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**Equity Proposal II**  
 Applied Materials (AMAT)  
**Rating: BUY**

**Company Profile**

Applied Materials (AMAT) was founded on November 10, 1967 by Michael A. McNeilly in Santa Clara, California. In 1972, AMAT had its initial public offering and has since evolved to one of the top Semiconductor Machinery Manufacturers in the world. Before the founding of AMAT, semiconductor device companies made their own semiconductor machinery. Applied Materials was the first of its kind. AMAT is an innovative company focused on the future and resides in the heart of Silicon Valley. The company has over \$1.5 billion invested in research and development, and owns over 10,200 patents. AMAT owns 20.4% of the market share within the Semiconductor Machinery Manufacturing space, but its machinery is dependent on the production cycles of four companies: Micron Technology (13.00% revenue), Taiwan Semiconductors (13.00%), Samsung Electronics (12.00%), and Intel Corp. (11.00%). Applied Materials' products are divided into three categories:

***Silicon/Semiconductor Systems: 64.8% of Revenue***

The Applied Silicon/Semiconductor Systems segment develops, manufactures, and sells a wide range of manufacturing equipment used to fabricate semiconductor chips, or integrated circuits (ICs). The Silicon Systems segment includes semiconductor capital equipment for deposition, etch, ion implantation, rapid thermal processing, chemical mechanical planarization, metrology and inspection, and wafer packaging. The majority of the Applied new equipment sales are to leading integrated device manufacturers and foundries worldwide.

***Applied Global Services: 23.8% of Revenue***

The Applied Global Services (AGS) segment provides integrated solutions to optimize equipment and fabrication performance and productivity, including spares, upgrades, services, remanufactured earlier generation equipment and factory automation software, and display and solar products. Customer demand for products and services is fulfilled through a global distribution system with trained service engineers. They are located in close proximity to customer sites in more than a dozen countries to support approximately

<b>Metric Comparison</b>	<b>AMAT</b>	<b>Industry Average</b>
<b>Current Price</b>	\$28.86	-
<b>Target Price</b>	\$28-39	-
<b>PEG</b>	1.08	1.89
<b>Market Cap</b>	\$31.19B	\$12.18B
<b>Trailing P/E</b>	21.23	25.88
<b>Operating Margin</b>	21.13%	17.34%
<b>EVA Spread</b>	4.13	2.59
<b>ROA TTM</b>	10.8%	7.5%
<b>Beta</b>	1.26	1.09
<b>Dividend Yield</b>	1.39	1.56
<b>TTM R&amp;D</b>	\$1.51B	\$0.50B

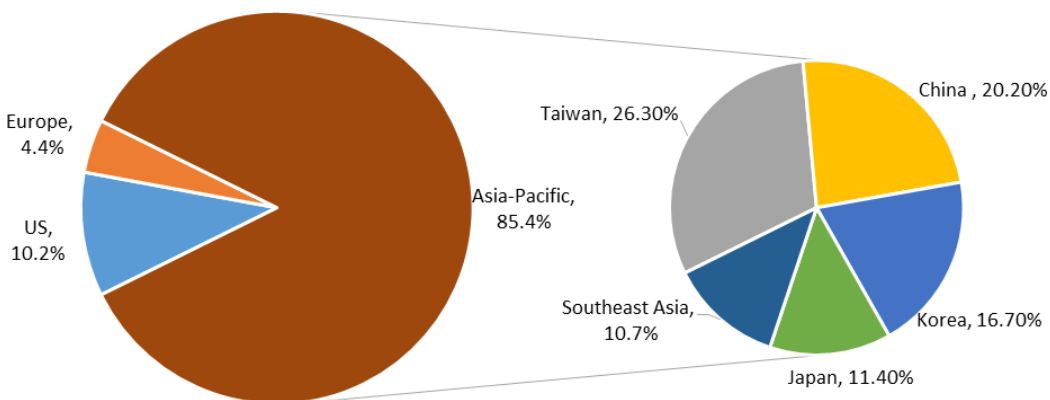
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33,000 installed applied semiconductor, display and solar manufacturing systems worldwide. Under the AGS segment, AMAT offers certificate services, fabrication consulting, parts programs, sub fabrication equipment, legacy equipment, and automation software.

