties impacted our enterprise system business. We expect this headwind and the purchase timing for a couple of large customers to result in a meaningful decline in our system revenue in the September quarter.

Importantly, we shipped our first HAMR-based Corvault system for revenue as planned during the June quarter. We expect broader availability of these Corvault systems by the end of calendar 2023. Moving to our operational performance. Non-GAAP gross profit in the June quarter was $313 million, down 10% sequentially, reflecting lower revenue and a less favorable mix partially offset by lower underutilization costs.

Non-GAAP gross margin expanded 80 basis points sequentially, approaching 20%. Underutilization cost decreased to approximately $40 million in the June quarter as we temporarily increased production to build long lead time components. Based on the current business outlook that Dave outlined, we expect higher underutilization costs in the September quarter. However, we expect gross margin to modestly increase as our cost structure improvements are fully realized, and we implement pricing adjustments in certain markets during the second half of calendar 2023.

We reduced non-GAAP operating expenses to $258 million, down $91 million year over year and $24 million sequentially. The year-over-year decline reflects our cost structure improvement actions to date, lower variable compensation, as well as disciplined cost management. We expect non-GAAP opex in the September quarter to be similar to the June quarter, reflecting nearly full realization of cost savings from restructuring efforts announced in April, offsetting an increase related to the recent sales and leaseback of three nonmanufacturing sites. Moving on to the balance sheet and cash flow.

We ended the June quarter with liquidity level of approximately $2.3 billion, including our revolving credit facilities of $1.5 billion, which was lowered by $250 million as previously disclosed in the credit agreement amendment. Inventory was down $60 million quarter over quarter at $1.14 billion and we will continue to focus on reducing our own inventory in the coming quarters. Capital expenditure totaled $50 million in the June quarter, down 7% sequentially. Fiscal year '23 capex was $316 million or roughly 4% of revenue.

We target lower capex in fiscal year '24 as we maintain our focus on shifting to a build-to-order factory loading, balancing supply to demand and still supporting our innovation-driven product road map. Free cash flow generation was $168 million for the quarter, and $626 million for the fiscal year, reflecting solid operational execution and efficiency in working capital management. We expect free cash flow to be lower in the September quarter as we incur a majority of the cash payments associated with the restructuring charges announced in April. We used $145 million for the quarterly dividend and exited the quarter with 207 million shares outstanding.

There were no share repurchases during the quarter. Our debt balance equity in the quarter was $5.5 billion, down $507 million quarter over quarter, primarily reflecting the 2023 notes retirement. This debt reduction was mostly funded to the sales and leaseback of the three facilities noted earlier. Additionally, we raised $1 billion in new notes and used the proceeds to prepay $450 million of existing term loans and retired the March 2024 notes of $500 million.

As a result of these actions, we now have less than 12% of total debt coming due over the next two fiscal years. Interest expense in the June quarter was $84 million and is expected to increase slightly for the September quarter, reflecting a full quarter of the debt restructuring actions that I just described. Adjusted EBITDA for the last 12 months totaled $974 million, resulting in a net debt leverage ratio of 4.8 times, well below our amended credit agreement terms. Turning to our September quarter outlook.

For the hard drive business, we expect incremental improvements in mass capacity to offset declines in the legacy market. For non-HDD, revenue for the system business is expected to decrease sequentially due in part to demand timing among a couple of our large system customers, as noted earlier. With that as context, we expect September quarter revenue to be in the range of $1.55 billion, plus or minus $150 million. At the midpoint of our revenue guidance, we expect non-GAAP operating margin to be in the low to mid-single-digit range, which includes the proactive measure we discussed today, partially offset by higher underutilization cost in the range of $70 million.

And we expect a non-GAAP loss per share in the range of $0.16 plus or minus $0.20. I will now turn the call back to Dave for final comments.

Dave Mosley -- *Chief Executive Officer*

Thanks, Gianluca. I'm proud of the perseverance and agility as we continue to proactively respond to the market environment we have faced over this past year. Entering fiscal 2024, we are leaner. Our balance sheet is healthier and our product road map is stronger.

