Q1 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
- Edwin Mok, Analyst
- Farhan Ahmad, Analyst
- Harlan Sur, Analyst
- Joseph Moore, Analyst
- Patrick Ho, Analyst
- Sidney Ho, Analyst
- Toshiya Hari, 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.

Michael Sullivan {BIO 16341622 <GO>}

Good afternoon, everyone. I'm Mike Sullivan, Head of Investor Relations at Applied Materials. We appreciate you joining us for our first 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-K and 8-K filings with the SEC. All forward-looking statements are based on management's estimates, projections and assumptions as of February 14, 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.

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

Gary E. Dickerson {BIO 2135669 <GO>}

Thanks, Mike. I'm happy to report another record quarter for Applied, with revenue up nearly 30% from the same period last year. 2018 already looks like another great year, and we expect each of our three major business segments to deliver strong double-digit growth. We have tremendous momentum across the company and we are confident this momentum is sustainable for two reasons.

First, we see an expanding set of market drivers as more and more industries are disrupted by emerging technologies, from retail to entertainment, healthcare, manufacturing and transportation. The way companies create value and compete increasingly depends on their ability to capture, store and understand huge amounts of data. The overall market for electronics is increasing and, as those electronics get smarter, semiconductor and display content grows even faster.

Second, Applied is in a great position to outpace our markets. We are turning our investments into a strong pipeline of differentiated products, and we are using our broad set of capabilities to bring highly enabling new technologies to market faster than ever before.

In today's call, I'll talk about the major trends driving sustainable growth in our markets. I'll describe our strategy and how we're translating our broad portfolio of products and capabilities into differentiated performance for our businesses. Then Dan will provide details about our financial execution and capital allocation, which reflects our increasing confidence in the sustainability of our markets.

This is an incredibly exciting time in electronics industry because we are at the start of a new era of growth. The Internet of Things, big data and artificial intelligence will transform the economy over the next decade. As a result, a broad spectrum of companies are making substantial investments in these technologies to position themselves for the future. These large, powerful trends are already driving a fundamental shift in demand for semiconductors and displays.

While these are only the early stages of AI and big data, there are already applications that have significant traction and are starting to scale. The first example is AI Natural

Language Processing which is being integrated into more devices and driving silicon content at the edge and in the cloud.

Voice assistants are fast becoming the hub for home automation. A typical voice assistant has around 30 chips and a total of 200 square millimeters of silicon, that's about twice the area of a smartphone application processor. Language processing is compute-intensive and the leading companies are building dedicated data centers to support it.

These AI workloads require new server architectures that have up to eight times more logic and four times more memory content by area than traditional enterprise servers. Another important AI trend for 2018 is neural processing units in smartphones. This is a great example of AI at the edge, where machine learning is used to enable a phone's camera to identify and react to what it's seeing.

The third example is self-driving cars. It's reported that $80 billion has already been invested as technology companies and traditional automakers race to get Level 4 vehicles to market. We believe Level 4 vehicles will have approximately eight times more silicon content than a standard car has today. These powerful emerging trends layer on top of traditional demand drivers, such as smartphones, data centers and storage, which continue to evolve and grow. We see leading cloud service providers announcing significant increases in their capital investments to expand data center capacity.

To keep pace with the explosion of data generation, the storage market is growing rapidly, and NAND is taking a larger share. Recent data suggests that NAND will grow from 18% to about 30% of the total data storage market in the next three years. And while smartphone unit growth is relatively flat, the value of the silicon content in smartphones grew more than 30% in 2017. All these demand drivers add up to a very positive outlook for Applied's served markets.

In Semiconductor, market fundamentals are strong, and we see disciplined investments in capacity and technology across a broadening customer base. Based on the timing of customer projects, we expect DRAM and logic spending to be higher in 2018, while the overall mix between foundry logic and memory investments will be similar to the 2017. We see a steady ramp of spending in China, which is positive for Applied because of our strong and growing market share and high service penetration at both multinational and domestic manufacturers.

At the end of last year, we expected total wafer fab equipment spending in 2017 and 2018 combined would be more than $90 billion. As we look further ahead, we believe combined spending in 2018 and 2019 could be around $100 billion. While it's too early to comment on timing of that spending, we believe the overall trend line is clear.

In Display, there are two equally large market inflections driving capital investments: the introduction of Gen 10.5 substrates for TV manufacturing and organic LED displays. In mobile, the transition to OLED displays is compelling. This is because rigid OLED offers significant performance, power and cost advantages over LCD, and flexible OLED will enable new form factors, such as curved and eventually foldable screens. As a result, our

positive outlook for 2018 and beyond remains unchanged. Display is a unique growth driver for Applied, and we expect to increase our revenue by more than 30% in 2018 on top of nearly 60% growth last year.

