AIXTRON Investor Presentation

IR Presentation – FY/2019

(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 the current assessments, expectations and assumptions of the executive board of AIXTRON, of which many are beyond control of AIXTRON, based on information available at the date hereof and 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 those discussed by AIXTRON in public reports and statements, including but not limited those reported in the chapter "Risk Report". 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 report 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 near Aachen, Germany
- Worldwide presence in 7 countries
- R&D and production facilities in Germany and UK
- ~ 700 employees
- Company founded in 1983, >35 years of experience
- Technology leader in deposition systems
- Around 3,500 deposition systems sold worldwide

Where we are


Cambridge
UK
Herzogenrath
Germany
AIXTRON SE
Headquarters
Santa Clara
USA
Hwaseong, Asan
South Korea
Tokyo
Japan
Shanghai
China
Hsinchu
Taiwan
AIXTRON Group
Representation

What We Do

We provide enabling **Deposition Equipment to the Compound Semiconductor and Display Industry**

For Optoelectronics and Power Electronics

- **Metal-Organic Chemical Vapor Deposition (MOCVD)**
  for the deposition of compound materials to produce for instance Lasers, LEDs, GaN and SiC Power Electronics or other Optoelectronic components
- **Plasma-enhanced Chemical Vapor Deposition (PECVD)**
  for the deposition of Carbon Nanostructures and 2D materials (Carbon Nanotubes, Nanowires or Graphene)

For Organic Electronics Applications

- **Organic Vapor Phase Deposition (OVPD)**
  for the deposition of Organic Light Emitting Diodes (OLED) based displays for smartphones to TV

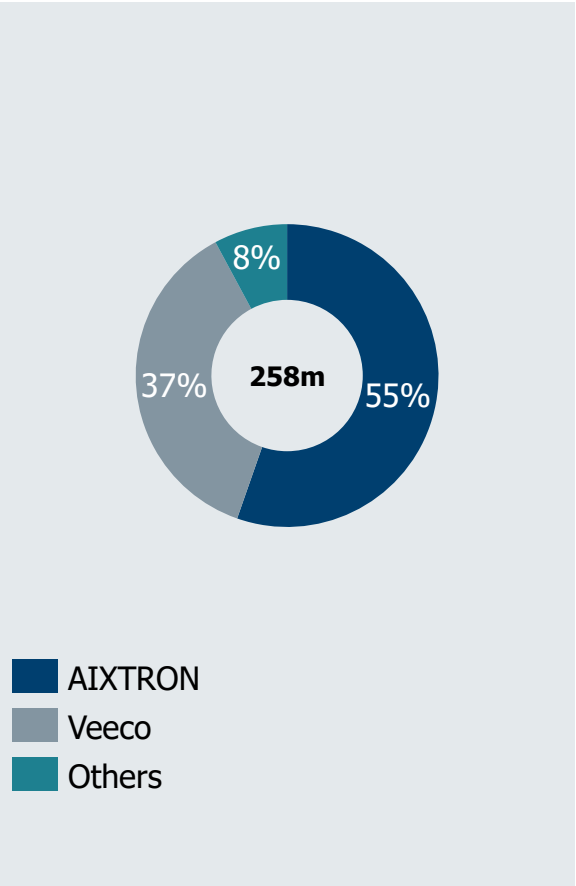
These thin film deposition technologies are offered by AIXTRON's subsidiary APEVA.

