PIVOTAL SYSTEMS

FIRST HALF RESULTS PRESENTATION
30 August 2019

John Hoffman- Chairman & CEO
Tim Welch - CFO

(ASX: PVS)

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Financial data - All dollar values are in US dollars (US$) unless as otherwise presented.

Non IFRS financial measures

Pivotal Systems uses certain measures to manage and report on its business that are not recognized under Australian Accounting Standards or IFRS. These measures are collectively referred to in this document as 'non-IFRS financial measures' under Regulatory Guide 230 'Disclosing non-IFRS financial information' published by the Australian Securities and Investments Commission (ASIC). Management uses these non-IFRS financial measures to evaluate the performance and profitability of the overall business. The principal non-IFRS financial measures that are referred to in this document is EBITDA. EBITDA is earnings before interest, tax, depreciation and tax charges . Another non-IFRS measure referred to in this document is Pro Forma Gross Margin ("GPM"). Pro Forma GPM is the statutory GPM normalized for significant charges in the current period to improve comparability to the prior period.

Although Pivotal Systems believes that these measures provide useful information about the financial performance of Pivotal Systems, they should be considered as supplements to the income statement measures that have been presented in accordance with the Australia Accounting Standards and IFRS and not as a replacement for them.

PIVOTAL SYSTEMS OVERVIEW

GLOBAL LEADER IN GAS FLOW CONTROL SOLUTIONS

- Leading provider of innovative gas flow control solutions which are integral in the production of semiconductor devices (semiconductors)
- Pivotal's portfolio of gas flow controllers (GFCs) and Flow Ratio Controllers (FRCs) assist semiconductor manufacturers to stabilise and control the delivery of gases used to deposit or remove materials during the semiconductor manufacturing process

FINANCIAL POSITION

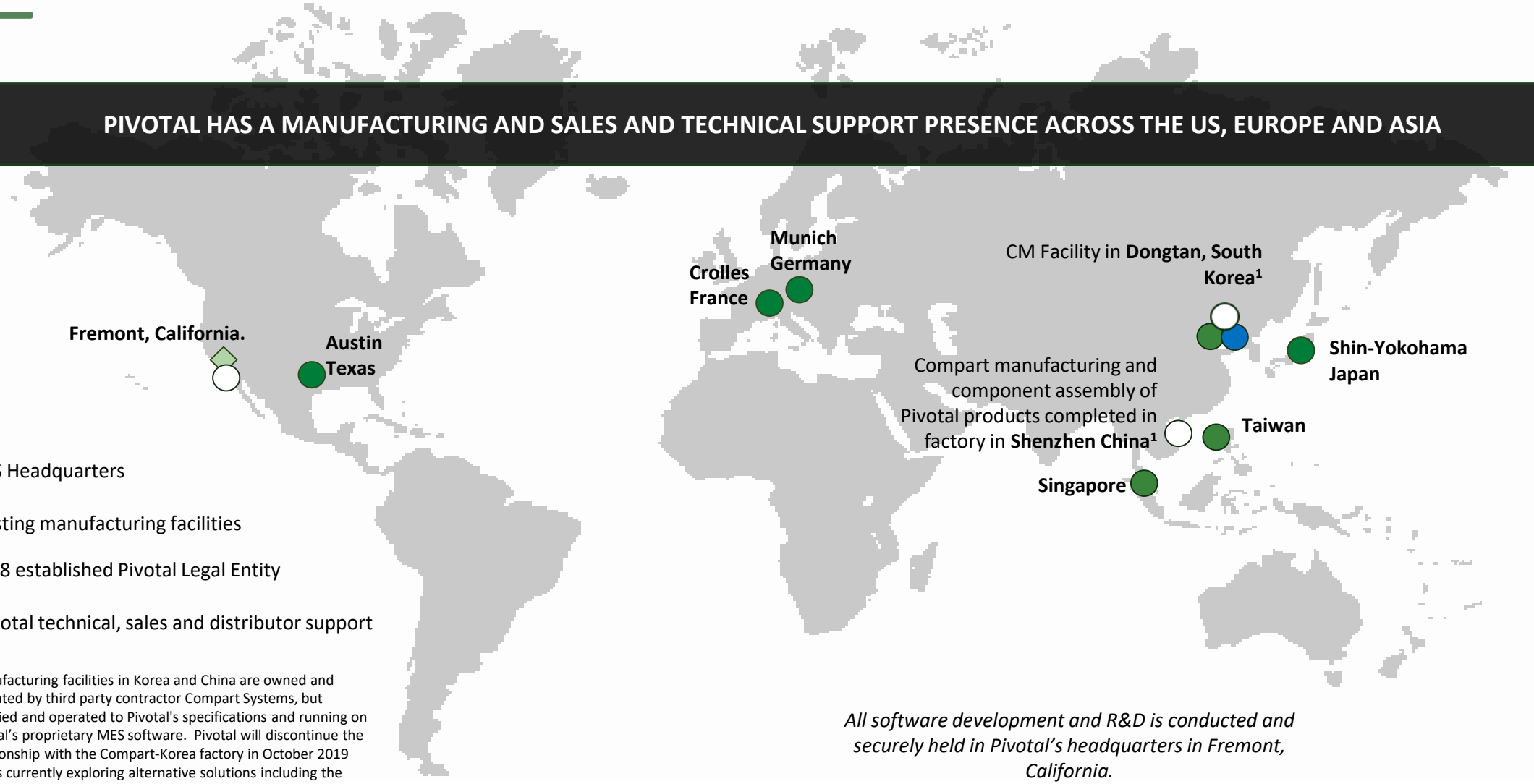
- Pivotal met its market guidance and delivered revenues of US$8.0m for 1H2019.
- 1H2019 Revenue decreased 28% to US$8.0m (1H2018: US$11.2m), due to less shipments to Korean IDM customers
- Statutory Gross Profit decreased 95% to US$0.2m (1H2018: US$4.2m)
- Cash balance of US$9.7m at 30 June 2019 with no debt
- Secured new US$10.0m debt facility (comprising US$7m working capital facility, US$3m line of credit) in August 2019

POSITIONED WITHIN MULTIBILLION DOLLAR INDUSTRY

- The broader mass flow controller (MFC) market is forecast to grow to well above US$1 billion by 2022
- Pivotal's customer base includes some of the largest integrated device manufacturers (IDMs) and original equipment manufacturers (OEMs)
- Opportunity for significant increase in customer penetration and expansion of overall market share

GLOBAL FOOTPRINT

PIVOTAL HAS A MANUFACTURING AND SALES AND TECHNICAL SUPPORT PRESENCE ACROSS THE US, EUROPE AND ASIA



Note:

1. Manufacturing facilities in Korea and China are owned and operated by third party contractor Compart Systems, but certified and operated to Pivotal's specifications and running on Pivotal's proprietary MES software. Pivotal will discontinue the relationship with the Compart-Korea factory in October 2019 and is currently exploring alternative solutions including the certified PVS Fremont Facility.

All software development and R&D is conducted and securely held in Pivotal's headquarters in Fremont, California.

REVIEW OF FIRST HALF 2019

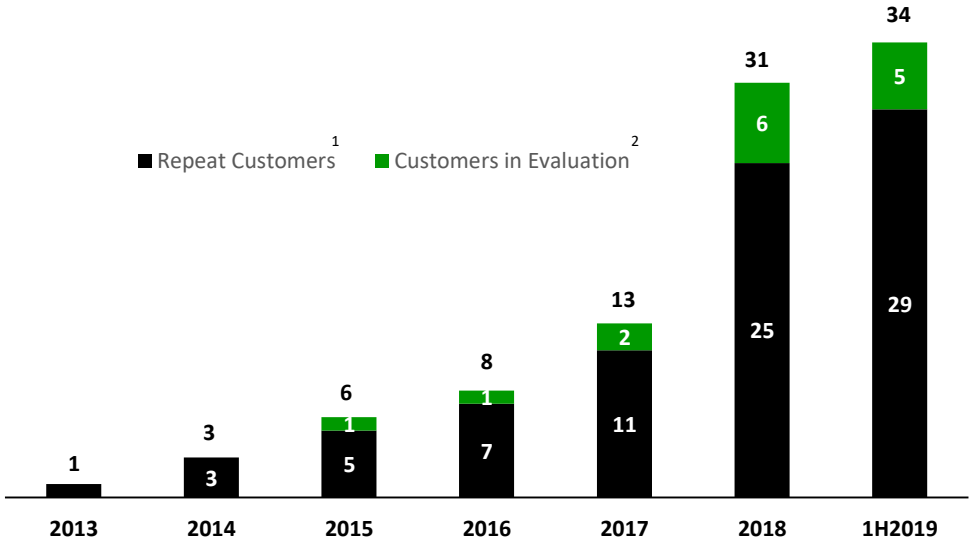
Despite difficult trading conditions experienced during the first half, the Company met its market guidance and delivered revenues of US$8.0m. Pivotal Systems continues to win market share with both the Low Flow GFC and the High Flow GFC, drive new business for the Flow Ratio Controller and remains well positioned ahead of the expected capex cycle recovery.