At Applied, our vision is to make possible the technology shaping the future, and we have aligned our investments and our organization around this vision. It is increasingly clear that the breadth of our capabilities and product portfolio is an important source of differentiation because we bring together the most enabling capabilities in one place. We are in a unique position to help customers accelerate their time to market, which is tremendously valuable to them.

Against this backdrop, I'll now provide updates for each of our business segments. In calendar 2017, we grew our semiconductor process equipment business more than 40%, and our inspection and metrology business more than 10%. We expect to grow faster than these markets in 2018 and beyond with three major growth drivers.

First, in areas where we're traditionally strong, we are extending our leadership. Our leadership products create the materials that determine the power, efficiency and performance of devices. To drive the major advances in transistor and interconnect needed to enable high-performance computing and AI, customers are increasing their focus on innovative materials and structures. This is translating to significant growth in areas like PVD, where we grew revenues about $800 million in 2017.

Second, we're focused on capturing more share in markets where we have room to grow, specifically patterning, inspection and metrology. In patterning, we are providing materials-enabled solutions to customers' three most significant scaling challenges: resolution, the two-dimensional geometric shrinking of a device's features; 3D scaling, ways to increase transistor or memory cell density; and, increasingly important, placement, which is the vertical alignment between the layers of a device. By focusing on these key areas, we are on track to generate over $1 billion of patterning revenue in 2018. And regardless of EUV adoption, we expect our patterning opportunity to grow considerably over the next several years.

Management of placement errors is also a driver for accelerated adoption of our e-beam inspection technologies. E-beam is the fastest-growing segment in the inspection and metrology market, and we're on track to grow significantly faster than the market in 2018.

Third, we are finding new ways to combine our innovative technologies in materials deposition, materials removal, materials modification and materials analysis. Based on these capabilities, the pull from our customers for earlier and deeper collaborations is stronger than ever, and we're working with them to develop new solutions that accelerate their technology roadmaps and expand Applied's market opportunities.

In Service, on a year-on-year basis, we've grown revenues every quarter since the end of 2013. And we're confident we can continue to grow at least 15% per year. This sustainable growth is driven by: a growing installed base, an increasing number of tools under long-term service agreements, and advanced service products that help customers shorten

ramp times, improve device performance and yield, and rapidly optimize their factory output and operating costs.

Before I turn the call over to Dan, I'll quickly summarize. With record performance in the first quarter, 2018 is off to a great start. And we're confident we can deliver strong double-digit growth across our Semiconductor, Display and Service businesses. We see sustainable strength in our markets as new demand drivers, including IoT, big data and AI, layer on top of traditional computing and mobility. Applied is uniquely positioned to outperform our markets as we enable customers to accelerate their device roadmaps using our broad portfolio of products and capabilities.

Now, Dan will give his perspective on our financial execution and outlook, as well as provide additional color on our capital allocation.

Daniel Durn {BIO 17483115 <GO>}

Thanks, Gary. I'd like to begin by sharing some of my observations about the environment Gary described and discuss how we plan to allocate the company's capital as a result. The semiconductor industry is fueling a new data economy. And today, we're already seeing record semiconductor industry revenue of over $400 billion. We're excited about the Internet of Things and artificial intelligence, and we believe this next era of computing will be built out over the next decade or more. Of course, nobody can guarantee that the growth will follow a straight line, but the future we envision is nondiscretionary to the world's largest industries, and semiconductor process technology and systems are at the foundation.

All of the leading indicators of our equipment business are positive, and Gary shared that we see strength in 2018 and 2019. I believe WFE spending is going to remain significantly higher and less cyclical than it was during the PC era, which many people still identify with.

Consider these facts, 300-millimeter technology arrived in the year 2000 and gave customers 2.3 times the number of chips for every wafer. While semiconductor revenue grew, equipment spending actually declined between 2000 and 2013 as WFE intensity dropped from a peak of 17% to a low of 9% over that same time period.

But from 2013 to 2017, while semiconductor sales grew, wafer fab equipment grew even faster, and WFE intensity kicked higher to 12%. With technology getting more complex, I think it's hard to imagine WFE intensity drifting much lower.

So consider what happens if the semiconductor industry grows from today's levels at a modest 5% pace, as multiple forecasts predict. Then if WFE intensity stays flat at 12%, WFE investments of $50 billion or more should not be considered unusual in the near term, and spending could potentially reach $75 billion by the middle of the next decade.