***Display and Adjacent Markets: 11.4% of Revenue***

The Display and Adjacent Market segment is comprised of products for manufacturing liquid crystal displays (LCDs), organic light-emitting diodes (OLEDs), and other display technologies for TVs, personal computers, tablets, smartphones, and other consumer-oriented devices. While similarities exist between the technologies utilized in semiconductor and display fabrication, the most significant differences are in the size and composition of the substrate. Substrates used to manufacture display panels are typically glass, although newer, more flexible materials are entering the market. Display industry growth depends primarily on consumer demand for increasingly larger and more advanced TVs and high resolution displays for mobile devices.

**Below is a chart representing AMAT's revenue breakdown by geographic location:**



**Management**

***Chief Executive Officer, Gary Dickerson***

Gary Dickerson was named president of Applied Materials, Inc. in June 2012 and appointed CEO and a member of the board of directors in September 2013. Dickerson received a Bachelor's of Science degree in Engineering Management from the University of Missouri, Rolla, and an MBA degree from the University of Missouri, Kansas City.

***Chief Financial Officer, Bob Halliday***

Bob Halliday was named Senior Vice President and CFO of Applied Materials, Inc. in February 2013. He was previously the CFO of Varian Semiconductor Equipment, which was acquired by Applied Materials in 2011. He received his MBA and Bachelor's of Science degrees from the Wharton School of the University of Pennsylvania and has been a Certified Public Accountant.

***Chief Technology Officer, Dr. Omkaram Nalamasu***

Dr. Omkaram Nalamasu is Senior Vice President and CTO of Applied Materials, Inc. Nalamasu sits on several technical advisory boards and university advisory committees. Dr. Nalamasu received his Ph.D. from the University of British Columbia, Vancouver, Canada.

### ***Head of Engineering Operations and Quality, Dr. Gino Addiego***

Dr. Gino Addiego is Senior Vice President of Engineering, Operations and Quality at Applied Materials. Addiego received his Bachelor's of Science and doctorate degrees in Electrical Engineering from the University of California, Berkeley. He holds several patents and was nominated for the National Inventor of the Year Award in 1993.

### **Recent News**

**Analysts Upgrade Applied Materials:** 21 firms have assigned a buy or better rating to Applied material and expect their Q4 earnings to come in at \$3.31 billion in revenue and an EPS of \$0.65, which represents a 124.14% year-over-year increase.

**Samsung OLED Displays:** Rumor has is that Samsung will be adopting OLED technology in their new S8 phone. Samsung buys their OLED machinery from Applied Materials. This could be a potential catalyst for growth in the Display and Adjacent Markets. Apple is also putting OLED screens in their new phones and has chosen Samsung to supply them with the screens, which would be made with machinery from Applied Materials. The overall move toward OLED screens for smartphones and the demand from VR and AR will generate more orders for AMAT's display machinery.

**TSMC \$3 Billion Deal for Wafer Plant:** In March of 2016, TSMC (Taiwan Semiconductor Manufacturing Company) declared that it would be building a new massive wafer plant in China that is expects to be producing over 200,000 wafers per month in the second half of 2018. The machines that are used to make these wafers would come from orders made with Applied Materials. Wafers are small and thin slices of semiconductor material which are used to make integrated circuits.

**Samsung's Note 7 is the BOMB:** Because one of AMAT's major customers is Samsung, problems with their devices may be a problem for AMAT. However, "Samsung has recalled all of its top-of-the-line Galaxy Note 7 smartphones because a number of users have experienced fires, sometimes aboard airplanes. Given that AMAT makes semiconductors and displays for smartphones, some may have correlated the two, expecting demand for AMAT products to drop. But, while Samsung has pulled one of its models—albeit the top one—from the market, there are plenty of others ready to fill the void." This incident has not altered Samsung's demand of OLED displays ordered from AMAT and semiconductor machinery from AMAT.