BUILT ON ESTABLISHED RELATIONSHIPS AND PENETRATED NEW CUSTOMERS	• Achieved Preferred Supplier Status for both the Standard GFC and High Flow GFC at a leading US based Original Equipment Manufacturer (OEM) • Achieved qualification and multiple repeat orders for the High Temperature GFC with a leading Japanese OEM • Successfully qualified the standard GFC at a leading European foundry
BACKLOG AND ORDERS DEMONSTRATE STRONG GROWTH TRAJECTORY	• Achieved record bookings (new orders) from China for both the Standard GFC and the High Flow GFC at a leading Chinese Integrated Device Manufacturer (IDM) • Successfully shipped a second Flow Ratio Controller (FRC) to a leading Korean IDM • Backlog (confirmed orders not yet shipped) at 30 June 2019 was US$5.8 million
CONTINUED NEW PRODUCT DEVELOPMENT & COMMERCIALISATION	• High Flow GFC was qualified at a leading US based OEM for the large deposition market. This qualification will potentially lead to a doubling of our existing market share with this OEM over time • Four customer-led product development initiatives currently under active R&D • Strong customer interest in new SmartStik architecture for the existing etch gas stick commonly used by the OEMs as demonstrated at SEMICON West • Release of new High Flow GFC (ALD), new Flow Ratio Controller and the new High Temperature GFC planned for the next 6-12 months. Increase in Pivotal' s total available market to >US$1 billion

CUSTOMER SEGMENTATION

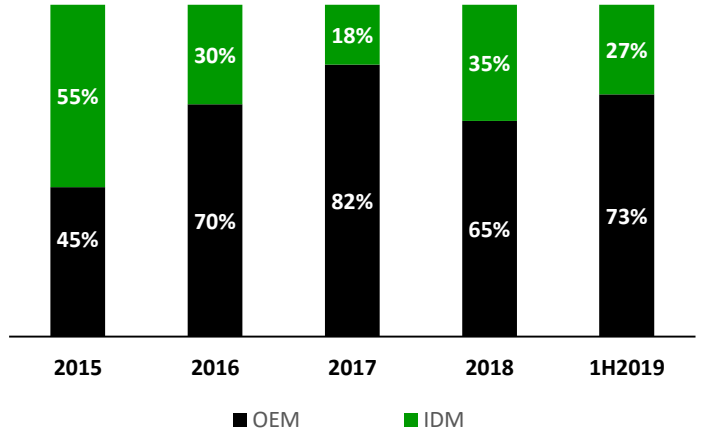
BREADTH OF CUSTOMER VALIDATIONS DRIVES REPEAT ORDERING BEHAVIOUR

- Total customer growth of 17% in 1H2019 versus prior period & 9.7% since 2018
- Repeat customer growth of 81% in 1H2019 versus prior period and 16% since 2018
- 4 additional customers who validated Pivotal's technology during 1H2019
- First significant breakthrough into China fabs with both Standard GFC & High Flow GFC's sold for multiple Etch and Deposition Applications on multiple OEM Platforms.
- Selling, validation and development partnerships with blue chip IDMs and OEMs continued during 1H2019



THE MAJORITY OF PIVOTAL 1H2019 REVENUES WERE FROM OEMs

- Maintained or increased SOM at the three largest OEMs
- Maintained or increased SOM at leading IDM Customers
- Decline in shipments to leading OEM's and IDMs in 1H2019 due to industry slowdown
- Revenue mix of 73% OEM and 27% IDM in 1H2019
- >85% of Pivotal sales have been used in etch process tools, remainder in deposition process tools. This mix is expected to balance out in the coming years.

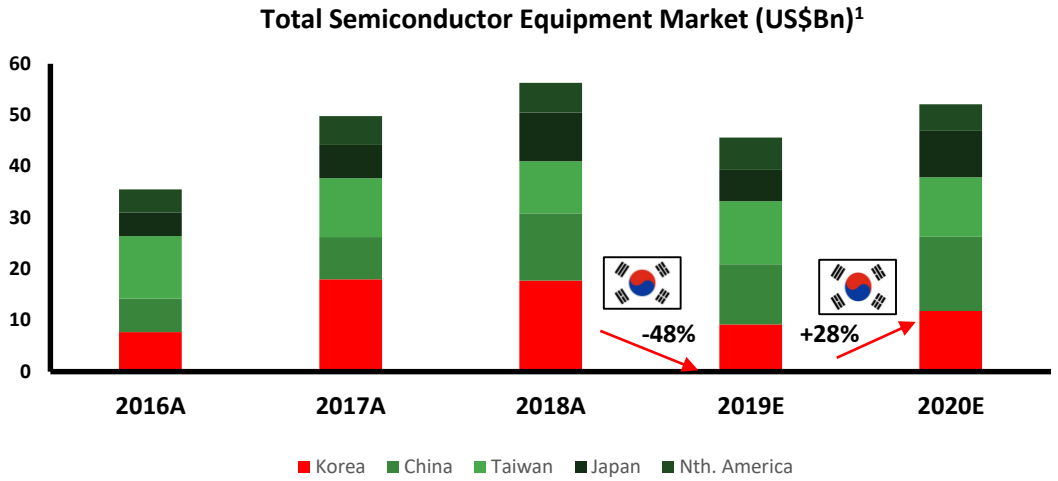


1. Repeat customers defined as a customer who has ordered a Pivotal product on more than one occasion.
2. Customers who are currently evaluating the Pivotal GFC Technology.

INDUSTRY DYNAMICS AND ORDERS

SEMICONDUCTOR CAPITAL EQUIPMENT MARKET FORECAST TO DECLINE 23% DURING 2019, REBOUND IN 2020

- 66% sales into Asia in 1H2019 (FY18:78%)
- South Korean Equipment CAPEX market most recently forecasted to contract 48% in 2019, before rebounding 28% in 2020
- China Fab Growth continues into 2020. Headwinds of US-China Trade War is affecting China CAPEX Plans
- While Pivotal has significant exposure to the Korean Memory Market, our presence in Taiwan, China and Japan has improved significantly post IPO
- Despite these headwinds, Pivotal saw significant customer activity during the half and is positioned to benefit from any industry upturn

