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Taiwan Semiconductor Manufacturing Co., Ltd. (TSM)

Q2 2020 Earnings Call

CORPORATE PARTICIPANTS

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

Wendell Huang

Chief Financial Officer, Vice President-Finance & Spokesperson, Taiwan Semiconductor Manufacturing Co., Ltd.

Che Chia Wei

Chief Executive Officer & Vice Chairman, Taiwan Semiconductor Manufacturing Co., Ltd.

Te Yin Liu

Chairman, Taiwan Semiconductor Manufacturing Co., Ltd.

OTHER PARTICIPANTS

Gokul Hariharan

Analyst, JPMorgan Securities (Asia Pacific) Ltd.

Sebastian Hou

Analyst, CLSA Ltd.

Bill Lu

Analyst, UBS Securities (Asia) Ltd.

Brett Simpson

Analyst, Arete Research Services LLP

Mehdi Hosseini

Analyst, Susquehanna Financial Group LLLP

Randy Abrams

Analyst, Credit Suisse AG (Taiwan)

Roland Shu

Analyst, Citigroup Global Markets Taiwan Securities Co., Ltd.

Charlie Chan

Analyst, Morgan Stanley Taiwan Ltd.

Bruce Lu

Analyst, Goldman Sachs (Asia) LLC

Aaron Jeng

Analyst, Nomura International Hong Kong Ltd. (Taiwan)

Laura Chen

Analyst, KGI Securities Investment Advisory Co. Ltd.

MANAGEMENT DISCUSSION SECTION

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

[Foreign Language] (00:00:00-00:00:32)

Ladies and gentlemen, welcome to TSMC's Second Quarter 2020 Earnings Conference Call. This is Jeff Su, TSMC's Director of Investor Relations and your host for today.

To prevent the spread of COVID-19, TSMC is hosting 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 Vice President and CFO, Mr. Wendell Huang, will summarize our operations in the second quarter 2020 followed by our guidance for the third quarter 2020. Afterwards, Mr. Huang and TSMC's CEO, Dr. C.C. Wei, will jointly provide the company's key messages. Then, TSMC's Chairman, Dr. Mark Liu, will host the Q&A session where all three executives will entertain your questions.

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 current quarter guidance.

Wendell Huang

Chief Financial Officer, Vice President-Finance & Spokesperson, Taiwan Semiconductor Manufacturing Co., Ltd.

Thank you, Jeff. Good afternoon, everyone. Second quarter revenue was flat sequentially as the continued 5G infrastructure deployment and HPC-related product launches offset weaknesses in other platforms. Gross margin increased 1.2 percentage points sequentially to 53%, mainly due to continuing high level of utilization and the absence of unfavorable inventory valuation adjustment partially offset by NT dollar appreciation in the second quarter.

Total operating expenses increase by TWD 1.19 billion mainly as TSMC supported a range of COVID-19 relief efforts. Operating margin increased by 0.8 percentage point sequentially to 42.2%. Overall our second quarter EPS was TWD 4.66 and ROE was 28.5%.

Now let's move on to the revenue by technology. 7-nano process technology contributed 36% of wafer revenue in the second quarter, while the 16-nanometer contributed 18%. Advanced technologies, which are defined as 16-nanometer and below accounted for 54% of wafer revenue.

Moving on to revenue contribution by platform; smartphones decreased 4% quarter-over-quarter to account for 47% of our second quarter revenue. HPC increased 12% to account for 33%. IoT decreased 5% to account for 8%. Automotive decreased 13% to account for 4%. Digital consumer electronics decreased 9% to account for 5%.

Moving on to the balance sheet. We ended the second quarter with cash and marketable securities of TWD 605 billion. On the liability side, current liabilities increased by TWD 25 billion, mainly due to the increase of TWD 30 billion in short-term loans. On financial ratios, accounts receivables turnover days increased 2 days to 44 days. Days of inventory also increased 2 days to 55 days, mainly due to N5 ramp and stronger N7 demand.

Now let me make a few comments on cash flow and CapEx. During the second quarter, we generated about TWD 170 billion in cash from operations, spent TWD 127 billion in CapEx and distributed TWD 65 billion for third quarter cash dividend. We also increased TWD 30 billion in short-term loans and issued TWD 36 billion of corporate bonds. Overall, our cash balance increased TWD 37 billion to TWD 468 billion at the end of the quarter. In US dollar terms, our second quarter capital expenditures amounted to \$4.2 billion.

I finished my financial summary. Now let's turn to our third quarter guidance. Based on the current business outlook, we expect our third quarter revenue to be between \$11.2 billion and \$11.5 billion, which represents a 9.3% sequential increase at the midpoint. Based on the exchange rate assumption of \$1 to TWD 29.5, gross margin is expected to be between 50% and 52%, operating margin between 39% and 41%.

Now, I will hand over the call to C.C. for his key messages.

Che Chia Wei

Chief Executive Officer & Vice Chairman, Taiwan Semiconductor Manufacturing Co., Ltd.

Thank you, Wendell. Good afternoon, ladies and gentlemen. Let me start with our near-term demand outlook. We concluded our second quarter with revenue of TWD 310.7 billion or \$10.4 billion in line with our guidance given three months ago. Our second quarter business increased slightly in US dollar terms as the continued 5G infrastructure deployment and HPC-related product launches offset weakness in other platforms.

Moving into third quarter 2020, we expect our business to be supported by strong demand for our industry leading 5-nanometer and 7-nanometer technologies, driven by 5G smartphone, HPC and IoT-related applications.

Looking at the second half of this year, COVID-19 continues to bring some level of disruption to the global economics and uncertainty remain. We have observed weak consumer demand in the first half of this year and now expect global smartphone units to decline low-teens percentage year-over-year in 2020. However, amid the COVID-19 pandemic, we also observed the supply chain making efforts to ensure supply chain security and actively preparing for new 5G smartphone launches. We raise our forecast for 5G smartphone penetration rate to high teens percentage of the total smartphone market in 2020.

For the full year of 2020, 5G and HPC related applications will continue to drive semiconductor content enrichment. We now forecast the overall semiconductor market excluding memory growth to be flat to slightly increasing, while foundry industry growth is expected to increase to be mid to high-teens percentage.

For TSMC, although COVID-19 related uncertainties remain, our technology leadership position enable us to outperform the foundry revenue growth. We believe we can grow above 20% in 2020 in US dollar terms, including the impact from the new US regulations, which I will discuss in the next session. Our 2020 business will be supported by strong demand for our industry leading 5-nanometer and 7-nanometer technologies and our

specialty technology solutions, driven by customers of 5G smartphone-related product launches and expanding HPC-related opportunities.

Now let me talk about the impact of new US regulations. On May 15, the US Department of Commerce announced a set of new export control regulations. As a global and law-abiding company, TSMC will follow all the rules and regulations fully, no doubt about it. While there may be some impact from the new US regulations, TSMC's purpose to unleash innovation remain unchanged. Our leading position in the semiconductor industry, built upon our technology leadership, manufacturing excellence, and customers trust also remain unchanged. We will continue to build upon our trinity of strengths and conduct our business with integrity to ensure our value and contribute to the semiconductor industry.

In the near-term, we will work dynamically with our customer to minimize the impact to our business from new US regulations. In the mid to long-term, we believe the underlying megatrend of 5G-related and HPC applications remain intact, and supply chain can adjust and rebalance themselves. With our technology leadership, we are well positioned to capture the mid to long-term growth opportunities. We reaffirm our goal to grow at the high-end of our long-term growth projection of 5% to 10% CAGR in US-dollar terms.

