Q2 2019 Earnings Call

Company Participants

- Daniel Durn, Chief Financial Officer
- Gary Dickerson, President and Chief Executive Officer
- Michael Sullivan, Corporate Vice President

Other Participants

- Atif Malik, Analyst
- C.J. Muse, Analyst
- Harlan Sur, Analyst
- John Pitzer, Analyst
- Joseph Moore, Analyst
- Krish Sankar, Analyst
- Mehdi Hosseini, Analyst
- Patrick Ho, Analyst
- Pierre Ferragu, Analyst
- Quinn Bolton, Analyst
- Timothy Arcuri, Analyst
- Toshiya Hari, Analyst
- Vivek Arya, Analyst

Presentation

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, Corporate Vice President. Please go ahead, sir.

Michael Sullivan {BIO 16341622 <GO>}

Hello, everyone, and good afternoon. Thank you for joining our second quarter of fiscal 2019 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, I'd like to remind you that today's call contains forward-looking statements. These statements are subject to risks and uncertainties that could cause our actual results to differ. Information concerning the risks and uncertainties is contained in Applied's most recent Form 10-Q and 8-K filings with the SEC. Today's call also includes non-GAAP financial measures. Reconciliations to GAAP measures are found in today's earnings press release and in our reconciliation slides which are available on the IR page of our website at appliedmaterials.com.

Before we begin, I have a calendar announcement. On Tuesday, July 9, Applied will host a Technology Day for the financial analyst community and other industry participants. The events will take place in San Francisco beginning at 8 AM Pacific Time. Gary Dickerson will be joined by other CEOs and technology leaders from throughout the semiconductor, hardware , software and data center ecosystem. We hope you'll join us and we'll be in touch with invitations in more details.

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

Gary Dickerson {BIO 2135669 <GO>}

Thanks, Mike. In our second fiscal quarter, we delivered results toward the top end of our guidance range, reflecting solid execution across the Company in a challenging business environment. Overall, our outlook has not changed significantly since our February call. Investment by memory and display customers remains muted for the time being, and we continue to pay attention to the broader macroeconomic risks.

Looking further ahead, we maintain a strong positive view of our markets as powerful new demand drivers take shape. We're excited about the opportunities these secular trends create for Applied and while we are carefully managing discretionary spending consistent with current market conditions, fueling our long-term growth remains a top priority. We're focusing on driving R&D to accelerate customers' roadmaps, building new capabilities and positioning Applied to play a bigger and broader role in the AI, big data era.

In today's call, I'll begin with our latest perspective on near-term market dynamics, then I'll talk briefly about the future growth drivers that are reshaping the semiconductor and display industries, as well as the implications for Applied. And I'll finish by describing our performance and strategic priorities. Starting with the near-term environment, our view of 2019 is largely the same as it was at the start of the year and shaped by two key factors. First, the semiconductor industry is in a period of diversification.

If you look back over the past five years or so, you will see that smartphones drove the majority of semiconductor capital investments. We believe that is changing. As we transition to the AI, big data era, major new drivers are emerging that will fuel industry growth for years to come. Although we're only in the early stages of the build-out, we see the combination of cloud data centers, 5G infrastructure, IoT and automotive technologies underpinning a much more significant portion of wafer fab equipment spending in 2019.

The second major factor impacting this year ahead is the memory cycle that the industry has been navigating for the past several quarters. Recent data shows that NAND pricing is stabilizing and inventory levels are down from their peak, although they still remain above normal levels. DRAM is not as far along in the correction cycle, with high inventory levels and prices still falling. As I've said before, I believe this memory cycle is different from those of the past. The fundamental dynamics in the market are healthy with disciplined investments in capacity. This year customers are focusing resources on advancing their technology roadmaps and overall memory spending will be down significantly from 2018.

We expect inventory levels to normalize as the year progresses, creating a more favorable environment for capacity investments in 2020. In foundry logic, we have seen customers' plans firm up over the past few months and now expect spending to be up year-on-year. In aggregate, our view of overall wafer fab equipment spending in 2019 is unchanged. We still see spending down mid to high-teens on a percent basis versus last year.

In display, the picture is also consistent with our outlook from last quarter. We are still anticipating that our 2019 display revenues will decline by about a third from 2018's level as customers push out investments. Over the longer term, we maintain our view that display is an attractive market, which is becoming more technology-intensive and increasingly dependent on materials innovation. The introduction of larger substrates and TV manufacturing, as well as rigid and flexible OLED technologies for mobile applications creates important growth opportunities for Applied over the next several years.

Even as we work through this period of softer demand, I believe it's critically important we do not lose sight of the bigger picture. Major new industry growth drivers are emerging in the form of IoT, next-generation communications, big data and artificial intelligence. These technologies are disruptive and transformative, and will touch almost every area of the economy and our lives.

From a semiconductor perspective, we believe the AI, big data era will be characterized by two major inflections. The first is a computing architecture inflection towards AI workloads as we move beyond general-purpose computing to specialized systems designed for new applications in the cloud and at the Edge. The second is overcoming the deceleration of classic Moore's Law scaling to deliver system-level improvements and power, performance and cost that will unlock the full potential of AI and big data.

We see a new industry playbook for semiconductor design and manufacturing emerging that includes five key components; new architectures, 3D structures and scaling techniques, novel materials, new ways to shrink feature sizes and advanced packaging including new ways to connect chips together. We see Applied's breadth and depth as a key strength as we collaborate broadly to address the technology challenges that will enable this new playbook.