**Emerging Technology Bringing Demand for Semiconductors:** As new technologies move into the market as part of the Internet of Things (IoT) movement, we can expect to see increasing demand for semiconductors. The IoT movement is expected to cause a 15-20% increase in internet integrated devices made.

### **SWOT Analysis**

#### ***Strengths***

- **Exposure to Strong Companies:** As of now, 49% of Applied Materials' revenue comes from the four largest integrated device manufacturers in the world: Intel, Samsung, Micron and TSMC. 13% belonging to TSMC, 13% belonging to Micron Technology, 12% belonging to Samsung Electronics, and 11% belonging to Intel Corporation. Samsung and Intel Control 26.2% of the market share of the semiconductor industry.
- **Focus on Maintaining Competitive Edge through Research and Patents:** Applied Materials, due to their size and scale, can afford to have a budget of over \$1 billion dedicated to Research and Development. AMAT also has over 10,200 patents.
- **OLED Machinery:** Applied Materials manufacturers machinery for OLED screens, a new type of display that other semiconductor manufacturers are not venturing into.

### **Weaknesses**

- **Large Exposure to Demand for Semiconductors:** As stated previously, 64% of Applied Materials' revenues come from their Silicon Systems Segment, which essentially means that 64% of their revenue will move in line with the performance of the Semiconductor sub-industry. Even though this industry is expected to perform extremely well in the years to come, that is still a lot of exposure to the industry.
- **Large Exposure to Four Companies:** While it was previously stated that 36% exposure to the largest semiconductors in the world was a strength; it also can be weakness because if any of these companies run into problems that could be a problem for Applied Materials. However, these are strong and stable companies
- **Cyclical Revenues:** Revenues depend on new orders based on the production cycles of the major companies that AMAT deals with year after year.

### **Opportunities:**

- **Self-Driving Vehicles/Integration of Computing in Vehicles:** The increasing need for advanced computing and automation in vehicles is driving some demand for semiconductor device manufacturers and those companies are ordering Machinery from AMAT to make the devices.
- **Chip Forensics Needed to Trace Car Failures:** "The opportunity for Applied Materials is on the materials engineering and product development side, which requires more R&D"
- **Internet of Things:** Semiconductors are crucial for companies that are setting up their infrastructure to compete in the IoT space. Also as technology continues to advance, the use of smart grids, smart cities, and smart manufacturing will become increasingly common and will also provide demand for the semiconductor industry.
- **Emerging Technologies:** The world is in a state of rapid change, and it is seen through the emerging technologies that have been evolving (virtual reality, augmented reality, artificial intelligence, etc.). These technologies will provide a demand for increasingly complex computing that will drive demand for the companies that make semiconductor devices. This trend will result in those companies increasing their capital expenditures on machinery.

### **Threats:**

- **Competition in Largest Segment of Company:** The Semiconductor/Silicon Systems segment is filled with competition and is a fierce field to compete in, and the four companies controlling roughly 70% of the market share, they are always at odds.
- **Potential Poor Performance of Largest Clients:** As mentioned earlier, AMAT has a large amount of exposure to four companies. For AMAT, the weakness is the exposure, but the threat is that these companies may run into problems completely independent of AMAT.
- **Slowing of Moore's Law:** If Moore's Law begins to slow, this could lead to longer innovations cycles in computing, which would have an adverse effect on the demand for new machinery used to make these items.
- **Clients Exposure to Certain Markets:** The demand for semiconductors can come from two places: either consumer electronics spending or corporate electronics spending. Consumer electronics spending is not doing too well as of late. The smartphone market is still growing, but in the single digits (estimated 6% CAGR 2016-2020) instead of its historical double digit growth rates. The consumer PC market is still declining, but it is declining at a slower rate and starting to show signs of consolidation. Consumer electronics have yet to break into the African and Middle Eastern regions. Once those regions become emerging markets, the demand for these devices will bolster. Southeast Asia, including Taiwan and China (main countries the companies Applied Materials supplies make their sales are made to), are anticipated to grow over the next few years.
- **Unfavorable Currency Shifts:** In fiscal year 2015, approximately 83% of AMAT's net sales were to customers in regions outside the United States. Unfavorable shifts in currency can hurt a global company.