Next let me talk about our N5 ramp up and N4 introduction. N5 is the foundry industry's most advanced solution with best PPA. N5 is already in volume production with good yield, while we continue to improve the productivity and performance of the EUV tools. We are seeing a robust demand for N5 and expect a strong ramp up of N5 in the second half of this year, driven by both 5G smartphones and HPC applications. As we observed some delays earlier this year in N5 tool deliveries due to COVID-19, we now expect 5-nanometer to contribute about 8% of our wafer revenue in 2020.

We also introduced N4 as an extension of our 5-nanometer family. N4 will have compatible design rules and highly competitive performance-to-cost advantages as compared to N5 and will target next wave of N5 products. Volume production is targeted for 2022. Thus, we are confident that our 5-nanometer family will be another large and long-lasting node for TSMC.

Now, I will talk about our N3 status. N3 will be another full-node stride from our N5 with about a 70% logic density gain, 10% to 15% speed gain and 25% to 30% power improvement as compared with 5-nanometer. Our N3 technology will use FinFET transistor structure to deliver the best technology maturity, performance and cost. Our N3 technology development is on track with good progress. N3 risk production is scheduled in 2021 and volume production is targeted in second half of 2022. We have already demonstrated 256-megabit SRAM functionality. N3 logic test chip is fully functional with yield ahead of plan.

The device performance is also on track. Our 3-nanometer technology will be the most advanced foundry technology in both PPA and transistor technology when it is introduced, which will further extend our leadership position well into the future.

Finally, let me talk about our US fab plan. On May 15, we announced our intention to build an advanced semiconductor fab in the US. We have received the commitment to support this project from both the US Federal Government and the State of Arizona. We are working closely with them, as well as our supply chain partners to build an effective supply chain and makeup the cost gap. This fab will start with 5-nanometer technology with 20,000 wafer per month capacity. Production is targeted to begin in 2024. US fab will enable TSMC to expand our technology ecosystem and better service our customer and partners. At the same time, as TSMC's global presence increases, it will allow us to better reach global talent to sustain our technology leadership.

Now, let me turn the microphone over to our CFO.

Wendell Huang

Chief Financial Officer, Vice President-Finance & Spokesperson, Taiwan Semiconductor Manufacturing Co., Ltd.

Thank you, C.C. Let me start by making some comments on our second half profitability outlook. We have just guided third quarter 2020 gross margin to decline by 2 percentage points sequentially to 51% at the midpoint, primarily due to the margin dilution from the initial ramp-up of our 5-nanometer technology in the third quarter and the less favorable foreign exchange rate. As compared with our expectation three months ago, our third quarter gross margin midpoint is higher mainly supported by the high level of overall capacity utilization despite the uncertainty from COVID-19.

Looking ahead to the fourth quarter; we expect the continued steep ramp up of our 5-nanometer to dilute our fourth quarter gross margin by about 2 to 3 percentage points.

Now, let me talk about our capital budget for this year. Every year our CapEx is spent in anticipation of the growth that will follow in the next few years. While the impact of COVID-19 virus brings uncertainties in 2020, we have seen our business holding up well so far. Thanks to our technology leadership at 5-nanometer and 7-nanometer nodes.

Looking ahead, the multi-year megatrends of 5G-related and HPC applications are expected to continue to drive strong demand for our advanced technologies in the next several years. In order to meet this demand and support our customers capacity need, we have decided to raise our full year 2020 CapEx to be between \$16 billion to \$17 billion. We also reiterate that TSMC is committed to sustainable cash dividends on both an annual and quarterly basis. That concludes my key messages.

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

Thank you, Wendell. This concludes our prepared statements. Before we begin the Q&A session, I would like to remind everybody to please limit your questions to two at a time to allow all participants an opportunity to ask questions. Should you wish to raise your question in Chinese, I will translate it to English before our management answers your question. [Operator Instructions] Now, let's begin the Q&A session.

Operator, please proceed with the first caller on the line.

QUESTION AND ANSWER SECTION

Operator: Yes. Thank you. The first to ask question, Gokul Hariharan, JPMorgan. Go ahead, please.

Gokul Hariharan

Analyst, JPMorgan Securities (Asia Pacific) Ltd.

Q

Yeah. Hi. Good afternoon, and thanks for taking my question, and great results in a tough time. Just a quick question on how we think about N3 development. Do we feel that N3 since we talk about mass production in second half of 2022 usually the new node start sometime in Q2. I just wanted to understand are we thinking about a slightly slower ramp for N3 compared to what we have had in the first year for N5, as well as N7? That is my first question.

My second question is, when I think about leading edge, once the US regulation starts to come in. How do we think about managing capacity? Do we feel that the capacity can get filled up relatively quickly? One of our leading customers, you have to start shipment to them or do we feel that there could be a couple of – there could be some time where there could be a little bit of underutilization?

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Okay. Thank you, Gokul. Let me try to – allow me to summarize your question. Your first question is related to N3, how do we think about the N3 development? We have said the mass production timing is in second half 2022 versus typically the second quarter, so should we expect a slightly lower ramp of N3. This is your first question.

Che Chia Wei

Chief Executive Officer & Vice Chairman, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Okay. Let me answer that Gokul. In fact, we've developed our new leading edge technology, we work closely with our customer. So, the schedule and also the ramp-up, also the progress we all working with customer closely and determine when will be the best timing. So far our N3 development is very smooth and successful, and we still target the risk production in next year and ramp-up in the second half. This is all the schedule of working with our customers.

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Okay. And then, Gokul your second question is on the leading edge and in light of the recent US regulations, how will we manage our capacity at the leading edge, will we see a gap in the utilization or will we be able to fill it up.

Che Chia Wei

Chief Executive Officer & Vice Chairman, Taiwan Semiconductor Manufacturing Co., Ltd.

A

We should be, no problem, because of us – we just stated that the 5G is a mega trend and also HPC-related application continue to be very strong, and we observe that all our customer are very actively preparing for these two application 5G and HPC. In addition to that, we also observe that all our customers try to secure their supply chain security which is very important with this COVID-19 uncertainty.

Gokul Hariharan*Analyst, JPMorgan Securities (Asia Pacific) Ltd.*

Q

Do we feel that even for N5 that is applicable.

Che Chia Wei*Chief Executive Officer & Vice Chairman, Taiwan Semiconductor Manufacturing Co., Ltd.*

A

Is even with N5, yes.

Wendell Huang*Chief Financial Officer, Vice President-Finance & Spokesperson, Taiwan Semiconductor Manufacturing Co., Ltd.*

A

Let me add to that, I think for the short-term some impact is inevitable. Currently, we work closely with our customer very dynamically trying to fill up the capacity and for the long term, as C.C. mentioned, we are very – we are still optimistic.

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

A

Okay, thank you Gokul. Can we have the next caller please?

Gokul Hariharan*Analyst, JPMorgan Securities (Asia Pacific) Ltd.*

Q

Thank you.

Operator: Next to ask question, Sebastian Hou, CLSA. Go ahead please.

Sebastian Hou*Analyst, CLSA Ltd.*

Q

Hi. Good afternoon, gentlemen. Thank you for taking my question. So, my first one is, wanted to pick your brain about how do you evaluate the feasibility and probability of building up and advanced node fab without American contents, be it technology equivalent IP material et cetera in the next five years or ten years or even longer? Does it worth it or even if it takes a long time instrumental efforts would TSMC ever consider that? Thank you.