Our strategic priorities are to accelerate innovation for our customers while finding new ways to create sustainable value with our technology. I'll highlight four important ways that we're doing this. First, we are building new capabilities. We're creating powerful R&D platforms like META Center in New York and advanced packaging lab in Singapore to

complement our existing beta and technology center in Silicon Valley. In parallel, we are leveraging state-of-the-art sensors in metrology combined with data science, machine learning and simulation to reduce product development cycles and speed up transfer of new technologies from lab to fab.

Second, we are developing entirely new types of products to address the most complex challenges in the chip manufacturing process from the introduction of novel materials to key integration bottlenecks. Some of our key areas of focus include critical deposition, implant and Edge processes to scale current memory structures, the introduction of novel materials combined with sub angstrom-level control of those materials that are needed to enable new memories including MRAM, ReRAM and PCRAM, new materials and interface engineering to enable significant improvements in power, efficiency and performance at leading Edge foundry logic nodes and next-generation advanced packaging for heterogeneous integration. Our product pipeline spans from new unit process tools, all the way to Integrated Material Solutions or IMS where we can combine multiple processes together with customized metrology within a single system.

Third, we're expanding our engagements across the AI ecosystem to accelerate innovation from materials to systems. In July, we will be hosting another AI design forum, bringing together leading companies in the field to support deeper collaboration between system architects, chip designers and the manufacturing community. I hope that many of you will be able to join us for this event.

And fourth, we're building a more resilient company that performs well and could continue to fuel innovation in a variety of market conditions. For example, increasing our focus on our service business has been a great way to deliver additional value to customers, while providing a revenue stream that is relatively decoupled from industry cycles. We expect Applied Global Services to deliver high single-digit growth this year, even in an environment where semiconductor and display customers are trimming their capital spending.

Before I turn the call over to Dan, I'll quickly summarize. Despite soft near-term demand, the Company is delivering solid performance. We are prudently managing discretionary spending and relentlessly focusing on our R&D pipeline. We expect 2020 to be a more positive set up both in terms of industry spending and how much of that spending Applied can address. And we remain highly optimistic about the longer term. As powerful new drivers for semiconductors and displays emerge, we see tremendous opportunities for Applied Materials.

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

Daniel Durn {BIO 17483115 <GO>}

Thanks, Gary. In Q2, Applied delivered solid financial results in a challenging environment. While we are still not ready to call the bottom of the semi equipment cycle, I believe our industry thesis is very much intact. New demand drivers are taking shape. And even in this memory correction year, wafer fab equipment spending could be $10 billion

higher than the peaks of all the prior cycles. In this environment, I'm focused on four financial priorities; carefully managing our overall expenses, fully funding our new product pipeline, maximizing our recurring revenue and delivering attractive cash returns to our shareholders.

I'll share my thoughts on each one. First, in Q2, we reported OpEx of $745 million, which was below the midpoint of our guidance. It was also below our spending in Q1, which included a holiday shutdown and only one month of this year's merit increase. We'll continue to keep a tight rein on discretionary spending. Second, at the same time we're fully funding R&D. As Gary described, our customers need more innovation than ever to improve chip performance, power and cost. We're investing in unique systems that enable new architectures, materials, 3D design techniques and packaging, in addition to 2D scaling. Third, in addition to strengthening our competitiveness in the near term, these investments will increase our installed base and give us more opportunities to earn recurring revenue well into the future.

I'll give you some metrics to think about. You may know that Applied has the largest installed base in the industry of more than 40,000 systems. Many of our systems have multiple chambers and we actually have over 140,000 chambers in the field. Helping customers maximize the installed base is a key opportunity for Applied, especially in a year like 2019. This year we expect to generate about 40% of our semi-related revenue from the installed base, which includes 200 and 300 millimeter upgrades, refurbs, parts and services. The most strategic pillar of the AGS growth strategy is long-term service agreements, which allow us to deliver the most value to our customers and generate subscription like revenue for Applied. Today more than 20% of our semi-installed base is covered by long-term agreements.

This business needs to be earned and we do it by generating recurring value to our customers in the form of faster ramps, higher yields, greater throughput and lower costs. Our strongest growth comes from advanced services where we use data science to help our customers achieve maximum performance and continuous improvement. Our renewal rates are world-class. 2018 was the first year when AGS generated over 50% of services and spares revenue from subscription like agreements. In 2019, we expect to grow the subscription part of the business at about twice the rate of the segment as a whole.

Finally, cash returns. As Gary said, the memory correction we are seeing today is different from those in the past. For our part, we are still generating solid profitability and more cash flow than we need to support the business. In Q2, we generated operating cash flow of $800 million and we returned $814 million to shareholders. We paid $189 million in dividends and we announced a 5% dividend increase. We were opportunistic with the buyback program, using $625 million to repurchase approximately 16 million shares. In fact over the past four quarters, we've repurchased 8% of the shares outstanding at the beginning of that period. Over a five-year basis, we bought back approximately 28% of the shares.

Looking ahead, we're excited about the industry and confident that the actions we're taking today will generate substantial shareholder value in the years ahead. Now I'll

summarize our Q2 results. We delivered Company revenue of $3.54 billion, which was slightly above the midpoint of guidance. Non-GAAP gross margin was 43.5% and in line with our outlook as the revenue upside was relatively balanced across the segments. We held non-GAAP OpEx at $745 million and we generated non-GAAP earnings of $0.70 which was the top of our guidance range.

Turning to the segments, semiconductor systems revenue was $2.18 billion and slightly above the midpoint of our outlook and non-GAAP operating margin was 27%. Global services revenue was $984 million, which is a new record and demonstrates how well we are growing the business even in a correction year for the industry. AGS non-GAAP operating margin was 28.8%.