We'll leave forecasting to others. The point I want to make is that demand is much broader today than during the PC area. WFE intensity has stabilized and the industry is

likely to be a lot more attractive in the years ahead.

So, the future looks bright especially for Applied Materials because we have a growing Semi business, a growing Services business and a unique growth opportunity in Display. I believe Applied Materials will become larger and more profitable and generate significantly more free cash flow than we do today.

Against this backdrop, here is how we plan to deploy the company's capital going forward. Our capital allocation priorities are unchanged. Our first priority is to invest in the growth of the business with an emphasis on organic growth. We will continue to invest with discipline. This means every dollar of R&D is tied to an attractive margin target, and we will continue to look every quarter for opportunities to shift money from lower return areas to high return areas before increasing R&D. We will also stay laser focused on maintaining G&A efficiency.

Our second priority is to maintain a robust and flexible balance sheet. We remain committed to a strong investment-grade credit rating. Our third priority is to return excess cash to our shareholders. In fact, since 2000, Applied has returned nearly 90% of free cash flow to shareholders. And today, we're announcing a change in the dividend policy.

We've said that our markets are bigger and less volatile, which gives us the opportunity to pay higher dividends. Applied's Board of Directors has approved a 100% increase in the quarterly cash dividend and declared the first $0.20 quarterly dividend will be payable in June. We'll review our distribution practices on a regular basis and evaluate further dividend increases as we continue to grow the business.

At the same time, we strongly believe in the future growth and value creation of the company. Accordingly, the board has also increased our buyback authorization by $6 billion. Combined with more than $2.8 billion remaining from the previous authorization, we have a significant opportunity to increase shareholder value through buybacks. We plan to be opportunistic, repurchasing more shares when we believe they are significantly undervalued.

Next, I'll discuss the impacts of the U.S. corporate tax reform, which is beneficial to Applied because it gives us greater flexibility in how we deploy future profits to serve our customers, grow the company, and return capital to our shareholders. With freer access to profits generated offshore, we now have greater flexibility to invest within the U.S., where we do much of our advanced technology development and manufacturing. This year, we plan to add new engineering jobs in the U.S. and invest in new labs and office space to support our growth objectives.

In Q1, the new tax legislation resulted in a one-time repatriation tax of about $1 billion. As you may know, the tax amount is payable over eight years and the payments are significantly back-end weighted. Because of this one-time repatriation tax, Applied's GAAP tax rate for the quarter was 88.4%.

Our non-GAAP tax rate was 6.3% for Q1, and we're using a 6.5% tax rate in our planning for the rest of fiscal 2018. Beginning in fiscal 2019, we expect our non-GAAP tax rate to be in the range of 11% to 12%. This increase reflects a minimum tax on foreign income that becomes effective next year.

Now I'll comment on our financial execution in Q1. We delivered our eighth consecutive quarter of year-on-year growth in both revenue and non-GAAP EPS, which was $1.06, or $1.02 when excluding a $0.04 tax benefit. On a year-over-year non-GAAP basis, we increased gross margin by 1.3 points, reduced OpEx as a percent of sales by 2.3 points and grew operating margin by 3.6 points.

Turning to the segments. We delivered record revenue and operating profit in both semi equipment and Services. In Semi equipment, we grew revenue by 32% year-on-year and delivered the highest operating margin in over seven years. I'm particularly impressed with the growth of our Services business. AGS grew revenue by 30% year-over-year, which was above our expectation mainly due to higher-than-expected spare parts demand. AGS also delivered record operating margin.

In Display, revenue and operating margin were both lower sequentially following a record Q4, which we anticipated due to lumpiness of the business. We expect Display revenue and operating margin to trend higher in the balance of the year.

Now I'll share our business outlook for Q2. We expect revenue to be in the range of $4.35 billion to $4.55 billion. The midpoint would be up nearly 26% year-over-year. We expect Semiconductor Systems revenue and Services revenue to both increase by about 23% year-over-year, and our Display revenue should increase by about 48% year-over-year.

We expect the non-GAAP gross margin percentage to be approximately flat sequentially. Non-GAAP operating expenses should be in the range of $755 million, plus or minus $10 million. At the midpoint, OpEx would be approximately 17% of revenue, down 1.4 points year-over-year. And we expect non-GAAP EPS to be in the range of $1.14, plus or minus $0.04. The midpoint of the range is up nearly 44% year-over-year.

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 of you as we can, please ask just one question at this time. If you have an additional question later, please just 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, sir. And our first question will come from the line of Atif Malik with Citigroup. Your line is now open.

