AIXTRON Investor Presentation

IR Presentation – 9M/2017

(FSE: AIXA, ISIN DE000A0WMPJ6)

AIXTRON

Forward-Looking Statements

This document may contain forward-looking statements regarding the business, results of operations, financial condition and earnings outlook of AIXTRON. These statements may be identified by words such as "may", "will", "expect", "anticipate", "contemplate", "intend", "plan", "believe", "continue" and "estimate" and variations of such words or similar expressions. These forward-looking statements are based on our current assessments, expectations and assumptions, of which many are beyond control of AIXTRON, and are subject to risks and uncertainties. You should not place undue reliance on these forward-looking statements. Should these risks or uncertainties materialize, or should underlying expectations not occur or assumptions prove incorrect, actual results, performance or achievements of AIXTRON may materially vary from those described explicitly or implicitly in the relevant forward-looking statement. This could result from a variety of factors, such as actual customer orders received by AIXTRON, the level of demand for deposition technology in the market, the timing of final acceptance of products by customers, the condition of financial markets and access to financing for AIXTRON, general conditions in the market for deposition plants and macroeconomic conditions, cancellations, rescheduling or delays in product shipments, production capacity constraints, extended sales and qualification cycles, difficulties in the production process, the general development in the semi-conductor industry, increased competition, fluctuations in exchange rates, availability of public funding, fluctuations and/or changes in interest rates, delays in developing and marketing new products, a deterioration of the general economic situation and any other factors discussed in any reports or other announcements , in particular in the chapter Risks in the Annual Report, filed by AIXTRON. Any forward-looking statements contained in this document are based on current expectations and projections of the executive board based on information available the date hereof. AIXTRON undertakes no obligation to revise or update any forward-looking statements as a result of new information, future events or otherwise, unless expressly required to do so by law.

This document is an English language translation of a document in German language. In case of discrepancies, the German language document shall prevail and shall be the valid version.

Due to rounding, numbers presented throughout this presentation may not add up precisely to the totals indicated and percentages may not precisely reflect the absolute figures for the same reason.

Our Vision

Technology. Materials. Performance.

Technology.

We are the **recognized technology leader** in complex material deposition.

Materials.

We **enable our customers** to successfully shape the markets of the future, exploiting the potential offered by **new materials**.

Performance.

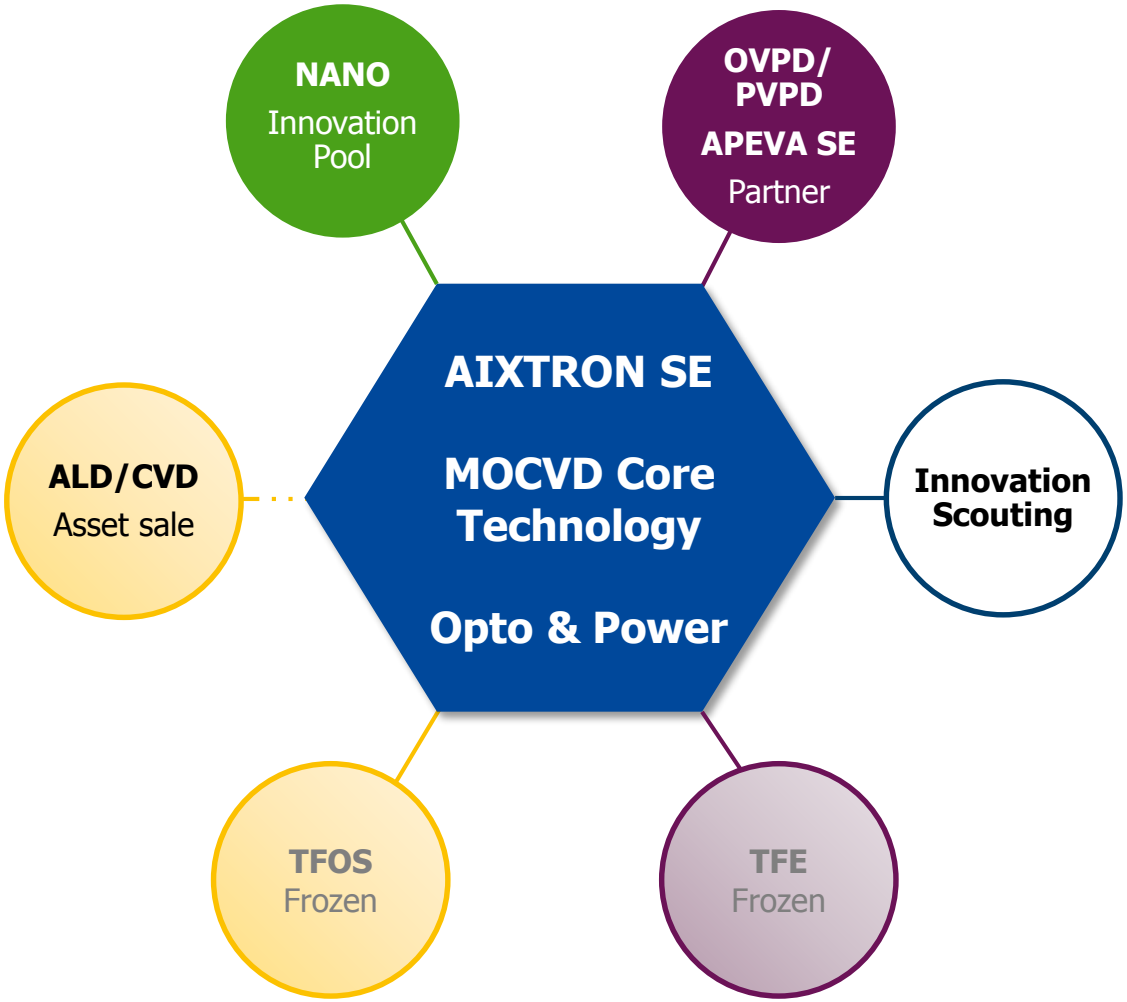
We **deliver the performance** driving **economic success** through our expertise, our employees and the quality of our products.

Who we are

- Headquarters based in Herzogenrath, Germany
- Worldwide presence with 13 sales/representatives offices and production facilities
- Company founded in 1983 – over 30 years of experience
- ~ 680 employees
- Technology leader in deposition systems
- More than 3,000 deposition systems delivered all over the world
- State of the art R&D center and demo facilities

Global Presence

Technology Portfolio – Strategy



Executing Strategic Plans:

- ✓ Partner: APEVA / OLED Deposition
  - Established APEVA SE as AIXTRON subsidiary; Joint Venture discussions in progress
- ✓ Freezing R&D: TFOS & TFE
  - Q1/2017: freezing III-V on Silicon (TFOS) R&D activities
  - Q2/2017: freezing Thin Film Encapsulation (TFE) R&D activities
- ✓ Asset Sale: Memory Product Line
  - Sale of ALD/CVD Memory Product line to Eugene Technology in South Korea expected to close in 2017

Technology Portfolio

AIXTRON SE
MOCVD Core Technology
Opto & Power

Photonics
(e.g. VCSEL for 3D Sensing, Lasers for CE, Datacom)