All of these factors enhance our ability to weather near-term market conditions, deliver financial leverage and position the company to capture attractive long-term opportunities for mass capacity storage. As we conclude our prepared remarks, I would like to thank our employees, suppliers, customers and shareholders, once again, for their support. Thanks for joining us, and let's open up the call for questions.

Questions & Answers:

Operator

[Operator instructions] The first question today comes from Chris Shankar with TD Cowen. Please go ahead.

Eddy Orabi -- *TD Cowen -- Analyst*

This is Eddy for Chris from TD Cowen. I understand you won't guide for December, but curious to know your thoughts on December near-line exabyte shipments. Like do you see them growing sequentially from September, more like flat or maybe slightly down. I'm asking because in case we remain at current revenue of $1.6 billion per quarter into next year.

I'm wondering if there would be a risk to the dividend in case, especially you guys continue to invest in the business.

Dave Mosley -- *Chief Executive Officer*

Yes. Thanks, Eddy. So we aren't guiding for December. I think, we expect at this point to hold the line on overbuilding.

And so, that's one of the reasons we're being very cautious. But there will be some -- there's an indication of some natural flow-through at the cloud service providers, for example. So we expect it to slowly start trending back up from here. I don't expect a big hockey stick rebound.

I mean, I could be wrong on that, but -- and we do expect it to slowly go back up mainly because we're not pushing in a bunch of our own inventory. And relative to the dividend, we're planning for all this in all of our plans right now. And I think, the way we execute this plan, we should be just fine and we want to continue to be the person for all of our stakeholders that we've always been before, we've got laser focus on that right now.

Operator

The next question comes from Wamsi Mohan with Bank of America. Please go ahead.

Wamsi Mohan -- *Bank of America Merrill Lynch -- Analyst*

I was wondering, Dave, if you could flush out a little bit to the points that you made in your prepared remarks, one on adjusting pricing strategy in certain markets. What specifically are you doing in these markets? And then, secondarily, the reduced production output through this build-to-order and lower capex comments that you made. How exactly will this build-to-order work? Is this specifically for mass capacity, what kind of lead times would you require? And are your customers? And what do you expect follow-through from customers and also from a competitive standpoint?

Dave Mosley -- *Chief Executive Officer*

Thanks, Wamsi. Yes, it is complicated because there's a number of different markets in play here. So for example, a distribution channel or some of the classic markets we have consumer client server, you just don't move things very quickly. But some places, it's relatively easier to raise prices and have that flow through into the system.

On mass capacity drives, generally speaking, we do the price increases through transitions of products. So we'll say this is the changing economics, we need to make sure that we get paid for that. So as we go through the next product generation, there's still a TCO benefit to the end customer to drive through that product transition, but the economics have to change, largely so that we can go back and pay our suppliers and keep everybody healthy. There's been such a profound downturn in demand that we have to make sure that the entire supply chain is treated properly.

But exactly what you said, different markets are behaving very differently and accept things very differently. And this is the direction we're pushing at this point.

Gianluca Romano -- *Executive Vice President, Chief Financial Officer*

Yes. On the cost side, Wamsi and on the production that is, of course, driving under utilization. We had a little bit higher production in the June quarter, mainly on the wafer side and a little bit on the media, but I would say more on the wafer. We will not need to do that level of production right now.

So the under utilization charges were declined in the June quarter from almost $80 million to $40 million. It's probably going up a little bit in September. We estimated about $70 million. But of course, through the quarter, that could change a little bit.

Operator

The next question comes from Timothy Arcuri with UBS. Please go ahead.

Tim Arcuri -- *UBS -- Analyst*

I also had a question on pricing and sort of how you think about it versus market share. We've heard examples of you raising prices 10% to 15%. It's, obviously, a little bit counterintuitive in such a soft market. So I guess, two questions.

One, how are customers reacting to that? And then also, are you willing to lose share as you kind of look out, is there like a line in the sand on share that you're gonna draw where you wouldn't raise pricing if you lost share? Or are you willing to lose share to get pricing reset to a more acceptable level?