Display revenue was $348 million, which was above the midpoint of our outlook as some of the system scheduled for Q3 actually shipped before the end of Q2. Display non-GAAP operating margin declined 10.1 points sequentially and we expect the margin to recover along with revenue in the upcoming quarters. Turning to the balance sheet, we ended the quarter with $5.2 billion in cash and investments and nearly $3 billion remaining in our buyback authorization.

Next, I'll provide our Q3 guidance. We expect the Company revenue to be approximately $3.525 billion, plus or minus $150 million, and we expect non-GAAP earnings to be in the range of $0.67 to $0.75 per share. Within this outlook, we expect semiconductor systems revenue to be approximately $2.175 billion, services revenue should be about $990 million, display revenues should be around $335 million. We expect non-GAAP gross margin to increase by about 30 basis points sequentially and non-GAAP OpEx should be approximately flat sequentially.

Now, Mike, let's begin the Q&A.

Michael Sullivan {BIO 16341622 <GO>}

Thanks, Dan. Now to help us reach as many of you as we can, please ask just one question and not more than one brief follow-up. Operator, let's please begin.

Questions And Answers

Operator

Thank you. (Operator Instructions) And our first question will come from the line of C.J. Muse with Evercore. Your line is now open.

Q - C.J. Muse

Yes, good afternoon, thank you for taking my question. I guess to follow-up on your commentary regarding 2020 and more favorable capacity spending environment, can you walk through how you're expecting the mix there, what the implications would look like to your market share and how we should think about silicon operating margins

bouncing off the current lows of the 27% and whether we should be thinking at least over time we can get back into the mid 30%s. So I know a lot there, but -- hear your thoughts. Thank you.

A - Daniel Durn {BIO 17483115 <GO>}

Thanks, C.J. Let me start with the overall market profile and then what we expect from a margin standpoint as we roll forward into 2020. So as we take a look at where we sit in 2019, we talked about the overall WFE being down mid to high-teens. Our view on that hasn't changed. That puts us in about a mid $40 billion range for WFE this year. As we look at the profile across device types and you look at foundry, logic and you look at memory, we think foundry, logic is going to be up a little bit this year, we think memory is going to be down a good amount this year. That gives you a bit of a setup on how we're profiling in 2019.

As we roll the clock forward and we look at how WFE is likely to unfold in 2020, we view this as a growth year in WFE. As we look in the foundry, logic space and we have advanced purchases of things like EUV in metrology systems around advanced nodes, we see the capacity adds building out those nodes going in 2020 beyond and we think that's a favorable setup for our overall market. On the memory side, we don't see a memory correction this year and we do see the memory correction profiling into 2020.

That is our current expectation. If it happens faster than that, then we will benefit in a material way. The combination of the setup around foundry, logic and memory going into 2020 is a favorable setup for Applied and we feel really good about the position that we're in. As we take a look at operating margins, operating margins are going to be a function of two things, how we profile from a gross margin standpoint and how we invest to fund future growth and deliver key enabling technologies to make our customers successful. Gross margin in any given quarter, not surprisingly, will vary depending on product mix and customer mix, and factory activity levels as well as aggregate revenue levels and it's going to vary from quarter to quarter.

As we look at the investments we're making today, we see 2D scaling and Moore's Law increasingly having challenges, we see the roadmap and Gary has talked about this in the past, there's a new playbook that our industry is going to create to drive power and performance for our customers, Applied has a key role to play in each of those elements of the new playbook whether it's materials or architectures or 3D structures or packaging and we're going to position our business and invest in our business to lead going forward.

Now that said, in an environment where you see recovery in our end markets and our ability to grow into those end markets, we fully expect to see leverage on both the gross margin and the operating margin line. Premature at this point I think to give a point estimate on 2020, but we like the setup around 2020 and we do think we will see leverage in our margin structure as the business returns to growth.

A - Gary Dickerson {BIO 2135669 <GO>}

Yeah, C.J., thanks for the question. Let me start with 2019 and then I'll go to the 2020 and beyond and build on some what Dan talked about. While we're not going to forecast 2019 share on the call, we do think '19 is a more favorable setup for Applied. While we still see additional EUV adoption in 2019, the non-EUV spending mix is more favorable for Applied than it was in 2018, and going forward I believe that we are very well positioned to drive share gains.

Customers are struggling to deliver improvements in power, performance and cost. And as Dan said and as I've talked about many times, it's very clear, a new playbook is needed based on new 3D structures, new materials, new ways to drive cost and new ways to connect chips together. A great example of our new playbook is our potential to enable 1000x improvement in leakage current and there are other enabling capabilities that we have that address power, performance and cost that we not going to discuss in public.

We are engaged with the majority of our leading customers with integrated material solutions and we're even more confident that in both future and trailing nodes we can help our customers integrate new technologies in their chips and drive incremental growth for Applied. We also have a very strong pipeline of new products, including products that expand our positions into markets that we don't currently serve. Some of those new products are already gaining traction with major customers. So overall, I believe that the setup for Applied is better in '19 and certainly in 2020 and beyond.

A - Michael Sullivan {BIO 16341622 <GO>}

Thanks, C.J. Operator, can we have the next question?

Operator

Our next question will come from line of Atif Malik with Citi. Your line is now open.