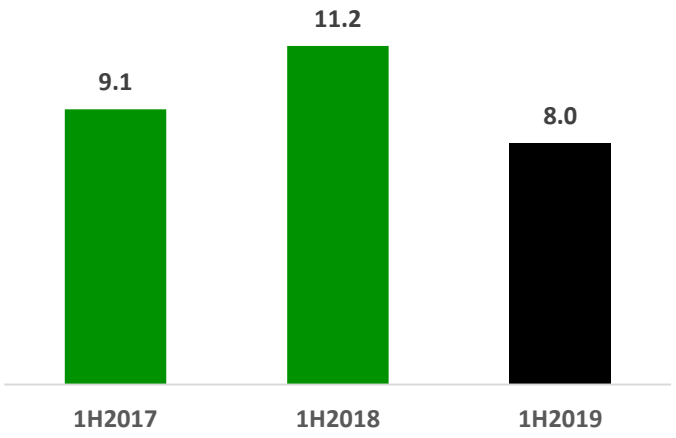


[1] Source: SEMI Global Update, July 2019

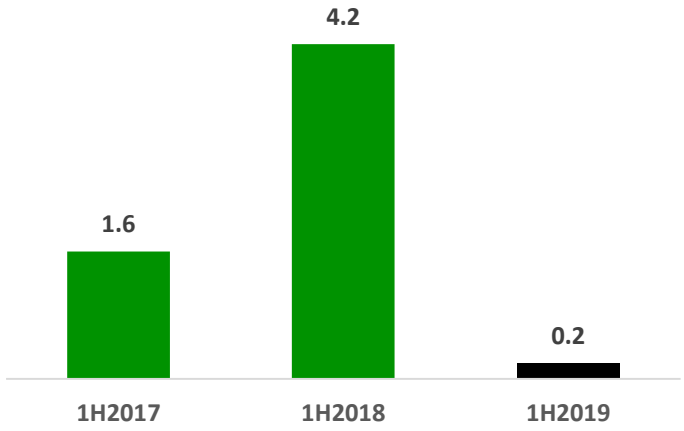
FINANCIAL RESULTS

KEY FINANCIAL METRICS

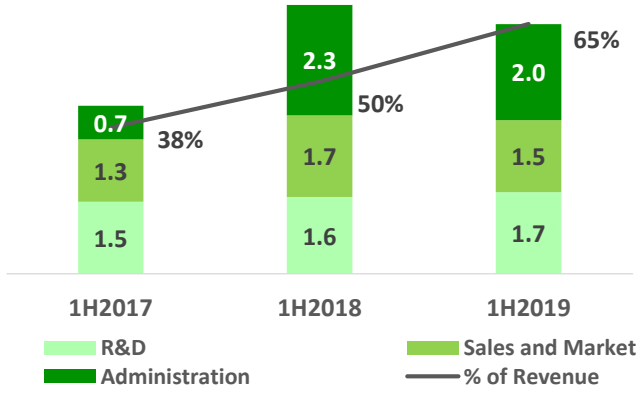
REVENUE $M



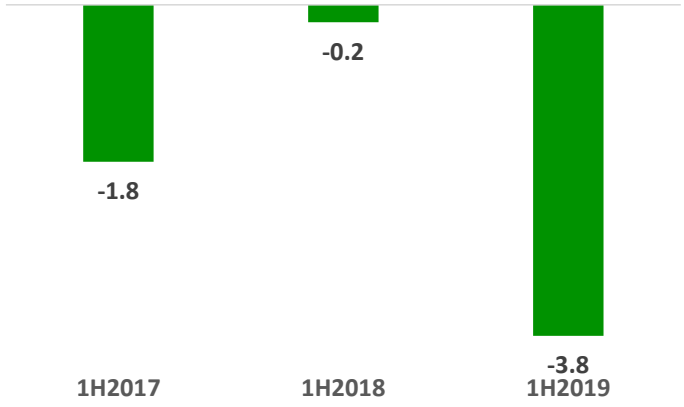
GROSS PROFIT $M



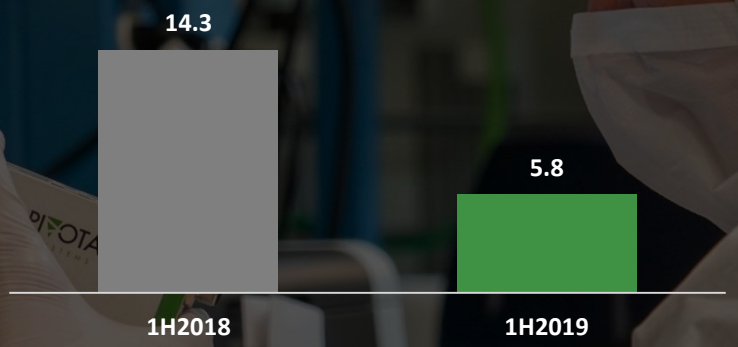
OPEX $M



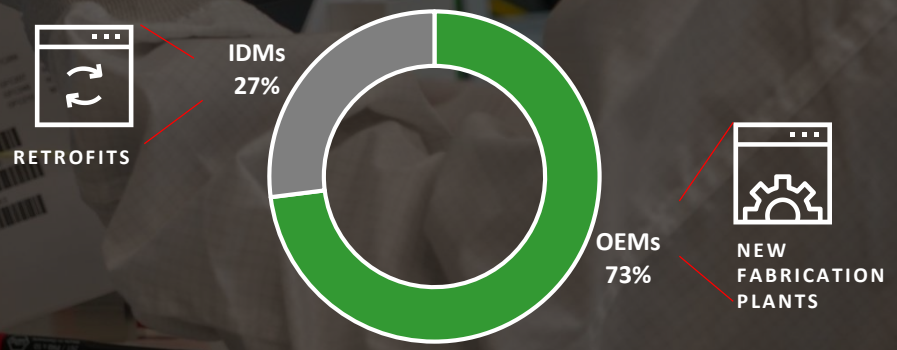
EBITDA $M



ORDER BACKLOG $M



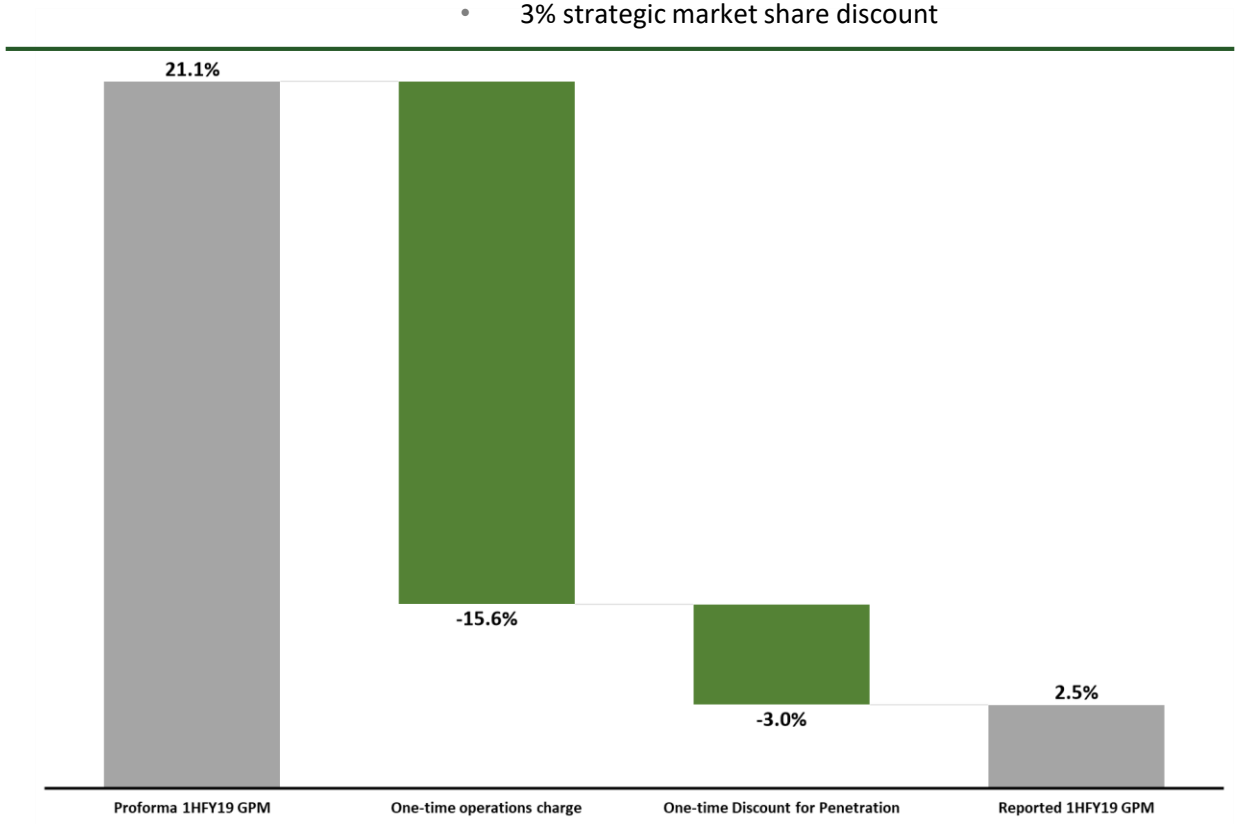
REVENUE BREAKDOWN

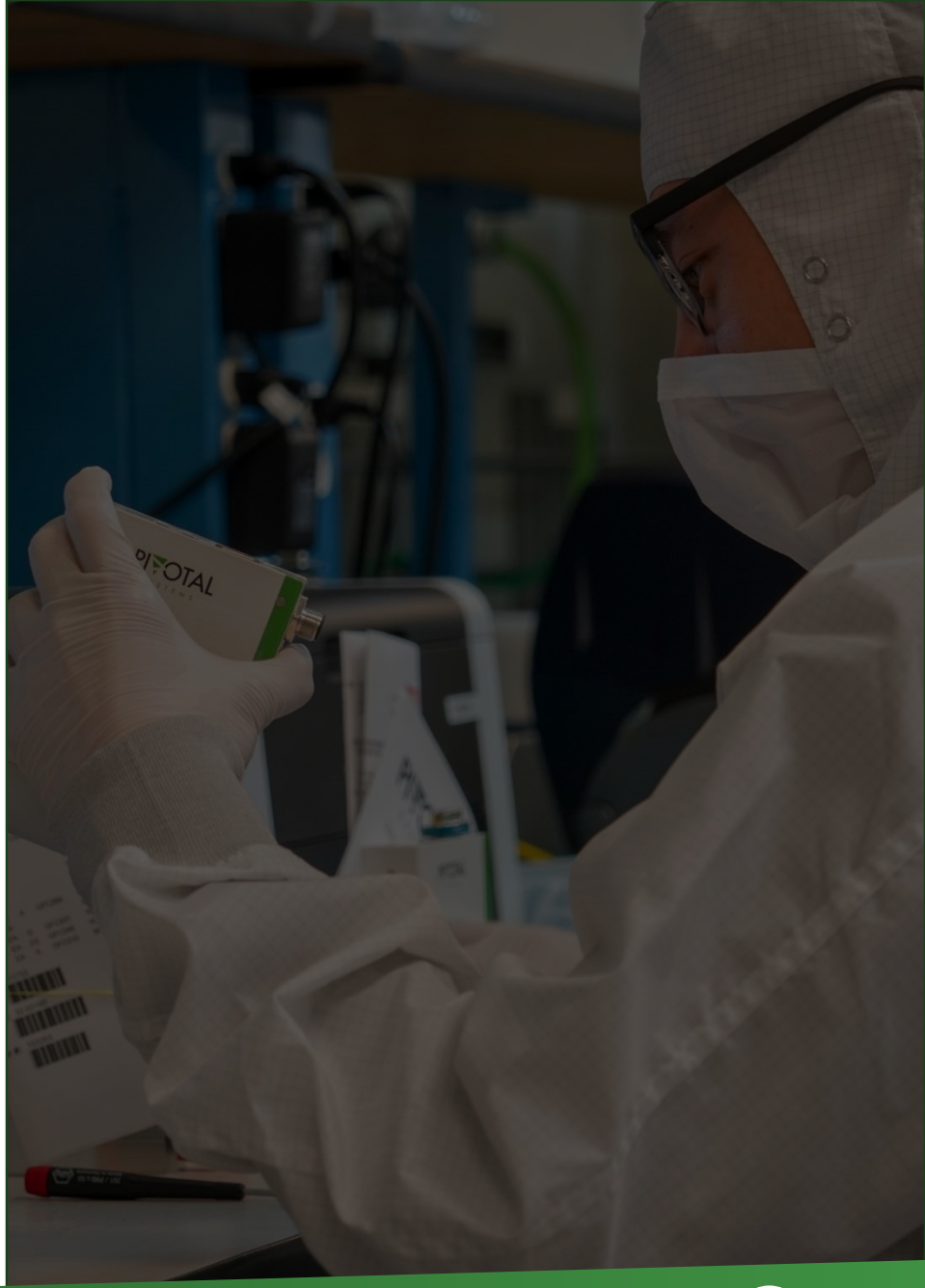


GROSS PROFIT MARGIN RECONCILIATION

A NUMBER OF GROSS PROFIT MARGIN (GPM) IMPACTS IN 1HFY19

- Proforma GPM of 21.1%
- Statutory GPM of 2.5% impacted by a number of significant charges:
  - 6% MFG variance incurred developing new product for strategic customer
  - 6% inventory reserve charge on early model products
  - 3% tariffs imposed as a result of US-China trade dispute
  - 3% strategic market share discount





STATUTORY PROFIT AND LOSS

FINANCIAL INFORMATION	1H2018* ($m)	1H2019 ($m)	% change
Revenue	11.2	8.0	(28%)
Cost of goods sold	7.0	7.8	11%
Gross profit	4.2	0.2	(95%)
Gross margin	37.3%	2.5%	
Research and Development	1.6	1.7	6%
Sales and Marketing	1.7	1.5	(12%)
General and Administration	2.3	2.0	(13%)
EBIT	(1.4)	(5.1)	(264%)
EBITDA	(0.2)	(3.8)	(1,800%)

- Revenue decreased 28% to $8.0m versus the pcp as a result of a challenging industry capex environment resulting in less shipments to Korean IDM customers.
- 1H19 Gross Margins declined to 2.5% (1H18: 37.3%) reflecting lower volumes for the half and higher supply chain costs
- Total Operating expenses were down 5% to $5.3m, which reflected:
  - R&D costs at $1.7m were up 6% reflecting continued investment into new product development including the released High Flow GFC, the new Smartstik architecture, the proprietary High Flow GFC currently under development for future Atomic Layer Deposition applications, the Flow Ratio Controller (FRC) currently in Beta at a leading Korean IDM and the High Temperature GFC currently in Beta at a leading Japanese OEM;
  - Sales and marketing expenses declined 12% on the pcp to $1.5m, reflecting lower sales commissions as a result of shipments and therefore revenue being deferred;
  - General and admin expenses of $2.0m declined 13% reflecting one-off IPO offer costs in the prior period; and
  - Headcount grew from 35 in the pcp to 46 full-time employees at the end of June 2019.

* The Company's previous 2018 half year financial results are presented effective 2 July 2018 to provide a more complete and informative reflection of the position of the Pivotal and its subsidiaries, as the Company did not list on ASX until 2 July 2018.

SUMMARY BALANCE SHEET

FINANCIAL INFORMATION	FY2018 (US$m)	1H2019 (US$m)
CURRENT ASSETS		
Cash and cash equivalents	17.5	9.7
Trade and other receivables	3.9	6.7
Inventory	6.3	5.8
Other current assets	0.3	0.4