APEVA

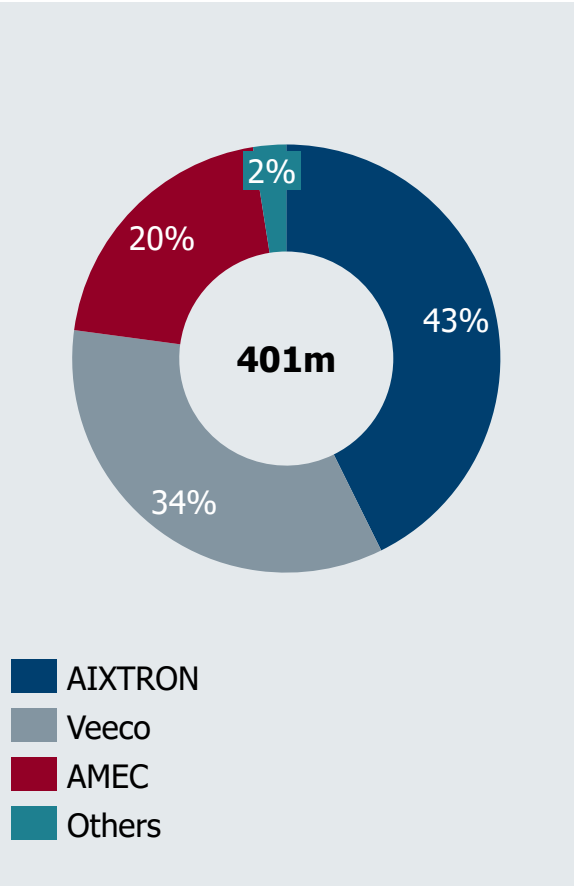
Our MOCVD Market Position

(Market Size in USD)

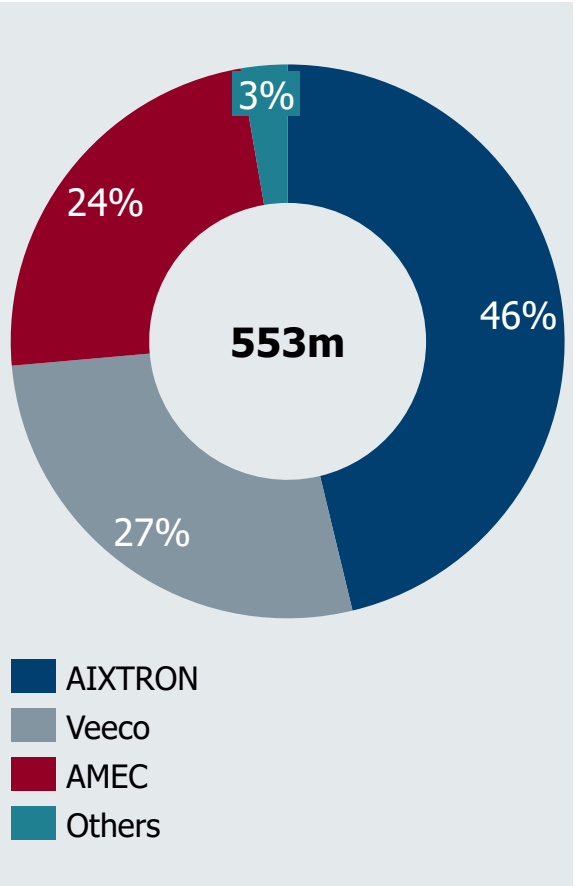
2016



2017



2018



Source: Gartner „Market Share: Semiconductor Wafer Fab Equipment, Worldwide, 2018" (publ. April, 2019)

Technology Portfolio for Complex Material Deposition

OLED: OVPD®/PVPD®

APEVA

AIXTRON
Our technology. Your future.

Carbon – PECVD

NANO: Innovation Pool

LEDs / Optoelectronics

Lasers (VCSEL/EEL)

(e.g. 3D Sensing; Consumer Electronics; Optical Datacom, LIDAR)

Specialty LEDs

(e.g. Fine Pitch-, MiniLED-, Horticulture; Purification, next-gen MicroLED-Displays)

GaN Power | GaN RF

(e.g. Wireless Charging, Fast Charging, Power Supply, 5G Network)

SiC Power

(e.g. Electric Vehicles, Charging Stations, Infrastructure)