## Competitors

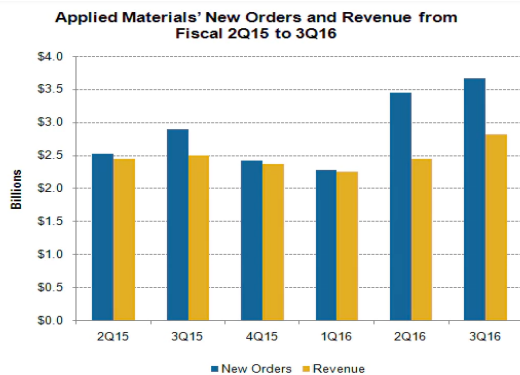
	<u>Last Price</u>	<u>MKT Cap</u>	<u>P/E</u>	<u>PEG</u>	<u>ROIC</u>
<b>AMAT</b>	28.27	30.56B	20.84	1.08	19.48
<b>ASML</b>	102.63	44.49B	17.78	2.01	14.96
<b>LRCX</b>	95.24	15.51B	14.65	1.38	20.77
<b>KLAC</b>	74.68	11.67B	24.80	3.12	16.41

	<u>EPS 1Yr Growth</u>	<u>FCF</u>	<u>OPM</u>	<u>Est. Comp Sales</u>	<u>EVA Spread</u>
<b>AMAT</b>	18.84%	1.92B	21.13%	3.57%	4.18
<b>ASML</b>	17.24%	1.24B	4.81%	-0.39%	-2.45
<b>LRCX</b>	25.63%	1.21B	19.35%	3.70%	0.10
<b>KLAC</b>	55.38%	701.41M	33.20%	9.91%	8.52

As Applied Materials Stated in their Annual Report, “The industries in which Applied operates are highly competitive and characterized by rapid technological change. AMAT’s ability to compete generally depends on its ability to timely commercialize its technology, continually improve its products, and develop new products that meet constantly evolving customer requirements. Significant competitive factors include technical capability and differentiation, productivity, cost-effectiveness and the ability to support a global customer base” In the semiconductor manufacturing sub industry there are many players but the four major players within this sub industry are: Applied Materials, ASML, Lam Research and Kla-Tencor. Two firms have tried to merge with other companies in the past; Applied Materials attempted to acquire Tokyo Electron in 2014 and Lam Research attempted to acquire Kla-Tencor in 2015. Both of these mergers were absolutely obliterated on the grounds of antitrust. The competition in the arena that makes up 64% of Applied Material’s revenues (Silicon/Semiconductor Systems) is fierce. Applied Materials, being as large as it is has gained the footing it needs and is in a constant state of maintaining their competitive edge through R&D investments and increasing the amount of patents they have. Applied Materials also has a ROE of 20.02% and a ROA of 10.55% which outperforms 86% of the competitors in the Global Semiconductor Equipment & Materials industry. Applied Materials has had a couple of rough years due to the cyclical nature of their business, but it seems as if they are exiting the bottom of the cyclical nature of their business and moving into the profitable. Also AMAT’s entrance into the AMOLED market as aided their 21.13% year over year EPS growth. The two rapidly growing Semiconductor Machinery manufacturers in the above list of competitors are AMAT and KLAC, but the main difference between these two companies that are quickly appreciating in share price is that AMAT has a PEG of 1.08 and KLAC has a PEG of 3.18. AMAT is more profitable, as seen through the ROA, ROE, and ROIC but it seems that KLAC has seen some attractive sales growth. This seems to have convinced the market that a PEG of 3.18 is justified, but these companies operate in a cyclical market. A PEG of 3.18 seems dangerous compared to AMAT’s PEG of 1.08, which is a reasonable price to pay for the earnings growth of the company. Besides, the earnings from 2016’s massive influx of orders will be recognized in the 2017 financial statements.

## Growth Analysis

As depicted above, AMAT has been decently outperforming both the S&P 500 and its peers in the Semiconductor Manufacturing Equipment Services and Component. However, after a huge dip in 2015 (attributed to the cancellation of the merger with Tokyo Electron due to antitrust regulations), Applied Materials has broken out of its usual channel and gone up 56% so far in 2016. AMAT has a PEG of 1.12, so its current price can be justified by the earnings growth it has realized. The real question is; why on earth did things suddenly change for AMAT in 2016?



