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Earnings Call

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PRESENTATION

Jeff Su - *Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations*

(spoken in foreign language)

good afternoon, everyone, and welcome to TSMC's first quarter 2025 earnings conference call. This is Jeff Su, TSMC's Director of Investor Relations and your host for today.

TSMC is holding our earnings conference call via live audio webcast through the company's website at www.tsmc.com, where you can also download the earnings release materials. If you are joining us through the conference call, your dial-in lines are in listen-only mode.

The format for today's event will be as follows: First, TSMC's Senior Vice President and CFO, Mr. Wendell Huang, will summarize our operations in the first quarter 2025, followed by our guidance for the second quarter 2025. Afterwards, Mr. Huang and TSMC's Chairman and CEO, Dr. C.C. Wei, will jointly provide the company's key messages. Then we will open the line for questions and answers.

As usual, I would like to remind everybody that today's discussions may contain forward-looking statements that are subject to significant risks and uncertainties, which could cause actual results to differ materially from those contained in the forward-looking statements.

Please refer to the safe harbor notice that appears in our press release. And now I would like to turn the call over to TSMC's CFO, Mr. Wendell Huang, for the summary of operations and the current quarter guidance.

Wendell Huang - *Taiwan Semiconductor Manufacturing Co Ltd - Senior Vice President and Chief Financial Officer*

Thank you, Jeff. Good afternoon, everyone. Thank you for joining us today. My presentation will start with financial highlights for the first quarter 2025. After that, I will provide the guidance for the second quarter of 2025.

First quarter revenue decreased 3.4% sequentially in NT dollars or 5.1% in US dollars as our business was impacted by smartphone seasonality, partially offset by continued growth in AI-related demand. In spite of the January 21 earthquake and several aftershocks, we work diligently to recover much of the lost production. Thus, our revenue in the first quarter was slightly above the midpoint of our guidance.

Gross margin decreased 0.2-percentage-point sequentially to 58.8%, primarily due to the earthquake impact as well as the start of overseas dilution, partially offset by the cost improvement efforts.

Total operating expenses accounted for 10.2% of net revenue. Operating margin decreased 0.5-percentage-point sequentially to 48.5%. Overall, our first quarter EPS was TWD13.94 and ROE was 32.7%.

Now let's move on to revenue by technology. 3-nanometer process technology contributed 22% of wafer revenue in the first quarter, while 5-nanometer and 7-nanometer accounted for 36% and 15%, respectively. Advanced technologies, defined as 7-nanometer and below, accounted for 73% of wafer revenue.

Moving on to revenue contribution by platform. HPC increased 7% quarter-over-quarter to account for 59% of our first quarter revenue. Smartphone decreased 22% to account for 28%, and IoT decreased 9% to account for 5%. Automotive increased 14% and accounted for 5% and DCE increased 8% to account for 1%.

Moving on to the balance sheet. We ended the first quarter with cash and marketable securities of TWD2.7 trillion or USD81 billion. On the liability side, current liabilities increased by TWD135 billion quarter-over-quarter, mainly due to the increase of TWD111 billion in accrued liabilities and others. The increase in accrued liabilities and others was mainly due to the accrual of income tax payables. On financial ratios, accounts receivable turnover days increased 1 day to 28 days. Days of inventory increased 3 days to 83 days, primarily due to the ramping of new overseas fabs.

Regarding cash flow and CapEx. During the first quarter, we generated about TWD626 billion in cash from operations, spent TWD331 billion in CapEx and distributed TWD104 billion for second quarter 2024 cash dividend. In addition, we raised TWD16 billion in cash from bond issuances.

Overall, our cash balance increased TWD267 billion to TWD2.4 trillion at the end of the quarter. In US dollar terms, our first quarter capital expenditures totaled USD10.06 billion.

I finished my financial summary. Now let's turn to our current quarter guidance. Based on the current business outlook, we expect our second quarter revenue to be between USD28.4 billion and USD29.2 billion, which represents a 13% sequential increase or a 38% year-over-year increase at the midpoint. Based on the exchange rate assumption of USD1 to TWD32.5, gross margin is expected to be between 57% and 59%, operating margin between 47% and 49%.

Also, in the second quarter, we will need to accrue the tax on the undistributed retained earnings. As a result, our second quarter tax rate will be around 20%. The tax rate will then fall back to 14% to 15% level in the third and fourth quarter, and the full year tax rate will be between 16% and 17%. This concludes my financial presentation.

Now, let me turn to our key messages. I will start by talking about our first quarter '25 and second quarter of '25 profitability. Compared to fourth quarter, our first quarter gross margin slightly decreased by 20 basis points sequentially to 58.8%. This was primarily due to 60 basis points impact from the January 21 earthquake and its aftershocks as well as the start of dilution from our Kumamoto fab, partially offset by cost improvement efforts.

We have just guided our second quarter gross margin to decrease by 80 basis points to 58% at the midpoint, primarily as the margin dilution impact from our Arizona fab starts to kick in. We expect the impact from overseas fab to grow more pronounced throughout the year, as we ramp up further in Kumamoto and Arizona and forecast 2% to 3% margin dilution impact for the full year 2025.

As we have said before, under today's fragmented globalization environment, overseas fab costs are higher for everyone, including TSMC and all other semiconductor manufacturers. With our additional \$100 billion investment plan in Arizona, we forecast the gross margin dilution from the

ramp-up of our overseas fabs in the next five years to start from 2% to 3% every year in the early stages and widened to 3% to 4% in the latter stages.