Che Chia Wei*Chief Executive Officer & Vice Chairman, Taiwan Semiconductor Manufacturing Co., Ltd.*

A

Well, let me answer that question. We know that US fab as compared with the fab in Taiwan, the cost structure is actually – it would be higher and that's why we say that we are working with the federal government and also the State of Arizona...

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

A

Sorry...

Che Chia Wei*Chief Executive Officer & Vice Chairman, Taiwan Semiconductor Manufacturing Co., Ltd.*

A

... to close the gap.

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Sorry, just to repeat the question, I think Sebastian – his question is asking about building up an advanced node fab or production line without using any so-called American contents, whether in terms of equipment, technology or IP materials. He wants to know in the next five to ten years, is it feasible, is it worth it and is it something that TSMC would consider?

Che Chia Wei

Chief Executive Officer & Vice Chairman, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Let me, let me pick up this one here. The semiconductor technology is very unique, in this industry, the technology continue to improve. Every two years, you will be a new generation of technology, come out to serve the best performance product and therefore we, I think our main force is still pursuing the technology leadership trying to overcome each generation's challenge. And to do that, I think our current focus still working with our equipment partners dealing with utilize the best of the kind equipments that we can have to pursue our business growth.

So, you are right the tool – if we do that otherwise, the technology advancement will be extremely challenging – will be extremely difficult not to talk about 5 to 10 years alone. So, that is not our – that is not our current effort at this point.

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Okay. Sebastian, do you have a second question?

Sebastian Hou

Analyst, CLSA Ltd.

Q

Yes, yes. Thank you for that. Very, very clear. Second question I'd like to follow on the – about the inventory situation. The first, could you – can you update us on how you see the fabless days of inventory at the end of Q2 and how you see that in the second half this year?

And also on the inventory side, it looks like it's getting increasingly difficult to look at the inventory from the comprehensive perspective. Fabless DOI may not be enough because apparently there is a lot of the Chinese companies stockpile the inventory in fear of being sanctioned and also across the board globally the whole supply chain has been raising the [ph] freestyle (00:25:34) level of inventory in the past few months in fear of supply disruption caused by COVID-19. But those are not reflected in fabless DOI, so how do we see about this inventory and potentially hidden excessive inventory situation going forward, which do you concern about that to be a potential overhang at some point a destocking could come? Thank you.

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Okay. Let me summarize your second question Sebastian, both of it relates to the inventory situation, the first part is what is in for TSMC tracking on fabless customers, what is the fabless DOI exiting 2Q and the outlook into second half, that's the first part of your question.

And then your second part of your question is are we concerned that the inventory situation may see some hidden or discrepancies due to whether it's COVID-related supply chain disruption or the US regulation and such, will this lead to a hidden inventory risk and is there a risk of inventory correction.

Wendell Huang*Chief Financial Officer, Vice President-Finance & Spokesperson, Taiwan Semiconductor Manufacturing Co., Ltd.*

A

Okay. Let me answer that. The inventory level of our fabless customers that we tracked exited first quarter above the seasonal level. We expect the further increase in second quarter and then stay at the high level in the second half as the supply chain is making efforts to ensure supply chain security and our customers are in high anticipation and preparing for new 5G smartphone product launches in the second half of this year. We cannot rule out the possibility of an inventory correction sometime down the road. We observe the supply chain active, making efforts to ensure the security and active preparation for 5G smartphone launches. We will just have to wait and see how the sell-through goes.

Sebastian Hou*Analyst, CLSA Ltd.*

Q

Okay. Thank you, Sebastian. Can we move on to the next caller, please? Operator, please move on to the next caller?

Operator: Thank you. The next caller is Bill Lu from UBS. Go ahead, please.

Bill Lu*Analyst, UBS Securities (Asia) Ltd.*

Q

Yeah. Hi. Thank you. Thanks for taking my question. I'm wondering if you can comment on the CapEx guidance for this year, it's now raised to \$16 billion to \$17 billion. I'm wondering what that increase is, whether it is 5 nanometer or something different?

Secondly related to that, can you talk about your CapEx intensity structurally whether this is – this increase is temporary, and whether this is pull-in from next year or maintenance driven intensity or how we should think about that? Thanks.

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

A

Okay. Let me summarize your two questions, Bill. Your first question is in relation to our 2020 CapEx guidance and the range of \$16 billion to \$17 billion. So, Bill wants to know, what is driving this increase. And then secondly, in terms of the capital intensity outlook over the next few years?

Wendell Huang*Chief Financial Officer, Vice President-Finance & Spokesperson, Taiwan Semiconductor Manufacturing Co., Ltd.*

A

Okay. The CapEx increase from three month ago for this year is basically comes from the advanced technologies and the capital intensity this year will be slightly lower than 40% and over the long-term it will gradually go down to about mid-30s.

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

A

Okay., Thank you, Bill. Let's move onto the next caller please. Operator?

Operator: The next caller is Brett Simpson from Arete Research. Go ahead, please.

Brett Simpson

Analyst, Arete Research Services LLP

Q

Yeah. Thanks very much. I wanted to ask about your relationship with Huawei and how you see the impact of the US regulation on the business with Huawei in the second half of the year? My understanding is that you will still have a relation – will still be shipping wafers probably at elevated levels in Q3. But can you confirm whether or not you have any sales with Huawei in Q4 and if not how do you manage your 5-nanometer utilization given the importance of Huawei as a customer? Thank you.

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Okay. Let me summarize your question, Brett, is regard to the relationship with Huawei. Brett wants to know what is the impact on our business from Huawei in the second half of this year. Will we continue to ship wafers to this customer in the fourth quarter? If we do not, then how will we manage the impact to our 5-nanometer?

Wendell Huang

Chief Financial Officer, Vice President-Finance & Spokesperson, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Okay. Let me answer your question. As C.C. just reported we are complying fully with all the regulation and we do not take any new orders or production starts from this customer since May 15. Although this regulation is just finished their public comment period, the BIS has not did a final ruling change at this point. And so, it's very early – still early to confirm. But under this current status, we do not plan to ship wafers after September 14. And yes, there will be a challenge to work dynamically with other customers. Thus, currently, we're working with them, and but as you – as you heard, we made a – C.C. just – our 2020's guidance is above 20%. That tell you, we are relatively progressing well in filling up the left – capacity left open.

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

A

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

Brett Simpson

Analyst, Arete Research Services LLP

Q

Yeah, yeah. Thanks. Thanks, Jeff. Just a follow-up. And I wanted to ask about depreciation for this year. I think previously you've talked about mid to high-teen growth for depreciation in 2020. Can you confirm whether that's still the case? And I look at the first half depreciation and it looks like depreciation costs were down year-on-year. So, in order to get to mid to high-teens growth that would imply a large increase in depreciation, so in the third – in the third and fourth quarter. So, if you can just clarify exactly how we should think about depreciation for the next couple of quarters that would be great? Thank you.

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Okay. Brett is asking his second question is our depreciation outlook for 2020. Do we still maintain what is our depreciation for 2020 year-on-year and then does this imply a pickup in depreciation in the second half on a quarterly basis?

Wendell Huang

Chief Financial Officer, Vice President-Finance & Spokesperson, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Okay. Brett, our current estimate on 2020 depreciation year-on-year growth is still high-teens growth. So, that gives you an idea of what this second half depreciation will be. It'll be higher than the first half.

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

Okay. Thank you, Brett. Can we have the next question on the line, please?