SiC Power
(e.g. EVs, Charging Stations, Infrastructure)

Specialty LED
MicroLED-, Fine Pitch Displays; Horticulture; Purification; IR & UV LEDs

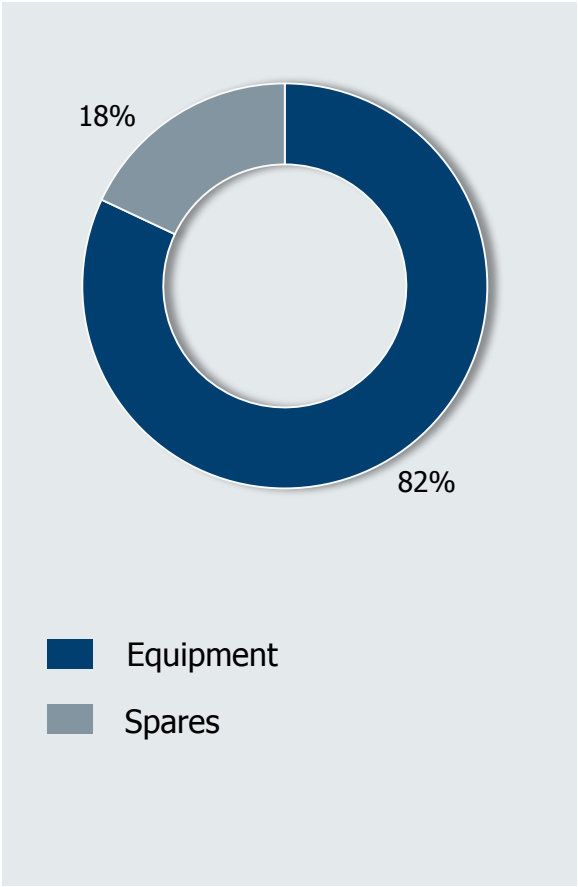
GaN Power
(e.g. Wireless Charging; RF, Fast Charging)

- Electric Vehicles
- Internet of Things
- Renewable Energy

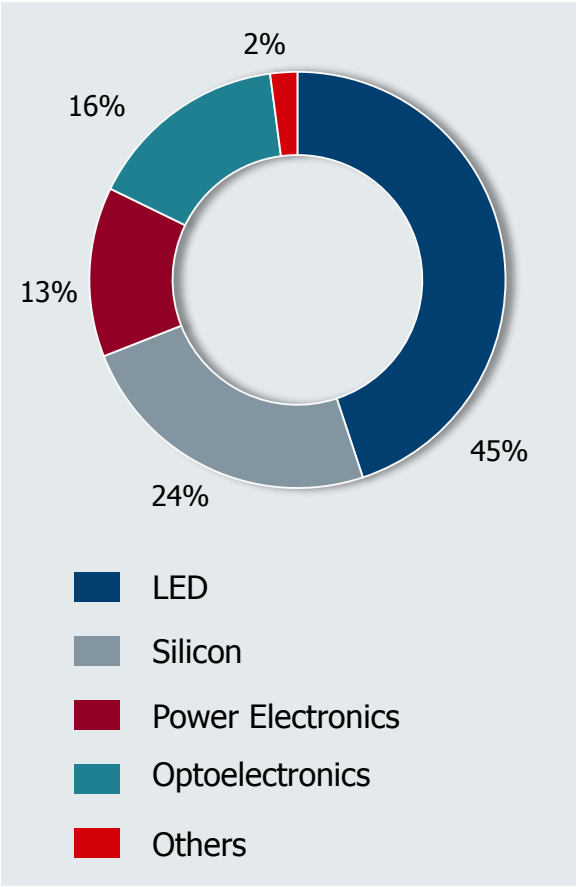
Revenue Analysis*

* Rounded figures; may not add up

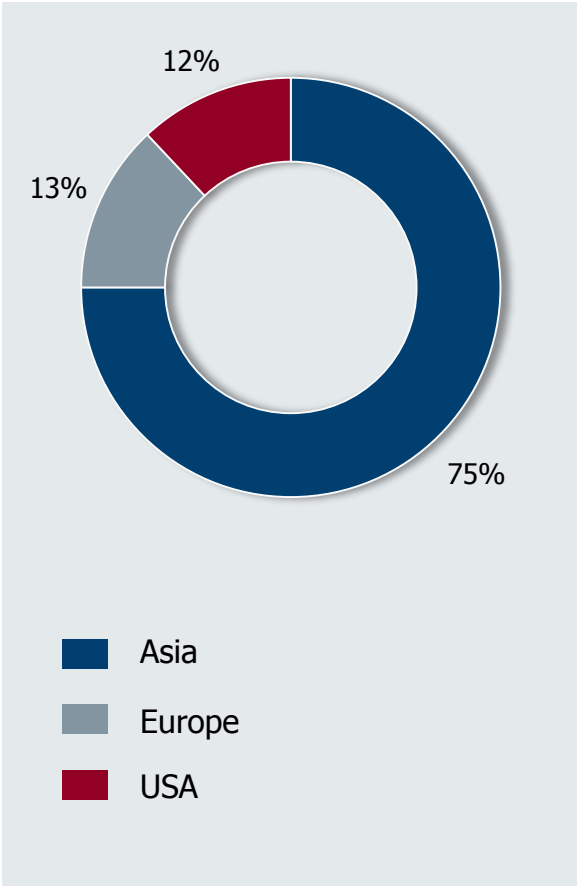
9M/2017: by equipment & spares



9M/2017: by end application (equipment only)