We will leverage our increasing size in Arizona and work on our operations to improve the cost structure. We will also continue to work closely with our customers and suppliers to manage the impact. Overall, with our fundamental competitive advantages of manufacturing technology leadership and large-scale production base, we expect TSMC to be the most efficient and cost-effective manufacturer in the region that we operate. Thus, even considering our global manufacturing expansion plans, we believe a long-term gross margin of 53% and higher is achievable.

Next, let me talk about our 2025 capital budget. At TSMC, a higher level of capital expenditures is always correlated with higher growth opportunities in the following years. We reiterate our 2025 capital budget is expected to be between USD38 billion and USD42 billion as we continue to invest to support customers' growth. About 70% of the capital budget will be allocated for advanced process technologies. About 10% to 20% will be spent for specialty technologies and about 10% to 20% will be spent for advanced packaging, testing, mask-making and others.

Our 2025 CapEx also includes a small amount related to our recently announced additional \$100 billion investment plan to expand our capacity in Arizona. Even as we invest for the future growth with this level of CapEx spending in 2025, we remain committed to delivering profitable growth to our shareholders. We also remain committed to a sustainable and steadily increasing cash dividend per share on both an annual and quarterly basis.

Now let me turn the microphone over to C.C.

C.C. Wei - *Taiwan Semiconductor Manufacturing Co Ltd - Chairman and Chief Executive Officer*

Thank you, Wendell. Good afternoon, everyone. First, let me start with our near term demand outlook.

But before that, I would like to mention the earthquake during Lunar New Year. On January 21, Taiwan experienced a 6.4 magnitude earthquake on the Richter scale, followed by several significant aftershocks. Although a certain number of wafers in process were impacted and had to be scrapped, we worked tirelessly and were able to recover much of the lost production, demonstrating the resiliency of our operation in Taiwan.

I want to recognize and deeply thank all of our employees and our suppliers for their dedication and hard efforts over the Lunar New Year holidays. I would also like to extend our great appreciation to our customers for their understanding and support during this time.

Now, let me talk about the first quarter as a result. We conclude our first quarter with revenue of USD25.5 billion. Our business in the fourth quarter was impacted by smartphone seasonality, partially offset by continued growth in AI related demand.

Moving into second quarter 2025, we expect our business to be supported by strong growth of our 3-nanometer and 5-nanometer technologies.

Looking at the full year of 2025, we expect Foundry 2.0 industry growth to be supported by robust AI related demand and a mild recovery in other end market segments. In January, we had a forecast of Foundry 2.0 industry to grow [10%] (corrected by company after the call) year over year in 2025, which is consistent with the IDC's forecast of 11% year over year growth for Foundry 2.0.

Now, let me talk about the recent tariff. We understand there are uncertainties and risks from the potential impact of tariff policies. However, we have not seen any change in our customers' behavior so far. Therefore, we continue to expect our full year 2025 revenue to increase by close to mid-20s percent in US dollar terms.

We might get a better picture in the next few months, and we will continue to closely monitor the potential impact to the end market demand and manage our business prudently. Amidst the uncertainties, we will continue to focus on fundamentals of our business, which are technology leadership, manufacturing excellence, and customer trust to further strengthen our competitive position. As such, we are confident TSMC can continue to outperform the Foundry 2.0 industry growth in 2025.

Now, I will talk about our AI demand outlook. We continue to observe robust AI related demand from our customers throughout 2025. We reaffirm our revenue from AI accelerators to double in 2025. The AI accelerators we define as AI GPU, AI ASIC, and HBM controllers for AI training and inference in the data center.

Based on our customers' strong demand, we are also working hard to double our CoWoS capacity in 2025 to support their needs. Recent developments are also positive to AI's long-term demand outlook. In our assessment, the impact from reasoning models, including DeepSeek, will drive greater efficiency and help lower the barriers to future AI development. This will lead to wider usage and greater adoption of AI models, which all require use of leading-edge silicon. These developments will serve to strengthen our conviction in the long-term growth opportunities from the industry megatrend of 5G, AI and HPC.

To address the structural increase in the long-term market demand profile, TSMC employed a disciplined and [thorough] (corrected by company after the call) capacity planning system. This is especially important when we have such high forecasted demand from AI-related business. Externally, we work closely with our customers and our customers' customers to plan our capacity. Internally, our planning system involves multiple teams across several functions to assess and evaluate the market demand, from both top-down and bottom-up approach, to determine the appropriate capacity to build. Based on our planning framework, we are confident that our revenue growth from AI accelerators will approach a mid-40s-percentage CAGR for the next five years period starting from 2024.

Next, let me talk about TSMC's additional USD100 billion investment plan to expand in Arizona. All our overseas decisions are based on our customers' need, as they value some geographic flexibility, and necessary level of government support. This is also to maximize the value for our shareholders.

With a strong collaboration and support from our leading US customers and the US Federal, state, and city government, we recently announced our intention to invest an additional USD100 billion in advanced semiconductor manufacturing in the United States.

This expansion includes plans for three additional wafer manufacturing fabs, two advanced packaging fabs, and a major R&D center. Combined with our previously announced plan to build three advanced semiconductor manufacturing fabs in Arizona, this brings our total investment in the US to USD165 billion to support the strong multi-year demand from our customers.

Our first fab in Arizona has already successfully entered high-volume production in 4Q '24, utilizing N4 process technology, with a yield comparable to our fabs in Taiwan. The construction of our second fab, which will utilize the 3-nanometer process technologies, is already complete, and we are working on speeding up the volume production schedule, based on the strong AI-related demand from our customers.