Q - Atif Malik {BIO 7312618 <GO>}

Hi, thanks for taking my question. Similar to CJ's question on the semiconductor market, I have a question on the display side. At recent San Jose Display Conference, there was a fair bit of optimism on display market rebounding next year with third-parties talking about 10% to 30% year-over-year growth. At one point you guys were talking about tripling your footprint in the display market. Can you just talk about how you're looking at 2020 from a display perspective given longer lead times for equipment?

A - Gary Dickerson {BIO 2135669 <GO>}

Yeah, let me start. Thanks for the question. Let me give you some color on the display business. I'll start with '19 and then I'll go into 2020. So for 2019, we still expect display revenue to be down about a third from 2018's record levels, with TV now being about three quarters of the business this year as customers move to Gen 10.5. Going forward, we see demand becoming more balanced between TV and mobile OLED. And as we look into 2020 based on everything we see today, TV demand looks stable and we expect mobile to grow year-over-year with a broader mobile OLED customer base.

And longer term we see great opportunities to drive growth in the display business. Some of the new technologies are more capital intensive. There are some great inflections where we can create value for customers. So overall, again, we see 2020 certainly being better and our position also being stronger as we go forward.

A - Daniel Durn {BIO 17483115 <GO>}

Yes, I think you're also kind of alluding to the new products. I think the next to that we do, we're really going to be focusing on semi, or semicon (inaudible), semi new products. So I think we'll do that. So pleased to stay tuned on the newer display products, and thank you.

Operator

Thank you. Our next question will come from Toshiya Hari with Goldman Sachs. Your line is now open.

Q - Toshiya Hari {BIO 6770302 <GO>}

Thanks very much for taking the question. Gary, I was hoping you could provide an update on what you're seeing in China, not so much from the multinationals, but more so the local manufacturers, both on the foundry side as well as the memory side, progress in terms of technology, any change in sort of buying patterns given kind of the political backdrop. Any update you can provide there would be helpful. Thank you.

A - Gary Dickerson {BIO 2135669 <GO>}

Yes, thanks for the question Toshiya. So let me give you a color on China. China wafer fab equipment will be down year-over-year in '19 versus '18 a small amount. We still see domestic flattish and multinational down in China. In domestic China, we see slightly higher spending on foundry, logic versus memory, with foundry, logic focused on trailing nodes for sensor, IoT, those kinds of the devices. Within China domestic spending, we're in a great position, we expect we're going to maintain a very strong share position in China.

In our display business, China is going to be down in line with the overall global display forecast. And I would say, relative to customer progress, certainly in the domestic foundry, logic business, we see a lot of growth in IoT, communications, automotive, power, sensor types of devices, and those are on more trailing nodes. Certainly China has the ability to build those kinds of devices, and again, that's where we see more spending in 2019. We see pretty strong growth there going forward.

In memory, I don't want to comment on any specific customers in terms of progress, but what I would say is that memory is very difficult market. If you look at DRAM, customers are adding letters to their nodes because scaling is becoming more capital-intensive and more difficult. And certainly also in 3D NAND scaling is difficult and you can see customer presentations where capital intensity is going up as they try to scale those devices. So I think that being in the leading-Edge memory is very, very, very difficult and will take many, many years. Thank you.

Operator

Thank you. And our next question will come from line of John Pitzer with Credit Suisse. Your line is now open.

Q - John Pitzer {BIO 1541792 <GO>}

Yes, good afternoon, guys, thanks for letting me ask the question, just going back to your reluctance to call the bottom, Dan, I kind of appreciate the conservatism given the macro uncertainty, but with sort of NAND and DRAM revenue down greater than 50% peak to current, even it's going to have to invest 96 layers sometime this year to hit your full year guide on display, it implies a pretty big ramp in the fiscal fourth quarter for that business and services is still kind of structural. I'm kind of just curious what's reticent to not calling the bottom, is it something you're seeing in your bottom forecast or is it more about kind of just the macro uncertainty overhang out there?

A - Daniel Durn {BIO 17483115 <GO>}

Thanks, John. I think there's a couple of things at play, at least how I process. So let me share with you a little bit of my thinking and hopefully that will give you a bit of color on how we're viewing the world right now. I think our reluctance to call the bottom is a semiconductor comment, it's not an overall Company comment and what I mean by that, if we take a look at our semi business, there is no change to our outlook this year in terms of -- no material change in terms of WFE, the overall market down mid to high teens, mid $40 billion WFE zip code.

I gave you the profile on how foundry, logic and memory will profile into this year and if we go back a quarter, on our earnings call we provided guidance around our semi systems business to be at a run rate of $2.15 billion and flat for the year. Very little has changed in our view on that business. We did a little better than that in Q2. We guided a little better than that in Q3 , but what we're talking about is really a 1% move and I think we have to stay focused on the right run rate to think about the business is about $2.15 billion and against that flat profile in semi, we see an OpEx level that underpins that, that's roughly flat with where we were in 2018.

If I transition to the services business, we do see a step-up into the back of the year. We do have confidence in our high-single digit growth projection for the business and I think it's important to note that Q4 is typically a seasonally good quarter for us. So we feel good about how that business profiles. In display for the full year, no change in our outlook. We said Q2, Q3 would profile very similarly, we see that playing out. We do see growth into the back part of the year. So when you bring it all together as an overall company for Applied, while we do see flatness from a semi standpoint from this point forward, we do see growth from a services perspective, we see growth off these levels from a display perspective and the overall Company -- the overall Company will grow from this point in 2019.