Total current assets	**28.0**	**22.7**
NON-CURRENT ASSETS		
Intangible assets	9.1	9.9
Other non-current assets	0.3	1.6
Total non-current assets	**9.4**	**11.5**
TOTAL ASSETS	**37.4**	**34.2**
CURRENT LIABILITIES		
Trade and other payables	5.3	5.5
Lease liabilities	0.0	0.2
Other current liabilities	0.5	0.7
Total current liabilities	**5.9**	**6.4**
TOTAL LIABILITIES	**5.9**	**7.6**
NET ASSETS	**31.6**	**26.6**
EQUITY		
Contributed equity	170.8	170.9
Share based payments reserve	1.3	1.3
Accumulated losses	(140.5)	(145.6)
TOTAL EQUITY	**31.6**	**26.6**

- At the end of 1H19, the company had a cash balance of $9.7m
- At the end of 1H19, the Company is debt free. Post balance date, the Company secured a $10m debt financing on August 27th 2019.
- Inventories decreased moderately from $6.3m at 31 December 2018 to $5.8m reflecting additional ramp up in production capacity, offset by a decline in backlog in hand during 1H2019.
- Receivables increased from $3.9m to $6.7m, reflecting heavy percentage of shipments at the end of the 1H2019.
- Intangible assets increased during the period as a result of ongoing product development efforts.
- The Company has a clean and strong balance sheet to support future growth.

CASH FLOW

FINANCIAL INFORMATION	1H2018 (US$m)	1H2019 (US$m)
CASH FLOWS USED IN OPERATING ACTIVITIES		
Receipts from customers	10.7	5.2
Payments to suppliers and employees	(10.0)	(10.9)
Other cash flows from operating activities	(0.4)	0.0
Net cash flows from/(used) in operating activities	0.3	(5.7)
CASH FLOWS USED IN INVESTING ACTIVITIES		
Payments for property, plant and equipment	(0.2)	(0.1)
Payments for capitalised development	(1.8)	(1.9)
Net cash flows used in-investing activities	(2.0)	(2.0)
CASH FLOWS USED IN FINANCING ACTIVITIES		
Receipts from the issue of shares	39.5	-
Payment to selling shareholders, net of costs	(13.0)	-
Payment of share issue costs	(1.8)	-
Receipts from the conversion of Preference Shares, Warrants and Options	2.1	-
Borrowings from bank loans	1.9	-
Mandatory deposits held in financing institutions	-	(0.1)
Net cash flows from/(used in) financing activities	28.8	(0.1)
Net increase / (decrease) in cash and cash equivalents	27.2	(7.8)
Cash and cash equivalents at the beginning of the financial period	1.1	17.5
Cash and cash equivalents at the end of the period	28.4	9.7

- Cash outflow from operations was $5.7m for the half year, which was significantly higher than the pcp, due to timing effects associated with shipments ($8.0m revenue v $5.2m in receipts).
- Cash outflow from investing activities was $2.0m which was flat versus the pcp. The Company continues to invest in new product innovation with capitalised development costs up 10% versus the pcp to $1.9m.
- Cash flow from financing activities negligible during the period, the pcp included the capital raised from Pivotal's IPO on ASX.