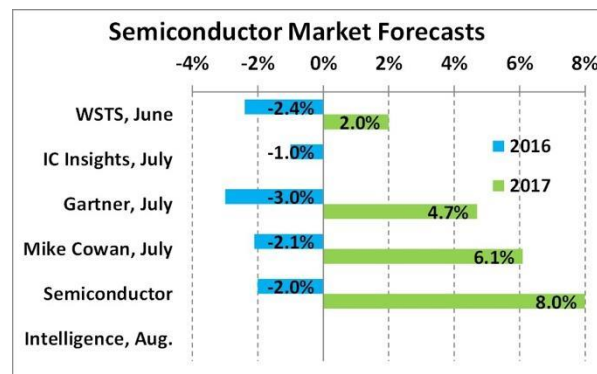
The real question is, why on earth did things suddenly change for AMAT in 2016? As shown on the graph to the left, Applied Materials has experienced an influx of new orders, which has contributed to growth in revenue for the company since year-end of 2015. The order totals are mostly driven by large orders for foundry, flash memory and display systems in the regions of China and South Korea.

### Semiconductor Systems

AMAT's Semiconductor Systems segment, which comprises 64% of Applied Materials' revenue is definitely the company's most important segment.

However, its biggest asset is also its biggest liability because the segment moves in-line with the Semiconductor industry. The industry has been on the decline, but is expected to improve in 2017.

The main driver of the global Semiconductor industry (market forecasts shown on the right) is growth in electronics production. The global consumer electronics market is predicted to expand at a 4.0% CAGR during the period from 2014 to 2022. Semiconductors are crucial for companies that are setting up their infrastructure to compete in the Internet of Things space. Corporate IT spending is expected to reach 2.7 Trillion in 2020, growing at a CAGR of 3.3% (2016-2020). As technology continues to advance, the use of smart grids, smart cities, and smart manufacturing will become increasing common. Everything is becoming "smart" and cloud integrated now that we have moved further into the "Internet of Things", which will continue to drive the demand for semiconductors considering that integrated semiconductor devices are integral parts of any piece of technology. The growth of internet-connected devices is still in its infancy stages, and companies like Samsung and Intel will be providing the integrated semiconductor devices (Computer chips, Motherboards, etc.). Applied Materials will be the major semiconductor machinery supplier within their supply chain. The main driver of this industry will come from the increasing amount of emerging technologies that have been multiplying over the past decade. It is estimated that "ultra 4K HD TVs will grow 105%; wearables will grow 39% (fitness trackers up 60%, smartwatches up 15%); Smart Home encompassing products like thermostats, smart smoke and CO2 detectors, IP/Wi-Fi cameras, smart locks, smart home systems, and smart switches, dimmers and outlets, will grow 29%; drones will grow 112%, VR 296%, voice-activated digital assistants like Amazon's Echo 32% and 3D printing 56%."



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The increase in new technologies will further drive the demand for semiconductors and the four major players in the semiconductor and circuit manufacturing industry will be at the forefront for supplying the products to meet demand. Applied Materials is the machinery provider within their supply chains. Also, analysts predict semiconductor capital spending “to grow at a CAGR of around 9% between 2015 and 2019.”

The Silicon and Semiconductor segment has an inherent tie to the consumer electronics spending and corporate electronics spending (due to its exposure to companies that supply semiconductor devices to the world) and the global smartphone market. A majority of Applied Material’s Semiconductor Machinery Sales go to Southeast Asia: “In 3Q16, Taiwan and China accounted for 57% of AMAT’s orders and 46% of its sales. Korea is AMAT’s third-biggest market, accounting for 19% of new orders and 17% of sales in fiscal 3Q16. By contrast, sales in the US and Europe fell as many semiconductor companies restructured and shut down fabrication facilities.” These companies are not tied to the spending of the countries because they are global companies that ship their semiconductor devices, storage, etc. to a global market. The shifts from planar to 3D NAND technology and the move from HDD to SSD around the world will drive growth in this segment also. The management at Applied Materials provided guidance with an expectation that the silicon systems segment’s revenue should rise by 80% YoY to \$423 million in fiscal 4Q16.