And when we take a look at that mix towards the latter part of the year, we all know that our semi business is the highest gross margin followed by display, followed by service, so a flat semi, growing service, growing display, that creates a natural gross margin

headwind for us. We think we can execute well into that environment and we're going to look to hold gross margins flat into Q4, off of the levels we produce in Q3. So we've got confidence that we can execute well into that environment. Now, we don't want to guide more than one quarter out and so a quarter from now on our earnings call we'll let you know what we see in Q4, but we hope to execute well against that natural margin headwind and keep our margins where they're at in Q3.

A - Michael Sullivan {BIO 16341622 <GO>}

Hey, thanks, John. Operator, can you take the next question?

Operator

Our next question will come from the line of Harlan Sur with JPMorgan. Your line is now open.

Q - Harlan Sur {BIO 6539622 <GO>}

Good afternoon. Thanks for taking my question. Strong foundry and logic, up 25% sequentially, up 30% year-over-year. I know you now anticipate this segment to be up versus your prior view of sort of flattish. What's driving the better outlook, is it better trajectory and 7 nanometer foundry or 10 nanometer logic or maybe even lagging Edge IoT and are you guys starting to see any 5-nanometer foundry, 7 nanometer logic because we know that the design activity has already started to pick up here. Thank you.

A - Daniel Durn {BIO 17483115 <GO>}

Thanks Harlan. As we look at what's driving it. We said incremental improvement in foundry, logic versus where we were a quarter ago, it's offset by incremental weakness from a memory standpoint. No change to the overall WFE. As we double-click on foundry, logic, I don't think there's any one element that we can point to. We do see a diversification and broadening of spend across matured nodes and leading-edge nodes. We do see capacity adds beginning to take shape around 5-nanometers, more at 7-nanometers. Still too early to extrapolate a trend line from that, but we're encouraged by the strength and resilience of that end market and the environment we find ourselves in, but no one specific thing to point to.

Q - Harlan Sur {BIO 6539622 <GO>}

Thank you.

A - Michael Sullivan {BIO 16341622 <GO>}

Thanks, Harlan.

Operator

Thank you. Our next question will come from the line of Timothy Arcuri with UBS. Your line is now open.

Q - Timothy Arcuri {BIO 3824613 <GO>}

Thanks a lot, Gary, I wanted to follow up on the WFE share comment. By my math, you sort of peaked at close to 22% in 2016. It was pretty flat in 2017. And you lost about 200 basis points last year. In that same time ASML gained about 400 basis points worth of share. And it sounded in the prepared remarks like you're a little more optimistic about gaining WFE share next year and I guess that's in a year where it seems like the industry has to come up with at least a couple of billion dollars year-over-year for EUV. So I guess I'm just trying to parse through, are you more bullish because of maybe some risk to EUV or are you bullish about the wafer capacity addition that you see on the NAND side next year? Thanks.

A - Gary Dickerson {BIO 2135669 <GO>}

Yeah thanks for the question, I just -- again, when we look at the setup for 2019, we believe that the mix is definitely more favorable for us. Certainly if you look at the foundry, logic business, the growth in IoT, communication, automotive, power, sensors, those different markets, that's going to be a bigger percentage in terms of 2019. We think we're set up pretty well there. The initial buys for 5-nanometer also, we think that we're in a better position there. Again, if you look at the EUV adoption, certainly that's one way for customers to drive their roadmaps, but we talked about five different ways, and EUV is one of those five. And you see customers driving improvements in power and performance, and that's all about materials innovation.

So we have new steps that are being adopted both in transistor and interconnect, that's going to be positive for us in terms of the leading-edge foundry and logic. And then in memory we also are gaining positions there and longer term we see that that's really good growth opportunity for us. If you go back over let's say a five-year period of time, we are probably 14%, 15% of the memory spend and now we're over 20% of the memory spend. And as customers are driving DRAM devices with new foundry like processes in the periphery, that's great for us because that leverages our leading-edge products, the PVD implant, thermal, CMP, all of those areas, we have very strong positions and we're gaining new positions also in memory.

So again, overall, we like the set up a much better in 2020 and longer term, again, all of these roadmaps are becoming more difficult. Customers are adding all kinds of pluses to their technology nodes because, again, the scaling is getting much more difficult. And at the foundational, that's materials innovation; integrated material solutions where we have engagements with all the major customers, it takes some time to drive those architectures and structures and materials into new devices, but we have tremendous traction there and we're certainly more optimistic in '19 and definitely there is a lot of great things that come together for us in 2020 and beyond that will be positive for Applied.

A - Daniel Durn {BIO 17483115 <GO>}

And Tim, I want to just add one more thing. When Gary explained earlier, he said there were two reasons why the share dropped year over year. He said one was EUV and that was coming in while our customers were in reuse mode. He said one other thing, he said there are other markets that we don't participate in that we're very strong in 2018, specifically dielectric etch and then a host of batch processes. So we do expect that EUV

will continue to be good in '19, but we don't see as much of those other areas that we nominally compete in, but in reality, do not. As a reminder, we're in conductor etch, not dielectric, right. We are in single wafer processes, not batch processes. So that part of that two-part equation that explains what you're describing.

Q - Timothy Arcuri {BIO 3824613 <GO>}

Thanks, Mike.

A - Michael Sullivan {BIO 16341622 <GO>}

Thanks, Tim.

Operator

Thank you. Our next question will come from the line of Vivek Arya with Bank of America Merrill Lynch. Your line is open.

Q - Vivek Arya {BIO 6781604 <GO>}

Thanks for taking my question. Gary, you mentioned TV flattish and mobile growing next year on the display side. That sounds kind of like a mid-single digit growth opportunity. I just wanted to make sure that's the right way to think about it from a '20 perspective. And longer term, do you think your display business kind of grows more in line with the adoption of OLED in phones. Just what is the right way to conceptually think about growth in display?