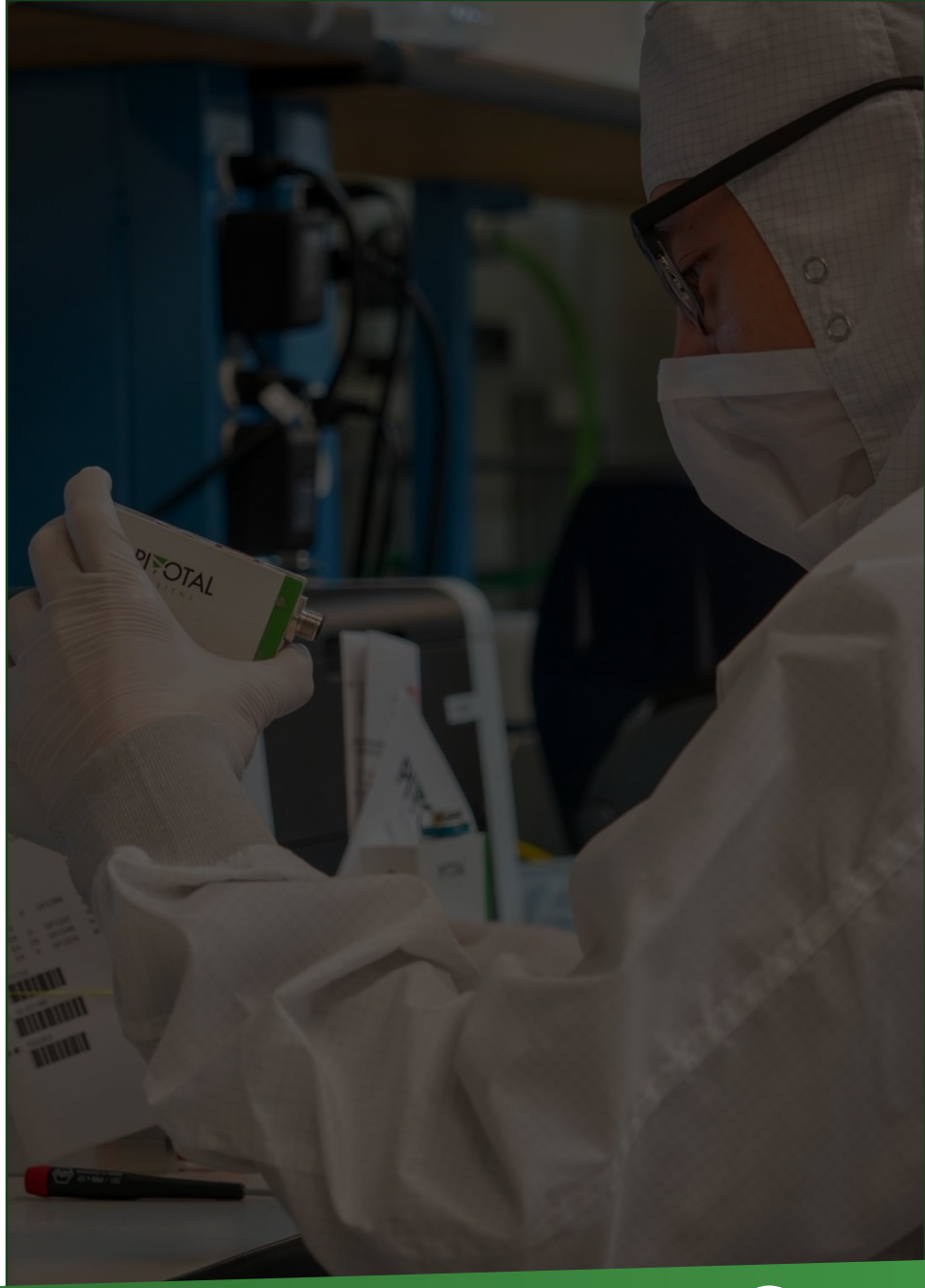
POST HALF EVENTS

DISCONTINUATION OF COMPART MANFACTURING IN KOREA FROM OCTOBER 2019

- Pivotal will end the manufacturing agreement between Pivotal and the Compart Systems (“Compart”) Korean factory in October 2019. Orders will be filled using the Pivotal Fremont Factory as needed.
- Shenzhen Factory does assembly and basic health check. Korea Factory conducted product customization
- Pivotal will continue to engage with Compart China under its current contract, and Compart will remain a qualified supplier for Pivotal Systems
- Pivotal does not expect this move to impact its product deliveries, or lead times to its customers
- Pivotal is currently exploring CM options for Product Customization in both Asia Pacific and Korea in order to maintain operating efficiencies

SECURED NEW US$10M DEBT FACILITY WITH BRIDGE BANK

- US$10m secured with Bridge Bank
- Comprising a US$7.0m working capital revolving credit line (“Revolving Credit Line”), due and payable in 24 months unless extended by the parties
- A US$3.0m term loan line of credit (“Term Loan”) for working capital and general corporate purposes for three years, then repayable in 36 equal monthly installments
- Provides Pivotal with balance sheet flexibility to meet its corporate objectives

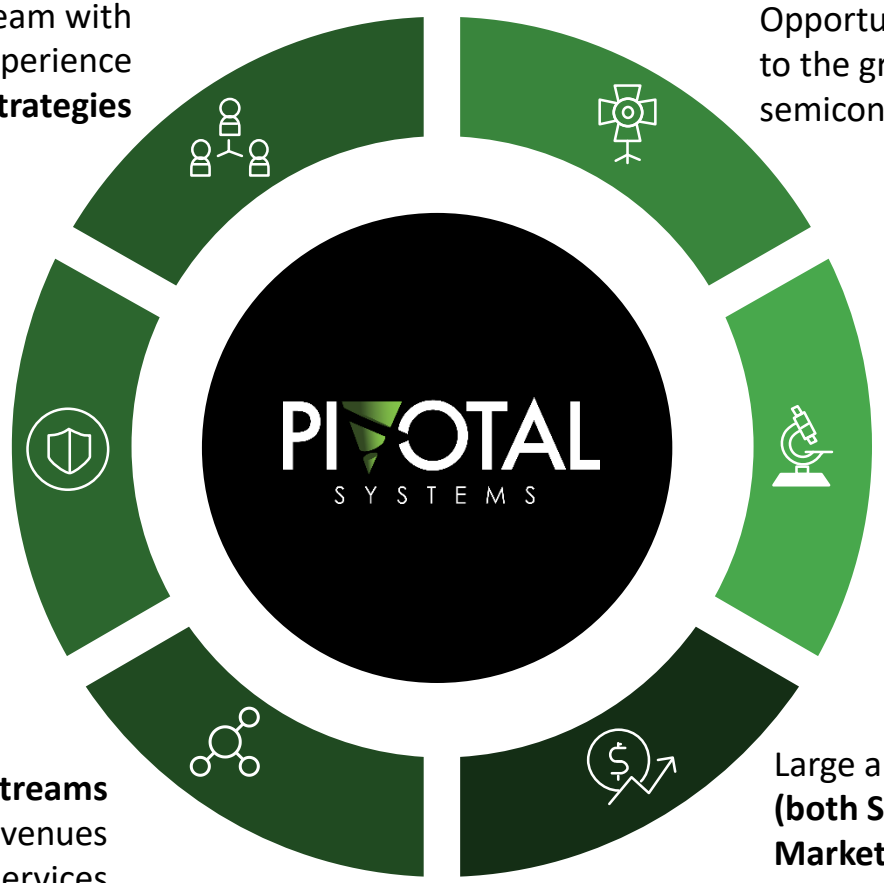


SUMMARY AND OUTLOOK

PIVOTAL SUMMARY

Highly aligned management team with the technical and commercial experience to **deliver on growth strategies**

Opportunity to **gain exposure** to the growing global semiconductor industry



Strong customer retention and a highly defensible product model. Close relationships with high quality customer base comprised of leading **blue-chip IDMs and OEMs**

Clear technology leader with a continuously expanding product set that continues to receive validation from a number of key blue chip customers

Opportunity for **diversification of revenue streams** with growth in high quality subscription revenues from the sale of software and services

Large and **growing addressable market (both Semiconductor and Adjacent Markets)** with further opportunity for significant expansion of market share

