Q2 2018 Earnings Call

Company Participants

- Daniel Durn, Chief Financial Officer & Senior Vice President
- Gary E. Dickerson, President, Chief Executive Officer & Director
- Michael Sullivan, Vice President, Investor Relations

Other Participants

- Atif Malik, Analyst
- C. J. Muse, Analyst
- Craig A. Ellis, Analyst
- David M. Wong, Analyst
- Farhan Ahmad, Analyst
- Harlan Sur, Analyst
- Joseph Moore, Analyst
- Krish Sankar, Managing Director
- Mehdi Hosseini, Analyst
- Patrick J Ho, Analyst
- Pierre C. Ferragu, Global Team Head
- Romit Jitendra Shah, Analyst
- Sidney Ho, Analyst
- Timothy Arcuri, Analyst
- Toshiya Hari, Analyst
- Vivek Arya, Analyst
- Y. Edwin Mok, Analyst

MANAGEMENT DISCUSSION SECTION

Operator

Welcome to the Applied Materials Earnings Conference Call. During the presentation, all participants will be in a listen-only mode. Afterwards, you will be invited to participate in a question-and-answer session.

I would now like to turn the conference over to Michael Sullivan. Please go ahead, sir.

Michael Sullivan {BIO 16341622 <GO>}

Good afternoon and thank you for joining us. I'm Mike Sullivan, Head of Investor Relations at Applied Materials. We appreciate you joining us for our second quarter of fiscal 2018 earnings call, which is being recorded. Joining me are Gary Dickerson, our President and CEO; and Dan Durn, our Chief Financial Officer.

Before we begin, let me remind you that today's call contains forward-looking statements, including Applied's current view of its industries, performance, products, share positions, and business outlook. These statements are subject to risks and uncertainties that could cause actual results to differ materially and are not guarantees of future performance. Information concerning these risks and uncertainties is contained in Applied's most recent Form 10-Q and 8-K filings with the SEC. All forward-looking statements are based on management's estimates, projections and assumptions as of May 17, 2018, and Applied assumes no obligation to update them.

Today's call also includes non-GAAP financial measures. Reconciliations to GAAP measures are contained in today's earnings press release and in our reconciliation slides, which are available on the Investor Relations page of our website at appliedmaterials.com.

Before we begin, I have a calendar announcement. On Tuesday morning, July 10th, Applied Materials is sponsoring technology briefings during SEMICON West in San Francisco. Please save the date and stay tuned for additional details.

And now, I'd like to turn the call over to Gary Dickerson.

Gary E. Dickerson {BIO 2135669 <GO>}

Thanks, Mike. Applied's performance in the second fiscal quarter was another all-time record for the company, with revenue up 29% from the same period last year. I'd like to congratulate and thank our employees around the world for these outstanding results. Across the company, we have tremendous momentum. Applied has broad exposure to major technology trends and is playing a larger, more valuable role in the electronic ecosystem. All three of our major business segments, Semiconductor, Display and Service, remain on track to deliver strong double-digit growth in fiscal 2018.

In today's call, I'll provide our perspective on how the major trends driving our markets are evolving. I'll outline our strategy and how we're translating our broad portfolio of products and capabilities into sustainable growth for Applied. Then Dan will provide more details about our financial performance and outlook.

During this past quarter, there have been some puts and takes in our customers' near-term investment plans. Smartphone sales have been below expectations, particularly for high-end models. And in response, both semiconductor and display suppliers have made adjustments to their capacity planning. We view the current investment levels as rational and disciplined, particularly in the memory market. We, therefore, believe a healthy balance of supply and demand will be maintained.

Smartphones remain a key long-term driver of both technology and capacity. In many ways, smartphones are the ultimate edge device. And as handset makers add more functions and features to their products, we see the content per box continuing to grow.

For example, recent forecast from our customers indicate that average yearly growth in mobility content over the next three years will be around 35% for NAND and 20% for DRAM. In contrast to the weakness in smartphone unit sales we've seen in the first part of this year, there is evidence that emerging drivers of industry growth are picking up pace.

The Internet of Things, Big Data and Artificial Intelligence will disrupt and transform virtually every industry and area of the economy over the next decade. While we're only at the very beginning of the buildout of the AI big data era, we are already starting to see the positive impact on our markets. In just the past six months, cloud service providers have increased their capital investments significantly. Looking at the financial reports from the top seven cloud service providers, we see their CapEx up around 40% this year versus previous expectations of about 30%.

Also, data center real estate investments made by those companies in 2017 were up more than 250% compared to 2016, which we view as a positive leading indicator of growth. Data centers are already becoming a much larger consumer of silicon. For example, the market for server DRAM is currently growing about 75% faster than mobile DRAM, which means it could become the largest segment of the DRAM market in the next three to five years.

In addition, the architecture war for AI leadership is heating up with a steady stream of new high-performance computing hardware coming to market. At both the server and chip level, we see a major shift from general-purpose computing to new hardware architectures that are customized for specific computing tasks or workloads. This significant technology inflection is fueling new investments in hardware design and new silicon devices, which in turn, are driving significant innovation throughout the ecosystem.

I'll now translate these end market trends into an outlook for Applied's served markets. As I mentioned, we are seeing extremely disciplined investment by our memory customers, which we believe bodes well for healthy market dynamics. In line with our previous forecast, NAND bit demand is expected to grow at about 40% this year.

While we've reduced our expectations for NAND investments in 2018, we still see spending being similar to last year's high levels. Our outlook for DRAM investments has strengthened as customers invest in capacity and technology to meet growing demand for high-performance DRAM used in data centers.