Our third and fourth fab will utilize N2 and A16 process technologies, and with the expectation of receiving all the necessary permits, is scheduled to begin construction later this year. Our fifth and sixth fab will use even more advanced technologies. The construction and ramp schedule for this fab will be based on our customers' demand.

We also plan to build two new advanced packaging facilities and an R&D center in Arizona to complete the AI supply chain. Our expansion plan will enable TSMC to scale up to a GIGAFAB cluster, to support the needs of our leading-edge customers in smartphone, AI, and HPC applications.

With this additional USD100 billion investment plan to expand our leading-edge capacity in Arizona, I would also like to mention that TSMC is not engaged in any discussions with other companies regarding any joint venture, technology licensing, or technology transfer and sharing.

After completion, around 30% of our 2-nanometer and more advanced capacity will be located in Arizona, creating an independent leading semiconductor manufacturing cluster in the US. It will also create greater economies of scale and help foster a more complete semiconductor supply chain ecosystem in the US. Thus, TSMC continues to play a critical and integral role in enabling our customers' success, while remaining a key partner in enabling the strength and leadership of the US semiconductor industry.

Next, in Japan, thanks to the strong support from the Japan central, prefecture, and local governments, our first specialty technology fab in Kumamoto has already started volume production in late 2024 with a very good yield. The construction of our second specialty fab is scheduled to start later this year, subject to the readiness of the local infrastructure.

In Europe, we have received strong commitment from the European Commission and the German Federal, state, and city government. We are on track with our plan to build a specialty technology fab in Dresden, Germany.

In Taiwan, with support from the Taiwan government, we plan to build 11 wafer manufacturing fabs and four advanced packaging facilities over the next several years. Volume production of N2 is expected to start in second half 2025, and we are preparing for multiple phases of 2-nanometer fabs in both Hsinchu and Kaohsiung Science Parks to support the strong structural demand from our customers.

By expanding our global footprint while continuing investment in Taiwan, TSMC can continue to be the trusted technology and capacity provider of the global logic IC industry for years to come, while delivering profitable growth for our shareholders.

Finally, I'll talk about our N2 status and A16 introduction. 2-nanometer and A16 technology leads the industry in addressing the insatiable need for energy-efficient computing and almost all the innovators are working with us.

We expect the number of new tape-outs for 2-nanometer technology in the first two years to be higher than both 3-nanometer and 5-nanometer in their first two years, fueled by both smartphone and HPC applications.

N2 will deliver full node performance and power benefits with 10-15% speed improvement at the same power or [25]% (corrected by company after the call) to 30% power improvement at the same speed and more than 15% chip density increase as compared with N3E. N2 is well on track for volume production in the second half of 2025 as scheduled, with a ramp profile similar to N3. With our strategy of continuous enhancement, we also introduced N2P as an extension of N2 family. N2P features further performance and power benefits on top of N2 and volume production is scheduled for second half 2026.

We also introduced A16, featuring super power rail or SPR, as a separate offering. Compared with the N2P, A16 provides a further 8% to 10% speed improvement at the same Power, or 15% to 20% power improvement at the same speed, and additional 7% to 10% chip density gain. A16 is best suited for specific HPC products with complex signal route and dense power delivery network. Volume production is scheduled for second half 2026.

We believe N2, N2P, A16, and its derivatives will further extend our technology leadership position enable TSMC to capture the growth opportunities into the future.

This concludes our key message, and thank you for your attention.

QUESTIONS AND ANSWERS

Jeff Su - Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations

Thank you, C.C. This concludes our prepared statements. (Event Instructions)

Now let's begin the Q&A session. Operator, can we please proceed with the first caller on the line?

Operator

Gokul Hariharan, JPMorgan.

Gokul Hariharan - *JPMorgan - Analyst*

And first of all, thanks for clearing the air on all those JV-related news reports. I think a lot of people needed that. My first question is on AI demand. So C.C., there has been a lot of talks about CoWoS order adjustment and some concerns about AI demand.

You talked about CoWoS capacity doubling. Could you talk a little bit about how you see demand versus supply? I think last time we talked about this, you did indicate CoWoS demand is still well above supply. Could you talk a little bit about how the situation is looking for CoWoS demand versus supply this year? And maybe a little bit of early color on 2026 also as you plan for the capacity?

Jeff Su - *Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations*

All right. Thank you, Gokul. For everyone's benefit, let me try to summarize your first question. So again, Gokul's first question is on the AI-related demand. He notes there's been a lot of noise around CoWoS and order cuts and such.

So he would like to ask C.C. what is the thinking or strategy for TSMC CoWoS still doubling this year? Is the demand still exceeding the supply? And how is the CoWoS capacity and supply or supply and demand, I should say, look like going into '26, if C.C. is able to provide any color?

C.C. Wei - *Taiwan Semiconductor Manufacturing Co Ltd - Chairman and Chief Executive Officer*

Okay. Gokul, I know there're a lot of rumors about the CoWoS. The last time when we talk about the CoWoS, the demand is almost insane and much, much higher than we can prepare. And now it's a little bit better. I think still we need to build a lot of capacity to meet the demand.

As I said, we have to double our CoWoS capacity. Still fully loaded. And for 2026, I cannot say the number, but it's still a healthy momentum while we continue. Okay. Did that answer your question?

Gokul Hariharan - *JPMorgan - Analyst*

So do you still think 2026 is going to be supply limited still, that demand is still going to be much more than supply even in 2026. Is that your current expectation you see?