A

Operator: The next one on the line is Mehdi Hosseini from SIG. Please ask your question.

Mehdi Hosseini

Analyst, Susquehanna Financial Group LLLP

Yes. Yes. Thanks for taking my questions. Want to go back to your N4 and N3, how should we think about the migration and specifically to what extent this is driven by converting rather than installing new equipment. And I have a follow-up.

Q

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

Okay. Sorry, Mehdi, let me make sure we understood your first question. You're asking about N4 and N3, how to think about the migration and is there a conversion – tool conversion involved between N4 and N3. Is that your question?

A

Mehdi Hosseini

Analyst, Susquehanna Financial Group LLLP

Correct.

Q

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

Okay.

A

Che Chia Wei

Chief Executive Officer & Vice Chairman, Taiwan Semiconductor Manufacturing Co., Ltd.

All right. Actually the N4 is kind of improvement – continuous improvement from N5. So it has improved the speed, improved the geometry just a little bit. N3 is a totally a new node, all right. So that's N4 using the same equipment as N5. N3, we expect it to have a high percentage of the tool continue to be used from the N5, but N3 is a totally new node.

A

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

Okay. Thank you. Do you have a second question, Mehdi.

A

Mehdi Hosseini

Analyst, Susquehanna Financial Group LLLP

Yes. And my second question has to do with your HPC revenue growth in Q2, it was significantly higher compared to Q1. Would there be – can you please elaborate, which specific subsegment within HPC is doing better? Is it driven by communication or computer, and how do you see those trends trending into Q3?

Q

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

So, Mehdi, your second question is looking at our HPC sequential growth in the second quarter, Mehdi wants to know what specific segments are driving that increase and what is the outlook?

A

Wendell Huang

Chief Financial Officer, Vice President-Finance & Spokesperson, Taiwan Semiconductor Manufacturing Co., Ltd.

Well, Mehdi, I don't think we want to break down the details on the different platforms. Sorry about that.

A

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

Okay, Mehdi?

A

Mehdi Hosseini

Analyst, Susquehanna Financial Group LLLP

Sure, thank you.

Q

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

Yeah.

A

Mehdi Hosseini

Analyst, Susquehanna Financial Group LLLP

The concern is that maybe perhaps Huawei may have pulled in before you stop taking orders. I'm trying to understand how that particular customer has procured wafers in the first half versus second half?

Q

Wendell Huang

Chief Financial Officer, Vice President-Finance & Spokesperson, Taiwan Semiconductor Manufacturing Co., Ltd.

Sorry, Mehdi. No we don't comment on specific customer. Okay.

A

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

Okay. Thank you, Mehdi.

A

Mehdi Hosseini

Analyst, Susquehanna Financial Group LLLP

Yeah. Thank you.

Q

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

Thank you. Can we have the next caller on the line, please. Operator?

A

Operator: Yeah. Next one, we're having Randy Abrams from Credit Suisse. Go ahead, please.

Randy Abrams*Analyst, Credit Suisse AG (Taiwan)*

Q

Okay. Yes. Thank you. My first question I wanted to ask a bit more on the CapEx rate as that's more a function of what you mentioned in the forward demand outlook. If you could give a view on 2021, I know it's in early stage, but just factoring a full year, we mentioned Huawei and also mentioned potential but you don't rule out an inventory correction. And it does seem like Samsung at least is discussing a bit about some graphics in high-end smartphone business. So I'm curious like it's the CapEx rate what is driving it. If there are certain drivers that maybe lifted on the 2021, how you're seeing that? And implication, it follows up on Bill Lu's question, but implication for 2021, if it's impact, it might be a bit lower CapEx that you're spending a bit ahead of that now.

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

A

Okay. So Randy, let me summarize your first question. Your first question is really what is driving our raise for the 2020 CapEx? What is the drivers for that? And then what is the outlook for 2021 CapEx?

Randy Abrams*Analyst, Credit Suisse AG (Taiwan)*

Q

CapEx and sales, the sales just factoring in your comments about inventory, if your competitors taking up a bit of business and after your view, we could have a or don't rule out an inventory adjustment.

Te Yin Liu*Chairman, Taiwan Semiconductor Manufacturing Co., Ltd.*

A

Let me discuss, CapEx is a – we do the CapEx based on long-term perspective. If you talk about this year's CapEx, meaning of course this shows our demand of N5 is very strong. If you talk about the next year's CapEx is really talk about 2022's demand, which we see the continued increase of N5 demand, and also we see starting the launch of N3 technology. And we'll see by then how much the CapEx will increase and we'll report to you in due time.

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

A

Okay. Do you have a second question, Randy?

Randy Abrams*Analyst, Credit Suisse AG (Taiwan)*

Q

Yeah. And if I could follow-up because you mentioned like for the higher CapEx this year is a function that you expect next year to be even stronger. So could you talk a bit about would – I know you talk about the megatrends. But I'm curious if you're thinking about – just what you've mentioned also like could next year have impact from the high base this year on the inventory buildup and also – you have a full year – like in the first quarter Huawei is out, there's probably pent-up demand being tight, but how do you view a full year, if you're not shipping Huawei unless you're counting on by that point some partial license to – or if in your base case, you're assuming not shipping the Huawei next year.

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

A

Okay. Randy's second question, he wants to – he is thinking that with potential possibility of inventory correction with the US regulations, will that impact – what is the impact to 2021 growth outlook and CapEx?

Wendell Huang

Chief Financial Officer, Vice President-Finance & Spokesperson, Taiwan Semiconductor Manufacturing Co., Ltd.

Yeah, Randy, it's just too early for us to discuss anything about 2021. So we'll just wait until when the time approaches.

A

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

Okay. Thank you, Randy.

A

Randy Abrams

Analyst, Credit Suisse AG (Taiwan)

Okay.

Q

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

Let's move on to the next caller please.

A

Operator: The next one is Roland Shu from Citigroup. Please ask your question.

Roland Shu

Analyst, Citigroup Global Markets Taiwan Securities Co., Ltd.

Hi. Thanks. Good afternoon. First question is, can you remind me again how does the inventory valuation adjustment work every quarter, how about the 3Q, is this inventory valuation adjustment favorable or unfavorable to the gross margin? It's my first question. And second question is, you talked about that you are working with customer to minimize the impact of US new regulation and how are you going to – are working on that? Thanks.

Q

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

Okay, so Roland, your two questions, your first question is what is the impact of inventory (sic) valuation and then in the third quarter, will it be a favorable or unfavorable impact? And your second question is, you want to know how we are dynamically working with customers to mitigate the impact of the new US regulation.

A

Che Chia Wei

Chief Executive Officer & Vice Chairman, Taiwan Semiconductor Manufacturing Co., Ltd.

Okay. Let me...

A

Roland Shu

Analyst, Citigroup Global Markets Taiwan Securities Co., Ltd.

Correct. Thanks.

Q

Wendell Huang

Chief Financial Officer, Vice President-Finance & Spokesperson, Taiwan Semiconductor Manufacturing Co., Ltd.

Hi, Roland. Let me make some comments on the inventory valuation adjustment first. The impact on margins from inventory valuation adjustment is inversely co-related to that from changes in utilization. We normally report the net impact on margins from these two factors together. We will compare margins quarter-over-quarter, we will

A

report the Q-on-Q change and impact from inventory valuation adjustments, when it is more significant. In the second quarter, the quarter-over-quarter change and impact from inventory valuation adjustments was more significant. If you ask about third quarter at this moment, we believe the impact is less significant.