9M/2017: by region



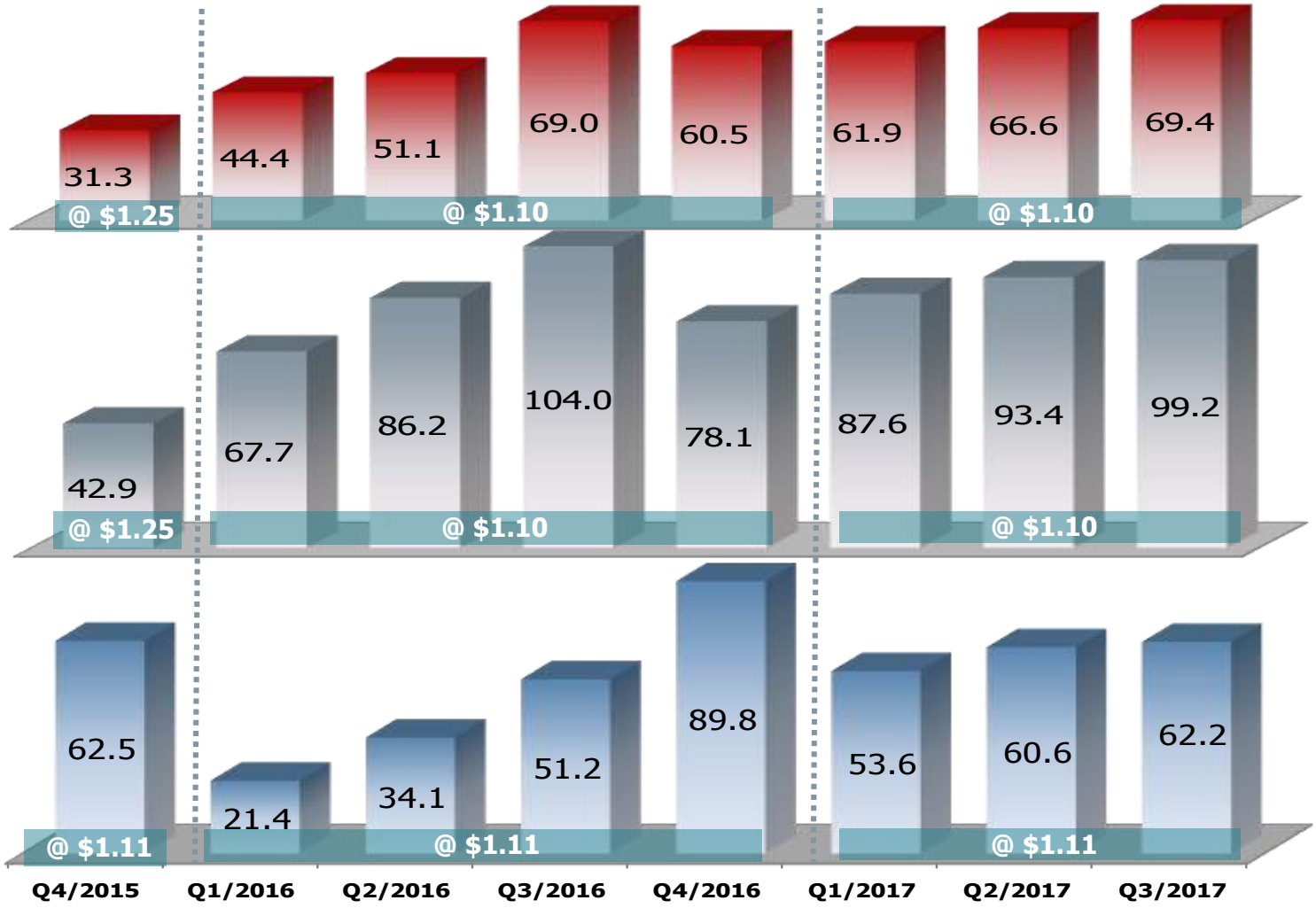
24 - Month Business Development

(€ million)

Order Intake
(incl. equipment, service, spare parts)

Order Backlog
(equipment only)

Total Revenues
(incl. equipment, service, spare parts)



USD order intake and backlog were recorded at the prevailing budget rate (2017: $1.10/€)
USD revenues were converted at the actual period average FX rate (9M/2017: $1.11/€)

Consolidated Income Statement*

* Rounded figures; may not add up
**Q3/17 adjusted vs Q2/17 adjusted

(€ million)	Q3/17			Q2/17			+/-
	Adjusted	Adjustment	Actual	Adjusted	Restructuring	Actual	%**
Revenues	**57.6**	**-4.6**	**62.2**	**60.6**		**60.6**	**-5**
Cost of sales	37.5		37.5	45.9		45.9	-18
Gross profit	**20.1**	**-4.6**	**24.7**	**16.0**	**1.3**	**14.7**	**26**
%	*35*		*40*	*26*		*24*	*9pp*
Selling expenses	2.7		2.7	2.7		2.7	0
General & admin expenses	3.7	-1.4	5.2	3.8	-1.3	5.1	3
R&D	12.8		12.8	14.8	-5.0	19.8	-14
Net other operating income & expenses	-0.5		-0.5	-1.6		-1.6	-69
EBIT	**1.4**	**-3.2**	**4.6**	**-3.6**	**7.7**	**-11.3**	**139**
%	*2*		*7*	*-6*		*-19*	*8pp*
Net result	**1.1**	**-3.2**	**4.3**	**-3.7**	**7.7**	**-11.4**	**130**
%	*2*		*7*	*-6*		*-19*	*8pp*

Consolidated Income Statement*

* Rounded figures; may not add up
**9M/17 adjusted vs 9M/16 actual

(€ million)	9M/17 Adjusted	9M/17 Adjusted	9M/17 Actual	9M/16 Actual	+/- %**
Revenues	**171.7**	**-4.6**	**176.3**	**106.6**	**61**
Cost of sales	121.0		123.3	79.7	52
Gross profit	**50.8**	**-2.2**	**53.0**	**26.9**	**89**
%	*30*		*30*	*25*	*5 pp*
Selling expenses	7.9		7.9	9.0	-12
General & admin expenses	11.6	-2.9	14.5	12.1	-4
R&D	41.6	-10.6	52.3	39.6	5
Net other operating income & expenses	-2.2		-2.2	-4.5	-51
EBIT	**-8.2**	**11.3**	**-19.5**	**-29.3**	**72**
%	*-5*		*-11*	*-27*	*22 pp*
Net result	**-9.3**	**11.3**	**-20.6**	**-30.4**	**69**
%	*-5*		*-12*	*-28*	*23 pp*

Balance Sheet*

* Rounded figures; may not add up

(€ million)	30/09/17	30/06/17	31/12/16
Property, plant & equipment	64.0	65.3	74.2
Goodwill	71.1	68.7	74.6
Other intangible assets	1.8	1.5	5.4
Others	1.9	2.1	2.4
Non-current assets	**138.8**	**137.5**	**156.5**
Inventories	40.2	36.4	54.2
Trade receivables	21.1	22.0	60.2
Others	4.8	6.0	5.3
Assets classified as held for sale	15.4	16.0	0.0
Cash & Cash Deposits	203.9	197.1	160.1
Current Assets	**285.3**	**277.6**	**279.7**
Shareholders' equity	**342.2**	**339.8**	**369.7**
Non-current liabilities	**1.7**	**2.5**	**4.2**
Trade payables	13.1	13.9	14.6
Advance payments from customers	41.7	33.6	26.1
Others	25.3	25.3	21.6
Current liabilities	**80.2**	**72.7**	**62.3**
Balance Sheet total	**424.1**	**415.0**	**436.2**

Consolidated Statement of Cash Flows*

* Rounded figures; may not add up

(€ million)	9M/17	9M/16	Q3/17	Q2/17
Net Result	**-20.6**	**-30.4**	**4.3**	**-11.4**
Adjust for				
Non Cash Items	16.8	9.8	2.6	6.8
Changes in Working Capital	60.4	-14.5	6.3	13.3
Cash Flow from Operating Activities	**56.5**	**-35.0**	**13.2**	**8.7**
Capital Expenditures	**-8.0**	**-3.0**	**-5.0**	**-1.7**
FX effects / Other	**-4.7**	**-7.9**	**-1.4**	**-3.6**
Total Cash Flow	**43.8**	**-45.9**	**6.8**	**3.5**
Cash & Deposits	**203.9**	**163.5**	**203.9**	**197.1**

Market Prospects

Short-Term

- Increasing emergence of compound semiconductor based laser devices such as VCSELs for sensors in automotive and mobile applications.
- Increasing emergence of compound semiconductor based laser devices for ultrafast Telecom and Datacom infrastructure and data center applications.
- Increasing adoption of LEDs and specialty LEDs (in particular Red-Orange-Yellow, IR or UV) for Sensor, Fine Pitch Display and other applications.
- Increased emergence of wide band gap SiC based devices for energy efficient power management in automotive, consumer electronics and mobile applications.