Dave Mosley -- *Chief Executive Officer*

Yes. Thanks, Tim. So yes, you are right. It's a weak demand environment, but I think also there's generally speaking, the whole industry is underwater.

So I mean, we have to make sure we protect ourselves, we protect the supply base as we talked about earlier. And it's different in different products across the market, obviously, the different markets, obviously. How is it being accepted. There's -- you can imagine the entire ponopoly of different responses.

Some people are worried about supply longer term. They do believe that supply will be short and demand will come back. And especially with the long, long lead times that there are on mass capacity products right now. I think, it's something that people are very much in tune with.

And so, it's forcing good discussions. There's other people for various reasons that need to make tactical procurement decisions and they'll take whatever deals that are out in front of them. And I get that. I mean, that happens from time to time in the business.

That's one of the big reasons why we don't want to overbuild. We want to make sure we hold as much as we possibly can. And as we continue to play this forward, I think we'll see and adjust accordingly to make sure that we defend our products. I think, the optimism for us is that we can actually go through the product transitions, get to the higher capacity points to provide a better TCO proposition, get components out of the supply chains and so on.

And then, we didn't dilute or extend the problem any by overbuilding or dilute the problem by continuing to overbuild and then lowering price. And that's what we have to hold on to.

Operator

The next question comes from Erik Woodring with Morgan Stanley. Please go ahead.

Erik Woodring -- *Morgan Stanley -- Analyst*

Awesome. Dave, I just wanted to ask if you could flesh out the comment you made in your prepared remarks about the timing of the demand recovery being delayed by AI investments. Just in the context of you talking about market conditions, weighing on demand through December, are you telling us we shouldn't expect sequential growth in capacity shipped until calendar '24? Just if you could help us connect some of these thoughts, that would be great.

Dave Mosley -- *Chief Executive Officer*

Thanks, Erik. Yes. And I think, I mentioned in one of the earlier comments that there will be slight capacity growth. But the way I read through most of the results that are already coming through in the cloud and in most of my conversations as well, I think it's fairly consistent that there's priorities being put on data center infrastructure, new data center build-out, power infrastructure that was already kind of -- things were biased that way instead of mass capacity storage, the mass capacity being something that would come later.

And we all know about the great new capabilities that there are in some of the compute technologies and how those new technologies are being applied in new applications. So that's

AI. And that's a high priority for cloud service providers and people doing stuff on-prem as well. We think data follows behind that.

Predicting it is gonna be really tough, but we do think that that's gonna be a bow wave at some point, there will be competition for the data that actually feeds the AI engines, if you will. Right now, there's a big battle to get the AI engines up and running and show those applications as being meaningful, and I think that's an interesting space to watch. Behind it, there's gonna be a lot of data that actually has to feed those AI engines every day, every day, every day, and we think that's mass capacity infrastructure net positive.

Operator

The next question comes from Thomas O'Malley with Barclays. Please go ahead.

Tom O'Malley -- *Barclays -- Analyst*

In the deck, you guys mentioned that you were extending your PMR platform into the mid- to upper 20 TB capacities. Could you talk about where your original plan was to extend into the mid-20s and where that is now and why you made that decision?

Dave Mosley -- *Chief Executive Officer*

Yes, Tom, there's no real change. We've been talking about it, I think, for about a year. We said we can get PMR into the mid-20s. And the product that we have now -- let me -- I'll talk about it very quickly here.

We believe that with SMR variants that can get in the high 20s, the product is in the mid-20s, but it's highly, highly leveraged. It's almost identical electronics and mechanics that takes us to HAMR. So it's almost the same product you swap out the heads and disks for HAMR and a couple of other component changes that have to happen. So we're gonna get a lot of leverage from that.

That platform has been planned for a long, long time. We called it a 10-disk platform in the prepared remarks. So I have a lot of confidence that we can solution PMR anywhere that the customer wants to stay there in the mid-20s or we can go to HAMR variants with the same bag of parts or very, very similar bag of parts. I do think that there's a lot of confusion out in the market, I'll say it this way about what capacity point, is it 24, 25, 26.