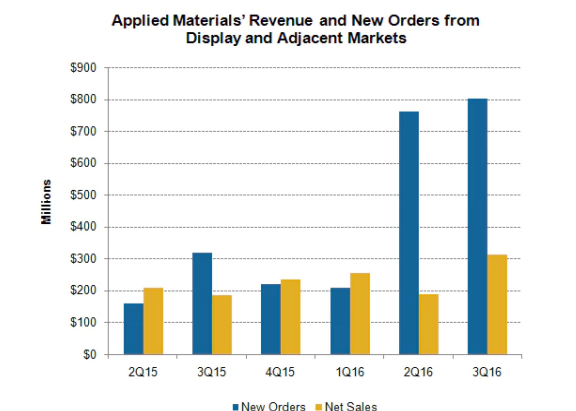
### ***Applied Global Services***

The Applied Global Services segment is essentially revenues from providing on-site integrated solutions to their clients for their equipment and factory automation software for semiconductor, display and solar products. The Applied Global Services segment has also been established to mitigate some of the risk associated with AMAT being tied to the semiconductor market. Since the Semiconductor Market is cyclical, when the market is at the bottom of the cycle, chipmakers will significantly curtail capital expenditures and companies like Applied Material will suffer, since so much of their revenue comes from their Semiconductor/Silicon solutions segment. The Global Services segment is not at all tied to the semiconductor market, and also forms stronger relationships with the clients’ customers that Applied Materials does business with. While this segment is not reliant on the semiconductor business, it is dependent on the amount of clients that AMAT maintains relationships with. However, the more machinery that is provided to these companies, the more use they will have for the Global Applied Services that Applied Materials provides for its clients. This segment will not necessarily grow because it is simply revenue from the company’s existing customers, and the customer pool does not grow usually. An increase in orders and installations will cause an increase in revenue from the applied global services segment.

### ***Display and Adjacent Markets***

Although Applied Materials has historically been a Semiconductor Machinery manufacturer, this is a mature market and has been expanding into adjacent markets. A segment that they have been developing is its Display and Adjacent Market Segments. In 2016, efforts in this segment have finally started to materialize.

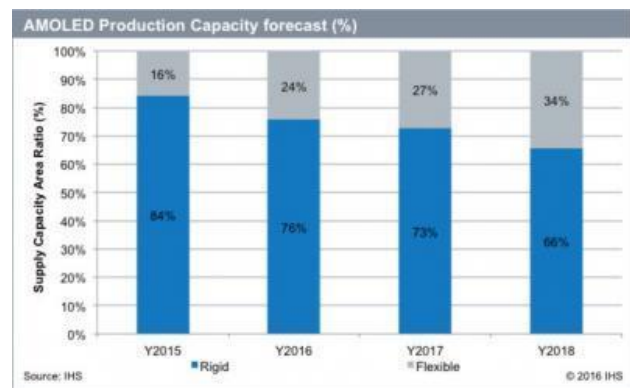
As depicted in the chart to the right, new orders from the Display and Adjacent Markets segment has spiked in the past two quarters in 2016, pushing prices upward as analysts and investors alike have become increasingly bullish on the performance of this segment and its potential for growth. “In fiscal 3Q16, display and adjacent markets revenue rose by 69% YoY (year-over-year) to a record \$313 million, accounting for 11% of the company’s revenue. The segment’s non-GAAP operating margin rose from 19.5% in fiscal 3Q15 to 20.1% in fiscal 3Q16.” New orders in this segment grew 153% YOY and more of half of the orders came from China. Applied Materials is currently the largest company offering OLED manufacturing equipment to companies and this innovation in display



screens is seen to be the next stage of all screens and the go to technology for VR headsets and phones. This is the only type of display that will work with VR technology ("the virtual reality market is expected to grow from USD 1.37 Billion in 2015 to USD 33.90 Billion by 2022, at a CAGR of 57.8% between 2016 and 2022"). OLED screens are lightweight, thin, flexible, energy efficient, and deliver high resolution, giving smartphones the much-needed innovation. It has been confirmed that Apple is going to start manufacturing phones with OLED screens, and it has decided to have Samsung manufacturer the screens. The iPhone 8 models with 5.5- and 5.8-inch screens will use organic light-emitting diode (OLED) displays.