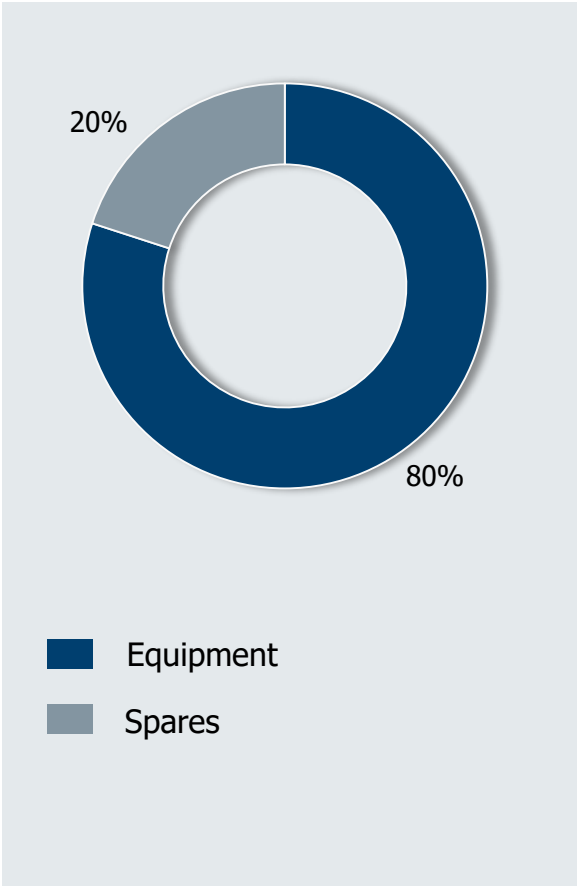
Power Management

MOCVD Core Technology

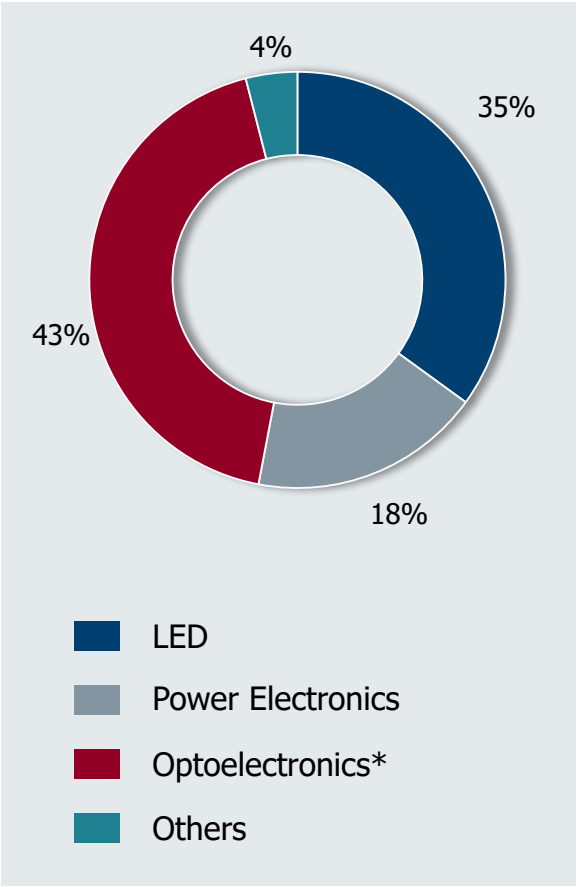
Revenue Analysis*

* Rounded figures; may not add up

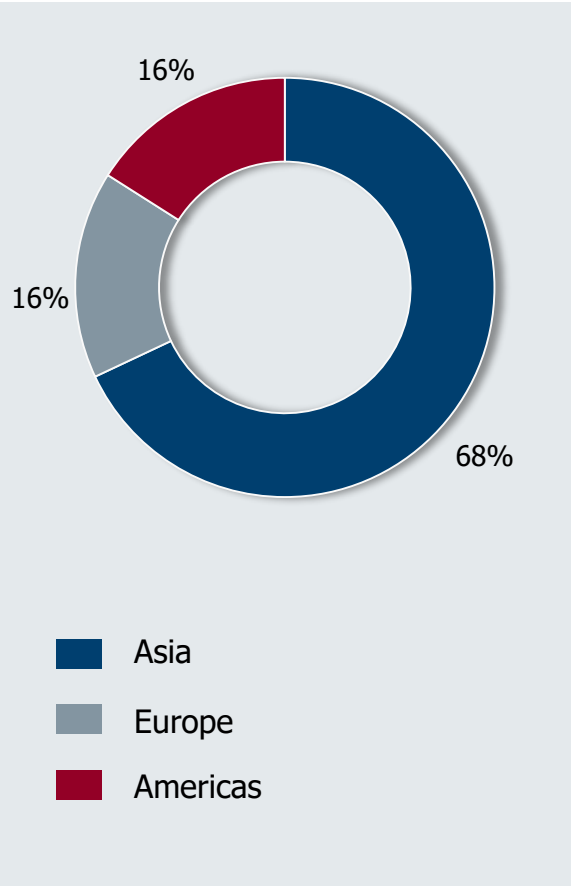
2019 by equipment & spares



2019 by end application (equipment only)