Look, there's customers who need all kinds of different variants. And I think, we confuse people, frankly, by kind of amalgamating all these things. All I will say is that I think those products that we have are very, very competitive in the market. Right now, the issue is if I added -- I'm not gonna try to force it into the market into a space that people don't need the product simply because that poisons the well for that product maybe two quarters out or three quarters after when people do need it, and it would erode the value proposition for the HAMR products when they come.

So we've got to run the business the way we are right now.

Gianluca Romano -- *Executive Vice President, Chief Financial Officer*

Yes. Let me add to that just for clarity, when we say the mid-20s is in the CMR version, if you go to the SMR version of that drive, of course, we are in the mid- to high 20s.

Operator

The next question comes from Aaron Rakers with Wells Fargo. Please go ahead.

Dave Mosley -- *Chief Executive Officer*

Aaron, sorry, we can't hear you.

Aaron Rakers -- *Wells Fargo Securities -- Analyst*

Yes, sorry about that. I just wanted to unpack some of the kind of considerations we should be thinking about in terms of gross margin as we move forward. Appreciating that you're not guiding explicitly. But I guess, first of all, if I look at the pricing discussion, based on the math, it looks like your mass capacity dollar per terabyte was up by about 10% sequentially.

I guess, as we look forward, should we be thinking that the ASP on that basis continues to trend higher? Or how much of that capacity shift, have you already kind of imposed price increases upon? And then also, when we look at the capacity shift in total with a 25% reduction in production capacity, do we take prior-peak capacity shipment levels and take 25% of that, and that should be a level for which you think you would get back to kind of that 30% gross margin level? I know there's a lot in that, but I'm just trying to think about some of the variables, looking out just not this current quarter, but beyond.

Dave Mosley -- *Chief Executive Officer*

Thanks, Aaron. I'll take my cut, and then I'll give it to Gianluca to answer. I think, as I look in at the tactics of what's going on right now, I think it's dangerous to say what changed quarter over quarter and extrapolate from there. You can draw straight lines, but I'm not sure that -- like whether we take a deal at the end of a quarter or not is a good way to think about what's gonna happen over the long haul.

We've said that pricing needs to go up or stabilize, depending on the different capacity points, the product transitions that we're going through, whether or not suppliers still want to stay around for a certain product line. I mean, there's a lot of different things to unpack there, to your point. Relative to our manufacturing capacity, we talked about 25%. Of course, that's not perfect across every single factory we have, nor is it perfect across the supply chain.

And we're only as good as our weakest link. We have to make sure those weakest links are still well cared for. And so, that's largely what's driving that. The ability to go put that capacity back online would -- is severely hampered because it's not just the capital, if you will, that we haven't invested in enough for peak capacity, but it's also the people we'd have to bring back.

I mean, unfortunately, our people and a lot of people in the supply chain have been dramatically taken down. So do you want to add something, Gianluca?

Gianluca Romano -- *Executive Vice President, Chief Financial Officer*

Yes, Aaron, you were asking about the price per terabyte in particular in Q4. That is a result also of the mix. So we have a reduction in cloud. That, of course, is our higher capacity that usually has the lowest price per terabyte, but also the lowest cost per terabyte.

And we have an increase in VIA. So mid-capacity drives with, again, higher price per terabyte and a little bit higher cost per terabyte. So there is a mix that is impacting, of course, when the volume is not very high. Just a few-exabyte difference in the different segments can swing those price and cost per terabyte.

In terms of capacity, Aaron, the 25%, I would not take the peak of where we were probably more than a year ago. We have done a lot of restructuring, a lot of adjustments. And as they said, we will need time to eventually rebuild that capacity also in terms of employees.

Dave Mosley -- *Chief Executive Officer*

Yes. We don't need to get back to the full capacity in order to get back into our margin model because we've taken so many cost actions across the business. I think, we've been very, very aggressive on that, knowing that our footprint had to change. I think, we'll be able to scale much better from a margin perspective as some of the demand comes back.