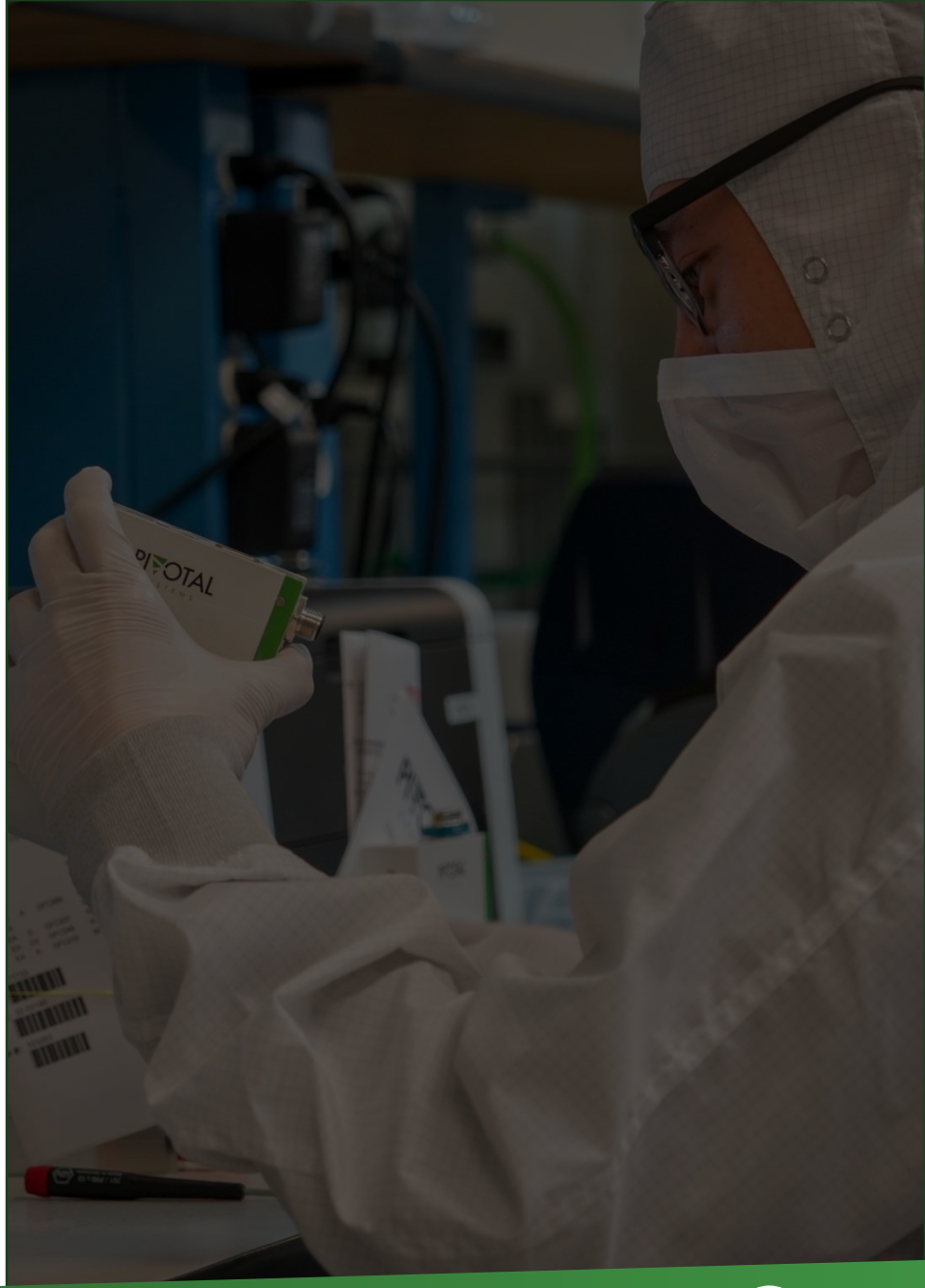
2019 OUTLOOK

MARKET DYNAMICS HAVE PERSISTED DURING 1H2019

- The market dynamics which prevailed in 4Q2018 have continued into the 1H2019, with strategic memory IDM's not taking significant new equipment deliveries
- OEMs are currently focused on managing their own inventory levels in light of the slowed IDM capex spend and are therefore slowing the deliveries of components such as Pivotal GFCs
- Despite these headwinds, Pivotal saw significant customer activity during the half with a number of new customer penetrations and new product introductions

PIVOTAL EXPECTS 2H REVENUES TO BE UP SEQUENTIALLY FROM THE 1H2019.

- The Company expects 2H2019 revenues to increase sequentially from the first half. At this time, the Company sees strengthening in the overall semiconductor industry
- Pivotal continues to work closely with customers during this downturn to assist them to maximise productivity and cost efficiency so that both the customers and Pivotal can emerge stronger, with the best technology, when the overall industry capex investment recovers
- Pivotal maintains that its client-led and innovative product development focus will continue to deliver significant market share gains



PIVOTAL SYSTEMS

Thank You

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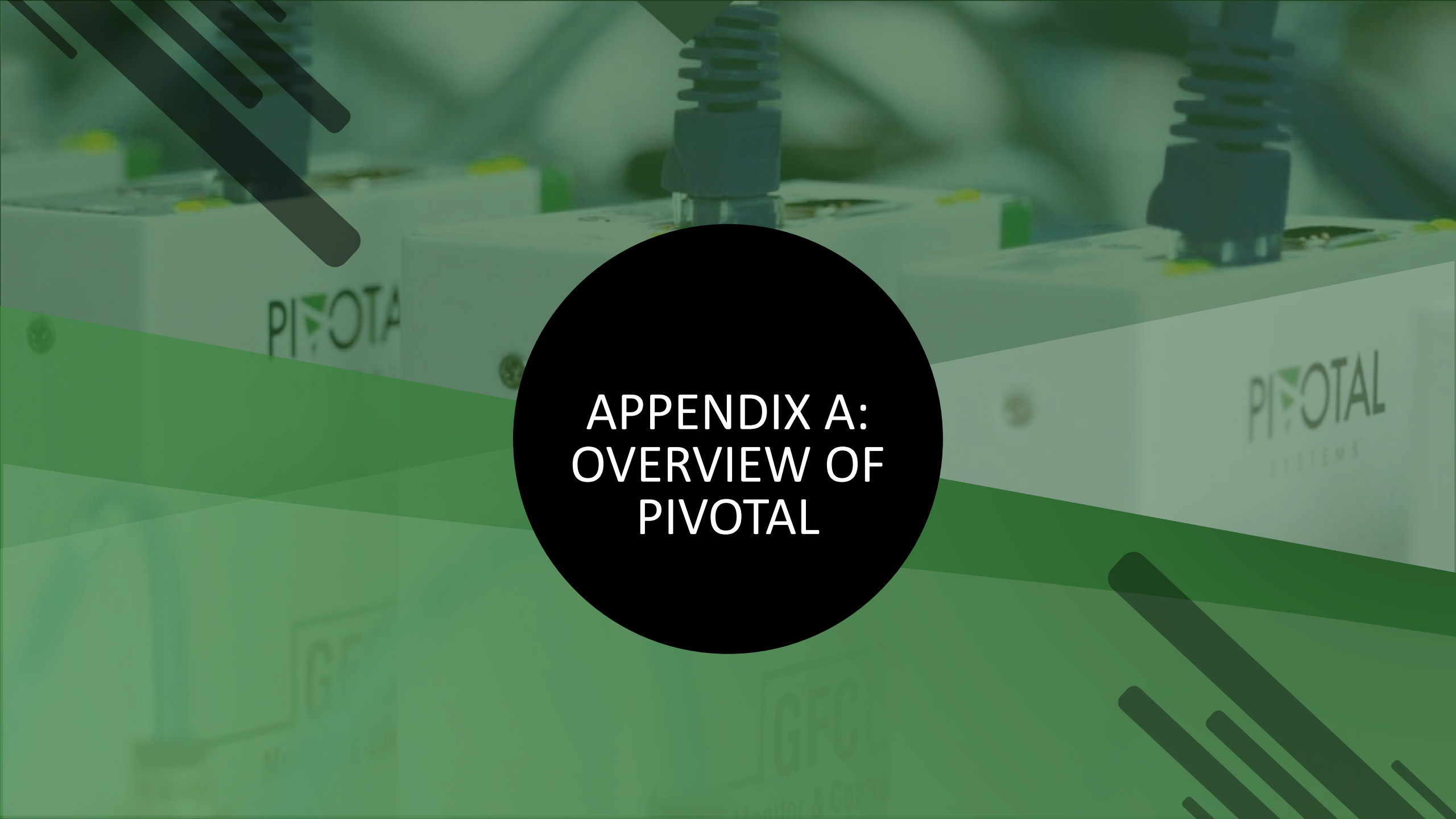


APPENDIX A: OVERVIEW OF PIVOTAL

COMPANY TIMELINE

2003

Pivotal Systems Corporation founded to commercialise IP development around gas flow analysis and monitoring and process tool communication

2011

Management identifies a decade-long lack of innovation in gas flow control technology and begins research into GFCs, incorporating the gas flow monitoring technology developed to date

2012

The leading Korean IDM purchases first units to begin validation of the Pivotal technology in a production environment

2014

Leading Korean IDM qualifies Pivotal's low flow GFC technology for Plasma Etching. Two of the leading US OEMs commence their own validation for use of Pivotal's products on process equipment

2015

Leading Asia-based OEM commences validation of Pivotal's technology. Shipments of units to the leading US OEMs commence. Pivotal awarded Red Herring 100 Award for North American and Global Companies categories and ranks 1st in Inc.500 for fastest growing U.S. Engineering companies.

2016

Pivotal awarded its second Global Red Herring Award

2017

Continued validation of Pivotal's products by leading IDMs and OEMs.

2018

Leading Japanese University Validates GFC

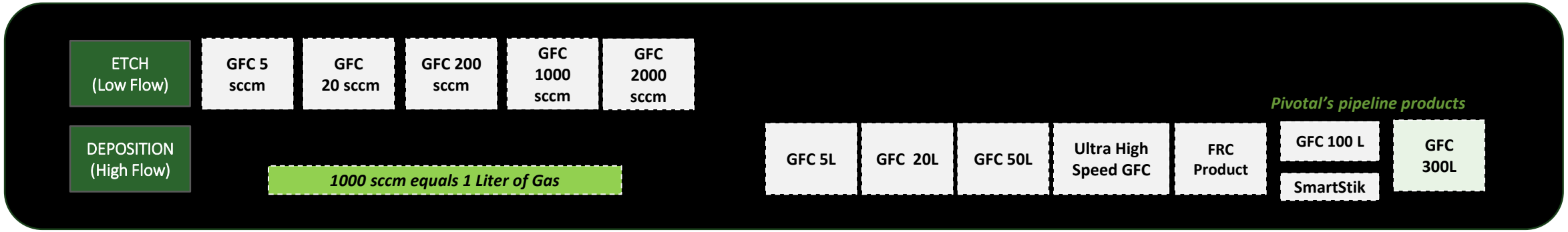
Leading US OEM qualifies High Flow GFC

Contracted integration facility in Korea

Capacity expanded to 5,000 units per month

Pivotal Awarded 3rd Red Herring Award for the High Flow GFC

HISTORY OF CONTINUOUS INNOVATION



Pivotal's software-enabled products have been designed such that they can be easily modified to be used in other manufacturing processes and verticals with minimal changes to hardware required, providing significant opportunity to further grow the Company's addressable market.