2019 by region



* Optoelectronics includes applications in Consumer Optoelectronics, Telecom/Datacom and Solar

Key Financials FY 2019*

* Rounded figures; may not add up

(€ million)	2019	2018	+/- %	Q4/19	Q3/19	+/- %
Order intake	**231.9**	**302.5**	**-23**	**81.4**	**52.2**	**56**
Order backlog (equipment only)	**116.7**	**138.3**	**-16**	**116.7**	**108.4**	**8**
Revenues	**259.6**	**268.8**	**-3**	**75.1**	**52.6**	**43**
Gross profit	**108.7**	**117.6**	**-8**	**34.0**	**22.1**	**54**
%	*42*	*44*	*-2 pp*	*45*	*42*	*3 pp*
EBIT	**39.0**	**41.5**	**-6**	**14.4**	**5.5**	**162**
%	*15*	*15*	*0 pp*	*19*	*10*	*9 pp*
Net result	**32.5**	**45.9**	**-29**	**12.2**	**4.4**	**176**
%	*13*	*17*	*-4 pp*	*16*	*8*	*8 pp*
Net result per share (EUR)	**0.29**	**0.41**	**-29**	**0.11**	**0.04**	**176**
Free Cash Flow	**36.0**	**4.4**	**718**	**37.8**	**2.6**	**n.m.**