Operator

The next question comes from C.J. Muse with Evercore ISI. Please go ahead.

Unknown speaker

This is Kurt Swartz on for C.J. Open to delve into generative AI implications for both HDD and SSD demand. What is the perceived time line for storage demand uplift as data creation accelerates? And is there any concern regarding more workloads moving from HDD to flash within an AI data center paradigm?

Dave Mosley -- *Chief Executive Officer*

Yes, thanks. I don't think of things that way that people in data centers are not making decisions like you would make for example, if you're building your own PC, this or that or this combination. Instead, they know how to manage data across multiple tiers and geographies very, very well. And make sure that the right data gets the right place at the right time.

There are some gen AI discussions that are very transactional and probably don't need a whole lot of HDD and there's a lot that are very video-intensive and want data to be sequestered in a certain tank and so that nothing else can touch it. And we believe that's gonna be that normal tier that you see today. So I think, it's a win-win for memory and storage long term. Obviously, it's win for compute.

And I think, as some of these new applications are lit up, I'm really excited to see it. We haven't seen it yet. I mean, unless you start to look back at some traditional cloud service provider capabilities and say that all along that was AI. But I do think there's a whole host of new tools coming.

It will be a very competitive space. And the data tiering infrastructure will become a critical part of that as we go forward.

Operator

The next question comes from Karl Ackerman with BNP. Please go ahead.

Karl Ackerman -- *Exane BNP Paribas -- Analyst*

I have two questions. First, I may have missed this, but why did average capacity per drives for the mass capacity area of your business shrink this quarter? And then, second, I guess, how should we think about mass capacity unit growth from here? And where do you believe we are in the replacement cycle and whether that should continue to elongate or whether that returns to some form of normal from a unit perspective?

Dave Mosley -- *Chief Executive Officer*

Thanks, Karl. So we are not overbuilding, especially the high capacity drives are trying to push out into some of the cloud service providers. We're waiting until the inventory actually goes down. And so, I think that's why -- and I made reference to this earlier, that's why some of the metrics may look weird, like you just pointed out on capacity per drive diving down.

I don't think that's a long-term trend either. I think, of course, that's gonna go back up.

Gianluca Romano -- *Executive Vice President, Chief Financial Officer*

Yes. The average capacity is down because of mix. So as I said before, in the June quarter, we shipped less to cloud and more to VIA. And of course, the capacity is much higher in the cloud business.

Dave Mosley -- *Chief Executive Officer*

I'm sorry, Karl, what was the second part of your question?

Karl Ackerman -- *Exane BNP Paribas -- Analyst*

Yes. Sorry about that. It's about how we should think about mass capacity unit growth from here? And where do you believe we are in the replacement cycle? I asked because it appears your mass capacity unit shipments peaked in the first quarter of 2022. So it's been about five consecutive quarters of decline.

At the same time, the units are down over two-thirds in that same period. And so, if we could just discuss perhaps the corollary between units and exabyte growth. I think, it's relevant here would be helpful.

Dave Mosley -- *Chief Executive Officer*

There are hundreds of -- sorry, hundreds of millions of cloud drives, if you will, in data centers around the world. And some of them are aging to your point. And if unit shipments go down, exabytes can still go up even though unit shipments are going down because the ones that are aging off or lower capacity points, say, 4, 8, 12 terabytes, whatever. But over time, it's much more efficient.

Actually, it's more efficient power-wise and for a lot of other features, system-level features to put the newer drives on. So it's about all these things in balance. And I do believe that unit shipments are down largely because of this inventory digestion that we've been talking about. That will turn again.

Will it go back to the peak of where it was five or six quarters ago and how fast will it go back? These are tough questions for our customers right now. It comes down to their prioritization of their spend. But all indications are in the latest numbers. And if I think about these latest numbers that the cloud service providers are announcing versus where they were six to nine months ago, there is a very positive trend.

And I think, to the questions about gen AI and other feature sets, we're not a peak cloud yet. So I do think it will come back fairly strongly from a units perspective when it does.

Operator

The next question comes from Tristan Gerra with Baird. Please go ahead.