Notes:`

1. *Market and Markets Nov-17 report estimates the market size for low flow controllers to be over $200 million in 2017. Low flow controllers are primarily used in the Etching (Etch) application.*
2. *Market and Markets Nov-17 report estimates the market size for low and high flow controllers to be over $500 million in 2017. High flow controllers are primarily used in the Deposition applications.*
3. *Market and Markets Nov-17 report estimates the total market size for flow controllers to be over $1 billion in 2017. This includes the Etch, Deposition and flat panel LED applications.*

MANAGEMENT TEAM

John Hoffman

Executive Chairman and Chief Executive Officer

- John has over 30 years of global technology management experience in both the semiconductor and information technology markets
- Senior Vice President with Spencer Trask Ventures, a New York based venture capital firm where he was primarily involved in the solar and integrated circuit efforts of the firm
- Previously CEO of RagingWire Enterprise Solutions
- Worked in various general manager roles at Applied Materials for 18 years, including President of the Etch Group, VP and General Manager of Process Control and Diagnostic Business Group and General Manager of the Customer Service Division
- B.S. from the United States Military Academy at West Point and an Executive MBA from Stanford University

Joseph Monkowski

Chief Technology Officer and Executive Director

- Joseph has extensive experience in the semiconductor industry focused on providing process equipment and metrology solutions for next generation device manufacturing
- Previously Senior Vice President of Business Development for Advanced Energy Industries, and held senior executive positions at Pacific Scientific, Photon Dynamics and leading OEM Lam Research
- Joseph has authored numerous patents and publications in the semiconductor and flow controller space
- B.S., M.S. and Ph.D. in Electrical Engineering and an M.S. in Materials Science, all from Penn State University
- He also served as a Professor of Electrical Engineering for six years at Penn State University

Tim Welch

Chief Financial Officer

- Mr. Welch is a highly experienced CFO for high-technology companies with operations experience and a proven track record of building infrastructures, scaling revenues, and executing successful mergers & acquisitions.
- Mr. Welch was the former CFO and VP, Operations of ReVera, Inc. a semiconductor capital equipment company located in Santa Clara, CA. ReVera was acquired by Nova Measuring Instruments (NASDAQ:NVMI) in April, 2015.
- CFO of Boxer Cross which was acquired by Applied Materials (NASDAQ:AMAT) and CFO of Asyst Technology which went public on the NASDAQ
- MBA from the University of California, Berkeley and a B.A. in Chemistry from California State University, Chico.

BOARD OF DIRECTORS

John Hoffman
Executive Chairman and Chief Executive Officer
See previous page

Joseph Monkowski
Chief Technology Officer & Executive Director
See previous page

Kevin Landis
Non-Executive Director

Kevin is the CIO of Firsthand Capital Management, an investment management firm he founded in 1994. Kevin has over two decades of experience in engineering, market research, product management, and investing in the technology sector. Kevin holds a bachelor's degree in electrical engineering and computer science from the University of California at Berkeley and an MBA from Santa Clara University.

Ryan Benton
Independent Non-Executive Director

Ryan joined the Board in 2018 bringing over 25 years of finance, operations, and transaction experience. Ryan previously served as CFO of BrainChip Holdings Ltd (ASX: BRN) and CEO and Board Member at Exar Corporation (NYSE: EXAR), which was acquired by MaxLinear Corporation (NASDAQ: MXL) in May 2017. Previous roles included senior and consulting positions at ASM International NV (NASDAQ: ASMI), and eFunds Corporation (NASDAQ: EFDS).

David Michael
Non-Executive Director

David is Managing Director at Anzu Partners, which invests in innovative industrial technology companies. He is also a Board member of Nuburu, OTI Lumionics, Niron Magnetics, and Terapore. David was formerly Senior Partner and Managing Director of The Boston Consulting Group (BCG). He led BCG's Greater China business and their Asia Technology Practice. He served a range of clients in semiconductors, components, hardware, software, and services. He remains a Senior Advisor to the firm. David holds a B.A. in Economics from Harvard University and an M.B.A. from Stanford.

Peter McGregor
Independent Non-Executive Director

Peter has over 30 years' experience in senior finance and management roles, including having been CEO of tech company, Think Holdings, CFO of the ASX50 transport company, Asciano, and a partner in the Investment Banking firm of Goldman Sachs JBWere. He also spent time as a Managing Director within the Institutional Banking & Market division of CBA and was COO of Australian Infrastructure Fund (ASX:AIX). He holds a Commerce Degree from the University of Melbourne, is a Fellow of FINSIA and a Member of the AICD.

PIVOTAL'S GFC

PIVOTAL DESIGNS AND MANUFACTURES INNOVATIVE GFCS WHICH HELP IMPROVE SEMICONDUCTOR MANUFACTURING YIELDS, ALLEVIATE KEY PROCESS INEFFICIENCIES WHILE INCREASING PRODUCTION OUTPUT.

Innovative hardware design eliminates need for supporting upstream or downstream machinery, alleviating additional.

Self calibration software – avoids the need for systems to ever come offline, saving valuable production time.

Highly intelligent software platform capable of providing ongoing updates and product improvements.

Highly accurate proprietary nanotechnology derived valve delivers industry leading accuracy.

Sensors able to monitor & control gas flows in real-time, every millisecond.

Built-in machine learning software capable of identifying changes in gas temperature and pressure as a process is being run.

Fastest turn on and turn off times in the industry – provides an increase in productivity for customers.

Flow Ratio Controller for Etch and Deposition
COMPETITIVE ADVANTAGE

Pivotal has a proprietary advantage over its competitors in the critical areas of speed, accuracy, and flow range

	Description	PIVOTAL SYSTEMS	Competitor 1	Competitor 2
Flow sensor type	Underlying process technology used to measure and control gas flow	Pressure and position based	Thermal	Thermal
Accuracy	Degree to which you can accurately control desired gas flow	0.5%	2.0%	2.0%
Flow Range	Widest Flow Range	1% - 100%	5%-95%	5%-100%
Turn on speed	The time required to switch on gas flow	<0.5 sec	≤4.0 sec	<3.0 sec

Notes:
1. *Includes core competitor models addressing both deposition and etch processes. All competitor data has been sourced directly from customer specification sheets, websites and presentations.*

SmartStik Concept

SmartStik leverages the inherent technical advantages (accuracy, speed, repeatability, continuous flow monitoring and control, and positive shut off) that only Pivotal's GFC offers.

- Pivotal introduced SmartStik at Semicon Korea in January 2019
- SmartStik enables OEMs to reduce costs by eliminating components that have been made redundant by the GFC's inherent capabilities.
- A typical tool requires 84 sticks, which is material given Pivotal's SmartStik is up to 30% lower cost (per gas stick) and does not require a RoR measuring device.
- Value add and cost reductions will allow Pivotal to maintain or improve its ASPs
- Introduction of SmartStik to the product portfolio is highly strategic as it balances the more expensive GFC relative to peers, allowing Pivotal to take $600m addressable market more aggressively.

	Description	PIVOTAL SYSTEMS	Competitor 1
Accuracy at 10% of Full Scale	Degree to which you can accurately control desired gas flow when flowing 10% of Full Scale	0.5%/reading	1.0%/reading
Accuracy at 2% of Full Scale	Degree to which you can accurately control desired gas flow when flowing 2% of Full Scale	0.5%/reading	5.0%/reading
Positive shutoff	Leak By Rate of 1e-9 standard cm^3/second or 0.00000006 sccm	Yes	No
Turn on speed	The time required to switch on gas flow	100 msec	>500 msec

Notes:

1. *Includes core competitor models addressing both deposition and etch processes. All competitor data has been sourced directly from customer specification sheets, websites and presentations.*

APPENDIX B: INDUSTRY OVERVIEW

SEMICONDUCTOR MARKET OVERVIEW

FLOW CONTROLLERS ARE AN IMPORTANT COMPONENT WHICH MAKE UP THE INSTRUMENTATION USED IN SEMICONDUCTOR MANUFACTURING

MARKET SIZE - $1B[1]

Flow controller manufacturers

- Manufacturers of gas flow control devices
- Industry participants include:
  - Horiba, Ltd.
  - Brooks Instruments
  - Fujikin
  - Hitachi Metals
  - Pivotal Systems

MARKET SIZE $90B[2]

Original equipment manufacturers (OEMs)

- Designers and manufacturers of process tools used in the production of semiconductors
- Industry participants include:
  - Applied Materials
  - Lam Research
  - Tokyo Electron

MARKET SIZE $439B[3]

Integrated device manufacturers (IDMs)