Q - Atif Malik {BIO 15866921 <GO>}

Hi. Thanks for taking my question. And congratulations on a strong beating rate. The first question for Gary, Gary, can you just talk about the mix of mobile versus TV in your unchanged 30% year-over-year outlook for Display business?

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

Sure. Thanks, Atif. Just overall, again, in 2018, we're still seeing 30%, greater than 30% growth, and 2019 and beyond also look very strong. If we look at 2018, mobile versus TV, your question, it's about 50/50 mix. In TV, we see increased adoption of larger screens. We're tracking 13 Gen 10.5 projects. And also, a great example here is on 65-inch TVs. If you produce them with Gen 10.5, you have eight 65-inch TVs, only three with Gen 8.5. So that's driving the TV business.

OLED is the other half of our business in 2018, and we still see very strong opportunity in OLED. Previously, we had one customer that was more than 50% of the business. Now, greater than 50% of the business is coming from multiple customers. We talked about 10 customers in OLED. And the transition to OLED displays is really compelling. Rigid OLED gives you better performance, faster refresh rates, power cost advantages over LCD. Flexible OLED gives you new form factors such as curved displays and eventually foldable screens. So again, we're on track for greater than 30% growth in 2018 and on track with our longer-term model.

A - Michael Sullivan {BIO 16341622 <GO>}

Thanks, Atif.

Operator

Thank you. And our next 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 a question for you around your capital allocation plan. Obviously, with the doubling of the dividend, you're feeling good about the sustainability of this heightened level of spending in WFE. Would be curious to hear your thoughts around your framework of returning that capital. You announced a buyback program that's now $8.8 billion. Would love to hear whether that is going to be opportunistic or systematic. Overall, would generally like to hear how you think about free cash flow generation and plans to return excess back to shareholders. Thank you.

A - Daniel Durn {BIO 17483115 <GO>}

Thanks, C.J. Let me see if I can help you with that. So as you point out, we do see strength in our end markets. We're really encouraged by the diversification of those end markets. We're encouraged by capital intensity rising, and we're encouraged by the health of our customers. So we've got a strong view of our markets into the future.

From a capital allocation standpoint, the company's got a great history. Since 2000, the company has returned nearly 90% of free cash flow back to shareholders. As part of this announcement, we're changing the mix a bit. We're going to increase our dividend by 100%.

We've also announced a $6 billion share repurchase, when combined with the $2.8 billion that was outstanding from the prior authorization, gives us an opportunity to opportunistically be in the market to drive even more value for shareholders. And so we feel good about our end markets. We feel very good about the performance of the company. And we're going to remain committed to being very shareholder-friendly with our excess free cash flow.

Operator

Thank you. And our next question will come from the line of Farhan Ahmad with Credit Suisse. Your line is now open.

Q - Farhan Ahmad {BIO 18679280 <GO>}

Hi, thanks for taking my question and congrats on the great results. My first question is on the long-term drivers for the business. You talked about AI, IoT and the general data economy. Have you guys done any sort of work to figure out what portion of the business is currently being supported by these non-consumer markets?

A - Daniel Durn {BIO 17483115 <GO>}

So, as we look into the end markets and what's driving WFE, what we see is a lot of confidence in macro trends that are going to be driving a significant amount of efficiency into very large industries, and we see that spend as non-discretionary. It is foundational to company's competitiveness. It's difficult to unpack those macro trends and slice them by WFE to see what part of WFE specifically supports each trend. What we see is a noticeably larger end market.

We see strength across all device types, whether it's logic foundry, whether it's memory. And within logic foundry, we see strength in both end markets. Within memory, we see strength in both NAND and DRAM. So we're really encouraged by the breadth of the strength we're seeing and we think it bodes well for the market. But I think it's too difficult to unpack specifically how much is attributed to which end market trend.

Q - Farhan Ahmad {BIO 18679280 <GO>}

Thank you.

A - Michael Sullivan {BIO 16341622 <GO>}

Thanks, Farhan.

Operator

Thank you. And 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 and congratulations on another well-executed quarter. Good to see the boost in the capital return program, and this goes back to your previous answer. But if I use net income as a proxy for free cash flow, this calendar year, you guys are going to be generating about $4 billion in free cash flow. So the dividend increase you guys announced today is going to consume about 20% of that free cash flow.