Tristan Gerra -- *Robert W. Baird and Company -- Analyst*

Couple of questions. The first one is about the production cost curve. And if you could talk about the percentage decline per year that we should expect in the medium term on a per-bit basis? And then, second question about is the percentage of production that's coming from China and also the true demand that you see from China as a percentage of your revenue?

Dave Mosley -- *Chief Executive Officer*

I think, the relative -- I can answer the China question first and then Gianluca can take the cost discussion. China is down quite a bit, but relatively as part of our portfolio, it's about the same relative numbers that it was even when the peak of our portfolio. So I wouldn't overly analyze China versus CSPs versus consumer spending and all these other things that have affected our revenue downturn, I think it's a fairly consistent number across the entire portfolio. And we're looking for demand upswings in every one of those sections, as well as we go forward, but we're also managing the business really carefully because we don't think it's gonna come back in the next six months, like we said in our prepared remarks.

Gianluca Romano -- *Executive Vice President, Chief Financial Officer*

The cost per terabyte of course, we don't guide the full year. What I would say is in a down cycle, it depends a lot from the level of utilization that you have in your factories, so can vary a lot from one quarter to another quarter. In general, no, we are continuing to do our product road map. And as Dave said, we have a new PMR product coming out soon, higher capacity, that means lower cost per terabyte.

And then, we will have HAMR in just a couple of quarters. So all those new products will help us in reducing the cost per terabyte.

Dave Mosley -- *Chief Executive Officer*

I like our chances in the cost per-terabyte arena going forward. And I think, as we continue to work yields and scrap on these new products and so on, have the highest capacity points out there, have the ability to take that areal density to lower capacity points as well, it helps our cost per terabyte immensely.

Operator

The next question comes from Mehdi Hosseini with Susquehanna. Please go ahead.

Mehdi Hosseini -- *Susquehanna International Group -- Analyst*

Yes. A couple of follow-ups. Given your lower opex less rounded to 160, how should I think about scaling, especially on the revenue side before you would need to increase opex materially?

Dave Mosley -- *Chief Executive Officer*

Yes, Mehdi. I think, we can hold the line on where we are right now and get a lot of scale. I mean, we've been through the product transition far enough on the PMR product and HAMR product that we can -- we're pretty much done with the development phases, all the experimentation and so on and so forth. So I don't think we need to grow opex until we build back quite a bit of revenue and so we'll get very efficient scale there.

I appreciate the question.

Mehdi Hosseini -- *Susquehanna International Group -- Analyst*

And then, for Gianluca, should I assume that free cash flow would be down in September and then up in December?

Gianluca Romano -- *Executive Vice President, Chief Financial Officer*

Well, in general, no, we have generated good free cash flow through all our quarters. I said in the prepared remarks, September would be a little bit lower because we have to pay for the restructuring charges that we executed in end of June and during July. But no, we also said we expect every quarter to be positive.

Mehdi Hosseini -- *Susquehanna International Group -- Analyst*

Maybe you're negative just sequentially, down in September and then rebounding in December on a sequential basis.

Gianluca Romano -- *Executive Vice President, Chief Financial Officer*

Better. Yes, better point. On the opex, I want to just clarify, we don't have variable compensation right now in our numbers. So we could have a little bit of increase in the future if the business comes back stronger, just a little bit, not much.

Operator

The next question comes from Mark Miller with the Benchmark Company. Please go ahead.

Mark Miller -- *The Benchmark Company -- Analyst*

I'm just wondering if -- it sounds like the PMR is going further than I originally thought it would be. Is this a change? Or was that always in your plan?

Dave Mosley -- *Chief Executive Officer*

It was always in the plan. Yes. I think, Mark, we've kind of been focused on 16, 20, 24 and bringing on the technology that way. We believe we have great heads of media on PMR.

It's getting toward the top end of the curve, right? So it's harder and harder to squeeze things out. And we've worked really hard to make sure that the drive that was taking us there would also take us to HAMR. So we're leveraging as much as we possibly can and then only changing the areal density critical components that get us the areal density to get us into the 30s and building much more confidence on that new S curve actually as time goes on. So I'm convinced there's gonna be 40-terabyte drives in the world, not too distant future.