As shown on the table at the top of the following page, Applied Materials has slowly been divesting out of its Energy and Environmental Solutions segment and investing in its Display and Adjacent Markets segment, growing revenues from 8.1% in Q4 2015 to 11.4% in Q3 2016.

The success and positive reception of the display on the Apple Watch and the Samsung Edge prompted display manufacturers to move towards OLED screens. In 2014, flexible OLED shipments were only 2% of all AMOLED panel shipments (AMOLED Production Capacity forecast shown in the chart to the right). In 2015, 57 million flexible AMOLED were produced, to grab a 20% share of the total AMOLED market (285 million panels, according to IHS). By 2020, flexible AMOLEDs will represent 40% of the total AMOLED market. Of course, rigid AMOLED production will rise too - but the growth rate for flexible OLEDs is expected to be much higher than for rigid ones. An analyst at UBS stated "We estimate Applied can generate incremental EPS of 15 cents next year just from selling its OLED equipment to Apple iPhone, we estimate this base case OLED EPS impact from smartphones is sustainable for a few years as more customers possibly adopt OLED screens."



## Valuation



Bloomberg analysis shows that Applied Materials is anticipated to exceed earnings estimates in Q4 2016, and continue the stellar EPS growth that the company has realized over the course of 2016. Analysts expect AMAT to grow earnings in a big way, most likely due to the coming shift in the semiconductor market as the world's technology continues to advance. New technologies entering the market will bring new demand for AMAT.

Case	EPS	P/E x	Est. Price
Bull	\$ 2.37	23.99 x	\$ 56.94
Base	\$ 2.37	19.03 x	\$ 45.18
Bear	\$ 2.37	14.08 x	\$ 33.41

A P/E Multiple method shows that AMAT appears to be undervalued at a base-case price target of \$45.18. The P/E method's bear-case price target of \$33.41 is more comparable to Bloomberg analysts' estimations of a median price target of \$33.67.

In consideration of the growth in new orders for Applied Materials' products and services that are anticipated in upcoming quarters, I have determined a price target of \$35. AMAT's current price at \$28.86 stands to gain, which is indicative of a buying opportunity.



## **Investment Thesis**

### **For the following reasons, I issue a BUY recommendation for Applied Materials:**

- Applied Materials is ramping down its languishing Solar Equipment business to focus on more profitable aspects of the company. This redirection of focus will further increase margins and optimize the profitability of their operations.
- AMAT provides machinery to the largest semiconductor manufacturers that will be at the forefront of improvement in the semiconductor market.
- The transition to more technology oriented products and services continues to shift, as evidenced by manufacturers' switch from 7nm nodes to 10nm nodes and memory manufacturers make the transition to 3D NAND technology. Applied Materials is well-positioned to take advantage of this shift.
- Due to more smartphone innovations in OLED displays and computing chips, AMAT's sales are expected to increase.
- Following Q3's massive increase in orders from Southeast Asia, analysts anticipate stellar sales growth from Applied Materials going forward.

***I recommend purchasing 100 shares of AMAT at \$28.86 for a total value of \$2,886.00. AMAT will represent 1.71% of the SMIF Portfolio.***

## **Resources**

- [Semiconductorintelligence.com](http://Semiconductorintelligence.com)
- [Nasdaq.com](http://Nasdaq.com)
- [Wsj.com](http://Wsj.com)
- [AppliedMaterials.com](http://AppliedMaterials.com)
- [Thestreet.com](http://Thestreet.com)
- [ibisworld.com](http://ibisworld.com)
- [kpmg.com](http://kpmg.com)
- [forbes.com](http://forbes.com)
- [Technavio.com](http://Technavio.com)