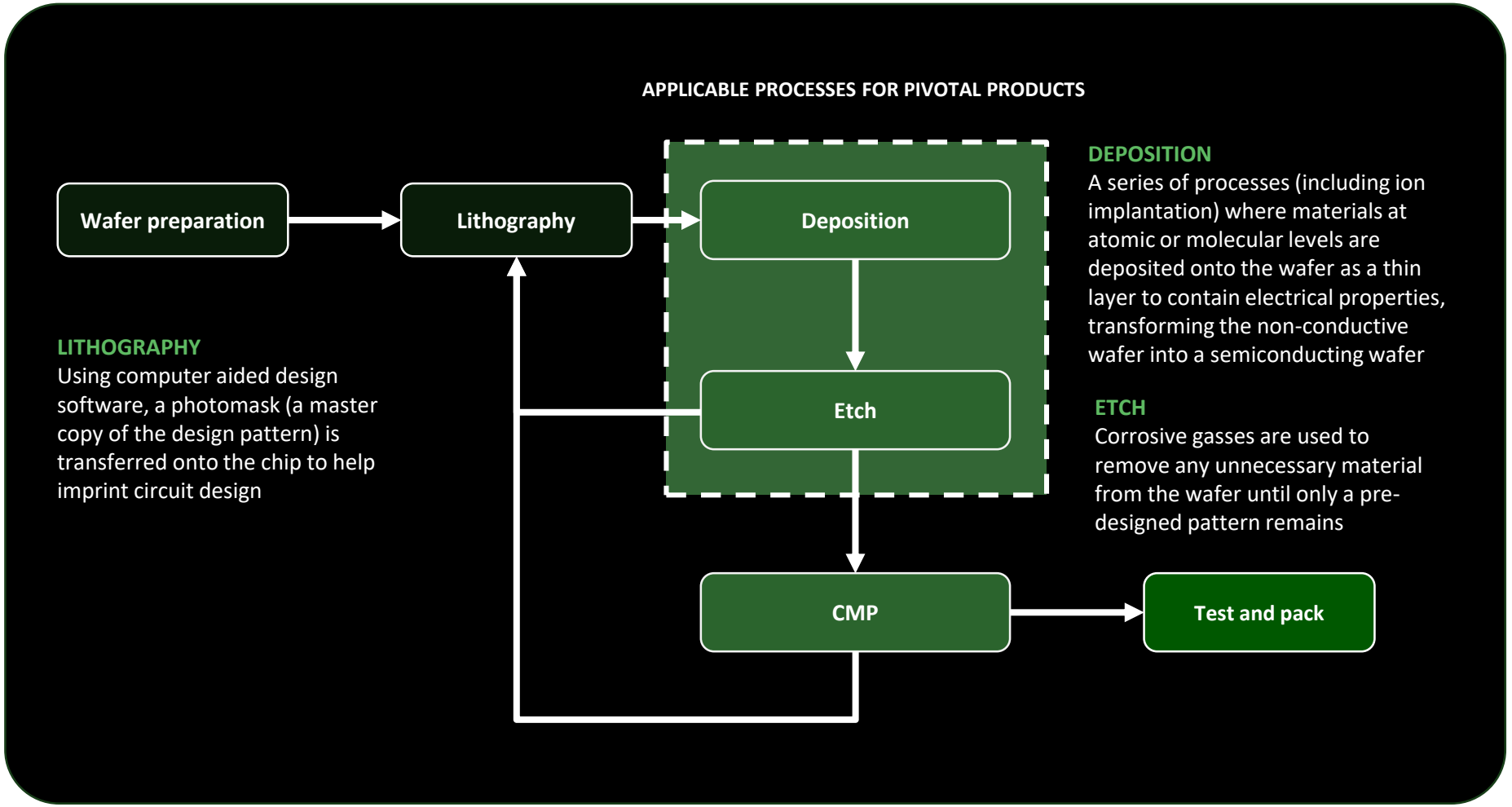
- Semiconductor and integrated device manufacturers
- A sample of industry participants include:
  - Samsung
  - Intel
  - TSMC
  - Texas Instruments
  - SK Hynix

Represents Pivotal's addressable customer base

Note:

1. *Market and Markets, November 2017. Includes etch, deposition and other markets.*
2. *IC Insights, 2018 McClean Report.*
3. *IC Insights, 2018 McClean Report.*

SEMICONDUCTOR MANUFACTURING PROCESS

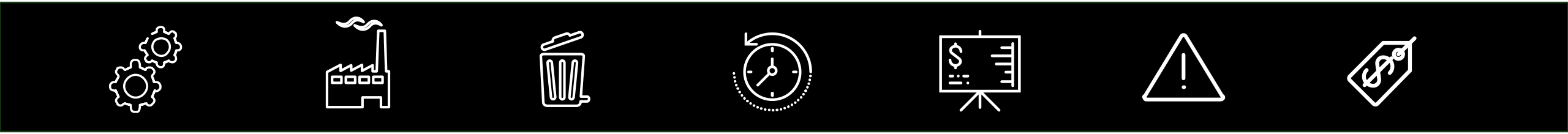


The semiconductor manufacturing process typically consists of more than a hundred individual steps, of which Pivotal's GFC solutions are applicable to the core steps of deposition and etch

Deposition and etch tools used in the fabrication of semiconductors are key drivers of the market for flow control devices. These tools have experienced strong recent growth as fabrication capacity has expanded and production processes grow more complex

WHAT IS THE INDUSTRY PROBLEM?

THE PRODUCTION OF SEMICONDUCTORS IS EXPENSIVE, COMPLEX, AND HIGHLY COMPETITIVE, WITH A SMALL NUMBER OF BLUE CHIP MANUFACTURERS COMPETING LARGELY ON COST AND YIELD



Wide range of production yields due to difficulty in producing *repeatable gas flows*. Yields may vary in a wide range between 85-99% of total factory output.

The various gases that are used in the manufacturing process can be expensive and toxic. *Wasted gas* is expensive and not good for the environment.

Gas *flow errors* in the production process lead to expensive wafer materials being scrapped and potentially lower yields on "good" wafers.

Slow machine turn-on and turn-off times *(settling times)* contribute to lower productivity and output.

Maintenance costs involved with the *manual recalibration* of competitors' flow controllers are a double hit, labor and lost production time.

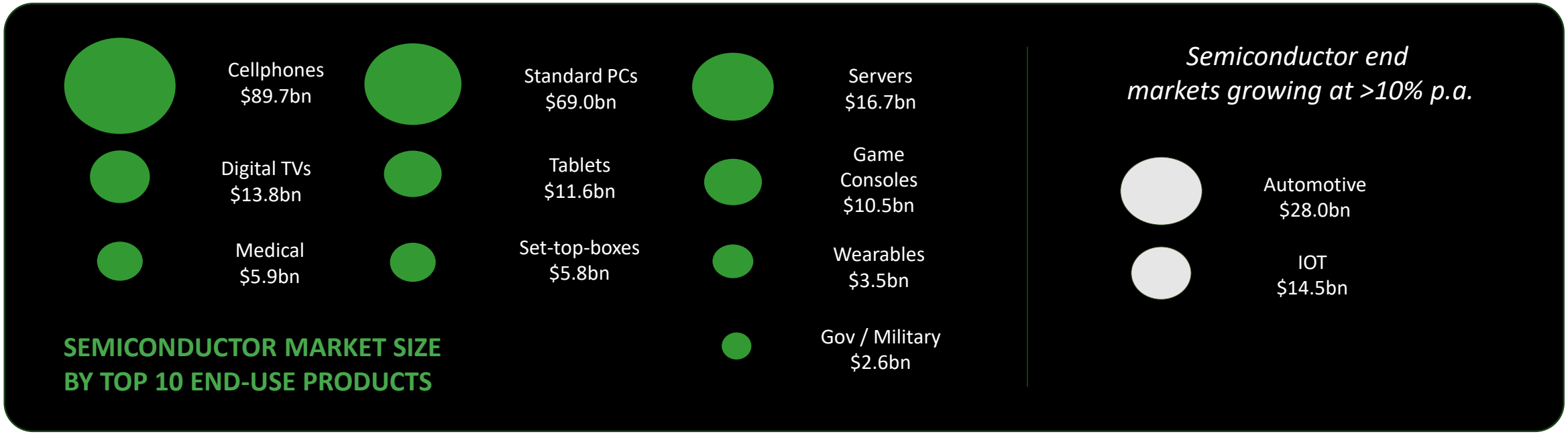
Limited gas flow *intelligence and diagnostic* capabilities.

Expensive upstream and downstream *equipment (valves, regulators etc.) required to help stabilize gas flows*.

One important issue for semiconductor manufacturers is variability in gas flows.

An inability to accurately measure and control gas flows creates a range of issues for semiconductor manufacturers.

SEMICONDUCTOR END MARKETS



GLOBAL SEMICONDUCTOR MARKET AND CAPITAL EXPENDITURE

- Global growth in the Semiconductor market is driven by growth in end-use products including communication devices, personal computers, artificial intelligence, self driving vehicles and Internet of Things.
- Technology trends require increasing number of semiconductors to be used per connected device, underpinning this consistent market growth.
- The core growth catalyst of the semiconductor capital equipment market is the pipeline of new fabrication plants being constructed by IDMs as they keep pace with Moore's Law which requires the number of transistor per sq. mm of silicon to double every 1-2 years.
- While IDM CAPEX Spending is forecasted to be lower in 1H2019, both IDM's and OEM's expect to see the 2H2019 CAPEX spending levels to improve.

Source: IC Markets – 2018 McClean Report