And we've talked about the capabilities of these things in the lab. We're ready to go 5 terabytes per disk. So teams incrementally more positive every time. So that's good.

The teams are making progress.

Mark Miller -- *The Benchmark Company -- Analyst*

Is there any specific technology advance that's allowing you to push that now up to almost 30 terabytes?

Dave Mosley -- *Chief Executive Officer*

Sorry, you mean beyond HAMR?

Mark Miller -- *The Benchmark Company -- Analyst*

I mean, taking the PMR up to the high 20s in terms of terabytes, anything new in the technology and any breakthroughs or advancements.

Dave Mosley -- *Chief Executive Officer*

Well, we're always working new readers designs that are applicable to go to 30- and 40-terabyte drives as well. It's not only about the right technology, if you will. There's -- because PMR is implying the write technology. That's write with the WRITE.

You know that. So it's not a HAMR just versus PMR. There's other technology things that are being worked. Technology vectors are being worked.

But mid-20s is CMR, high 20s has been SMR, and there's many different kinds of SMR variants for different customers. So I think, you have to be a little bit careful with picking individual capacity points. And by the way, HAMR can use SMR as well on top of it. So when we get into the 30s, there might be that same kind of spread of capacity points because of how people are choosing to deploy HAMR in their data centers.

Operator

The last question today comes from Vijay Rakesh with Mizuho. Please go ahead.

Vijay Rakesh -- *Mizuho Securities -- Analyst*

Just quick two questions. Just when you look at HAMR, obviously, ramping well, any way of looking at what the exabyte mix would be as you look at calendar '24 or even calendar '25?

Dave Mosley -- *Chief Executive Officer*

Yes. I do think that as we -- and this is a delicate balance between the capacity we'll still have to make drives, the lead times associated with those big drives and the economic returns that we're gonna be getting, so how many do we start now, how many parts do we start now to be able to answer that. But theoretically, with HAMR allowing us to jump quite a bit in exabytes per box, if the demand is strong enough, then the exabyte growth will be strong, very strong. So a lot of this first order driver is still demand, we're gonna answer that call with the components that we have.

We're very much leaning into the product transition on HAMR because we have that much confidence. I think, the customer's qualification is going well and the customer interest is high because they see such a market TCO proposition as well. And if all that stuff lines up into good box demand, like somebody asked earlier, that means good exabyte growth. That's what we're all hoping for.

Vijay Rakesh -- *Mizuho Securities -- Analyst*

Got it. And then, on the data center inventory side, any way to kind of gauge how much -- how many weeks of inventory is still there? And how that compares to the prior [inaudible] I guess, in the inventory or --

Dave Mosley -- *Chief Executive Officer*

Right. It's not an exact science. I would say we have evidence that it's going down, not only that's what people are telling us, our customers are telling us, but also we're not putting any in. So definitely, the Seagate inventory is going down.

We're even managing our owned inventory down as well, I can't speak for the rest of the industry. But all indications are that things are getting healthier and -- but we don't think that it's gonna be fixed overnight. We think it's gonna take another couple of quarters before the upturn. And that's something that I'm very cognizant of.

We didn't project originally going into this downturn that this would be this long, but I don't think it's gonna last forever either. I think, it will turn north again here. We just basically said not until the end of the calendar year.

Operator

This concludes our question-and-answer session. I would like to turn the conference back over to management for any closing remarks.

Dave Mosley -- *Chief Executive Officer*

Thanks, Betsy. As you heard today, Seagate is continuing to take proactive actions to navigate this tough business environment over the near term. However, we remain excited as ever for the long-term opportunities for mass capacity storage, and it's brought about by existing and emerging trends that are underpinned by data like AI, like we talked about today. Our leading technology road map positions us really well to address future demand and enhance value for both our customers and for Seagate's financial performance.

I'll close by thanking all of our stakeholders for their ongoing support. Thanks for joining us today.

Operator

[Operator signoff]