I guess, the question is, is the team committed over a multiyear period to its 90% free cash flow return, which would imply, at least for this year, about $3.2 billion in repurchase activity? And the reason why I ask this is that many semi companies and some of your peers are articulating capital return as a percent of free cash flow. So, I guess, the question is 90% of free cash flow, is that how we should think about the capital return commitment from the team on a go-forward basis?

A - Daniel Durn {BIO 17483115 <GO>}

Thanks, Harlan. Let me see if I can add a little more color on this to try to be helpful. I would look at the 90% historical number as a mindset of this management team, as a mindset of Applied Materials, to be committed to getting cash back in the hands of shareholders. We're going to remain committed to that going forward.

I don't think what you will see from us is a formulaic approach to that. From a dividend standpoint, we made a big move on the dividend. We are going to continue to look at the performance of the business and the way we grow the business and review that policy on the periodic basis and look to grow our dividend as we grow the business. We're going to compliment that, the way we have historically, by being aggressive repurchasers of our shares when we feel intrinsic value is not fully reflected in the trading price of our stock. And we're going to continue to do that.

So, rather than be formulaic, I think we're going to look to be opportunistic with the repurchase, committed to the dividend, committed to reviewing that policy over time as we grow the business. And I think our track record into the future will be similar as our historical track record of getting a substantial amount of excess free cash flow back to shareholders. But we do not want to be formulaic in that approach today.

A - Michael Sullivan {BIO 16341622 <GO>}

Thanks, Harlan.

Q - Harlan Sur {BIO 6539622 <GO>}

Got it. Thank you.

A - Michael Sullivan {BIO 16341622 <GO>}

Thanks.

Operator

Thank you. And our next question will come from the line of Toshiya Hari with Goldman Sachs. Your line is now open.

Q - Toshiya Hari {BIO 6770302 <GO>}

Hi, guys. Thanks for taking the question. Dan, you're guiding gross margin this quarter flat sequentially despite Display becoming a bigger percentage of your overall business, which I think historically would have been detrimental to gross margins. So, I guess, what's driving the fundamental improvement in gross margins? And longer term, you've shared the 47% target in your midterm plan. But we're kind of there. So how should we think about potential upside from there going forward? Thank you.

A - Daniel Durn {BIO 17483115 <GO>}

Thanks, Toshiya. So the company's got a really good track record over the last four years. Last four years, we've improved gross margin by 5 points. We've also articulated a model that says we're going to capture about 70 basis points of material costs of sales savings each year as we drive the business forward. That model still holds. But that's assuming a constant mix.

You rightfully point out that we're going to have composition of our business, the mix composition of our business that's going to create a bit of a headwind and mask some of that ornamental progress. So to see a quarter where we see strong sequential growth in Display and have us hold the gross margin flat I think is a reflection of all the hard work that's going on behind the scenes to continue to drive the profitability of the company.

What I would say is, our long-term model, we'd like to articulate a long-term model once a year during our Analyst Day and resist the temptation to update it along the way. What I would say is that we're going to be aggressive about looking for opportunities to do better than what we've advertised in our long-term model. And where we see opportunities, we will pursue it aggressively and make sure we're delivering as much value as possible for shareholders.

Given the mix of businesses and the growth profile going forward, we'd like to stay consistent with our 47% gross margin out into the 2020 timeframe. And if we have an update, we'll review it in the fall at our Analyst Day.

A - Michael Sullivan {BIO 16341622 <GO>}

Thanks, Toshiya.

Q - Toshiya Hari {BIO 6770302 <GO>}

Thank you.

Operator

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

Q - Joseph Moore {BIO 17644779 <GO>}

Great. Thank you. I wonder when you talk about the $100 billion of WFE for the next two years versus the $90 billion you talked about for the next years 12 months ago, how much of that increment do you think is coming from which segment and how much is memory versus foundry logic? And is there a level where you start to feel like you start to worry about the supply growth being too high or just how are you guys thinking about these levels, because they keep kind of ratcheting higher?

A - Daniel Durn {BIO 17483115 <GO>}

Thanks, Joe. So, implicit in the question is a framing that says we're ratcheting our estimates higher. What I would say is we're extending the range of our forecast out into the 2019 timeframe. And we feel really good about our end markets. What we're encouraged by is driven by three primary reasons. Macro trends, diversification of our demand drivers is the first. Second, capital intensity is up across the board, and that's all device types. And the third, customers are very, very healthy right now.

So just double-clicking on each of those three elements, we've got macro trends shaping how we live our lives right now. We've been thinking about it for a while I think probably back into 2016 timeframe at our Analyst Day. Artificial intelligence, big data, Internet of Things, autonomous driving, these are playing out. We view these trends as real. They're making an impact.