Jeff Su - *Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations*

So Gokul was asking, then do we still see demand exceeding supply for CoWoS in 2026?

C.C. Wei - *Taiwan Semiconductor Manufacturing Co Ltd - Chairman and Chief Executive Officer*

Well, we will work very hard to make sure that we don't have this demand much, much higher than the capacity. We're working very hard, and I believe that it will be more balanced next year.

Gokul Hariharan - *JPMorgan - Analyst*

My second question is on the US. investment and all this like persistent rumors about involvement in your competitors, operations, et cetera. You have interacted with the US government, the new administration for the last several months and C.C. made a big announcement at the White House as well. Just wanted to understand what is -- what does TSMC's impression in terms of what is required? Now that there is also the semiconductor tariffication going on. What is TSMC's impression of what is required over the next two years in terms of reshoring of capacity both from a US administration's perspective and also from your US customers' perspective.

And I also -- I think Wendell also indicated that the margin dilution may be slightly bigger as we go along. So could you talk a little bit about how much of the value can you pass on to the customers as the expansion becomes a little bit more accelerated?

Jeff Su - *Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations*

Okay. So Gokul's second question is a bit involved, but he's asking about again, a lot of talk about our recent announcement for an additional \$100 billion expansion in the US again, talk about this involving a competitor. C.C. has been speaking to the US government. There's still potential semiconductor tariff. So his question is really from TSMC's point of view, what do we think is required for more onshoring in the US? Can we share the perspective from the US government? Or more directly what our customers are asking us to do in terms of reshoring?

That's the first part. And the second part will -- maybe Wendell can address on them, too.

C.C. Wei - *Taiwan Semiconductor Manufacturing Co Ltd - Chairman and Chief Executive Officer*

Really, Okay. I thought that's a very long, long question. Let me answer that. Yes, we -- indeed, we have talked with US government officials. And the reason we are expanding in Arizona actually, let me say again, it's all because of our customers' request. And that because of the very high, high demand. I announced it in other occasion that very strong AI demand from US customers such as Apple, NVIDIA, AMD, Qualcomm and Broadcom. And so that we need to expand our capacity in the US and to support them.

We talked with the US government and to ask for their help in getting the necessary permits so we can start the fab. And as a result, I would expect our 2-nanometer [and more advanced] (added by company after the call) capacity, around 30% will be in Arizona. And that will be also independent leading-edge semiconductor manufacturing cluster.

Jeff Su - *Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations*

And then, Gokul, the second part of your question is related to the -- sorry, Wendell had mentioned that the margin may widen. So Gokul's second part of the question, I think, was related to pricing and what is our strategy or approach here as we expand overseas. Is that correct?

Gokul Hariharan - *JPMorgan - Analyst*

Yes, that's right. Yeah.

Wendell Huang - *Taiwan Semiconductor Manufacturing Co Ltd - Senior Vice President and Chief Financial Officer*

You're asking about the pricing. As we always said, reflecting our value is a continuous and ongoing process for TSMC as well in a very capital-intensive business. So we need to have a very high gross margin to earn the sustainable and healthy return.

And that is why we set up our pricing strategy. Geographic manufacturing flexibility is an important part of our value proposition to the customers. We are already discussing this with our major customers, and the progress is so far so good.

Jeff Su - *Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations*

Okay. Gokul?

Gokul Hariharan - *JPMorgan - Analyst*

Okay. Understood.

Jeff Su - *Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations*

All right. Thank you. Operator, can we move on to the next participant, please?

Operator

Bruce Lu, Goldman Sachs.

Bruce Lu - *Goldman Sachs LLC - Analyst*

I think the geopolitics is one of the major uncertainty nowadays. Last two days, we have like H2O being banned in China. So how does that impact TSMC's forecast and production planning, right? Do we have enough other customer and demand to keep our advanced node capacity fully utilized? Or how does that change our long-term production planning moving forward?

Jeff Su - *Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations*

Your first question is related. He's talking about geopolitical risk or I guess some of the recent rules and announcements specifically the ban on H2O. So his question is how does this impact TSMC's business? How does this impact capacity planning and our strategies?

C.C. Wei - *Taiwan Semiconductor Manufacturing Co Ltd - Chairman and Chief Executive Officer*

Let me answer this question. Of course, we do not comment on specific customer product, but let me assure you that we have taken this into consideration when providing our full year growth outlook. Did I answer the question?

Bruce Lu - *Goldman Sachs LLC - Analyst*

Yes, but I want a little bit more about -- I'm sure you guys did a lot of sensitivity analysis, like what impact is going to be? Or can you show us like how much buffer we got, that you've assumed, like how comfortable we have to maintain our current capacity planning moving forward or current utilization right now?

Jeff Su - *Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations*

Okay. So Bruce is asking for some more color in terms of what type of buffer or what type of room we have in making our decisions for the long-term capacity planning.

C.C. Wei - *Taiwan Semiconductor Manufacturing Co Ltd - Chairman and Chief Executive Officer*

Well, actually, we know a lot of people right now speculate a lot of things. But again, we certainly -- we are mindful of the potential impact from all the recent tariff announcements, especially the potential impact to the end market demand. We'll continue to watch it carefully.

Having said that, we have not seen any change in our customers' behavior so far. And so we stick on our forecast.

Bruce Lu - Goldman Sachs LLC - Analyst

I see. Let me switch gears a little bit for the non-US capacity expansion. I think yes, as we understand that the current capacity for mature node is under-utilized. Do we consider to slow down the capacity essentially in Japan or Europe?