We expect this year's combined investments by foundry and logic customers to be similar to 2017. And we anticipate that spending will be split relatively evenly between leading edge and trailing geometries to serve growing IoT and automotive applications. We also continue to see a steady ramp of spending in China by both multinational and domestic manufacturers, in line with our prior assumptions. Taking all of these factors into account,

we maintain our view that combined wafer fab equipment investments in 2018 and 2019 could be around $100 billion.

In Display, investments in large substrate Gen 10.5 TV capacity remain strong. Adoption of OLED screens in mobile and the ramp of manufacturing capacity are slower than previously expected, primarily due to weakness in high-end smartphone sales. We view OLED as a compelling technology, and the leading handset makers are committed to making the transition over time. Compared to LCD, OLED offers significant performance in power advantages, as well as lower cost and high-volume production.

In addition, next-generation flexible OLED will enable new form factors such as curved and ultimately, foldable screens. Applied Materials' vision is to make possible the technology shaping the future. And we have aligned our investments, organization and operating systems to realize this vision. In many ways, it is the breadth of our capabilities and product portfolio that sets us apart. We have the broadest exposure to industry trends, and our business is well balanced across a variety of markets and market segments.

In addition, as the industry roadmaps become increasingly challenging, material solutions are more critical to deliver the needed improvements in power, performance, area and cost for next-generation devices. Our ability to address these complex challenges with innovative approaches to materials creation, materials removal and materials modification is becoming increasingly valuable.

We also have unique technologies, like eBeam, to measure, understand and inspect new materials and structures. We're using our breadth to help customers accelerate their roadmaps. Shortening the time it takes to bring new devices to market is incredibly valuable, resulting in strong customer pull for materials solutions that go beyond traditional unit process tools. We're excited about our pipeline, and we'll share more insights into these capabilities later this year.

In Semiconductor, the strength of our technology portfolio has enabled us to outperform the market for six consecutive years. Based on our expanding opportunities and the traction of our new products, we expect to grow faster than the market again this year. With our R&D priorities aligned to our customers' evolving requirements, it is clear that advancing the industry roadmaps is going to require a combination of new device architectures, including 3D structures and advanced packaging; new materials; and new ways to shrink chip geometries that address both resolution and placement.

There are significant innovation taking place in all three of these areas, and that creates great opportunities for Applied. Even in shrink, our opportunity is growing regardless of the pace of EUV lithography adoption. The reasons for this include self-aligned multi-patterning techniques; SADP and SAQP, which are needed in conjunction with EUV lithography to drive the resolution roadmap; and new materials-enabled patterning approaches, which are being developed as the primary solution for placement errors.

Placement errors or the vertical alignment between the layers of a device can have a significant impact on device performance and reliability. Beyond equipment, we continue to invest in new service products and organizational capabilities to create value for our customers.

Our Service business delivered all-time record performance this quarter with revenues up 30% relative to the same period last year. Over the longer-term, we're confident that we can sustain annual service growth of at least 15%, driven by a growing installed base, a larger portion of those tools under long-term service agreements, and new service products that help customers shorten ramp times, improve device performance and yield, and optimize operating costs.

In Display, since 2012, we've grown revenues at an average rate of 25% per year. And in 2018, we remain on track to grow by more than 30%. Based on recent revisions to timing of customers' OLED plans, our early view of 2019 is that our revenue will be lower than this year, although still nicely up from 2017. Overall, we maintain a positive outlook for the business as the unique long-term growth driver for Applied.

Before I turn the call over to Dan, I'll quickly summarize. While we've seen some recent changes in customers' near-term investment plans, our markets remain strong and healthy, with long-term demand drivers firmly in place. We maintain our view that wafer fab equipment spending for 2018 and 2019 combined could be $100 billion.

Applied is outperforming our served market. And in fiscal 2018, we expect to deliver strong double-digit growth in Semi, Display and Services. As we look ahead, we see emerging technology trends that play to Applied's breadth. And we're excited about our expanding role of bringing new devices to market.

Now, Dan will give his perspective on our performance and outlook.

Daniel Durn {BIO 17483115 <GO>}

Thanks, Gary. In Q2, Applied set new performance records across a variety of operating and financial metrics. Our manufacturing and operations teams shipped a record number of 300-millimeter systems while hitting key goals for quality and on-time delivery. Company revenue was an all-time high, up 29% year-over-year. Our Semi equipment and Services businesses both set revenue records, and we exceeded our outlook in Display. We maintained strong gross margins even as our Service and Display businesses outgrew Semi.

We grew non-GAAP operating profit by 40% year-over-year to $1.38 billion, a new record. And we continue to become more efficient. We reduced our non-GAAP OpEx to sales ratio to 16.6%, the lowest in our history. And we did this by growing, not cutting.

In fact, we're investing more in R&D than at any time in our history to support our customers with new materials and innovative solutions. This makes Applied a uniquely valuable partner in driving the roadmap for continued high-performance, low-power and

low cost. We will continue to invest with discipline and be laser-focused on improving our execution and financial results.

I believe Applied's strong performance is also attributable to better industry dynamics. We see growing evidence that our markets are larger and less variable. We expect strong Semiconductor equipment spending in 2018 and 2019, despite weakness in the high-end segment of the smartphone market, which is still the single biggest driver of Semiconductor revenue.

In the past, weakness within the largest end product category might have caused a significant correction, particularly in memory. But Applied's results and outlook remains strong. This outcome reinforces our belief in three positive factors.

One, there are more demand drivers than ever before. Today, the PC market (14:47) is growing. Smartphones comes with a wide range of price points to suit more consumers around the world, and the new data economy is just beginning to take shape. Gary mentioned the strength in data center (15:01) leading indicator for us. I personally believe the Internet of Things and artificial intelligence are business critical, not consumer discretionary.