Roland Shu

Analyst, Citigroup Global Markets Taiwan Securities Co., Ltd.

Okay.

Q

Che Chia Wei

Chief Executive Officer & Vice Chairman, Taiwan Semiconductor Manufacturing Co., Ltd.

And then, he is asking about how we work with customer dynamically to mitigate the impact of Huawei ban. I cannot tell you that how we are going to do it, because this is our company's strategy and our strengths. But one thing I can tell you, we are based on the technology leadership and the excellent manufacturing. That's all we did.

A

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

Okay. Thank you. Operator, can we move on to the next caller please.

A

Operator: Yes. The next question Charlie Chan, Morgan Stanley. Go ahead please.

Charlie Chan

Analyst, Morgan Stanley Taiwan Ltd.

Hey, good afternoon, management team. So my first question is really about your upward revision of the full year revenue guidance. So compared to last time, you were at the mid to high teens percent and now it's above 20%. I think there is at least a 5 percentage point of revenue growth in 2020. But last time your assumption is that the pandemic can get controlled by June and now currently there is a second wave, third wave pandemic in many countries. So, how are you going to reconcile this kind of a weak economy or a healthcare crisis issue versus your very strong revenue guidance? Should I just attribute that to the higher 5G smartphone penetration or there is other factors that we should pay attention to?

Q

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

Okay. Let me summarize your first question, Charlie. You're asking basically we have increased the full-year outlook, but the risk of COVID-19 continues to remain. So, how to reconcile a weak global economy with TSMC's full-year outlook and what will be driving this besides 5G smartphone preparation.

A

Che Chia Wei

Chief Executive Officer & Vice Chairman, Taiwan Semiconductor Manufacturing Co., Ltd.

Well, Charlie...

A

Charlie Chan

Analyst, Morgan Stanley Taiwan Ltd.

Yeah.

Q

Che Chia Wei*Chief Executive Officer & Vice Chairman, Taiwan Semiconductor Manufacturing Co., Ltd.*

A

...we do observe the 5G smartphone, the momentum is getting stronger, so we understand the situation. However, we also observed that our customers are making efforts to ensure supply chain security. So, they might expect there is a second wave, third wave COVID-19, but since that end demand looks very promising, so they are not afraid to make sure that their supply chain will not be disrupted. Because of 5G, as you just mentioned, 5G smartphones demand is continuing to increase.

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

A

Okay. Do you have a second question Charlie?

Charlie Chan*Analyst, Morgan Stanley Taiwan Ltd.*

Q

Yes. I do. Thanks. Thanks, Jeff. And so I think, a lot of things happened over past months right, another – I would take it as a U-turn, is your decision for the US fab intention because half year ago, I remember the comment was like the cost is pretty high, logistic doesn't make sense, so what exactly is the trigger for you change this US operation decision. And it would be very kind of you if I can had a very small question because the investors may care as well, your fourth quarter's seasonality because based on your new full year guidance, if we would take it as a 20% or 21% lower bar, the fourth quarter revenue may decline sequentially.

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

A

Okay.

Charlie Chan*Analyst, Morgan Stanley Taiwan Ltd.*

Q

Is that a kind of fair comment? Thank you.

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

A

Okay, well, Charlie, your second question relates to our US fab plan and you want to know why six months ago, we were talking about the cost gap being the major challenge and now we have decided to go ahead. So what has changed?

Charlie Chan*Analyst, Morgan Stanley Taiwan Ltd.*

Q

Yeah. What's the figure, yeah.

Te Yin Liu*Chairman, Taiwan Semiconductor Manufacturing Co., Ltd.*

A

Well, as you know the – with expanding our technology ecosystem and reach to global talent, closer to our customer to get a better service, all are benefits of the fab in US. But in the past, indeed the cost, the gap prohibited us to make those decisions. More recently I think since last December, and I think the things is getting a turn and we did get a positive encouragement from the US administration and about the cost gap and actually

the US administration and the state of Arizona combined. They do – they seem to be able to close the cost gap. We used to hold up against this decision, with their commitment and we are preparing for that.

And how do they close the cost gap? As you have reading we – the US Congress both in Senate and the House are all driving for the incentive packages aimed at revive US semiconductor manufacturing. And with that, I think they do have a way to fulfill that commitment to close – to make up the cost gap. And that was the major decision turning point.

Wendell Huang

Chief Financial Officer, Vice President-Finance & Spokesperson, Taiwan Semiconductor Manufacturing Co., Ltd.

A

And then...

Charlie Chan

Analyst, Morgan Stanley Taiwan Ltd.

Q

Thank you.

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Okay. And then Charlie, he snuck in a third question which he wants to know our outlook for fourth quarter given the full year guidance?

Wendell Huang

Chief Financial Officer, Vice President-Finance & Spokesperson, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Okay. Well, Charlie...

Charlie Chan

Analyst, Morgan Stanley Taiwan Ltd.

Q

Thank you.

Wendell Huang

Chief Financial Officer, Vice President-Finance & Spokesperson, Taiwan Semiconductor Manufacturing Co., Ltd.

A

...it's also too early to talk about fourth quarter. But I think you can do the math and come up with certain estimation. But what we can say is our second half will be growing – will be higher than the first half.

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Yeah. Okay. Thank you. Let's move on to the...

Charlie Chan

Analyst, Morgan Stanley Taiwan Ltd.

Q

Okay. Thank you.

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

A

...next caller on the line please.

Operator: The next one to ask questions, Bruce Lu, Goldman Sachs. Go ahead please.

Bruce Lu

Analyst, Goldman Sachs (Asia) LLC

Q

Hi. Thank you for taking my question. I think given your positive progress in 3-nanometer and 5-nanometer especially from CapEx, can we assume that similar to previous node like 7-nanometer or 12-nanometer that first year of 3-nanometer can achieve 10% of the wafer revenue and the second year of the 5-nanometer can achieve 30% of the wafer revenue?

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Okay. So Bruce your first question is regards to N5 and N3. Bruce wants to know with the progress in N3, can it be contribute 10% of the wafer revenue in the first year? And he also wants to know can N5 contribute 30% of the wafer revenue in its second year?

Wendell Huang

Chief Financial Officer, Vice President-Finance & Spokesperson, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Okay. Bruce both of them are really too early to talk about it. We certainly hope that there will be pretty big nodes. But we will definitely let you know when time is closer.

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Do you have a second question Bruce?

Bruce Lu

Analyst, Goldman Sachs (Asia) LLC

Q

Yes. I think to double check, we raised our 5G penetration shipment forecast, but we lowered the overall smartphone forecast for 2020. And how about the actual number for the 5G smartphone shipment? The penetration is higher because of the lower total smartphone shipment or the 5G smartphone shipment itself is going up as well?

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Okay. So your question – second question Bruce is that we – the global smartphone shipment we now lowered to low-teens decline, but we raised the 5G penetration to high-teens. Is this simply because of a lower smaller global base or what is the 5G penetration number?

Che Chia Wei

Chief Executive Officer & Vice Chairman, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Well the 5G penetration as I said the momentum continue to increase, so even with the total smartphone number being decreased at low teens, but 5G's percentage continued to increase and that's what we observe and also the 5G semiconductors content is higher than the 4G and especially high-end is much higher. So that's what we base on.

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

Okay. Thank you, Bruce. Operator, can we move on to the next question on the line please?

A

Operator: The next on the line is Aaron Jeng from Nomura Securities. Go ahead please.