Or just relocate the current equipment from Taiwan to Japan or Europe instead of building the new one? We don't want -- why do we want to expand the capacity for the mature nodes, which management already mentioned as the oversupply industry though. If we relocate them, we can squeeze more space, clean room in Taiwan for more advanced nodes.

Jeff Su - Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations

Okay. So Bruce, the second question is around mature node and our expansion into Europe and Japan. His question really is given that the capacity of mature node 7-nanometer underutilized. Number one, are we concerning to slow down our expansions in these places? And then number two, would we consider using current relocate equipment from Taiwan to overseas rather than just the pure new extension or greenfield expansion?

C.C. Wei - Taiwan Semiconductor Manufacturing Co Ltd - Chairman and Chief Executive Officer

Bruce, let me answer the first part of the question. Are we considering in slowing down, the answer is no. We executed our plan as scheduled. The reason is very simple, because of this kind of mature node is a specialty technologies' demand, which my competitors did not have capacity or capability to support. So it's kind of free from as you mentioned under-loading mature nodes. So again I would emphasize, no, we are not going to slow down our plan in Japan or in Germany.

The second question is how to do it. We have a good idea, but it's TSMC's confidential information. I'll let you know later.

Jeff Su - Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations

All right. Thanks, Bruce. Operator, can we move on to the next participant, please.

Operator

Charlie Chan, Morgan Stanley.

Charlie Chan - Morgan Stanley Asia Ltd. - Analyst

My first question is really very specific on the semiconductor tariffs on either Taiwan or TSMC's leading edge. So I'm wondering, first of all, does the TSMC get involved in all those tariff negotiations between Taiwan government and the US government?

And secondly, do you believe that your commitment of USD165 billion investments can get us spare on these semiconductor tariff? Because in your previous comment, it seems to only concerned about the tariff impact on consumer tech demand. But I think global investors are also very concerned about additional tariffs on this semiconductor category. Can you give us some color?

Jeff Su - Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations

Okay. Let me summarize your question. First question, Charlie. So Charlie's first question is on semiconductor tariffs. He wants to know what is our comment or view on potential tariffs on Taiwan, reciprocal tariffs or semiconductor-specific tariffs.

His question specifically, is TSMC get involved in in negotiations between the Taiwan government and the US government?

C.C. Wei - *Taiwan Semiconductor Manufacturing Co Ltd - Chairman and Chief Executive Officer*

Charlie, this tariff discussion is between countries. We are a private company. Certainly, no, we are not getting involved. What is the second question?

Charlie Chan - *Morgan Stanley Asia Ltd. - Analyst*

Okay. Yeah. So actually, do you have any visibility that the semiconductor specific tariffs can be exempt?

Jeff Su - *Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations*

Sorry, Charlie, I think your question was with our total investment of USD165 billion in Arizona. Do we believe, does TSMC believe semiconductors will be exempt from these tariffs?

C.C. Wei - *Taiwan Semiconductor Manufacturing Co Ltd - Chairman and Chief Executive Officer*

Charlie, all policy especially this tariff decision are government's responsibility to decide. And as a private company, we are fully respectful of this, but we are not get involved.

Charlie Chan - *Morgan Stanley Asia Ltd. - Analyst*

Okay. Got you. I think you were too moderate, but let's move on to my second question. So based on your second quarter guidance, which is very strong, up 13% quarter-on-quarter. I can't help to think whether there are customers pull-in given the tariffs. Or is it real demand?

And also based on your full year guidance, so called the mid-20%, it seems like second half recovery will be very, very gradual or flattish. So I'm wondering if you already bake in consumer tech demand impact. And if a tariff have some turnaround, right, meaning some exemption on, for example, major smartphone brands, whether there's a chance for you to revise your full year revenue guidance?

Jeff Su - *Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations*

Okay. So Charlie, second question is on the revenue outlook is first part is on the second quarter. He noted second quarter, 13% at the midpoint in US dollar terms, Q-on-Q is very strong. So he wonders, is this -- are we seeing already some tariffs pull-in impact? Or is this part of that guidance? I'll stop here first.

Wendell Huang - *Taiwan Semiconductor Manufacturing Co Ltd - Senior Vice President and Chief Financial Officer*

Yeah, Charlie, we have -- as we said in the prepared remarks, we haven't seen any changes in customers' behavior so far. Our second quarter growth was driven mainly by strong demand for the 3-nanometer and 5-nanometer technologies underpinned by the growth in our HPC platform. As I said, we haven't seen any -- observed any changes in customer behavior in terms of pull-in or due to tariff tariffs, you're probably better to ask them directly.

Jeff Su - *Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations*

And the second part then Charlie is asking about what the second quarter guidance implies limited half-on-half growth. So is that also because we are assuming something from tariff impact to consumer demand? Or why is that?

Wendell Huang - *Taiwan Semiconductor Manufacturing Co Ltd - Senior Vice President and Chief Financial Officer*

Charlie, as we also said in the prepared remarks, there are uncertainties and potential risk from tariffs exist. So, so far, that's what we are able to share with you is we stick to the mid-20 or close to mid-20% year-over-year growth. No different from the previous quarter.

Charlie Chan - *Morgan Stanley Asia Ltd. - Analyst*

I see. So yeah, so I think that's real. But I think your answer to Gokul's previous question on long-term margin dilution was a little bit unclear because we thought that a 2% to 3% margin dilution from overseas should remain to be the case, but it seems like it's widening. So I'm not sure if you use because you are further accelerating your US fab expansion or some cost item or pricing item or not in your stations versus maybe one or two months ago.