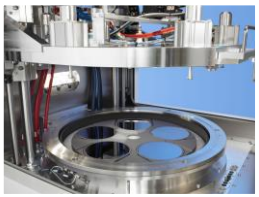
Mid- to Long-Term

- Increased emergence of wide band gap GaN based devices for energy efficient power management and communications in automotive, consumer electronics and mobile applications.
- Increasing emergence of compound semiconductor based sensor devices for autonomous driving.
- Development of new wide band gap applications such as RF and System-on-Chip with integrated power management.
- Progress in the development of large area OLED displays requiring efficient deposition technologies such as OVPD.
- Increased development activity for specialized compound solar cell applications.
- Development of applications using Carbon Nanostructures (Carbon Nanotubes, Carbon Nanowires, Graphene, 2D-Materials).
- Development of alternative LED applications such as Visual Light Communication technology or Micro-LED Displays.

AIXTRON – Enabling Emerging Global Mega Trends

AIXTRON
Our technology. Your future.

AIX G5



AIX G4

AIX R6

Materials

GaN GaAs
SiC InP
InSb ZnO
Ge …

Applications

Autonomous Driving

Wireless Charging

Micro-LED

3D Sensing

Smart Home

Electric Vehicles

Thin-film III–V
Solar cells

Application: Short Term – Compound Semis in Next-Gen CE

Source: Gartner; Credit Suisse, Deutsche Bank, Stifel

AIXTRON Enables GaAs Applications

RF Switches

RF Power transistors

MMIC

HMIC Pin diode

3D gesture sensors

Base Station for 3G / 4G

Iris scan

Proximity sensor

Logic processor

Camera autofocus

Environmental scan

HDMI interconnects

Body functions

Night vision camera

Displays

Camera Flash

Wireless charger

Pulsed power transistor

Fast charger

RF energy solution

MMIC

Base station for 5G

Wireless PAs

Noise cancelation

GaN ICs

AIXTRON also in...

OLED

Flexible Display

3D NAND

1X DRAM

CNT based LiB

- **Potential CE markets (2017e) ~3bn units**
  - Smartphones: 1.55 bn units
  - Laptops: 0.18 bn units
  - Tablets: 0.3 bn units
  - Smartwatches: 0.1 bn units
  - Wearables: 0.3 bn units
  - TV: 0.25 bn units
  - Others (DSC, Game consoles): 0.1bn
- **Customer profiles:**
  - Fragmented and global
  - IDMs, PDM, foundries and start ups
  - GaN MOCVD: 100+ players with epi capability
  - GaAs MOCVD: 60+ players with epi capability
  - CNT PECVD: shift toward commercial customers

AIXTRON Enables GaN Applications

Application: Mid Term – Compound Semis in Connected E-Vehicles

Source: Gartner; Baader, Bernstein, Deutsche Bank, Stifel

AIXTRON Enables GaAs Applications

Vehicle speed sensing (IR)

Night vision IR

Emergency break assist (IR)

Adaptive cruise control (IR)

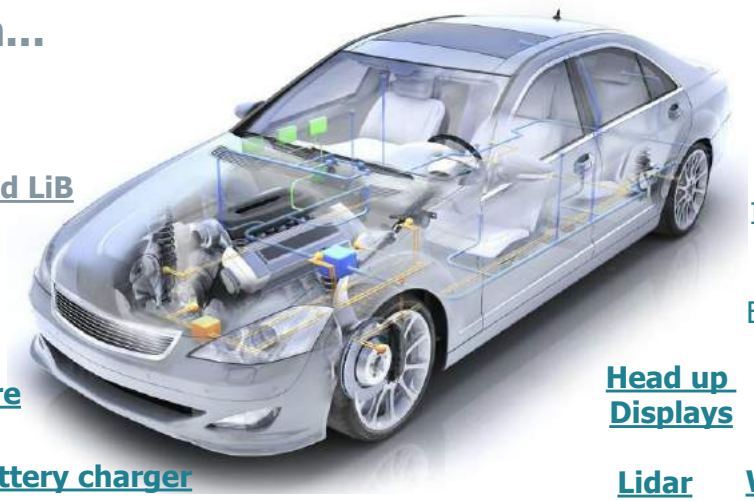
Pedestrian detection (IR)

Driver condition monitoring (VCSEL)

AIXTRON also in...

OLED

CNT based LiB



Interior Lighting LED

Exterior Lighting LED

Charging infrastructure

Head up Displays

48V system

On board battery charger

Lidar

Wireless charger

DC/DC conversion

Headlights

Infotainment

Main inverter

AIXTRON Enables SiC Applications

AIXTRON Enables GaN Applications

- **Potential EV, BEV and PHEV**
  ~ 4m units in 2020e
  - Power Semiconductor content per car internal combustion engine: $50
  - Power Semiconductor content per car electrical vehicle: $350
- **Potential ADAS**
  ~ 25m units in 2019e
  - Semiconductor content partially automated: sub $100 per car
  - Semiconductor content fully automated: $580 per car
- **Customer profiles:**
  - Fragmented and global
  - IDMs, PDM, foundries and start ups
  - GaN MOCVD: 100+ players with epi capability
  - GaAs MOCVD: 60+ players with epi capability
  - CNT PECVD: shift toward commercial customers

Application: Long Term – Compound Semis in Smart Homes

Source: Gartner; Credit Suisse, Deutsche Bank, Stifel

AIXTRON also in...

OLED

CNT based LiB

AIXTRON Enables GaAs Applications

Night vision IR

Terrestrial CPV

FTTH

3D gesture sensors

Motion sensors

Environmental sensors

Fast charger

5G Home Internet

Smart Lighting
LED

Wireless PAs

Charging infrastructure

Main inverter

DC/DC conversion

LiDAR
AR Gaming

Infotainment

Med-Tech wearables

Wireless charger

AIXTRON Enables SiC Applications

AIXTRON Enables GaN Applications

- **Smart homes: Self-sufficient, environmentally friendly and connected**
  - Smart sensing: motion, environmental sensors, microphones
  - Processing: low power, high performance, microcontroller
  - Connectivity: Sub-GHz, Bluetooth, WiFi
  - Energy management: digital power, energy harvesting
- **Applications**:
  - appliances, home control, household robots, smart lighting, home multimedia, smart door locks, EV chargers, smart meters, improved security