Second, capital intensity is higher. And third, our customers are healthy and adding capacity in a disciplined manner to meet demand where it is needed the most. In fact, while high-end smartphone units were weaker than expected, lower NAND pricing is creating additional demand for solid state drives. In a world where data grows exponentially, it will take many years for our customers to convert the storage market from magnetic technology to semiconductors.

In this environment, Applied's breadth is a unique advantage. In Semiconductor Systems, Gary described how we are combining our technologies to help customers in new ways. You'll see more evidence of this in the months ahead. Applied is strong across memory, foundry and logic, and we're growing in memory, where our leadership products are being used to improve performance and reduce power consumption. Technologies like high-k/metal gate were pioneered in the logic market and are now being adopted in DRAM. Many of our new multi-patterning wins are also in DRAM.

Today, we are also growing our Semi business beyond the opportunity set of the most advanced logic and memory nodes. Our 200-millimeter systems and our trailing node 300-millimeter systems serve many hundreds of end customers in diverse industries such as automotive and industrial. Our 200-millimeter systems revenue should be up over 20% this year.

In fact, we are now building brand-new systems to keep up with the demand for the billions of sensors and other low-cost devices needed in the Internet of Things, advanced automotive applications, and Industry 4.0. These systems shipments are also helping us diversify in service, which gives us growth, consistent revenue, and excellent cash flow.

And Applied has a unique opportunity in Display. As Gary discussed, while the transition to OLED smartphones will take some additional time, our overall Display business is diverse and remains very strong. As a company, we've never had such a broad set of growth drivers, and we have more in the pipeline.

As a result, our fiscal year revenue could be up by more than 20% in 2018, and our non-GAAP EPS could be up over 40%. We're well on track to our goal of achieving over $5 in non-GAAP EPS by 2020.

In short, we have strong conviction in our markets, our strategy, our technology pipeline, and our opportunity to deliver growth over the long run, even when equity markets are volatile in the short run.

Consistent with our conviction, we used $2.5 billion during the quarter to repurchase 44 million shares of our stock or about 4% of the shares outstanding at the beginning of the period. Over the past four quarters, our buybacks were equivalent to 7% of the shares outstanding. At the same time, we've maintained a very strong balance sheet. We plan to increase our CapEx by about $400 million this year. The majority of the increase will be used to expand our R&D capabilities and manufacturing capacity.

Now, I'll comment on our financial execution in Q2. We delivered our ninth consecutive quarter of year-over-year growth in both revenue and non-GAAP EPS, which was $1.22 or $1.19 minus the benefit of a lower tax rate and share count. On a year-over-year non-GAAP basis, we increased gross margin by 40 basis points, increased operating margin by 240 basis points, and grew EPS by 54%.

Turning to the segments. We delivered record revenue and operating profit in both Semi equipment and Services. We grew Semi equipment revenue by 25% year-over-year. Services revenue was up 30% and above our expectation, driven by strong spare parts demand along with new long-term service agreements and renewals.

In Display, we grew revenue by 53% year-over-year and grew non-GAAP operating margin by 620 basis points year-over-year. We expect Display revenue to be higher in our second half, thanks to our balanced exposure to inflections in both the TV and mobile markets.

Now, I'll share our business outlook for Q3 as compared to the same period last year. We expect overall revenue to be in the range of $4.33 billion to $4.53 billion, the midpoint would be up by about 18% year-over-year. We expect Semiconductor Systems revenue to grow about 7%. Our Services revenue should increase by about 23%. Our Display revenue should grow by about 75%.

Our non-GAAP gross margin should be around 46.5%. Non-GAAP operating expenses should be in the range of $770 million, plus or minus $10 million. And we expect non-GAAP EPS to be in the range of $1.17, plus or minus $0.04. The midpoint of the range is up nearly 36%.

Finally, I'll add some additional color to help you with your models for the full fiscal year in which overall company revenue could be up around 22%. The following four metrics are likely to be approximately flat sequentially from Q3 to Q4. Services revenue, Display revenue, non-GAAP gross margin, and non-GAAP OpEx. And our Semiconductor Systems revenue is likely to be up sequentially in Q4.

And now, I'll turn the call back to Mike to start the Q&A.

Michael Sullivan {BIO 16341622 <GO>}

Thanks, Dan. Now, to help us reach as many people as we can, please ask just one question at this time. If you have an additional question later, please poll the operator and we'll do our best to answer it later in the call. Operator, let's please begin.

Q&A

Operator

Thank you. And our first question is from C. J. Muse with Evercore ISI.

Q - C. J. Muse {BIO 6507553 <GO>}

Yeah. Good afternoon. Thank you for taking my question. I guess question for me is considering that the weakness you're seeing in the high-end smartphone side, as your outlook for total WFE low double-digit growth in calendar 2018 changed, could you discuss that? And then how should we think about the $100 billion combined WFE outlook that you provided? Is that guide or just more reflective of your view that spending will remain sustainable – strong into next year? Thanks.

A - Daniel Durn {BIO 17483115 <GO>}

Thanks, C. J. I think it's a reflection of our conviction in our end markets and sustainably strong. We feel really good about the end markets. Like Gary said, $100 billion in 2018 and 2019, and we're seeing strength across all device types. The markets are more balanced today than they've probably ever been. 2017 is a very strong year. 2018 will be up over 2017, and we see the fundamentals into 2019 being strong. So we still feel good about the markets, the performance, and the outlook into 2019.

A - Michael Sullivan {BIO 16341622 <GO>}

Thanks, C. J.

Operator

Thank you. Our next question is from Atif Malik with Citigroup.