A - Gary Dickerson {BIO 2135669 <GO>}

Well, I would say for next year we certainly believe that the market is going to be stronger than it is this year, we're not giving any estimates in terms of the magnitude of the growth into next year. But longer term, we see this is a great opportunity. Before this year for several years in a row we were growing at 25% compound annual growth rate. The -- just like in semi, those display technologies are very difficult. If you look at mobile OLED, I mentioned that the customer base will be broadening out and that will be great for Applied, it will also be great for adoption as there are more customers that can supply those types of devices, and we look at the capital intensity is increasing. As I said in flex OLED, it goes up by about a factor of two. And we're certainly working on very high value problems for our customers in the display market that further expand our business. So longer term, we think that this is a very good growth driver for the Company.

Q - Vivek Arya {BIO 6781604 <GO>}

Thank you.

A - Michael Sullivan {BIO 16341622 <GO>}

Thanks.

Operator

Thank you. And our next question will come from the line of Pierre Ferragu with Newstreet Research. Your line is now open.

Q - Pierre Ferragu {BIO 15753665 <GO>}

Hi, thanks for taking my question. So, Dan, I understand you don't want to call the bottom, but I see like your semiconductor what you anticipate for next quarter to be kind of flattish sequentially. And my question is really, if you get the run rate of this quarter like the -- the money that your clients spent with you in DRAMs, so that's about $400 million, $500 million in NAND, that kind of run rate, what's happening in the market, what's happening in the installed base. Does that mean zero capacity additions, does that mean capacity reduction. So where are we in terms of capacity being added in the market at this run rate?

A - Daniel Durn {BIO 17483115 <GO>}

Thanks, Pierre. As we take a look at the overall market and the willingness to call the bottom, that's as much a function of what we're seeing in the end market as it is just a recognition of the elevated risk environment we find ourselves in, and we just think it's prudent right now to set expectations in a way that reflect that environment. And I just think you see that coming through in the way in which we're talking about the business and again it's only intended to be prudent in this environment.

As we take a look at both memory types and we look at capacity additions, as we think about the investments going in today, the investments are more of a technology transition nature. Technology transitions are fundamentally, as you know, about cost competitiveness of our customers going forward. And so as those markets recover, they're going to need to keep pace from a technology roadmap standpoint to be cost competitive as those markets recover.

If we look at the aggregate capacity in each of those markets, we look at them as flat to down slightly in both of those markets. This is not a year for capacity adds. What you see are some conversions going on and when you convert, you tend to lose some capacity. So investors are acting in a -- I mean, I'm sorry, the customers are acting in a very profit-minded disciplined way to keep the supply-demand in balance in a difficult year. I think what that sets us up well for as we exit the year, we do think that our customers under-ship end market demand as they work down inventories in the channel, both their inventories as well as their customers' inventory and that's a good setup going into 2020. But in this year, we don't expect capacity additions in either of those two markets.

A - Michael Sullivan {BIO 16341622 <GO>}

Thanks, Pierre.

Operator

Thank you. And our next question will come from the line of Krish Sankar with Cowen & Company. Your line is now open.

Q - Krish Sankar {BIO 16151788 <GO>}

Yes, hi, thanks for taking my question. I had one for Dan. Dan, I just with the question on the buybacks, it looks like your services business is pretty resilient and growing, so that alone can probably fund the dividend easily and understand the reluctance to call the bottom. But it looks like you are in a bottoming out phase. So, why wouldn't you be more aggressive with the buyback or is it because you're seeing -- like keeping it as dry powder for M&A for some to attractive assets out there or is there a change in the methodology of how you think about buybacks?

A - Daniel Durn {BIO 17483115 <GO>}

Thanks, Krish. I think the best way to think about this is not read too much in any one quarter in terms of what we do from a buyback. I think you need to take a look at a longer-term trend line of what our Company has done. We've always talked about our three priorities for capital allocation and it's a consistent approach to capital allocation. That hasn't changed over time. First element is we're going to fully fund growth of this Company that has an organic and inorganic component to it. The second priority will be to maintain a strong flexible balance sheet. And the third priority is to take the vast majority of the excess cash and give it back to shareholders.

If you look at a two-decade trend for the Company, we're very close to a 100% of excess cash has gone back to shareholders. We've been big purchasers of our shares, given what we see happening in unfolding in our end markets as a result of the data economy diversifying end market demand in our business, we think that takes the semiconductor industry structurally larger. By implication, that's going to take our industry structurally larger, even off the levels we saw in 2018 and Applied will benefit in a very material way.

In the last four quarters alone we've repurchased about 8% of the Company, last three years around 17%, in the last five years, just about 28% of the Company. So I think we've been significant purchasers of our shares in light of what we see unfolding. And we think a steady approach to this quarter in, quarter out is the right approach to take -- to drive long-term shareholder value. So I wouldn't read too much into any one quarter and just look at our track record over an extended period of time, which I think is quite strong.

Q - Krish Sankar {BIO 16151788 <GO>}

Thanks, Dan.

A - Michael Sullivan {BIO 16341622 <GO>}

Thanks, Krish.

Operator

Thank you. And our next question will come from the line of Joseph Moore with Morgan Stanley. Your line is now open.