Jeff Su - *Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations*

Okay. I think, so Charlie is asking basically how come the dilution in the latter period widens to 3% to 4%? What are the drivers or reasons behind it?

Wendell Huang - *Taiwan Semiconductor Manufacturing Co Ltd - Senior Vice President and Chief Financial Officer*

Yeah, Charlie, the widening of dilution on the gross margin in the later part of the five-year period is mainly from inflation in cost and also potential tariff-related cost increases. Those are the reasons.

Jeff Su - *Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations*

Okay. Operator, let's move on to the next participant, please. .

Operator

Charles Shi, Needham.

Charles Shi - *Needham & Company, LLC - Analyst*

Maybe I'll ask a relatively higher level question. It's a two-part question. Both are regarding your expansion plan in the United States. I think management – in another occasion that what TSMC wants the most is really fairness. Nothing monetary, nothing about tariffs, but fairness and management kind of elaborate a little bit what fairness means, give us a little bit more specifics.

But the other part of the question regarding the US expansion, it's about the R&D team center now that we understand, yes, the TSMC's R&D in the US does need to start somewhere, right, you said it's more about the production improvements related to R&D on derivative nodes. But since this seems to be something US really cares about the R&D capability on the US soil on the leading edge, is there any longer-term plan to have the U.S. R&D center to be involved, let's say, in the primary R&D, let's say, brand new processes, the major nodes development that – that's my two-part question.

Jeff Su - *Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations*

So again, to summarize, both questions are related to the expansion in the US. So first part of the question is we -- C.C. has mentioned, all we want is fair treatment. So what do we mean by fair or fairness?

C.C. Wei - *Taiwan Semiconductor Manufacturing Co Ltd - Chairman and Chief Executive Officer*

Well, let me answer this question. What do we mean the fair treatment it's very simple. If anybody gets a subsidy or get the incentive, it should be everybody should get the same. Either we got all or we got zero, all right? So that's what we call it fair. So again, I would like to assure you that we are -- we will be very competitive in either conditions.

Jeff Su - *Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations*

Okay. And then the second part of the question is regarding the R&D. Charles is saying he understands the R&D needs to start from somewhere, but with our major R&D center in Arizona, what will be the purpose or the focus? And will it be involved at some point in ramping new technologies?

C.C. Wei - *Taiwan Semiconductor Manufacturing Co Ltd - Chairman and Chief Executive Officer*

As I said before, TSMC's fab never stays stagnant. We always continue to improve it. And we need to establish a major R&D center in Arizona with about 1,000 engineers. That's a big amount. The focus will be support our manufacturing cluster, improve its technology, and allow it to operate independently. Okay. Did I answer the question?

Charles Shi - *Needham & Company, LLC - Analyst*

Maybe let me just really follow up because there has been a good amount of chatters about the US. R&D center more supporting manufacturing rather than doing a brand -- major R&D, the brand new nodes, but it looks like that's not the plan, but over the longer term, is there any thoughts of our management, maybe they will get involved in brand-new nodes development one way or the other. I think that's the question people have been discussed about over the last quarter.

Jeff Su - *Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations*

Okay. So Charles is asking, will the R&D center over the mid to long term. Can you also focus on things like new node development or path finding opportunities, long-term research, these type of things?

C.C. Wei - *Taiwan Semiconductor Manufacturing Co Ltd - Chairman and Chief Executive Officer*

Okay. Actually, the first purpose is that Arizona fab can operate independently. But of course, we have done -- and we are doing it right now to some kind of pathfinding, exploratory work and cooperate with university, blah, blah. It's actually a lot of activities. 1,000 engineers is not a small amount. Of course, it's not comparable to TSMC right now, it's a 10,000 R&D people, but it's a beginning, okay? So we'll do a lot more.

Jeff Su - *Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations*

Okay, Charles, do you have a second question?

Charles Shi - *Needham & Company, LLC - Analyst*

No, I don't.

Jeff Su - *Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations*

Okay. Great. Operator, the next participant, please?

Operator

Sunny Lin, UBS.

Sunny Lin - *UBS Equities - Analyst*

So my first question is to follow up on the Arizona expansions. So first part is on the timeline or the pace of your expansion. Now given the stronger demand for your US capacities, to what extent could you pull in the ramp of the original second and third phase? And for your fourth phase, you earlier mentioned you will be constructing the fab shell later this year.

So with that, will be possible that you start to ramp the fourth phase at the same time as the third phase?

Jeff Su - *Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations*

Okay. So Sunny's first question is regarding our GIGAFAB cluster in Arizona. She wants to understand the timeline of expansion, particularly given the strong AI-related demand. Can we pull in the timing for both the second fab and the third fab? And also, can we, at the same time, start the production of the third and fourth fab simultaneously?

C.C. Wei - *Taiwan Semiconductor Manufacturing Co Ltd - Chairman and Chief Executive Officer*

Well, Sunny, we are working very hard to speed it up of our production in the second fab and the construction of the third fab. All I can say now is customers' demand is strong. We have to really to speed it up. And the following all the fabs definitely will depend on our customers' demand, of course.

Jeff Su - *Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations*

Okay, Sunny?

Sunny Lin - *UBS Equities - Analyst*

Well, so sorry, just to clarify. So the second phase originally is planning for production in 2028. So now should we assume it to be from maybe mid-2027 or even first half 2027? And for the third phase since you are building the fab shell this year, so will the production start maybe one year ahead versus the original timeline of 2030?