Q - Atif Malik {BIO 15866921 <GO>}

Hi. Thank you for taking my question. Can you talk about the mix of LCD versus OLED displays in the reported quarter? And with your expectations for Display being down in 2019, are you expecting the TV market to be down or is it more OLED? Thank you.

A - Gary E. Dickerson {BIO 2135669 <GO>}

Thank you. So, let me give some color on Display, overall. Display is a really good adjacent market for Applied. We averaged 25% growth, annual growth between 2012 and 2017, and we're still on track to greater than 30% revenue growth in 2018. Based on the customer plans, our view of 2019 is for revenue to be down around 15% or 20%.

When we look at mobile and TV, in 2018, we see investment balanced between mobile and TV. 2019 more weighted towards TV. And in TV, the adoption of larger screens is driving the market. If you look at Gen 10.5 factory versus a Gen 8.5 factory, you can produce eight 65-inch televisions versus three 65-inch televisions. So it's really compelling value proposition there. We're still tracking 13 Gen 10.5 projects. There's a long lead time for these factories, and customers are still on track with these investments.

In OLED, it is slower than we previously expected. We're still tracking 23 fabs. That timing has extended out from around 2021 to 2023, but the transition to OLED Display is still compelling, and leading handset makers are still committed to making the transition.

If you look rigid OLED, you have better performance, better from factor, lower cost entitlement and high-volume manufacturing, and the ability to go to flexible OLED for curved and eventually foldable screens. So we've had great performance in growth in Display over the last few years. With future technology inflection as our pipeline of new capabilities, we continue to see Display as a really good growth opportunity for Applied.

A - Michael Sullivan {BIO 16341622 <GO>}

Thanks, Atif.

Operator

Thank you. Our next question is from Pierre Ferragu with New Street Research.

Q - Pierre C. Ferragu {BIO 15753665 <GO>}

Hi, thank you for taking my question. Gary, you've mentioned in your prepared remarks how the industry has become disciplined in the way it's managing its investments. And I think maybe you could elaborate on that and tell us about what happened in the first half – in the first quarter of the year. So, demand in smartphones came in weaker than expected. We are in a weak smartphone environment, that's fairly new. So my question is, is this new discipline. Does that mean that your clients have been able to adapt their plans very rapidly and did they adapt plans already? Or does that actually mean that the unit growth of smartphone as a driver for the industry as a whole is now so small and lost into other drivers like content increase and other markets like datacenter. And this is – that actually – that's not a moving body, that really affects investment plans in today's world? Thank you.

A - Daniel Durn {BIO 17483115 <GO>}

Thanks for the question. So if we take a look at the memory market as an illustration of the point around discipline, we take a look at the demand. End market demand is strong, the macro drivers, we keep talking about artificial intelligence, data economy are real. They're playing out and its driving demand for silicon. We see that demand in the memory market. Customers are incredibly healthy. They're investing a lot, but they're also making a lot. And in fact, WFE as a percent of EBITDA is down 50% from 2012 to today. And the environment is characterized by demand-led investments. The market is showing incredible discipline.

In DRAM, 2017, supply bit growth was about 20%. Demand bit growth in 2017 was slightly more than that. In 2018, we expect supply and demand in the DRAM market to be balanced at about 20% growth each. In NAND, it's a similar story. In 2017, supply bit growth was about 30% to 35%. And 2017's demand bit growth was about 35% to 40%. In 2018, again, we see a balanced market from a supply-demand perspective, both at about 40%.

When we look at what's happening in China, we're seeing modest and disciplined growth in China. China is emerging as a spender. Their strategic intent is clear and the financial resources they have are clear. And based on our dialog, we think the expectations with those customers are realistic. They're being pragmatic. Capacity additions to-date are modest. And when we take all of this into account, we have confidence in this region in the long run.

So, across multiple markets, multiple geographies, we're seeing a very disciplined environment play out. And as we take a step back from that environment, 2017 was a great year in WFE. 2018 will be up over 2017. As Gary said, could be $100 billion between 2018 and 2019. So we're seeing strength across all device types, customers are healthy, and they are acting in a disciplined manner.

A - Michael Sullivan {BIO 16341622 <GO>}

Thanks, Pierre.

Operator

Thank you. Our next question is from Harlan Sur with JPMorgan.

Q - Harlan Sur {BIO 6539622 <GO>}

Good afternoon. Thanks for taking my question. Thanks for the commentary on memory. So, you see a balanced supply-demand outlook for DRAM. I think industry capacity entering this year was about 1.1 million wafer starts per month. But as you guys know, the DRAM suppliers are losing effective capacity, like every time they do a technology migration, I think, something to the tune of like 15% capacity lost. And then bit per wafer is also going down every time they do technology migration. So given what you're seeing, what do you think we end the year as it relates to total DRAM capacity? Thank you.

A - Daniel Durn {BIO 17483115 <GO>}

Thanks for the question. If we go back to 2016, it was 1.1 million wafer starts per month. And probably a handful of years before that, it was 1.1 million wafer starts per month. In 2017, because of exactly the dynamic you talked about, which is we're getting less bit growth out of shrinks, and the shrinks are happening at a less frequent interval, we saw more capacity adds in the DRAM market. So, it rounded to 1.2 million wafer starts per month exiting 2017.

I think it's too early to call where we end up in 2018, but we definitely see customers struggling to drive bit growth from shrinks alone, factory output when you shrink, because the process is more complex, goes down. And greenfield adds our being just added to keep the supply-demand in balance, driving about a 20% bit supply growth in line with bit demand growth. So too early to call it, but it still looks like a healthy market acting with discipline.

Q - Harlan Sur {BIO 6539622 <GO>}

Thanks, Dan.