AIXTRON Opto & Power – Positioned for Profitable Growth

* WSPM: wafer starts per month; Source: IHS, LEDinside, AIXTRON estimates

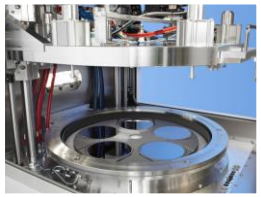
higher

Relative Profitability

lower

Planetary system

AIX G5



AIX G4

Showerhead system

AIX R6

	AIXTRON Position	6" WSPM* CAGR 2016-2021e
Power (e.g. EVs, Charging Stations Wireless Charging, GaN RF)	#1	78%
Specialty LED (e.g. Micro LED, ROY for Fine-pitch Displays, Infrared, UV)	#1	72%
Photonics (e.g. VCSEL for 3D Sensing, Lasers for Data-/Tele-com)	#1	44%
SSL +BLU LED	#3	7%

Overview: GaN/SiC as Wide Band Gap (WBG) Power Electronics

Consumer Electronics & IT	Automotive	Energy	Industrial
Power Management		**Power Switching**	
30V	**600V**	**1.2 kV**	**≥2kV**
• Electronic appliances • Computing • Wireless charging • Power supplies • PFC	• Infotainment • GPS • Connected car • Autonomous driving • EMI/EMC • Adaptive cruise control	• General automotive electronic • HEV/EV • Charging station • Inverter / motor drives • Converter • Radar test applications	• Power Grid / Smart meter / appliances • Solar / Wind inverters • Solar / Wind power DC distribution • storage • UPS	• UPS • Industrial machines • Building • Mining, oil, gas power generation • Shipping/Rail
				
GaN	**GaN / SiC**		**SiC**	

Volume segment Niche segment

Devices: GaN/SiC Power Electronics – Superior Performance

Source: icons from www.flaticon.com

More Efficient

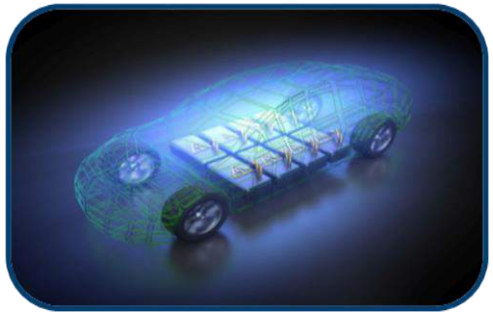
Smaller

Energy Saving

Less Heat

Light Weight

Lower System Cost



Electric Vehicles

EV-charging

Data Centers

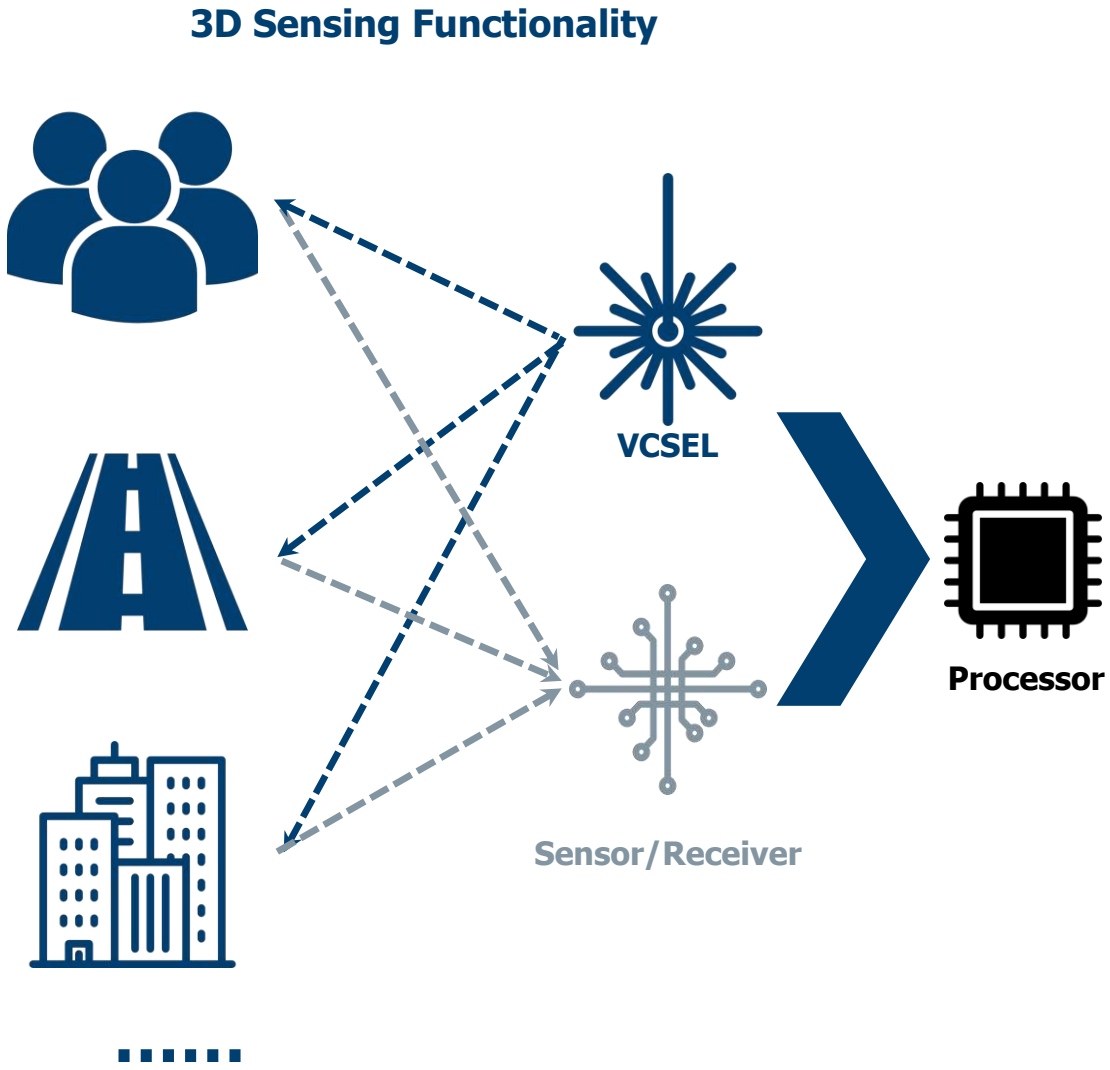
Renewable Energy

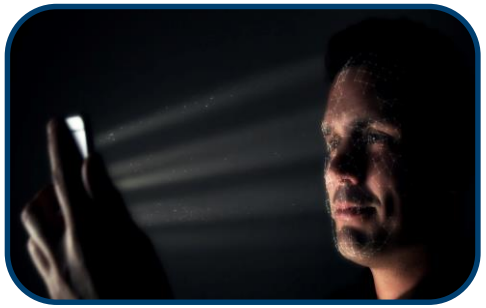
Wireless Charging

Fast Charging

Devices: VCSEL – Internet of Things Creates New Opportunities

Source: icons from www.flaticon.com





Facial Recognition

Autonomous Driving

Tailor-made clothing/shoes

Interior Design

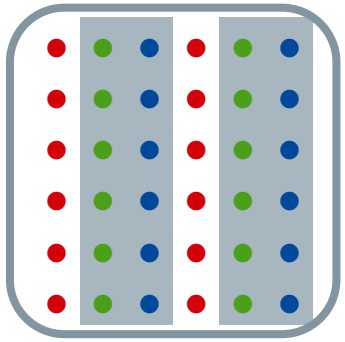
Mapping

Industry 4.0

Devices: ROY LEDs for RGB Displays; UV LEDs for Niche Markets

Source: LEDinside

ROY LED



RGB Fine-Pitch Indoor Display (Pixel Pitch ≤2.5mm)