Demand for silicon is going up. Semiconductors are on the critical path of enabling each of these trends. Content in data centers is going up, content in edge devices is going up, and again, we're seeing strength across all device types. So the macro trends are incredibly favorable.

As we look at capital intensity, capital intensity is up across the board. In foundry, 7-nanometer is up 100% over 28-nanometer. Memory, both NAND and DRAM is up between 40% and 60% over that same time period. Foundry is three times more capital-intensive than the memory market. And we used to have wafer size transitions where you would get 2.3 times the number of chips per wafer, for instance, when you go from 200 millimeter to 300 millimeter.

The last transition was at – in the year 2000. WFE intensity went from 17% in that year to a low of 9% in 2013 when all of the efficiency gains of that transition were absorbed. And from 2013 to today, we've seen it trend up from that 9% to 12%. And we don't have

another wafer size transition on the horizon, so we feel really good about the capital intensity that underpins our markets.

And I guess, the third thing, customers are healthy. They're investing a lot of money to drive this growth into the semiconductor industry, but they're also making a lot of money. Their WFE spend as a percent of EBITDA is down. In 2012 to 2018, the three largest memory providers and the three largest foundry logic providers are all down 60% WFE spend as a percent of EBITDA.

So we're really encouraged by what we see. Macro is good, markets are good and customers are profitable. We think it's a really healthy market, we're encouraged by it.

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, Nicolaus. Your line is now open.

Q - Patrick Ho {BIO 5499707 <GO>}

Thank you very much and congrats on the nice quarter. Gary, in your prepared remark, you talked about some of that share gains you've generated over the past few years, particularly in patterning and e-beam inspection. A lot of it is due to the industry transition to 3D NAND and your ability to introduce some of the new products for that product. At the same time, we're seeing now the industry transition on the logic side to 10 and 7 nanometers. Can you discuss some of the opportunities there and maybe some of the share gain potential you have as that segment of the market makes a pretty sizable transition?

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

Sure, Patrick. Let me first start kind of big picture, and then I'll cover the question on the – that you asked. So, in 2017, we grew process equipment more than 40%. PDC grew about 10%. Now, if you look back over the last three years, 2014 to 2017, process equipment grew much faster than the PDC market. And we see that playing out in 2018, and probably in future years also.

But again, process equipment, very, very strong growth, and as you said, very strong balance for us. It used to be that, if it was a good foundry year, Applied would do well and not as well on the memory years. We've increased our share of memory about 7% over the last few years of total spending.

So, in 2017, we had very balanced share in all the different segments, device segments, around 20% or more in all of those different segments. And then what we're looking for 2018 is strong double-digit growth in our leadership businesses, in our growth businesses

and also in PDC. PDC, we have new capabilities, new products that will increase our growth a fair amount above what we accomplished in 2017.

In foundry, there really are two big drivers. And one of those drivers is in the trailing geometries. There was question earlier about AI and what's driving AI. We really have data generation, many, many smart devices, data storage, and then you have the high-performance computing to process the information.

So, if you look at the trailing geometries, China is increasing investment in 2018 a fair amount both with domestic and global companies. We have a great position in China. It's one of our highest share positions in Semiconductor and Display. And we expect that we'll outgrow the market in China in 2018.

Patterning is a great opportunity for us. We've gained about 19 points of share in patterning over the last few years. If we look forward, patterning in 2020 will be about a $5 billion TAM. We anticipate that we could add another $1 billion approximately in revenue over the next four years in patterning.

And then if you look at scaling challenges, scaling, you have different drivers. One is resolution, two-dimensional shrinking of features. Their multi-patterning is growing. 80% layers are multi-patterning. Those are growing, and that's a great opportunity for Applied Materials. 3D scaling certainly happened in 2D to 3D NAND, but you also see that in logic. The contact over active gate is one example where you see that, and that's also materials-enabled scaling for customers. And certainly, you see that in high-performance computing and advanced foundry and logic.

And then another big industry challenge where we're in a great position, one of the biggest challenges for customers is pattern placement, the alignment of one layer to the next, edge placement errors. And there was a conference in early January; two of the top technologists from leading companies talked about edge placement errors being one of the biggest industry challenges. And what they said was that materials is the key driver for solutions to pattern placement. And if you look at our position with all of the selective technologies we have and materials technologies we have, we're in a very strong position to grow, especially in foundry, foundry and logic, as they move to these new technologies.