A - Gary E. Dickerson {BIO 2135669 <GO>}

Yeah. One of the things I'd like to add is that in DRAM, we're going to see very strong growth in revenue in 2018, much faster than what we project for the market. The devices are changing to become more logic-like in the periphery, similar to 28-nanometer foundry steps. We're also gaining and patterning new wins where we never had positions. So especially, in DRAM, we see very strong growth for Applied in 2018 and beyond.

A - Michael Sullivan {BIO 16341622 <GO>}

Thanks, Harlan.

Q - Harlan Sur {BIO 6539622 <GO>}

Thanks, Dan. Thanks, Gary.

Operator

Thank you. Our next question is from Romit Shah with Nomura Instinet.

Q - Romit Jitendra Shah {BIO 16865852 <GO>}

Yes. Thank you. If I heard you correctly, Dan, you guys are reiterating your 2020 target but at the same time you're lowering your outlook for Display. I mean, relative to what the Street is forecasting, it looks like it's about $600 million swing in Display revenue guidance relative to forecast. So can you help us reconcile your reiteration of the 2020 target versus the lower guidance for Display? Thank you.

A - Daniel Durn {BIO 17483115 <GO>}

Thanks, Romit. So, look, the business is performing extremely well. Q2 was a record quarter. 2018 is going to be a record year for the company. We've got more pipeline opportunities, new products that are going to be introduced. We're going to be announcing them in the near-term. The business is performing well and we're driving good performance. We are well on our track to hitting over $5 of EPS by 2020.

How that profiles across the business? We're not going to update the long-term model on this call. We'll do that at our Analyst Day later this fall. But at the core is a business that's performing well with a lot of conviction around hitting that long-term target of $5 of EPS – over $5 of EPS by 2020.

A - Michael Sullivan {BIO 16341622 <GO>}

Thanks, Romit.

Operator

Thank you. Our next question is from Timothy Arcuri with UBS.

Q - Timothy Arcuri {BIO 3824613 <GO>}

Thank you very much. I wanted to follow-up on this $100 billion over this year and next year. And it sounds like the baseline for this year that you guys are talking about, is it like in low 50s because you're saying up double-digits off like a $47 billion number. So that would imply that it's down like $5 billion to $6 billion next year. I know that that's not guidance and you could just as easily probably raise it to $105 billion or something like that. But I'm a little surprised that the number is not a bit higher because of what's happening in China. So I guess my question is, A, like, what's going to decline next year if that's what you're trying to imply? And B, can you talk about the ramp in China now we're shipping into three projects in China, and Gary, sort of how you think that those will ramp through this year and next year? Thank you.

A - Daniel Durn {BIO 17483115 <GO>}

Yeah, so, couple of things. First of all, thanks for the question. I don't think we're providing a specific guide on 2018 and 2019. It's an indication of strength and follow-through. And at the core of that, we feel really good about the end markets. Like Gary said, $100 billion 2018 and 2019. We see strength across all device types. It's too early to tell today exactly how 2018 profiles, first half, second half, full-year, and how 2019 profiles. But we've got a lot of conviction and confidence heading into 2019.

There's a number of reasons at the core of it. We're talking about the macro trends, they're real, they're having a real impact. Demand for silicon is up. Second, capital intensity is up across the board, and that's all device types. Markets are balanced. We're seeing strength across all four device types. We take a step back NAND has gotten a lot of publicity of late. When we end 2018, we're going to see something very similar in the NAND markets to 2017, which was an all-time high. Taking a step back from the near-term noise, this is an incredibly strong market.

Customers, again, for customers continue to be healthy, they're profitable, they're behaving in a disciplined manner. And again, we're seeing the right kind of signals out of China that indicate long-term stability health and being a meaningful driver of growth going forward. So too early to call exactly how it profiles, but we've got a lot of strength and conviction about how the outlook and fundamentals look into 2019.

A - Gary E. Dickerson {BIO 2135669 <GO>}

Tim, I can give maybe a little bit more color also on China. So 2018 is going to be a great year for Applied in China. We have very strong position in Semi, Service, Display. And we anticipate that we're going to grow faster than the market there. 2018 is pretty balanced between domestic and global companies from a revenue perspective. Domestic China is higher on foundry logic, global is higher on memory. But overall, we're going to have a great year there in 2018. As Dan said, we believe the investments are rational and will continue. And this is, long-term, a great growth opportunity for Applied.

A - Michael Sullivan {BIO 16341622 <GO>}

Thanks, Tim.

Q - Timothy Arcuri {BIO 3824613 <GO>}

Thank you.

Operator

Thank you. Our next question is from Farhan Ahmad with Credit Suisse.

Q - Farhan Ahmad {BIO 18679280 <GO>}

Thanks for taking my question. My first question is regarding the comment that you had on 2018, 2019 WFE at $100 billion plus. If I look at the trend for last several years, 2014, 2015 WFE combined of was $70 billion; 2016, 2017 was $90 billion. 2018, 2019, you are saying $100 billion. What do you think like going forward 2021? Should we expect a continued growth in WFE as well, and maybe like 2018 to 2019 could be down but 2020, 2021 should be up from that?

A - Daniel Durn {BIO 17483115 <GO>}

Thanks, Farhan. If we go back to 2000 when 300-millimeter wafers were introduced, the industry peaked at a capital intensity or WFE intensity of about 17% of overall industry revenues. And as you work 300-millimeter systems into the mix, it drove a whole host of efficiencies that wasn't more just more output per factory, it's the way the factories were run, factory automation systems. There's a whole host of efficiencies that were driven into the industry. And then in about maybe 2011, I think it was, the industry bottomed at about 7% of WFE intensity and it's been on the rise – 13%, it's been – 2013, and it's been on the rise ever since then. But if we take a look at it today, 2017, it was about 12%.