Jeff Su - *Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations*

Okay. So Sunny, specifically, so the second one, we said we're speeding up. Can we give some context of the time frame? And then for the third fab, will we also speed it up, could that also be moved forward?

C.C. Wei - *Taiwan Semiconductor Manufacturing Co Ltd - Chairman and Chief Executive Officer*

Okay. Yes, we are speeding up. How fast? The second fab, as you said, it should be pulled in. And this one, we are working hard to pull in at least a couple of quarters that's at least.

On the third fab, actually, I did not speak the whole thing is also being constrained by the labor shortage of Arizona, and we need to get all the permits, everything, et cetera. So I cannot give you a very definite date yet, but we are going to update you probably in the next quarter or one quarter after that.

Sunny Lin - *UBS Equities - Analyst*

Got it. No problem. My second question is on the pricing and margin of the overseas expansions. And so now with the -- especially stronger demand for the US capacities, would you be able to sell more value given the stronger onshoring requirements?

And then for margin, earlier, you mentioned the 2% to 3% margin dilution for the coming two, three years and then expanding to 3% to 4% maybe into 2029 to 2030. I just wonder what the underlying wafer price assumption for that gross margin dilution estimate? If you are able to raise the AZ pricing a bit, will the gross margin dilution could be less?

Jeff Su - *Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations*

Okay. So Sunny's question is on the overseas expansion in both pricing and margin, given the strong demand in terms of pricing, can we reflect even greater value to our customers? And therefore -- and also her question is given that the dilution from overseas will widen to 3% to 4% in the latter stages of the five-year period, she wants to know what is our underlying wafer price assumption behind us.

Wendell Huang - *Taiwan Semiconductor Manufacturing Co Ltd - Senior Vice President and Chief Financial Officer*

Sunny, let me answer that. These two things are actually go together. As we said, reflecting our value is a continuous and ongoing process. And we -- because of our business nature, we need very high gross margin to earn a sustainable and healthy return. Now geographic manufacturing flexibility is an important part of our value proposition to the customers.

Therefore, we are already discussing this with our major customers. And the progress is so far so good, okay? Now at the same time, the margin dilution from the overseas fabs, the additional dilutions come from the cost inflation as well as potential cost increases from the tariff policies. Of course, with that, we also want to reflect the value and therefore, the discussion with the customers are continuous.

Jeff Su - *Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations*

Operator, can we move on to the next participant, please?

Operator

Brett Simpson, Arete.

Brett Simpson - *Arete Research Services LLP - Analyst*

I have a two-part question on this year's guidance for C.C. First. C.C., you mentioned that AI is still expected to double this year despite the US ban on AI GPUs into China.

And I guess, China was a meaningful portion of accelerated shipments, well over 10% of volumes. So factoring this in, it would imply your AI outlook this year, still doubling would mean that the AI orders have improved meaningfully outside of China in the last three months? Is that how we should interpret your comment about you still expect the business to double? And then second, we're in the June quarter where tariffs have been paused for 90 days.

So to what extent due to above seasonal June quarter guidance reflect customer pull-ins ahead of potential tariffs being applied in the September quarter?

Jeff Su - *Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations*

Okay. So Brett, this question is on, again, the one part is on the AI demand that although there is a ban in China, on certain AI chips or products that we reiterated our AI accelerated growth will double this year. So his assumption is that implies a strong non-China AI-related demand. I'm wondering what is the mechanics or can we comment beyond that?

C.C. Wei - *Taiwan Semiconductor Manufacturing Co Ltd - Chairman and Chief Executive Officer*

Brett, three months ago. Now, I can tell you that three months ago, we are -- we just cannot supply enough wafer to our customer. And now it's a little bit balanced, but still, the demand is very strong. And you are right. Other than China, the demand is still very strong, especially in the US. And so we are confident that we are going to double our AI revenue this year.

Jeff Su - *Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations*

Yeah. And then very quickly, he was asking about the second quarter revenue guidance. And do we see any tariff-related pull-in? I think Wendell answered this earlier.

Wendell Huang - *Taiwan Semiconductor Manufacturing Co Ltd - Senior Vice President and Chief Financial Officer*

Yeah. I think that we have, as C.C. said in his prepared remarks, we haven't seen any changes in customer behavior. The growth in second quarter was primarily due to the demand from our 3-nanometer and 5-nanometer technologies underpin the demand from the HPC platform.

Jeff Su - *Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations*

Okay. Do you have a second question, Brett? Sorry.

Brett Simpson - *Arete Research Services LLP - Analyst*

My second question was for Wendell, and thanks for clarifying that, Wendell. Follow-up is on shareholder returns. And TSMC traditionally has always favored growing the dividends as the main policy. But many shareholders would argue that the dividend payouts are not having that much of an impact on the discounted multiple that TSMC trades at versus some of your US big tech peers.

So my question is why does TSMC management not adopt a buyback framework, particularly with the strength of the cash position on your balance sheet at the moment?

Jeff Su - *Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations*

So Brett's second question is circulated on shareholder return. He noted TSMC's policy has always been stable and steadily increasing cash dividend and focused on cash dividend payout. His question is why do we -- would we consider, why do we not consider adopting more of a buyback policy, share buyback policy?

Wendell Huang - *Taiwan Semiconductor Manufacturing Co Ltd - Senior Vice President and Chief Financial Officer*

We've done studies a long time ago, and we continue to revisit that. We also talk to investors our conclusion stays the same. The sustainable and steadily increased dividends is a better way of returning cash to the shareholders. So we're maintaining the policy.

Jeff Su - *Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations*

All right. All right. Operator, in the interest of time, can we take the questions from the last two participants, please?