So again, overall 2017, we grew over 40% in process equipment. We see strong double-digit growth in all of our segments, leadership, growth, PDC. And the other thing I would say that we're seeing tremendous pull from customers is accelerating their roadmap. If they can bring those high-performance computing or AI chips to market faster, that's worth a tremendous amount of money and our ability to create, modify, remove and analyze materials is really unique. So we're seeing deeper engagements with customers than we've ever seen in the past, and I would say I've never been more optimistic about our markets and also our positions in those markets.

A - Michael Sullivan {BIO 16341622 <GO>}

Thank you, Patrick.

Operator

Thank you. And our next question will come from the line of Edwin Mok with Needham & Company. Your line is now open.

Q - Edwin Mok {BIO 15222334 <GO>}

Hey, thanks for taking my question. Sorry about the background noise. So I have a question about China. You guys sound pretty confident about investment by the local Chinese manufacturer, but these sort of new players, we haven't seen a lot of products coming out of there or even design come out of that. What gives you confidence that that investment will come maybe later this year or 2019, 2020 timeframe?

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

Yeah. Thanks for the question. So we have pretty significant visibility in China. We have the highest share. We also sell the manufacturing automation systems. So we have a lot of leading indicators relative to all the projects that are happening in China. And as I said earlier, we have the largest share and our share is growing in China, both in Semiconductor and in Display. And what we'll see in 2018 is a market that's going to grow. We're more optimistic, I would say, in terms of the growth in China. It's pretty balanced between global and domestic companies. And again, we're working very closely with all of those different companies.

Domestic China is higher in foundry and logic than it is in memory. And one of the things that we talked about was data generation, smarter devices, the increasing sensor technologies. That's an area where China has capability, and certainly the demand for those trailing geometries is now 40% of the foundry market and we're seeing very strong growth there in China. For the global companies, they are more weighted towards memory versus foundry and logic.

Another thing that Dan talked about in the prepared remarks was our service growth. I think something like 30% year-over-year in service. China is also a market where our penetration in service is very high, helping global and local of companies ramp new fabs in new locations. And so we had some one-time parts increases in our quarter that increased the rate of growth in service above the model that we gave. We think we may be a few points higher than that model, but that certainly contributed to an extraordinary quarter relative to service growth.

So anyway, we have very, very good visibility in China. The investments there are strategic investments, and we believe that that's going to remain a very good market and especially good for Applied Materials.

A - Daniel Durn {BIO 17483115 <GO>}

Yeah, I just want to build on very quickly the point Gary was making about our Services business. I think the way we profile this year from a service perspective will be different than we've seen historically because of the dynamic Gary talked about. I think you'll see a

seasonally stronger first half and different profile into the back half of the year as a couple of these fabs facilitated by international customers are brought online in China.

I think the way to think about the back half of the year, because you've got visibility now on Q1 and Q2, think about the back half of the year, is take our long-term compound growth rate in our Services business of 15%. And as you look at full year 2018 revenue over full year 2017 revenue, we're likely to be about 3 points above our long-term compound growth rate. I think that gives you a good framing on how to think about the Services business throughout the course of the year so you can dial in your models.

A - Michael Sullivan {BIO 16341622 <GO>}

Thanks for the question, Edwin.

Operator

Thank you. And our next question will come from the line of David Wong with Wells Fargo. Your line is now open.

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

Thanks very much. In terms of the growth you're expecting in display equipment this year, is this driven primarily by growth in your traditional display products or you're seeing – are you seeing meaningful new – meaningful growth from moving into new areas and increasing your addressed market in display?

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

So, the display market in 2018 is roughly 50% TV and 50% mobile. And they're really with the same products that we have – had in the market previously. So no real growth from significant new products forecasted in 2018. And the mix is really about 50/50 between mobile and TV.

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

Great. Thanks.

A - Michael Sullivan {BIO 16341622 <GO>}

Thanks, David.

Operator

Thank you. And our next question will come from the line of Sidney Ho with Deutsche Bank. Your line is now open.

Q - Sidney Ho {BIO 6922415 <GO>}

Thanks for taking my question. If you look back at the last calendar year, by my math, your Semi System business grew about 34%, which is obviously very impressive. And it's also

just a few percentage points better than the WFE market. But the outperformance was much higher the year before. When you talk about your expected business to grow – outgrow the market again this year, do you expect that outperformance to reaccelerate this year?

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

Yeah. Thanks for the question. So, again, if you breakdown our business, the process equipment business grew more than 40% in 2017. PDC grew 10%. So it was more growth in terms of the process equipment business. If we look into 2018, we see strong double-digit growth really across all of those different businesses, the growth businesses, the leadership businesses, where we have extremely high market share, and also in PDC. So strong growth across all of them, strong double-digit growth across all of those businesses in 2018.