I think there's arguments to say that it could go higher based on a lot of the complexity we see across the device types and capital intensity increasing. But if you just keep it at

12% and you think about where the overall semiconductor industry has the potential to grow to, even modest growth rates to 2025 mean that it could be a $650 billion, $700 billion, $750 billion industry. And if you apply your 12% ratio to that aggregate industry revenue, you get to WFE numbers that are significantly north of where we are today. So we believe in the long-term trends that we're seeing. We believe that semiconductors are on the critical path of enabling those trends. We believe that the industry is getting more complex, and hence more capital-intensive. And we think that we've got more opportunities in front of us than we have in the rearview mirror. So we feel good about where this has the potential to go.

A - Michael Sullivan {BIO 16341622 <GO>}

Thank you, Farhan.

Q - Farhan Ahmad {BIO 18679280 <GO>}

Thanks.

Operator

Thank you. Our next question is from Toshiya Hari with Goldman Sachs.

Q - Toshiya Hari {BIO 6770302 <GO>}

Yeah, great. Thanks very much for taking the question. I think historically, you guys had been very good at guiding the Services business. I think for the past two quarters, you've come in significantly above your guide. I'm just wondering, has anything changed in the business from a fundamental standpoint? And how should we think about sustainability of growth into the back half of the year and into 2019? Thank you.

A - Daniel Durn {BIO 17483115 <GO>}

Thanks, Toshiya. I don't think we're seeing any fundamental changes in the business. We think that this is a great business for us. We feel good about where it's headed. It's a form of less volatile revenue growth. It's more stable driver of cash flow over time. And the management team is operating this business in a very disciplined and focused way. We've seen growth above our long-term advertised growth rate of compounded 15% per year between now and 2020. At the Analyst Day, we'll revise that long-term forecast. But the team is executing well.

And growth is really a function of three things in this business. Our installed base, we've got the largest installed base in the industry. Complexity is going up, service opportunity on a 300-millimeter tool is 4x that of a 200-millimeter tool, so the opportunity continues to grow over time as we continue to grow and ramp our Semiconductor equipment business. And then the team's done a great job of driving service agreements with our customers. This is about the performance, performance of the machine, output, yield, capabilities. It drives better outcomes for our customers, better outcomes for us. And that partnership is reflected in the numbers that we're driving. So nothing fundamentally has changed. We've seen high utilizations probably driving higher parts uptake than we've

seen maybe historically at lower levels of utilization throughout the industry, but it's just a disciplined focus management team driving hard at producing good results.

A - Michael Sullivan {BIO 16341622 <GO>}

Thanks, Toshiya.

Operator

Thank you. Our next question is from Vivek Arya with Bank of America Merrill Lynch.

Q - Vivek Arya {BIO 6781604 <GO>}

Thanks for taking my question. Just curious, when I look at your Q3 outlook, it sounds Semis would be down sequentially, which is somewhat different than the up sequential sort of guidance that we saw from some of your peers. I know these things don't always line up exactly, but just wanted to hear your views on why there would be the kind of difference in terms of sequential growth rates in the Semiconductor business?

A - Daniel Durn {BIO 17483115 <GO>}

Absolutely. And I agree, this stuff doesn't line up perfectly. Different companies will profile differently. When we take a step back, 2017 was a great year for WFE, $48 billion. In 2018, it's going to be up over 2017. We are going to show strong double-digit growth in each of our respective businesses. First half in 2018 is strong, and with the inventory rebalance that we're seeing from smartphones, we're going to see a sequential dip into Q3. But from our guidance into Q4, you can see that it recovers nicely into Q4.

Fundamentals, we've talked about it on the call. Fundamentals into 2019 look good for us. 2018 and 2019 as a combined two-year period are going to be over $100 billion. It's going to be a good year. And so, we like the fundamentals and we like where the business is going, but I don't think there's too much read into any one quarter over this period of performance.

A - Michael Sullivan {BIO 16341622 <GO>}

Thanks, Vivek.

Operator

Thank you. And our next question is from Krish Sankar with Cowen and Company.

Q - Krish Sankar {BIO 16151788 <GO>}

Yeah. Hi. Thanks for taking my question. I had a question on Display, a two-part question. One is, is there a margin differential between selling to LCD and OLED customers within Display? And if the Display revenue is down 15% next year, if all other segments are similar, how should op margins look like? Thank you.

A - Gary E. Dickerson {BIO 2135669 <GO>}

Yeah. We don't see any – really any difference in the margins between the OLED and TV customers. And then operating margins, Dan, you want to cover that one?

A - Daniel Durn {BIO 17483115 <GO>}

Look, the team is doing a good job driving the operating margins. We've talked about the long-term trajectory to the high 20s. And on our Analyst Day, we'll update that long-term forecast. But the team is doing a good job driving the operating margins.

Q - Krish Sankar {BIO 16151788 <GO>}

Thanks both.

A - Michael Sullivan {BIO 16341622 <GO>}

Thanks, Krish.

Operator

Thank you. And our next question is from Patrick Ho with Stifel.

Q - Patrick J Ho {BIO 5499707 <GO>}

Thank you very much. Gary, maybe specifically for you, you talked about DRAM and the higher capital intensity trends that you're seeing there for equipment overall. There's more patterning stuff and even new materials being used. Can you maybe go a little more in color in terms of where that benefited your leadership segment as well as where you believe Applied is gaining share in the DRAM segment?

A - Gary E. Dickerson {BIO 2135669 <GO>}

Thanks, Patrick. So DRAM, as I said earlier, is really going to grow a significant amount for us in 2018. And we could, if you look at 2013 versus 2018, have revenue growth around 5x in terms of our DRAM revenue, so really a significant growth. And as I mentioned before on the call, in the past, we really had strength in one segment, which was foundry that was over 20%, all other segments were 15% or lower. We've increased our share of DRAM, a huge amount.