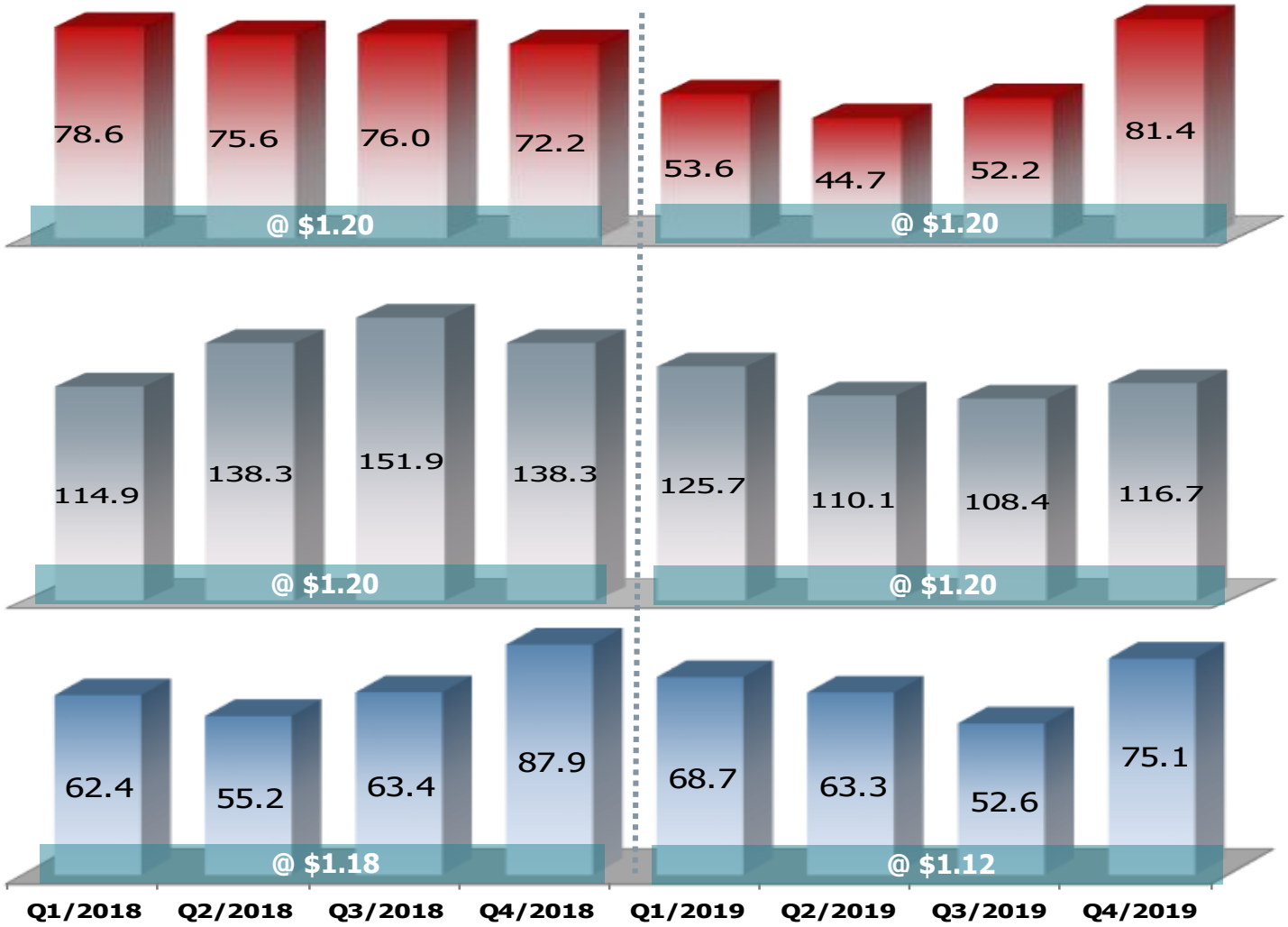
24 - Month Business Development

(€ million)

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

Order Backlog
(equipment only)

Revenues
(incl. equipment. service. spare parts)



USD order intake and backlog were recorded at the prevailing budget rate (2018: $1.20/€; 2019: $1.20/€)
USD revenues were converted at the actual period average FX rate (2018: $1.18/€; 2019: $1.12/€)

Consolidated Income Statement*

* Rounded figures; may not add up

(€ million)	2019	2018	+/- %	Q4/19	Q3/19	+/- %
Revenues	**259.6**	**268.8**	**-3**	**75.1**	**52.6**	**43**
Cost of sales	**150.9**	**151.2**	**0**	**41.1**	**30.4**	**35**
Gross profit	**108.7**	**117.6**	**-8**	**34.0**	**22.1**	**54**
%	*42*	*44*	*-2 pp*	*45*	*42*	*3 pp*
Selling expenses	9.9	9.4	6	2.8	2.4	16
General & admin expenses	16.5	18.4	-10	4.0	4.3	-6
R&D	55.0	52.2	5	15.0	14.7	2
Net other operating income	(11.6)	(3.8)	205	(2.3)	(4.7)	-52
EBIT	**39.0**	**41.5**	**-6**	**14.4**	**5.5**	**163**
%	*15*	*15*	*-0 pp*	*19*	*10*	*9 pp*
Net result	**32.5**	**45.9**	**-29**	**12.2**	**4.4**	**176**
%	*13*	*17*	*-4 pp*	*16*	*8*	*8 pp*

Balance Sheet*

* Rounded figures; may not add up

(€ million)	31/12/19	30/09/19	31/12/18
Property. plant & equipment	64.5	64.8	63.1
Goodwill	72.4	72.2	71.6
Other intangible assets	2.4	2.2	2.1
Others	11.7	12.5	13.3
Non-current assets	**151.0**	**151.8**	**150.1**
Inventories	79.0	87.9	73.5
Trade receivables	29.2	33.2	40.1
Others	5.4	6.5	11.5
Cash & Cash Deposits	298.3	260.6	263.7
Current Assets	**412.0**	**388.2**	**388.8**
Equity	**464.1**	**451.0**	**429.6**
Non-current liabilities	**4.5**	**4.8**	**1.8**
Trade payables	19.4	14.0	27.8
Advance payments from customers	51.1	44.4	53.3
Others	23.9	25.9	26.3
Current liabilities	**94.3**	**84.3**	**107.4**
Balance Sheet total	**563.0**	**540.1**	**538.9**

Consolidated Statement of Cash Flows*

* Rounded figures; may not add up

(€ million)	2019	2018	Q4/19	Q3/19
Net Result	**32.5**	**45.9**	**12.2**	**4.4**
Adjust for Non Cash Items	13.1	0.7	3.9	3.0
Changes in Working Capital	-2.8	-34.6	20.0	-2.4
Cash Flow from Operating Activities	**42.8**	**11.9**	**36.1**	**5.0**
Capex & Interest received	**-6.8**	**-7.6**	**1.7**	**-2.4**
Free Cash Flow	**36.0**	**4.4**	**37.8**	**2.6**
FX effects and financing	**-0.9**	**12.8**	**0.0**	**-0.8**
Cash & Deposits	**298.3**	**263.7**	**298.3**	**260.6**