RGB Stadium Outdoor Display (Pixel Pitch ≥10mm)

UV LED

Curing

Water Disinfection

Air Purifier

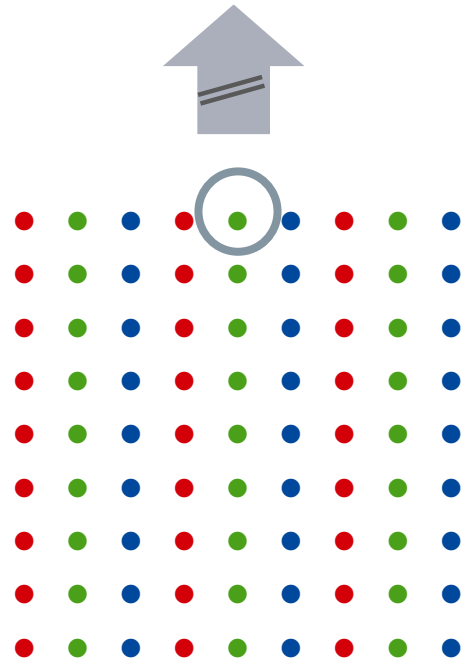
Devices: MicroLED – The Perfect Future Display Technology

Source: LEDinside

RGB MicroLED Display

1/100

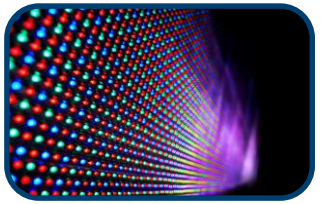
RGB LED Display



- Self-Emissive
- Low Power Consumption
- Perfect Contrast
- High Brightness
- Fast Response

Wearables

AR/VR



Signage

Smartphones/Tablets/TVs

AIXTRON Competitive Landscape

		USA	Europe	China	Korea	Japan
Compound	GaAs/InP Optoelectronics, ROY LED	Veeco				TAIYO NIPPON SANSO The Gas Professionals
	GaN LED	Veeco		AMEC TOPEC		TAIYO NIPPON SANSO The Gas Professionals
	GaN Power	Veeco				TAIYO NIPPON SANSO The Gas Professionals
	SiC Power		LPE			TEL TOKYO ELECTRON NuFLARE
Silicon					WONIK IPS JUSUNG	TEL TOKYO ELECTRON Hitachi Kokusai Electric Inc.
Organics		APPLIED MATERIALS			WONIK IPS SFA JUSUNG AP Systems	Canon CANON TOKKI CORPORATION ULVAC

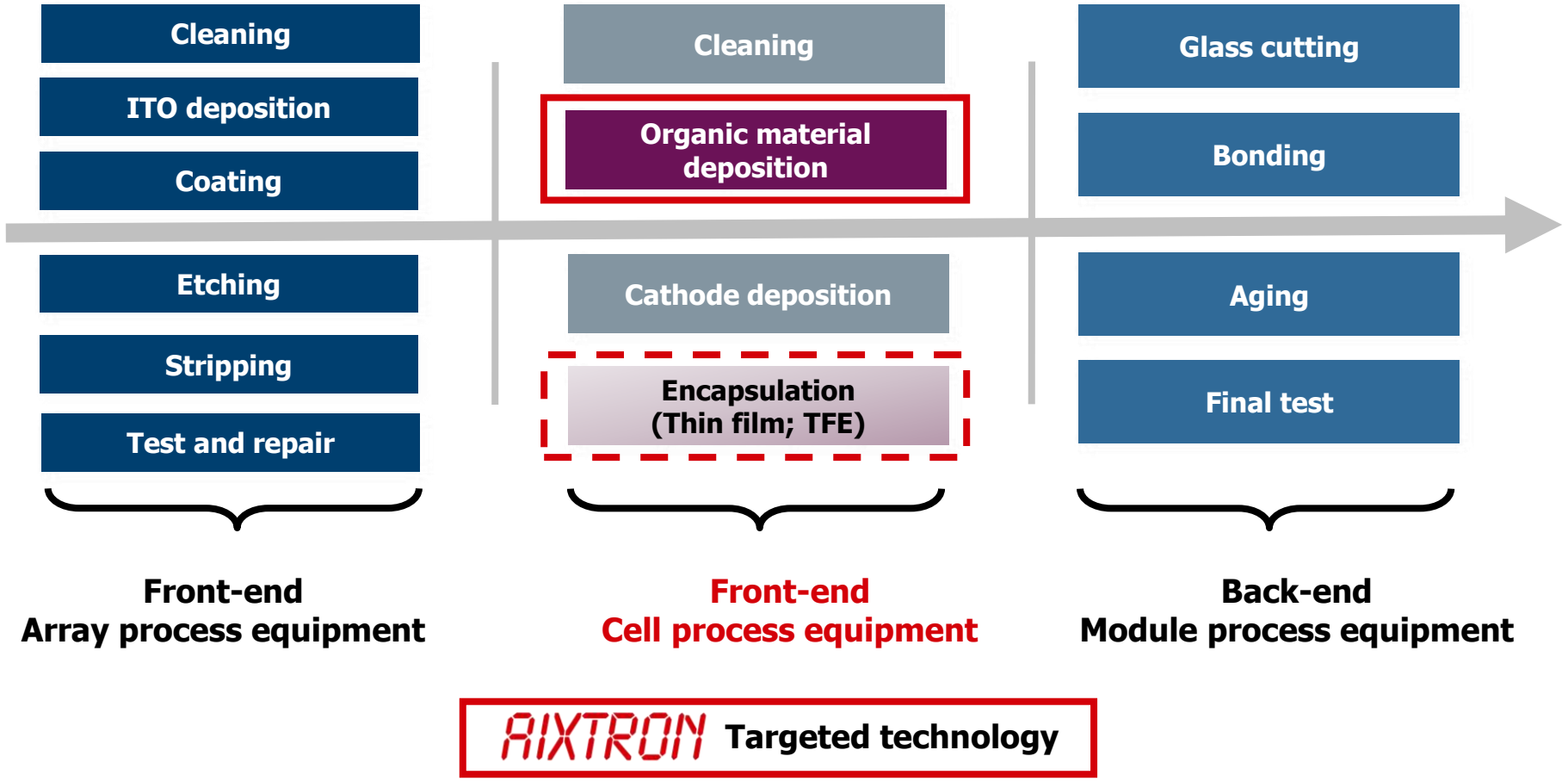
APEVA SE Partner

TFE Frozen

Organic Electronics – OVPD® – APEVA SE

Source: DisplaySearch, AIXTRON

OLED manufacturing process



APEVA SE
Partner

Organic Electronics – OVPD® – APEVA SE

Product Description – OVPD

- Proprietary carrier-gas enhanced gas phase deposition approach for organic thin films
- Based on AIXTRON's core competence of carrier gas enhanced vapor phase deposition
- Free scalability: suitable for all relevant substrate generations
- Manufacturing technology applicable for OLED displays, OLED lighting, organic semiconductors, and organic photovoltaic
- Proprietary STExS™ evaporation source technology: low thermal stress, high rates, continuous operation