And one thing that's happening from a device standpoint, they want faster input/output to the chip. In the periphery area, you're starting to see more logic-like steps. And as you said Patrick, that benefits all of our products that we normally sell into logic, the epi, PVD, implant, thermal, CMP, all of those areas are now seeing demand in DRAM. And especially there's greenfield activity taking place. That puts us in a great position relative to our overall share of the DRAM spending. We're also making gains in patterning in DRAM, new wins where we never had positioned really strong gains with Sym3. So those are the areas where we're seeing the fastest growth.

Q - Patrick J Ho {BIO 5499707 <GO>}

Thank you.

A - Michael Sullivan {BIO 16341622 <GO>}

Thank you, Patrick.

Operator

Thank you. And our next question is from Edwin Mok with Needham & Company.

Q - Y. Edwin Mok {BIO 15222334 <GO>}

Hi. Thanks for taking my question. My question is actually on the trading at foundry, logic. I think you guys mentioned 20-nanometer – sorry, 200 millimeter is up 20% this year. And I think, historically, that's perhaps not been a big part of the business, that we've heard more and more from more equipment companies that has become a really meaningful part of their business. So what change in the trading actually is driving this growth or become a bigger piece? A customer historically buy old tools or by older design tool. Are customer like adopting the latest and greatest hardware in the trading actually in the 200 millimeter now?

A - Daniel Durn {BIO 17483115 <GO>}

Thanks, Edwin. So, the changing buying patterns we've seen in customers is really been unfolding over the better part of a decade. If you would go back a decade ago, you would have seen 90% of the WFE in the foundry space on the leading edge, 10% on the trailing edge. Over time, that's evolved to 80%/20%, 60%/40%. And this year, we see it evolving to 50%/50%. And I think at the core of is – that more diversified spending is proliferation of edge devices as part of the Internet of Things requires a different power performance envelope. And you see our estimates call it for 28-nanometer peak capacity. Initially we called peak capacity at 28-nanometers, 330,000 wafer starts a month. Then it was 400,000, then it was 450,000 and now it's 500,000 wafer starts a month. So you can see those peak capacities beginning to expand as edge devices proliferate, and you need sensors and onboard intelligence in those devices. And so, we think it's really healthy to see this industry diversify geographically from a technology node perspective. We think it's healthy from a long-term industry perspective as well.

A - Michael Sullivan {BIO 16341622 <GO>}

Thanks, Edwin.

Operator

Thank you. Our next question is from Sidney Ho with Deutsche Bank. Your line is open.

Q - Sidney Ho {BIO 6922415 <GO>}

Thanks for taking my questions. A few months ago in an investor conference, Dan, you talked about the next downturn could be WFE going to $40 billion, and that you can

achieve EPS better than 2017. Can you walk us through that thought process behind that comment and what would be the biggest risk for those assumptions?

A - Daniel Durn {BIO 17483115 <GO>}

Sure. Thanks, Sidney. So, as you know, from the prepared comments and the Q&A, certainly $40 billion WFE is not our view. But, of course, we plan for a wide variety of scenarios. So if we walk through a scenario, say that's $40 billion WFE, let's say, our business is diverse. Services is more stable. It's growing well. And from Gary's comments, Display will be down in 2019. And the 24% market share for lack of a better number – so 24% share in our equipment business, Display down, Services growing, you get revenue somewhere around $16 billion. And let's say we keep OpEx in that difficulty environment, we keep OpEx the same as this year, which is probably a conservative assumption, but let's take it to this year. Operating profit based on that revenue flow through is something around 26.5%. And so 2019 EPS, in that scenario, is nicely higher than where we were in 2017. So, while we model a lot of scenarios, it's not our current view, but that's what a downside scenario could potentially look like.

A - Michael Sullivan {BIO 16341622 <GO>}

Thanks, Edwin (sic) [Sidney].

Operator

Thank you. Our next question is from David Wong with Wells Fargo.

Q - David M. Wong {BIO 6109216 <GO>}

Thanks so much. Looking at how the percent of your sales into China has been rapidly growing, I think it was 25% in the most recent quarter; do you have any view on what your sales growth into China might be in fiscal 2019 and fiscal 2020?

A - Gary E. Dickerson {BIO 2135669 <GO>}

Yes. Thanks for the question. Yes, China is definitely a very strong region for us. If we look at our share in Semi, Display, Service, it's one of the strongest regions. And as I said earlier, 2018 is going to see significant growth for Applied. We do see continued increasing investment in China as we move forward. We don't have any specific forecast on what that will look like, but we have been seeing increasing revenue from China and growth there over the last few years. We anticipate that to go forward.

Now, we don't expect to see a hockey stick. If you look at the technology needed to participate in the leading edge, there's still some gaps there. But one of the things that we're also seeing is that the trailing geometries are growing. Dan just talked about that relative to demand. And certainly, that's an area where China is making a lot of investment. So, again, we see increased revenue there, increased demand going forward, and overall, a great position for Applied.

Q - David M. Wong {BIO 6109216 <GO>}

Great. Thanks very much.

A - Michael Sullivan {BIO 16341622 <GO>}

Thanks, David.

Operator

Thank you. Our next question is from Mehdi Hosseini with Susquehanna. Your line is open.

Q - Mehdi Hosseini {BIO 4362002 <GO>}

Yes. Thanks for asking my question or thanks for taking my question. Dan, I see you had the largest incremental increase in inventory, the largest sequential increase for a number of years. Can you please help us understand what is driving this increase and the mix between finished good and components?