Aaron Jeng

Analyst, Nomura International Hong Kong Ltd. (Taiwan)

Hi, thank you for taking my question. Can I ask a follow-up to Bruce question just right now? He was asking by lowering the total smartphone demand to low teens, down 10% to 15% now from the earlier version of down 5% to 10%, but raising 5G penetration rate to 15% to 20% from earlier in mid-teens say by 15%. But in terms of absolute 5G phone demand or sell-in number. Is the number being raised or pretty much the same as the prior version. That's a follow-up – actually it is a part of my first question, but that's happened to be a follow-up to Bruce question.

Q

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

Okay. Aaron, let me summarize your first question. Basically Aaron wants to know, what is the – is our forecast for 5G smartphone in terms of units increased?

A

Che Chia Wei

Chief Executive Officer & Vice Chairman, Taiwan Semiconductor Manufacturing Co., Ltd.

The answer is Yes.

A

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

Okay.

A

Aaron Jeng

Analyst, Nomura International Hong Kong Ltd. (Taiwan)

Okay. Thank you.

Q

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

What is your second question?

A

Aaron Jeng

Analyst, Nomura International Hong Kong Ltd. (Taiwan)

Okay. Okay. Let me so – okay let me add my discretion that I was trying to compare the outlook offered by TSMC for the industry and the outlook given in the year beginning six months ago. And in the year beginning TSMC was saying that semi excluding memory was going to grow by 8% and now it's going to be flatish to slightly grow, which means I think overall demand including everything is lower than it was six months ago. But foundry growth in the year beginning was 17% but now it's pretty much unchanged at mid-to-high teens growth. TSMC's growth in the year beginning was above the industry growth, now it's above 20% growth.

Q

Okay. So, my question is over the last six months, TSMC along with actually everyone in the world particularly in tech have experienced challenges including one COVID-19 and two Huawei issue. But it turns out that TSMC is doing even better than there was no still these issues. So I wonder – actually I think the CEO already even said that the 5G absolute unit demand is going to be higher than you saw six months ago which is one I think key reason, but it looks to me that factor, two negative factors are still huge, actually either one of them is big, right, so TSMC turned out to be better than if there's no these two negative impact. So how do we think about this? Earlier also Chairman said that...

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Aaron, okay. I think let me summarize your question because it's quite long.

Aaron Jeng

Analyst, Nomura International Hong Kong Ltd. (Taiwan)

Q

Yeah.

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

A

I think...

Aaron Jeng

Analyst, Nomura International Hong Kong Ltd. (Taiwan)

Q

Sorry...

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

A

In essence what you're asking is when you look at the industry framework that TSMC provided in the beginning of the year and you look at the framework now, you point out that the semi ex-memory growth in January we said plus 8%, now we said flat to slightly up. Foundry growth in January reached at 17% increase year-on-year, now we say mid-to-high teens, but for TSMC growth we're now saying greater than 20%. So, given the challenges in this year from COVID-19 and such, what is driving TSMC's stronger growth?

Che Chia Wei

Chief Executive Officer & Vice Chairman, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Well, I can answer that question by simply one word, technology leadership. Actually, we see a very strong demand from our 7-nanometer and 5 nanometers technology and 5G again I would like to say that 5G is – it's momentum is getting strong...

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Okay.

Che Chia Wei

Chief Executive Officer & Vice Chairman, Taiwan Semiconductor Manufacturing Co., Ltd.

A

...and including also HPC, I'm sorry. Sorry. Yeah.

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

A

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

Operator: Next, we're having Gokul Hariharan, JPMorgan. Go ahead, please.

Gokul Hariharan*Analyst, JPMorgan Securities (Asia Pacific) Ltd.*

Q

Thanks for taking my follow-up question. First of all, just wanted to understand, we are running a 20-plus-percent growth this year. Any thoughts on – I think we expect some of these megatrends to last, any thoughts on why we aren't changing our long-term 5% to 10% target, especially given you're also spending more CapEx. So if our ROIC is similar and probably we need to be at a slightly higher growth rate? That's my first question.

Second, just wanted to understand what is management's view on how much of this year's outgrowth compared to the semiconductor industry have been some of this inventory build that your customers have undertaken. And for the last several years, there is very few years that TSMC outgrowth the semiconductor industry or foundry industry by a 50% margin and this seems to be one of those years where even smartphone is not really growing, it's actually declining while TSMC is growing more than 20%. So just wanted to understand, there is quite a bit of that which is real demand and market share gain and leading edge. But any part on how much of that do you feel that some of this inventory and supply chain security inventory that your customers are building?

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

A

Okay. Gokul, let me summarize your two questions. Maybe I'll start with the second question first. You just want to know management's view. The fact that TSMC's growth in 2020 is outpacing the foundry industry, can we break down what is driving this? How much of it is from supply chain efforts to ensure supply chain security? How much of it is market share gains? How much of it is due to leading edge?

Che Chia Wei*Chief Executive Officer & Vice Chairman, Taiwan Semiconductor Manufacturing Co., Ltd.*

A

We certainly at this time I don't think we can separate them so clearly each one that is because of our technology, because of share gain, because of HPC or something like that. Again, I would like to emphasize the need on the leading edge technology node on 7 and 5 and that's what we gain our advantage. Okay.

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

A

Okay. And then your second question Gokul to repeat again is that with the strong growth we see this year and the megatrends that we identify for the next several years, is there – will there be a change in our long-term growth target?

Che Chia Wei*Chief Executive Officer & Vice Chairman, Taiwan Semiconductor Manufacturing Co., Ltd.*

A

Well we continue to emphasize that we will be at a high end of our 5% to 10% CAGR. Remember these kind of forecasts is rolling forecast. So we continue to have confidence in our technology and also our market share and so our growth.

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

Okay. Thank you, Gokul. Operator, can we move on to the next caller from the line.

A

Operator: Next on we are having Sebastian Hou from CLSA. Go ahead please.

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

Sebastian, are you on the line?

A

Sebastian Hou

Analyst, CLSA Ltd.

Sorry. I forgot to unmute. Okay, can you hear me now?

Q

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

Yes, we can hear you. Please go ahead.

A

Sebastian Hou

Analyst, CLSA Ltd.

Okay. Okay, thank you. So, I have a two follow-up. First one is that, 5 nanometer revenue contribution is lowered from 10% to 8%, but total revenue outlook is 8%. So if we do the math, the 5 nanometer revenue probably lowered by 15% compared to April and if we further compare to January guidance, then actually 20% lower. So how do we attribute this, it's due to customers that got sanctioned in May or any other reasons? And furthermore, it also means that the other technology nodes are actually growing stronger. So what's driving the other applications in those and also can you give us an update on your expectation of the growth for the four major platforms, with the new revised up guidance? Thank you.

Q

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

Okay. So let me summarize Sebastian's question. He wants to know what is driving the difference in terms of N5 today versus six months ago and what other nodes then are stronger and then he also wants to know the 2020 growth outlook by platform.

A

Wendell Huang

Chief Financial Officer, Vice President-Finance & Spokesperson, Taiwan Semiconductor Manufacturing Co., Ltd.

Okay. Sebastian, actually compared to six months ago, our N5 revenue actually (sic) decreases. And so the other nodes maybe you can double check the math. Yeah. Okay.

A

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

And then the 2020 growth outlook by the four platforms.

A

Wendell Huang

Chief Financial Officer, Vice President-Finance & Spokesperson, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Oh, okay. All the platform will grow except the automotive.

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

Okay?

A

Sebastian Hou

Analyst, CLSA Ltd.