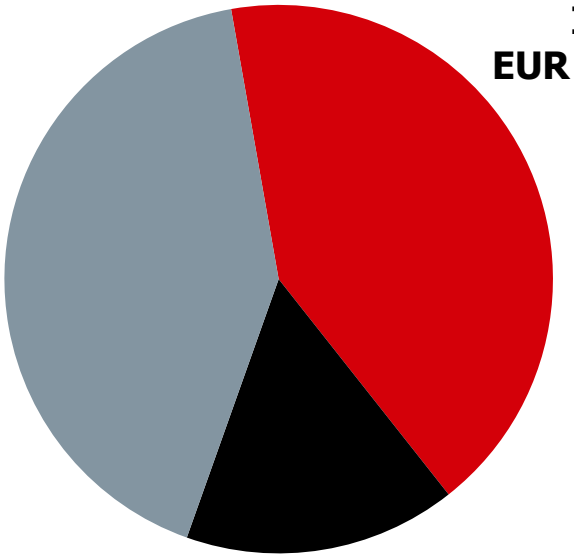
AIXTRON – 2020 Guidance*

Based on current order situation, Management expects for 2020**:

- Total Order Intake between EUR 260 ~ 300 million
- Revenues between EUR 260 ~ 300 million
- Gross Margin of ~40%
- EBIT between 10% and 15% of Revenues

2020 Guidance*

Order Backlog as of January 1, 2020: EUR 117m



2020 Shippable Equipment Order Intake: EUR 98 ~ 138m

2020 Estimated Spares & Service Revenues: ca. EUR 45m

* Based on 1.20 USD/EUR Budget Rate; please refer to "Expected Results of Operations and Financial Position" in the AIXTRON 2019 Annual Report for further information

** Based on the assumption that the COVID-19 outbreak will not have a significant impact on the business

Market Prospects

Short-Term

- Increasing adoption of compound semiconductor-based lasers for 3D sensor systems in mobile devices as well as sensors for infrastructure applications.
- Further increasing demand for lasers for ultra-fast optical data transmission of large volumes, such as for video streaming and Internet-of-Things (IoT) applications.
- Increasing use of LEDs and specialty LEDs (esp. red-orange-yellow, UV or IR) in displays and other applications.
- Increasing use of wide-band gap GaN- or SiC-based components for energy-efficient power electronics devices in autos, in consumer electronics, in mobile devices and in IT infrastructure.
- Progress in the development of OLED displays that require an efficient deposition technology.