A - Daniel Durn {BIO 17483115 <GO>}

Thanks, Mehdi. I think the inventory increase is a function of two things. We've got a growing business and we think that business is continue to grow going forward. But probably most importantly is, is we have consciously brought up our inventory levels in support of our fast growing Services business in the different geographies that we're experiencing that growth to make sure we get the right kind of customer responsiveness and the right kind of customer satisfaction from a Service business that's becoming increasingly important in and of itself, but increasingly important with our customers. And so it's a conscious effort to increase service levels in a way that supports that rapid growth.

A - Michael Sullivan {BIO 16341622 <GO>}

Thanks, Mehdi.

Q - Mehdi Hosseini {BIO 4362002 <GO>}

Thank you.

Operator

Thank you.

A - Michael Sullivan {BIO 16341622 <GO>}

And operator, I think, we have time for more two more questions, please.

Operator

Okay. Thank you. And our next question is from Joe Moore with Morgan Stanley.

Q - Joseph Moore {BIO 17644779 <GO>}

Great. Thank you. Sounds like your view of WFE overall hasn't changed that much but you said NAND a little bit maybe lower than you thought still up for the year and DRAM a little higher. I guess what form has that lower NAND taken. Is that sort of existing projects that you had planned that you're seeing in plan that you see are being deferred? Is it someone just saying, we're going to spend the same amount of money, but we're going to spend it on DRAM instead of NAND or is it just that the year is just playing out a little bit different than you thought and nothing that's sort of identify those changes. So what's the scenario that led you the NAND getting a little bit lower?

A - Daniel Durn {BIO 17483115 <GO>}

Sure. Absolutely. Look, so I don't think you can attribute it to any one single factor. And I think it gets back to what we were saying about discipline behavior in the market with our customers to make sure we're constantly balancing supply-demand so that customers remain healthy and we can just continue with the demand-led investment environment. And so I think it's just customers respond in a very rational disciplined way that reflects the reality of the current market. And, look, we're very close with all of our customers. And you hear our views on where we think this is headed into 2019, so we feel very, very good about where we sit. And I actually think the near-term behavior bodes well for the long-term health of the memory market as well as WFE in general.

A - Michael Sullivan {BIO 16341622 <GO>}

Thanks, Joe.

Operator

Thank you. Our next question is from Craig Ellis with B. Riley FBR.

Q - Craig A. Ellis {BIO 1870408 <GO>}

Yeah. Thanks for taking the question and thanks for all of the insight on the industry dynamics. I did want to however turn to a different issue and focus on a free cash or excuse me, a cash flow item. Share buyback was 2.5 billion in the quarter, so about 28% of the authorization that had been expanded three months ago. Dan, I was hoping you could just give us some sense for the way you're looking at executing on that program as we go forward whether it's going to be more opportunistic or if there's some calendar or periodic element to the way you would execute on the balance of the program? Thank you.

A - Daniel Durn {BIO 17483115 <GO>}

Thanks, Craig. So you can see the actions we've taken. We've got a view our markets are strong. Our position within those respective markets is probably better today than it's ever been. Company is executing well and we're generating a lot of cash. We've got a long-term track record of returning that cash to shareholders, and that's going -- that will continue. In June, we pay our first $0.20 dividend. We've repurchased 2.5 billion shares in the quarter, like you point out. And we're going to continue to be opportunistic in the market. While I won't commit 2.5 billion every quarter, we're going to continue to be

opportunistic when we don't feel like the trading price of our stock reflects the intrinsic value of the company, we'll be in the market over time, to return that cash to shareholders. And I think that general framing, that mindset, that outlook just reflects the strong confidence we have, confidence in our industry, in the business, and our execution. And we're going to continue to look at dividend levels periodically over time, and as we grow our business, continue to maintain a strong track record of returning cash to shareholders, but opportunistic approach going forward like we've always done.

A - Michael Sullivan {BIO 16341622 <GO>}

Thanks, Craig. Dan, anything else you want to add before we go ahead and close up the call today?

A - Daniel Durn {BIO 17483115 <GO>}

Yeah. Thanks, Mike. So maybe couple of quick thoughts that we can wrap up with. I think I want to reiterate, Q2 is a record quarter. 2018 is going to be another record year for this company, company is executing well. We're driving top line growth, we're driving margin accretion. We're driving strong cash flow and we're driving more resources into R&D to fuel our future growth.

Breadth, breadth is a major positive that sets us apart, in Semis were hitting new records. We're strong and strong across all device types. We've got a growing pipeline. These new products, they're going to deliver high-performance and low power to the market, and we're going to see some of those new products here in the very near future.

And we're growing beyond Semi. While Display investments are shifting out in time, it's being offset by tremendous growth in our Services business. The team has just done a fantastic job executing against that opportunity. And I guess, to Romit's earlier question, this is how we're offsetting that weakness in Display and still well on track to earning over $5 a share in 2020. We've got strong conviction, strong convection in our markets, in the pipeline, in the execution, and backing it up with strong capital allocation, $2.6 billion in Q2 alone.

And I guess, before we go, just look forward to seeing many of you at the following upcoming events. Gary and I are headed to Bernstein Strategic Decisions Conference, first time for Applied. At the new AI conference for investors arranged by New Street Research, and at the Cowen, upcoming Cowen and BOA Merrill Lynch conferences. Thanks for joining this afternoon. We appreciate it.

A - Michael Sullivan {BIO 16341622 <GO>}

Hey, thanks, Dan. And we'd like to thank everybody for joining us this afternoon. A replay of this call will be available on our website by 5:00 p.m. Pacific time. And we would like to thank you for your continued interest in Applied Materials.

Operator

And with that, ladies and gentlemen, we conclude our conference. You may all disconnect. Have a wonderful day.