"Disruptive deposition technology for cost efficient OLED manufacturing"

Product Features

- High deposition rates for high throughput
- Reduced thermal stress for organic materials

- High material utilization efficiency
- Flexible process control

- Simplified scaling due to
  - Close Coupled Showerhead and
  - Decoupled source technology

- Flexible integration solutions batch and inline
- Reduced number of deposition chamber and footprint
- Scalable: Available for substrate sizes up to Gen8.5 (=2.3 x 2.5 m²)

OVPD demonstrator OLAD (Organic Large Area Demonstrator) (optimized for Generation 8.5 substrate sizes)

Carbon Nanomaterials – PECVD

Graphene and Carbon Nanotube Deposition Systems

- Proprietary thermal and plasma enhanced chemical vapor deposition technology
- Excellent uniformity and reproducibility with fast turnaround cycle times
- BM platform: BM R&D (2-inch), BM Pro (4-inch and 6-inch), BM GB (4-inch glovebox), BM HT (high temperature, 1,700C), BM300T (300mm)
- Graphene and carbon nanotube films for electronics, energy storage, thermal management, sensors and flexible/transparent applications

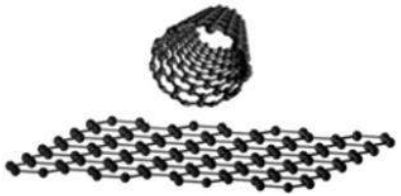
Product features

- Fast response heater and turnaround
- Thermal CVD
- Substrate and top heating

- Closed loop infrared wafer temperature control
- Plasma enhanced CVD with frequency control
- Flexible processing for different applications

- Low cost of ownership
- Easy maintenance and cleaning
- User management features and growth library

Material Properties + AIXTRON Technology → Enabling Applications



Graphene (2D) and Carbon nanotube (1D)

Unique combination of high electrical/ thermal conductivity, mobility, flexibility and transparency