Okay. Good. And my second question is also follow up on the 5G smartphone – also the total smartphone guidance you just gave, and the other analyst asked about. So what are the – so it looks like the total 5G smartphone numbers – absolute number is raised. And I wonder based on the forecasts on the final sales numbers or based on the forecast that you're seeing from your smartphone SoC fabless? Thank you.

Q

Che Chia Wei

Chief Executive Officer & Vice Chairman, Taiwan Semiconductor Manufacturing Co., Ltd.

Well, we based on the one we work with our customer, so that's a number that a customer demand to TSMC, of course, they are also doing their forecasts as we did.

A

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

Okay. Thank you, Sebastian.

A

Sebastian Hou

Analyst, CLSA Ltd.

So ...

Q

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

Yeah, Sebastian, sorry. Okay let's move on to the next caller.

A

Operator: Next one, we're having Mehdi Hosseini, SIG. Go ahead please.

Mehdi Hosseini

Analyst, Susquehanna Financial Group LLLP

Yes, yes. Thank you so much for taking my follow-up. I'm a little bit confused and I was wondering you could help me. All the 5G smartphone data point suggest that that smartphones that are selling through are priced well less than \$300. And also your commentary suggests that despite the fact that COVID has had the second wave, your outlook is actually stronger. So how can I reconcile 5G smartphone if it's mostly driven by low-end and the second wave of COVID with your outlook?

Q

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

Okay. Mehdi, your question is how – your observation is that 5G smartphone sell through is mainly coming through at the low-end 5G smartphones priced at \$300 or less. And with the potential second wave of COVID, how can you reconcile this low-end demand with what TSMC has seen? Is that correct?

A

Mehdi Hosseini*Analyst, Susquehanna Financial Group LLLP*

Q

And also your outlook for the year because earlier in last conference call you said your outlook is based on COVID stabilizing by June, but it seems like there's a second wave?

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

A

So, Mehdi is also asking because in April we said our outlook was premised on stabilization of COVID by June, but now it looks like COVID-19 continues.

Wendell Huang*Chief Financial Officer, Vice President-Finance & Spokesperson, Taiwan Semiconductor Manufacturing Co., Ltd.*

A

Actually we don't confirm there's a second wave of COVID-19 per se. But we'll leave that one alone. We do observe that our customers have demand to TSMC, and you mentioned that 5G is only in the low-end, we do expect yet another new 5G phones pretty high-end in the second half of 2020, and that's what we base on our assumption.

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

A

Okay. Thank you.

Mehdi Hosseini*Analyst, Susquehanna Financial Group LLLP*

Q

Okay. May I ask one follow-up on CapEx?

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

A

Okay.

Mehdi Hosseini*Analyst, Susquehanna Financial Group LLLP*

Q

The \$1 billion of increase to 2020 CapEx, is that equally distributed between frontend equipment and backend or is it more in one particular area. What's driving the incremental increase?

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

A

Okay. Mehdi, your second question is what's the increase in the CapEx guidance, is it more driven by the frontend or the backend for 2020.

Wendell Huang*Chief Financial Officer, Vice President-Finance & Spokesperson, Taiwan Semiconductor Manufacturing Co., Ltd.*

A

Yeah. Well, basically, it's frontend.

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

A

Okay. Thank you. Operator, let's move on to the next caller.

Operator: Okay. The next one we're have having, Laura Chen from KGI. Go ahead please.

Laura Chen

Analyst, KGI Securities Investment Advisory Co. Ltd.

Q

Good afternoon. Thank you for taking my question and congratulation for the good results. Actually the question is also related to the advanced packaging. I recall that we mentioned that we had about \$3 billion for the advanced packaging last year for the revenue contribution. I'm just wondering what's the latest guidance for this year; any revenue target for advanced packaging? And also what's our plan looking forward in this space? On the incremental increase CapEx, do we also have some planning in this space?

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Okay. So, Laura's question is related to the advanced packaging. She wants to know last year I believe it was not \$3 billion, it was \$2.85 billion. So, what is the growth outlook for this year? Number one. And then, what's the plan for advanced packaging, the outlook going forward?

Che Chia Wei

Chief Executive Officer & Vice Chairman, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Okay. We expect that the advanced packaging will grow probably similar to our corporate average this year. As to the CapEx increase, yes, a little bit, but mostly at the front end and with the advanced technology.

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Okay. Do you have a second question, Laura?

Laura Chen

Analyst, KGI Securities Investment Advisory Co. Ltd.

Q

Yes. My second question is about the legacy process and also like 28-nanometer. We all know that advanced packaging; we are very strong and fully loaded. I'm just wondering that for the legacy capacity and the utilization rate and especially for 28-nanometer, C.C. also mentioned before that you see structurally overcapacity in this space, looking forward, can we expect improvement in second half or next year, given our good progress in the RFIC or CIS, et cetera?

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Okay. So, let me summarize your second question, Laura, looking at our mature nodes, what is the utilization outlook for our mature nodes and specifically for 28-nanometer, do we see improvement in second half...

Laura Chen

Analyst, KGI Securities Investment Advisory Co. Ltd.

Q

Yes.

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

...or 2021?

A

Che Chia Wei*Chief Executive Officer & Vice Chairman, Taiwan Semiconductor Manufacturing Co., Ltd.*

All right. Let me answer that. Our mature node what we call the specialty, our mature nodes loading actually is quite good except 28-nanometer, okay. I still want to emphasize that 28-nanometer has been overcapacity for the whole industry, but we will continue to improve it and slowly of course we can see that CMOS Image Sensor and also other applications that will move into 28-nanometer. But it's slower than we thought however it will be improved. We have confidence to say that.

A

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

Okay. Thank you, Laura. Operator...

A

Laura Chen*Analyst, KGI Securities Investment Advisory Co. Ltd.*

Thank you.

Q

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

...let's move on to the next caller.

A

Operator: Next one to ask questions, Randy Abrams, Credit Suisse. The line is open now.**Randy Abrams***Analyst, Credit Suisse AG (Taiwan)*

Okay. Yes. Thank you for the following questions. First one, I wanted to just go back with the clarification on Huawei. If you're factoring in for the future view and the potential shipments, I think one is the regulations seem to allow some ways to ship to Huawei. I know you'll comply by the rules. But it seems to allow some way to ship directly to OSATs. I'm curious either from that or a perspective that you get a partial or full license if you're building that into the base case?

Q

Che Chia Wei*Chief Executive Officer & Vice Chairman, Taiwan Semiconductor Manufacturing Co., Ltd.*

Actually, the current regulation spells do not prohibit the standard product or general product to be able to ship to Huawei. And therefore we think Huawei is a smartphone business. Most likely they may strategize to stay by procuring general purpose products.

A

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

Randy, part of your question is that from TSMC's perspective, are there alternative ways to ship to this customer such as shipping to OSAT or will we have a partial license?

A

Che Chia Wei*Chief Executive Officer & Vice Chairman, Taiwan Semiconductor Manufacturing Co., Ltd.*

No, we don't. We don't have alternative way to ship.

A

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

Okay?

A

Randy Abrams*Analyst, Credit Suisse AG (Taiwan)*

Okay. If I can get the second question. If you could just...

Q

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

Randy, are you still there?

A

Randy Abrams*Analyst, Credit Suisse AG (Taiwan)*

...nanometer. If that would be a steep ramp-up...

Q

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

Sorry.

A

Randy Abrams*Analyst, Credit Suisse AG (Taiwan)*

...would be available in 2020?