Q - Joseph Moore {BIO 17644779 <GO>}

Great, thank you. I had a question -- your comments upfront, you talked about NAND kind of stabilizing. And I guess there are segments of NAND where that's true, but generally your customers have sort of talked about margins continuing to come down in the back half. I just want make sure, I mean, when you talk about NAND stabilization that's not weighing heavily into your forecast, it seems like there's fairly dormant NAND spending in the second half, but just is -- when you see that stabilization, is that kind of upside to the numbers that we're talking about here or just how should we think about that?

A - Daniel Durn {BIO 17483115 <GO>}

Thanks, Joe, let me share a little bit of our thinking and hopefully that will help give you with insight into where we see the NAND correction cycle. If we're on this call a year ago, that was the first time we started to talk about a pullback from an investment standpoint of our customers and it was still at a time when margins hadn't reached their peak, and so I think it's the first time in the industry's history where you saw that disciplined behavior of our customers begin to pull back at a time when margins were still moving forward. And I think it created some confusion. And the reason I bring that data point up is is I think the NAND industry is further along the correction cycle than the DRAM industry. And in the prepared comments, we talked about inventory being off of their peaks, but still at an elevated level.

So when we talk about early signs of stabilization, I would say, stabilization not in hindsight, or in the past tense, so I think it's in the process of stabilizing, hasn't fully stabilized yet, but we feel good that we're seeing those early signs and we see NAND is further along in that correction cycle than DRAM. So we've got more work to do as an industry, but again as we roll the business forward off these levels, we think we profile roughly flat for the rest of the year from a semi system standpoint.

Q - Joseph Moore {BIO 17644779 <GO>}

Makes sense. Thank you.

A - Michael Sullivan {BIO 16341622 <GO>}

Thanks, Joe.

Operator

Thank you. And our next question will come from the line of Patrick Ho with Stifel. Your line is now open.

Q - Patrick Ho {BIO 5499707 <GO>}

Thank you very much. Gary, maybe just as a follow-up to some of the commentary you said about foundry, logic and the price positioning. are some of the gains on the market share driven by your growth segments like etch and deposition or are they across the board with some of your leadership process segments as well?

A - Gary Dickerson {BIO 2135669 <GO>}

Patrick, let me give you -- thanks for the question. Let me give you some color maybe overall in terms of how I see Applied and within that I'll talk about the different products. So when I look forward, I see a number of factors that can drive very strong performance for Applied. As we've said before, in the semi market where the biggest -- beginning of the biggest way we've ever seen is AI, big data wave. In the next two years we could see this wave building momentum and creating a very strong semiconductor market.

At the same time, as I talked about earlier, capital intensity is increasing in memory and foundry, logic. And in foundry, logic, you see the end of classic Moore's Law. And as I talked about earlier, you see customers having 7, 7P, 7 plus, 6 popped up on the roadmap, some customers talking about many pluses, again, I think that's an indication that driving improvements in power, performance, area cost is getting harder and harder.

So we certainly see that in both the memory business and in the foundry, logic business and we've talked about this new path forward with five drivers. We've had some of our peers talk about similar drivers and some customers talking about those drivers relative to how you're going to improve power, performance, area and cost and we're really, really in the beginning of this, but you can see evidence of this in terms of the customer behavior, how they're driving the devices. So that's a great setup for us. If we look at our unit processes, if we look at the integrated material solutions that we have like the 1000X improvement in leakage current, it's really a great setup for us.

Let me go a little bit broader and talk about our display business. We've said our display market will pick up over the next two years. Capital intensity there is also increasing. Our service business is becoming an increasing part of the Company. We have the largest installed base for service. Our subscription type revenue is also growing very fast. And if the semiconductor market strengthens over the next two years, this business can go back to double-digit growth for Applied.

So you put the new products that we have that are targeted for the biggest problems our customers have in memory, scaling, the memory devices, addressing the leading-edge foundry and logic, performance, power, area, cost, new segments like IoT, communication, automotive, power, sensors, all of those things together, if you look out two years from now, you've got a stronger markets, stronger position, service still growing, a combination of factors that could be really great for overall performance for Applied.

A - Michael Sullivan {BIO 16341622 <GO>}

Thanks, Patrick.

Operator

Thank you. And our next question will come from the line of Mehdi Hosseini with SIG. Your line is now open.

Q - Mehdi Hosseini {BIO 4362002 <GO>}

Yes, sir. Thanks for taking my question. All the good ones have been asked, but I have couple of follow-ups. One for Gary. I just want to better understand how a greenfield fab would help with some of these initiatives that you have taken over the past two years versus existing fab.

So they're basically been converted like there are fabs, NAND-fabs that are being converted from a 64 layer 3D NAND to 96 and there are greenfield fabs. The same for DRAM. So as these greenfield fabs, at sometime in the future are actually going to turn on again, would that create a bigger opportunity for you given all R&Ds of the past or is that going to be the same as a fab being converted, and I have a follow-up?

A - Gary Dickerson {BIO 2135669 <GO>}

Yeah, I think the bigger -- so certainly the greenfield fabs create a bigger opportunity for us. But I think that really the biggest factor for us is what technologies are enabling those future devices when they ramp those greenfield factories. So if you look at the DRAM, as I mentioned, DRAM you have lot -- the periphery moving to more logic like type structures, so similar to what we saw in 28 nanometer foundry, you see strong demand for PVD implant, thermal processing, CMP.

In DRAM, you see capacitor formation, new structures, we have positive patterning inflections for Applied. In memory, I/O layer formation, so many things within DRAM. In 3D NAND, scaling is about multiple things, more layers, more tiers, focusing on layer thickness, lateral scaling. We're winning new etch applications in NAND. And one of the things that is most important in scaling NAND is new materials especially high selectivity hard mask where we have very strong capability. We have a new hard mask material that increases etch selectivity by 50% and we already see qualifications in future technology nodes.