Serving R&D market today

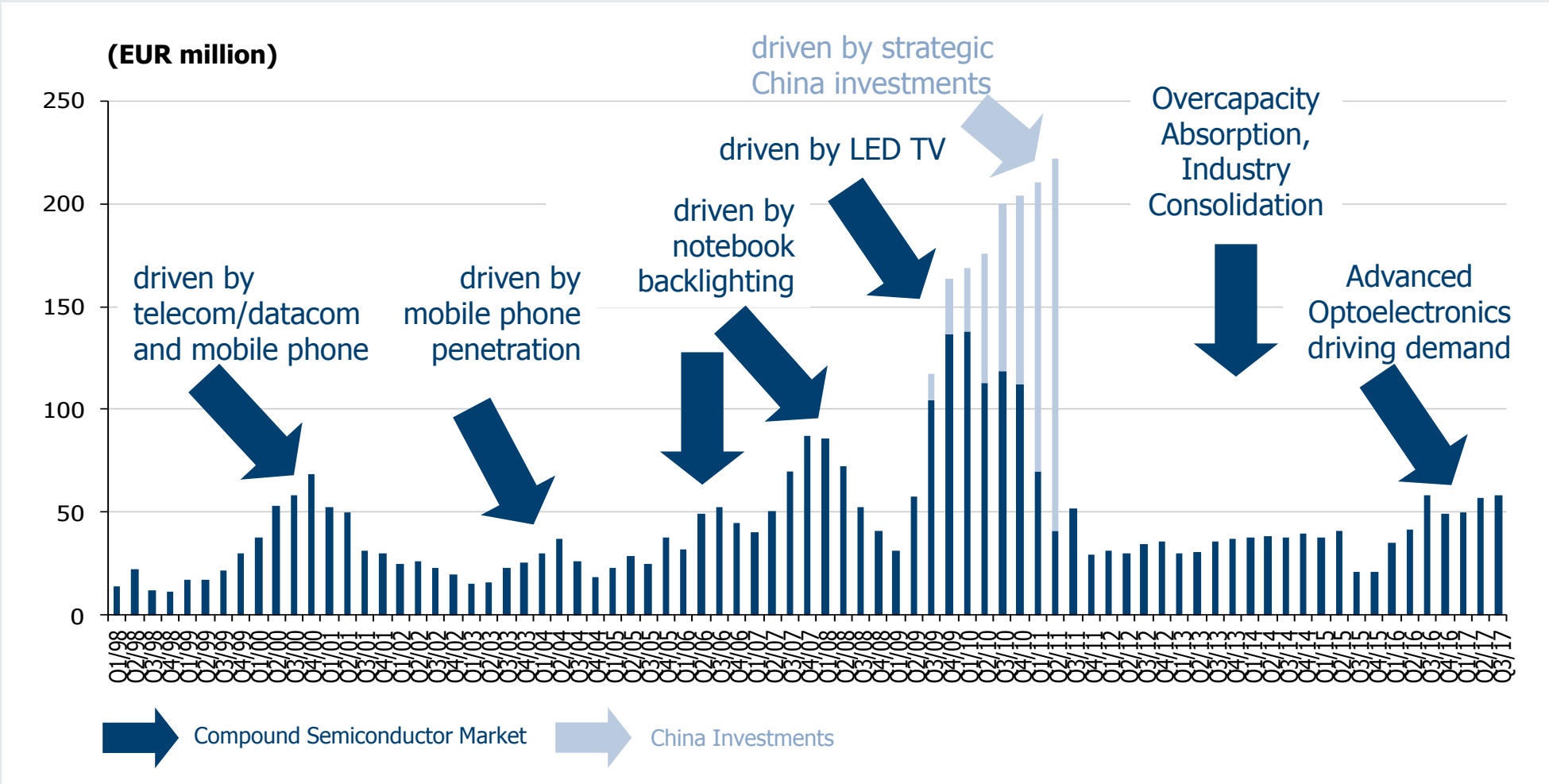
AIXTRON BM Pro

Production ready for tomorrow

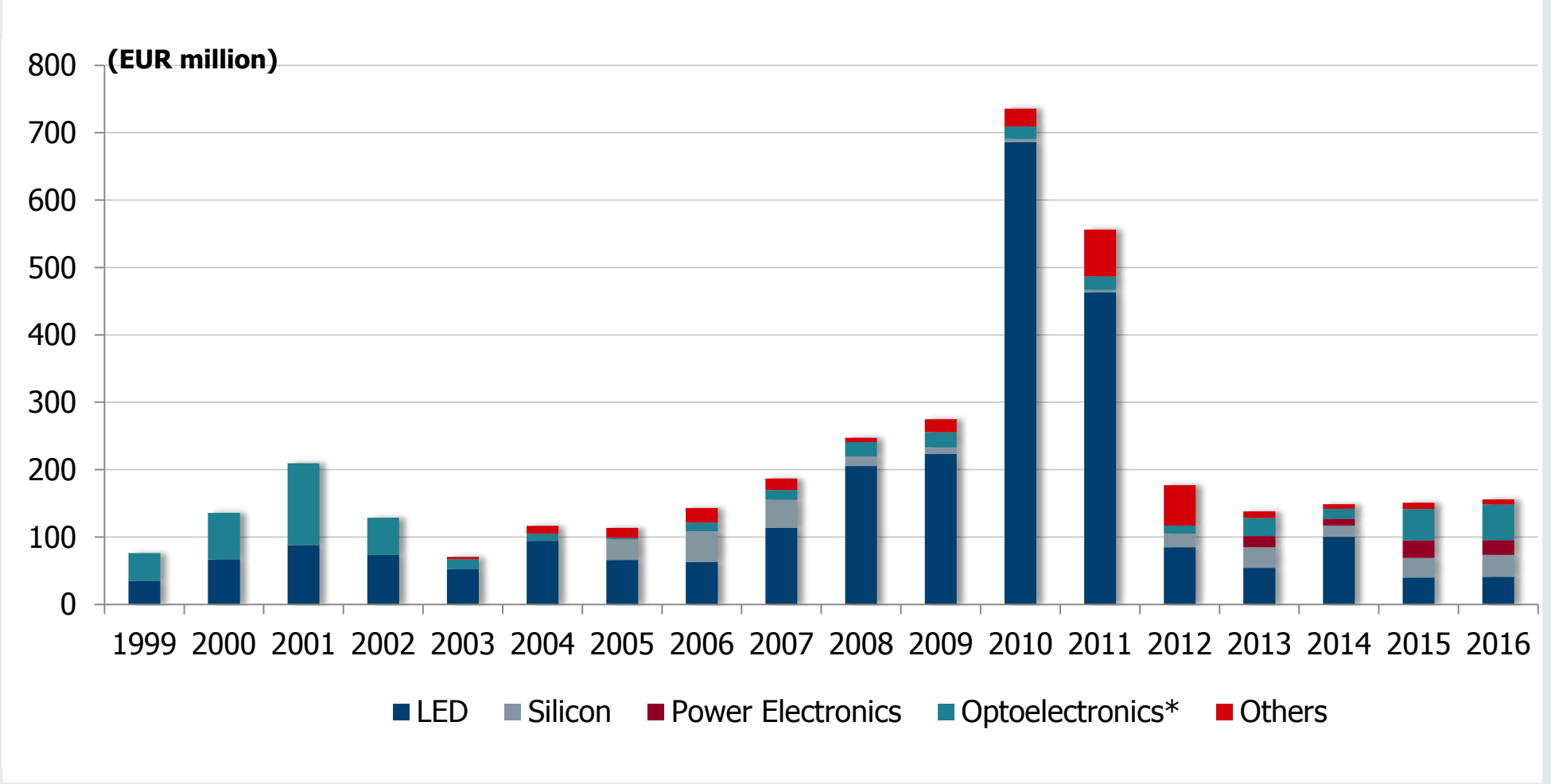
AIXTRON BM Pro 300

Our technology. YOUR FUTURE.

Equipment Order Intake per Quarter



Annual Equipment Revenues by Application (excl. spares)



* Optoelectronics includes applications in Consumer Optoelectronics, Telecom/Datacom, Solar, etc.

Consolidated Income Statement*

* Rounded figures; may not add up

(€ million)	2016	2015	2014
Revenues	196.5	197.8	193.8
Cost of sales	140.2	147.9	154.1**
Gross profit	56.3	49.8	39.7**
%	*29 %*	*25 %*	*20 %*
Selling expenses	13.8	11.5	14.1**
General & admin expenses	17.1	16.3	19.3
R&D	53.9	55.4	66.7
Net other operating income & expenses	-7.2	-6.7	-2.2
EBIT	-21.4	-26.7	-58.3
%	*-11 %*	*-14 %*	*-30 %*
Result before tax	-21.0	-26.0	-57.1
%	*-11 %*	*-13 %*	*-29 %*
Net result	-24.0	-29.2	-62.5
%	*-12 %*	*-15 %*	*-32 %*

**) 2014 figures adjusted to be comparable

Balance Sheet*

* Rounded figures; may not add up

(€ million)	31/12/16	31/12/15	31/12/14
Property, plant & equipment	74.2	81.3	77.3
Goodwill	74.6	75.9	64.8
Other intangible assets	5.4	6.4	2.5
Others	2.4	3.9	4.6
Non-current assets	**156.5**	**167.6**	**149.2**
Inventories, WIP & Finished Goods	54.2	70.8	81.7
Trade receivables	60.2	26.0	26.3
Others	5.3	8.2	8.3
Cash & Cash Equivalents incl. CD	160.1	209.4	268.1
Current Assets	**279.7**	**314.4**	**384.4**
Shareholders' equity	**369.7**	**396.5**	**415.7**
Non-current liabilities	**4.2**	**3.6**	**1.3**
Trade payables	14.6	9.8	16.4
Advance payments from customers	26.1	24.0	66.9
Others	21.6	48.0	33.2
Current liabilities	**62.3**	**81.8**	**116.5**
Balance Sheet total	**436.2**	**482.0**	**533.5**

Consolidated Statement of Cash Flows*

* Rounded figures; may not add up

(€ million)	2016	2015	2014
Cash Flow from operating activities	-37.7	-45.7	-33.8
Cash Flow from investing activities	43.4	41.2	-23.2
Cash Flow from financing activities	0.3	-0.1	0.2
Exchange rate changes	-2.3	4.3	5.9
Net change in Cash & Cash Equivalents	3.7	-0.3	-50.9
Cash & Cash Equivalents (beginning of period)	116.3	116.6	167.5
Cash & Cash Equivalents (end of period)	120.0	116.3	116.6
Change in Cash deposits	-52.8	-60.5	9.9
Free Cash Flow**	-42.9	-57.3	-47.0
Capex	5.3	13.3	13.4

**) Operating CF + Investing CF + Changes in Cash Deposits, adjusted for acquisition effects

Financial Calendar & Contact Data

- February 27, 2018 FY/2017 Results, Conference Call
- April 26, 2018 Q1/2018 Results, Conference Call
- May 16, 2018 2018 Annual General Meeting, Aachen, Germany
- July 26, 2018 Q2/2018 Results, Conference Call
- October 30, 2018 Q3/2018 Results, Conference Call

For further information please contact:

Investor Relations & Corporate Communications
AIXTRON SE ▪ Dornkaulstr. 2 ▪ 52134 Herzogenrath, Germany

IR Team Europe
Phone: +49 (2407) 9030-444 ▪ E-Mail: invest@aixtron.com

IR Team USA (California) – Andrea Su
Phone: +1 (669) 228-3751 ▪ E-Mail: invest@aixtron.com

Technology. Materials. Performance.

AIXTRON SE
Dornkaulstr. 2
52134 Herzogenrath
Germany
Phone +49 (2407) 9030-0
Fax +49 (2407) 9030-40
E-Mail invest@aixtron.com

AIXTRON