Operator

Laura Chen, Citi.

Laura Chen - *Citigroup Global Markets Taiwan Securities Co., Ltd - Analyst*

Yes. My question is also about the AI and also the US expansion. C.C. just mentioned that the CoWoS supply demand will be more balanced into 2026. Do you see any structural change in the future AI chip design when moving to N3 such as like a chiplet that kind of design. And also in that new trend, what TSMC's view on the new technologies, such as CPO or PLP panel base. Will that still start from Taiwan first? Or you would also consider to further invest the new like back-end technology in Arizona, since C.C. just mentioned that you would also start to build up the fab in advanced packaging in Arizona.

That's my first question.

Jeff Su - *Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations*

This question is a very broad question. But basically, if I just try to distil. She wants to know do we see any changes in the chip design, particularly moving to chiplets? With N3, do we see this more and more? What about the role of things like co-packaged optics and panel level packaging.

And I think the essence of the question, will we continue to use our leading -- sorry, advanced packaging technologies like CoWoS or SolC in Taiwan first? Or is this also part of the plan for the expansion in Arizona?

C.C. Wei - *Taiwan Semiconductor Manufacturing Co Ltd - Chairman and Chief Executive Officer*

That's a long question. But Laura, yes, our customers, they continue to use that TSMC's leading edge technology, and they also adopt the advanced packaging technologies more and more. And also, more advanced, right? This year is probably most of CoWoS-S and then next year CoWoS-L, et cetera. And we can see that customers start to pick up the SolC and more advanced packaging technologies. As for the -- what we call panel level packaging, we are aggressively developing it. And today, it's still in the feasibility study stage. Too early to say it will be in Europe, in Taiwan or in US. But most likely, it will be in Taiwan first, we ramp it up and then bring to US.

Laura Chen - Citigroup Global Markets Taiwan Securities Co., Ltd - Analyst

And also my second question is also about the capacity allocation between Taiwan and also Arizona. C.C. you just shared with us that for about like 30% of N2 capacity will be in Arizona. May we know it will be starting from when or what time frame you are looking for? Can we also assume that the same scale like 30% of your Arizona fab for the advanced node in the longer term?

Jeff Su - Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations

Okay. So Laura's second question is about the capacity allocation between -- how do we allocate between Taiwan and the US? Maybe is it duplicative or extra capacity? And then very specific, CC had mentioned that N2 and more advanced capacity, around 30% will be in Arizona once we scale up to the cluster. Will that be the percentage for the leading node in the future?

C.C. Wei - Taiwan Semiconductor Manufacturing Co Ltd - Chairman and Chief Executive Officer

Well, we have -- right now, we plan six fabs in Arizona. And in that six fabs, 2-nanometer will be a major node, and that's what I say, 30% will be there. As time goes by, after the 2-nanometer will be 1.4 and 1.0, that has not been discussed yet.

Jeff Su - Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations

Operator, can we take the last part questions from the last participant, please.

Operator

Krish Sankar, Cowen.

Krish Sankar - TD Cowen - Analyst

My first one is very impressive given uncertainty, you're still maintaining full year revenue guidance and also your N2 capacity planned for this year and next year. Kind of curious, what is your visibility on second half revenues and also N2 demand for wafers into next year? And then I have a follow-up.

Jeff Su - Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations

Okay. So Krish's, first question is sort of in the near term, what is our visibility into the second half business outlook? And then also, how do we see the demand for N2 progressing this year and also next year?

Wendell Huang - Taiwan Semiconductor Manufacturing Co Ltd - Senior Vice President and Chief Financial Officer

Okay. Let me talk about the first one. We're only at second quarter. So I think it's too early to talk about the second half. We did mention that the uncertainties and risks from tariffs exist, and we might get a better picture in the next few months. So we can probably update you in the next earnings call.

Jeff Su - Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations

And then the second part of it is on the demand visibility of our 2-nanometer.

C.C. Wei - Taiwan Semiconductor Manufacturing Co Ltd - Chairman and Chief Executive Officer

So far actually -- so far, it's very strong. As we said, all the new tape-out customers -- the number of the tape-out is exceeding what we expected. And as we said, the number of the new tape-out is much higher than the 3-nanometer and 5-nanometer in the same period of time.

Jeff Su - Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations

Okay. And did you have a second question, Krish?

Krish Sankar - TD Cowen - Analyst

Yeah. Just one quick follow-up. You spoke about the Japan fab. I'm curious what is the capacity installed in Japan today? And how do you think about the revenue contribution this year from Japan?

Jeff Su - Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations

Okay. Krish's second question is related to our first specialty technology fab in Japan. He wants to know what is the capacity installed for this specialty technology fab and also the revenue contribution from JASM?

Wendell Huang - Taiwan Semiconductor Manufacturing Co Ltd - Senior Vice President and Chief Financial Officer

Yeah. The capacity for the fab will be [55,000] (corrected by company after the call) when its ramp up. The revenue for this year compared to the whole company is really not significant at this moment.

Jeff Su - Taiwan Semiconductor Manufacturing Co Ltd - Director of Investor Relations

Thank you, everyone. That concludes our question-and-answer session, before we conclude today's conference, please be advised that the replay of the conference call will be accessible within 30 minutes from now. The transcript will become available 24 hours from now, and both will be available through TSMC's website at www.tsmc.com.

So thank you again for joining us today. We hope everyone continues to stay well and hope to join -- you will join us again next quarter. Goodbye, and have a good day. Take care. Thank you.

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