So a lot of those types of technologies, Mehdi, are ones that are enabling our memory customers, we have similar types of technologies for foundry and logic. And then the other thing, again I want to talk about that I mentioned before, are the integrated material solutions, combining multiple technologies in the same platforms under vacuum and we see engagements with many of our large customers. It takes some time for those new structures to be integrated into a node. But if you think about customers announcing improvements in power and performance, that's a key part of their competitiveness. We have technologies that enable improvements in power, performance. We have traction there with many large customers. And again, that will also fuel our growth over the future years.

A - Daniel Durn {BIO 17483115 <GO>}

And just to build on a little bit of what Gary was talking about to add some dimension, Mehdi, to the greenfield opportunity over time, we're currently tracking 31 300-millimeter factories around the globe. There's only a couple of them that are in the very early stages of beginning to take equipment and if we look at the aggregate WFE that those facilities represent, it's about almost $180 billion of WFE over time. So our customers are preparing for something that we think takes our industry structurally larger and is going to benefit Applied Materials as these macro trends we're talking about play out over time. So we're

really encouraged by both the conversions and technology buys we see today, as well as future greenfield buildouts over time.

Q - Mehdi Hosseini {BIO 4362002 <GO>}

Got it. Thank you. And just a quick follow-up for you, Dan. I apologize if this topic has already come up, what should we think of OpEx looking into the second half?

A - Daniel Durn {BIO 17483115 <GO>}

So I think we want to guide one quarter at a time. We'll talk about Q4 three months from now. What I did say in the Q&A, just to help give you some perspective on it, Mehdi, is we expect to keep OpEx flat this year with where we ended up 2018. And I think between the two quarters we've printed the one quarter we've guided. I think that gives you a sense of where the rest of the year is likely to unfold.

Q - Mehdi Hosseini {BIO 4362002 <GO>}

Got it. Thanks so much.

A - Daniel Durn {BIO 17483115 <GO>}

You're welcome.

A - Michael Sullivan {BIO 16341622 <GO>}

Operator, I think we have time for one more question, please.

Operator

Thank you. Our last question will come from the line of Quinn Bolton with Needham and Company. Your line is now open.

Q - Quinn Bolton {BIO 3192909 <GO>}

Hi, thank you for taking my question. Just wanted to follow up on Dan's comments in the prepared script about the opportunity for field upgrades, retrofits and parts. How much of that comes into the AGS business. How much of that drives the semiconductor systems and then I've got a quick follow-up.

A - Daniel Durn {BIO 17483115 <GO>}

Yeah, let me see, let me just pull up some data so I'm giving you the right perspective. So if we look, the vast majority of that number rolls in through AGS, I'd say roughly maybe 20% of the number rolls through our semiconductor systems business, which includes non-system upgrades as well as 300-millimeter refurbs. So it's roughly 80-20, give or take.

Q - Quinn Bolton {BIO 3192909 <GO>}

Great. Thank you. And then just a quick follow-up on the -- with the recent escalation in the tariff uncertainties again. Have you done any -- taken a look at what might happen to cost of goods if we get tariffs on the next $325 billion of China imports, would that have a meaningful impact on cost or you think you're pretty well insulated from that event, should it happen. Thank you.

A - Daniel Durn {BIO 17483115 <GO>}

Yeah, thanks for the follow-up. We feel pretty good about where we sit. If we look at everything that's been enacted to date and what's been discussed most recently, we think we've got plans in place to offset the impacts of that. The net impact of any of those tariffs becomes an immaterial impact to the Company. It's clearly something we're going to watch very closely. We'll continue to optimize our footprint, our operations and how we have geared our supply chain and logistics organization to make sure we continue to minimize the impact. But right now, given where we sit and what we know today, we think the net impact is going to be immaterial to the overall results of the Company.

A - Michael Sullivan {BIO 16341622 <GO>}

Thanks, Quinn. Dan, let me just kick it over to you. Anything else you want to say before we close the call?

A - Daniel Durn {BIO 17483115 <GO>}

Yeah, sure. Thanks, Mike. Just a couple of quick points to close out the call. First, we talked about it on the call. While I'm still not ready to call the bottom of the semiconductor cycle, I do believe we're seeing the early signs of stability and that's something that I find encouraging. Second, I like our setup for 2020. I believe off of these levels, WFE can grow into next year. I also think display can be higher and we've talked about the great job the team is doing executing against recurring revenue in our services business. So I especially like the setup around Applied as we look into the 2020.

Third, I believe the new bets we're making from a technology standpoint, Gary spent a lot of time talking about it on the call, I think they're going to pay off in a big way as the next wave of computing takes off, I hope you join us at the AI Design Forum over the summer. We'll share with you a lot more of what we're doing during that conference. Lastly, over the next couple of weeks Gary and I are going to be seeing many of you. We're both kind of travel to the Bernstein Conference at the end of the month and then I will be in New York for the Cowen Conference and also Europe for BNP. With that Mike, let's go ahead and close the call.

A - Michael Sullivan {BIO 16341622 <GO>}

All right. Thanks, Dan. And we'd like to thank everybody for joining us today. A replay of the call will be available on our website by 5:00 PM Pacific Time. And we'd like to thank you for your continued interest in Applied Materials.

Operator

Ladies and gentlemen, thank you for your participation on today's conference. This does conclude the program and we may all disconnect. Everybody, have a wonderful day.