Q - Sidney Ho {BIO 6922415 <GO>}

Thank you.

A - Michael Sullivan {BIO 16341622 <GO>}

Thanks, Sidney. And then, operator, I'd like to let you know that we've got time for about two more questions, please, if we have them.

Operator

Yes, sir. Our next questions will come from the line of Craig Ellis with B. Riley FBR. Your line is now open.

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

Thanks for taking the questions and congratulations on the very good quarterly execution and the evolution and capital return. Gary, I just wanted to go back to the multi-year outlook and see if I could get some color from you just on how you're thinking about the potential for growth in 2019. I know it may be early to be real precise there, but it seems like a lot of the secular factors that are helping cause be uplift from where we've been as an industry to where we are now, we're multi-year in nature and they would seem to be as or more forceful next year. So any color on the potential for WFE growth next year would be appreciated. Thank you.

A - Daniel Durn {BIO 17483115 <GO>}

Yeah. Thanks, Craig. I'll go ahead and jump in and take this. I think it's too early to tell how spending profiles across that two-year sequence. I think it's important to just take a step back and look at what's really driving our view on a multi-year basis. Macro trends are real. Capital intensity is up, and we're seeing modest and disciplined growth into China. Again, we think these macro trends shaping people's lives. We're in the early innings.

Gary referenced $80 billion of investments in autonomous vehicles. By 2020, eight OEMs are going to have Level 4 vehicles on the road. By 2022, it's 12 OEMs. We're in the early

stages of SSD penetration of hard disk drives. And when we correlate it bottoms up with dialogue we have with customers, all indicators look good the best we can see, and fundamentals continue to look good into 2019. So while those trends we have a lot of confidence in, too early to call how revenue profiles over the forecast horizon.

Operator

Thank you. And your last question will come from the line of Farhan Ahmad with Credit Suisse. Your line is now open.

Q - Farhan Ahmad {BIO 18679280 <GO>}

Hi. Thanks for taking my question. Just one question on how you're thinking about the buybacks. You laid out a very positive long-term outlook. And if I do like a DCF around it, I can get like a very significant upside from where your share prices currently are. So, is it fair to think that you could be a lot more opportunistic with the buybacks and it could be more front half loaded if share prices are around current level?

A - Daniel Durn {BIO 17483115 <GO>}

Thanks, Farhan. Like we said, we will be opportunistic with our repurchases. We've got a strong point of view on where the markets are going and how our company is performing within those respective markets gives us a lot of confidence in what the future holds for our business, more profitable, substantively higher free cash flow generation potential. And whenever we see disconnects in intrinsic value as we see it in our company and how we trade in the market, I think you'll see us be opportunistic with respect to those repurchases.

Q - Farhan Ahmad {BIO 18679280 <GO>}

Thank you.

A - Michael Sullivan {BIO 16341622 <GO>}

Okay, Farhan, thanks for the question. Let's see, Dan, anything you want to add before we close the call?

A - Daniel Durn {BIO 17483115 <GO>}

Yeah. Thanks, Mike. I think it's probably good to close with a couple of quick thoughts. Personally, I can't think of a better time to be in the semiconductor industry. We talked a lot about multiple growth drivers that are important trends shaping our lives. These trends are going to drive tremendous productivity and the investments are non-discretionary for some of the largest, most competitive industries on the planet. It is fundamentally about staying competitive.

Semiconductors are on the critical path of enabling those trends, and at the center of it, it all begins with what we do with Applied. When we bring all of this together, Applied's future is incredibly bright. Our breadth and depth is just an asset for the company. We are likely to be sustainably bigger, more profitable and we're going to generate more cash

than in the past. And as we think about putting that cash to use, we talked about three important ways.

Number one, we're going to invest in new products. This is going to lead the way and drive the organic growth profile we've seen over the last few years. We will invest to drive organic growth. We will pay higher dividends and we're going to be buying back more shares to drive even more shareholder value going forward.

Finally, we look forward to seeing many of you. We're going to be at the Goldman conference tomorrow, and then next week and we'll be on the road in New York, Boston or Toronto. And, as always, thanks for joining us and we really appreciate the support.

So, Mike, let's go ahead and close the call.

A - Michael Sullivan {BIO 16341622 <GO>}

Okay, great. Hey, thanks for that, Dan. And we'd like to thank everybody for joining us today. A replay of our call is going to be available on our website by 5:00 PM Pacific Time today. 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 our program, and we may all disconnect. Everybody have a wonderful day.