Q

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

Sorry, Randy, you dropped off for a second, can you repeat your second question...

A

Randy Abrams*Analyst, Credit Suisse AG (Taiwan)*

Okay.

Q

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

...again?

A

Randy Abrams*Analyst, Credit Suisse AG (Taiwan)*

Okay. Yeah. It's actually more about the half nodes. The 4-naometer will be available I think mass production early 2022. So, with N3 coming out late in the year, if you're expecting that would be the steep ramp, so we could see high volume, it also could allow you I think with the tool reuse a bit lower spend. So, I'm curious how you're

Q

thinking about that? And then, also on the 6-nanometer, if you're still seeing most of the customers on N7 migrate to N6, where I think previously you expected majority could end up going to that half node. Thank you.

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Okay. Your second question, Randy, is related to N4 and N3. And thus, with the timing differences of N4 and N3 where we see a lower spend as a result. Randy's view is that N4 will be early 2022. N3 will be late 2022. And then, so, with some conversion will that result in lower spend. And he also wants to know for our N6, we've talked about it before, do we see still a strong migration of our customers from N7 to the N6.

Che Chia Wei

Chief Executive Officer & Vice Chairman, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Let me answer the second one first. On the N6, yes, we are being – offer to our customer with a compatible, actually it's fully compatible to N7, so it will have a very good opportunity to catch the second wave of 7-nanometer product. With the same kind of strategy we offer N4 to follow the N5. So we do expect that N5 as a product finally, a large portion of the N5 product will move to N4. So, it's not to mix with N3's progress of N3 ramp up. N3 is another full node, it's more advanced by nature, as N5, so N3 is a N3, N4 is a N4.

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

A

And N6, do we still see strong migration...

Che Chia Wei

Chief Executive Officer & Vice Chairman, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Yeah. I already said that N6 is following the N7.

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Sorry. Okay. Operator, let's move on to the next caller?

Operator: Next one, we're having Charlie Chan, Morgan Stanley. The lines are open to you now.

Charlie Chan

Analyst, Morgan Stanley Taiwan Ltd.

Q

Thanks for taking my follow-up question. So, two parts, firstly is about your N3 and CapEx. Do you spent some CapEx for N3 this year, so that's another reason why you see a CapEx upward revision?

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Okay, Charlie. Your first question is that for 2020 CapEx, do we spend – does it include spending for N3?

Wendell Huang

Chief Financial Officer, Vice President-Finance & Spokesperson, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Charlie, part of the CapEx this year is for N3, but that's not the reason for our increase in CapEx.

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

Okay. And do you have a second question, Charlie?

A

Charlie Chan*Analyst, Morgan Stanley Taiwan Ltd.*

Yeah. I do. So every quarter I ask this question about the Chinese competition and notably your China competitor SMIC, they do [ph] A-share appear (1:14:51) with a very high valuation, and suppose the raised money can spend for their future CapEx or even new growth. So I am not saying about in the recent quarter but in the long-term, do you think that is a threat and you probably may lose the market share to China players given they want localization or do you have any china strategy to accommodate to China's localization policy? Thank you.

Q

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

Okay. So Charlie your question is that, what is the threat from our Chinese foundry competition, do we see it as a growing threat? How do we respond?

A

Charlie Chan*Analyst, Morgan Stanley Taiwan Ltd.*

Yes.

Q

Che Chia Wei*Chief Executive Officer & Vice Chairman, Taiwan Semiconductor Manufacturing Co., Ltd.*

Well, Charlie I also answer every time that we compete in technology and the manufacturing and the customer relationship. And whether it is China, in other area, we stay the same, we compete in technology, manufacturing and we have been keeping very good relationship with our customer, we've won their trust.

A

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

Okay. Thank you. In the interest of time, I think we will take the last two callers on the line.

A

Operator: Next one, we are having Bruce Lu, Goldman Sachs. Go ahead please.

Bruce Lu*Analyst, Goldman Sachs (Asia) LLC*

Hello. Thank you for taking my follow-up question. The first question is norm for the capital intensity, I think if I remember last six months management was talking about capital intensity will go back to 30% to 35% for 2021. But earlier the management was talking about it will go back to closer to 35%. So, do we foresee better capital intensity norm will be closer to 35% or the norm will still remain at 30% to 35%.

Q

Wendell Huang*Chief Financial Officer, Vice President-Finance & Spokesperson, Taiwan Semiconductor Manufacturing Co., Ltd.*

Okay. Bruce, I think our comment is over the long run, it will go to about 35% and that remains the same.

A

Bruce Lu

Analyst, Goldman Sachs (Asia) LLC

Q

Okay. I understand that. And second question is that we saw that TSMC announced two new factories for the advanced packaging this year, just through the groundbreaking and the size for the factory is pretty big. Do we anticipate that the advanced packaging penetration rate will be a lot higher in the advanced node and what's the future outlook for the advanced packaging?

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Okay. So, your second question is, Bruce wants to know that we announced a large advanced packaging site recently. So, he wants to know what is the penetration rate, so to speak, of advanced packaging in the leading nodes going forward and what is the outlook?

Che Chia Wei

Chief Executive Officer & Vice Chairman, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Well, we do work with our customer closely and we do see some increase on the demand of advanced packaging, and therefore, we try to enlarge our capacity that's for sure. But let me stress that we enlarge our advanced packaging capacity is for the leading edge, also for specialties. There is a new demand coming out, and we have to work with our customer to meet their requirement.

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Okay. Operator. Thank you, Bruce. Operator, can we take the last caller on the line, please?

Operator: Yes. The last one to ask questions Sebastian Hou, CLSA. Go ahead, please.

Sebastian Hou

Analyst, CLSA Ltd.

Q

Thank you. So on the CapEx increase, the \$1 billion CapEx increase which particularly node did that go to? Thank you.

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Sebastian wants to know with the increase in the CapEx to \$16 billion to \$17 billion from \$15 billion to \$16 billion previously, what node is the CapEx spending going to?

Wendell Huang

Chief Financial Officer, Vice President-Finance & Spokesperson, Taiwan Semiconductor Manufacturing Co., Ltd.

A

It's leading edge.

Sebastian Hou

Analyst, CLSA Ltd.

Q

Okay. Got it. And then my last question is I think the US Senator has proposed two bills, CHIPS Act and American Foundries Act in June. So, I wondered, how does that correlate with the TSMC, Arizona plant and if that were to

be passed, that should be passed, whether TSMC or non-American company are eligible for the potential subsidy? Thank you.

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Sebastian just to make sure we are understand your question. Your question is related to some of the proposed regulations in the US such as the CHIPS Act and the AFA. If these bills were to be passed, would it be eligible for TSMC or the industry?

Che Chia Wei

Chief Executive Officer & Vice Chairman, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Yes. It's well aligned with our request and if those bills, in different form passed, I think the administration and State of Arizona will make this project happen.

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

A

Okay. Thank you, Sebastian.

Sebastian Hou

Analyst, CLSA Ltd.

Q

Got it.

Jeff Su

Director-Investor Relations, Taiwan Semiconductor Manufacturing Co., Ltd.

Thank you. This concludes our Q&A session. Before we conclude today's conference, please be advised that the replay of the conference will be accessible within four hours from now. The transcript will be available 24 hours from now and both of them will be available through TSMC's website at www.tsmc.com.

Thank you for joining us today. We hope everyone continues to stay healthy and safe, and we hope you will join us again next quarter. Good bye, and have a good day.

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