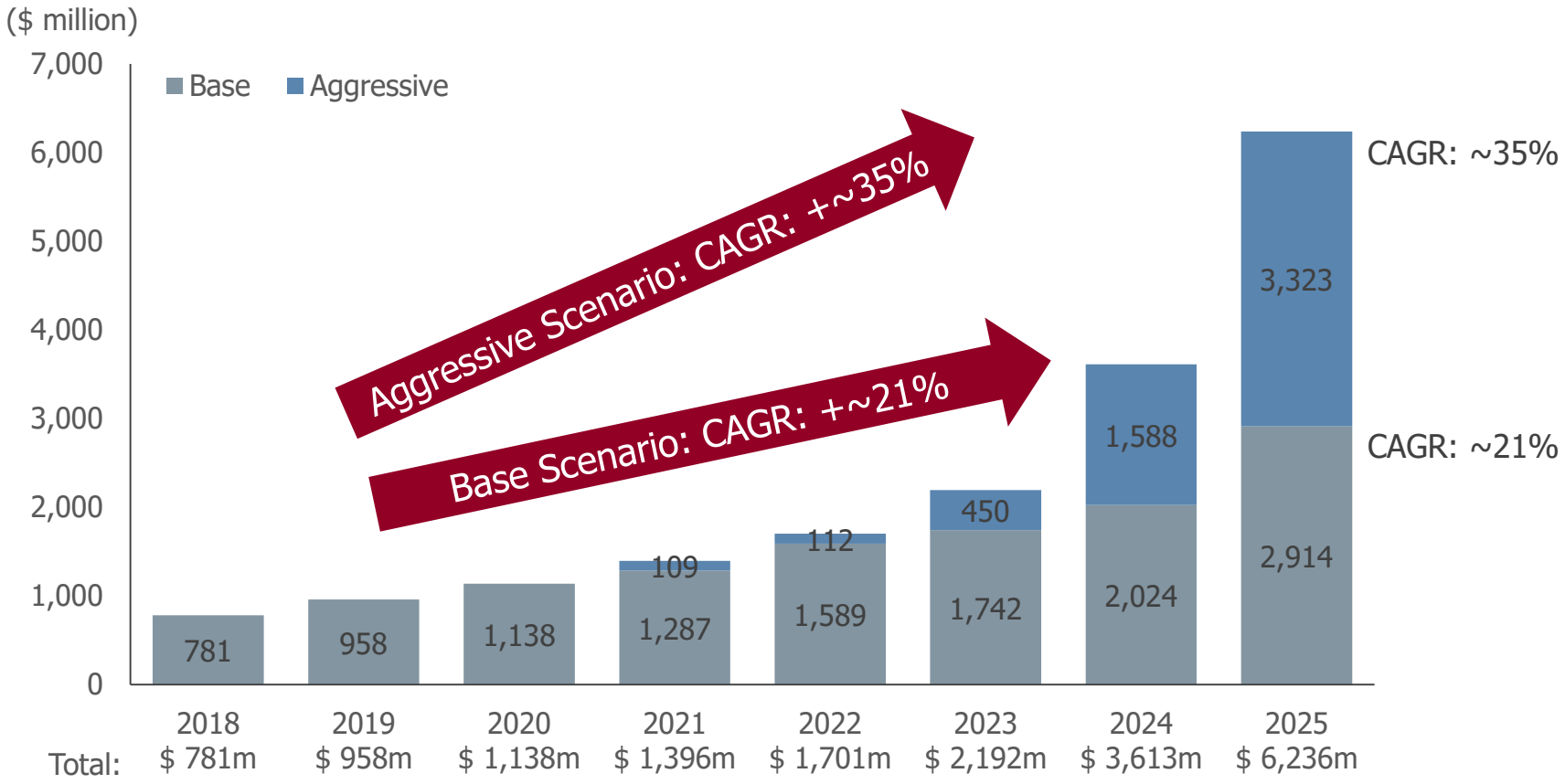
Mid- to Long-Term

- Development of new applications based on wide-band gap materials such as high-frequency chips or system-on-chip architectures with integrated power management.
- Increased use of compound semiconductor-based sensors for autonomous driving.
- Increased development activities for high performance solar cells made of compound semiconductors.
- Development of new materials with the help of carbon nanostructures (carbon nanotubes, -wires and graphene).
- Development of alternative LED applications, such as visual-light communication technology or Micro LED displays.

Epitaxial Growth Equipment Market Forecast*

* Excluding MBE

- ✓ **Micro LED equipment demand as strongest driver from 2021 (Aggressive Model)**
- ✓ **Power equipment demand to accelerate from 2021**

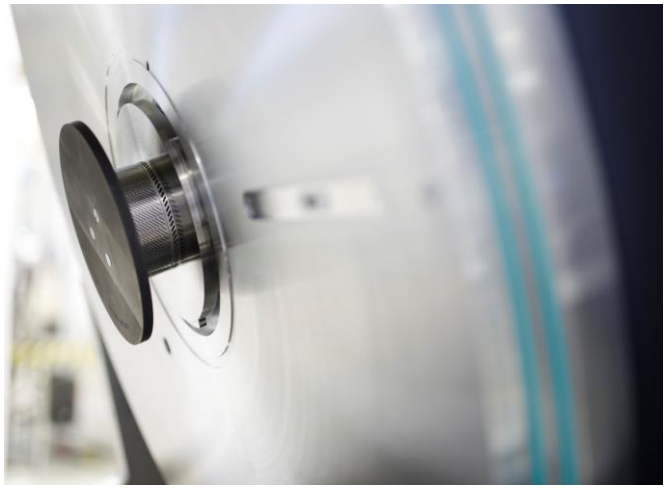


Source:
Epitaxial Growth Equipment Market for More-than-Moore Devices by Yole Developpement 2020

Our technology. YOUR FUTURE.

AIXTRON MOCVD – Planetary Reactor®: Tool-of-Record

- ✓ Individual Wafer Rotation = Best Material Uniformity
- ✓ Individual wafer temperature adjustment = Wafer Level Control/Optimization
- ✓ Highest Epi / Product Yield = Lowest Production Cost



AIXTRON – Enabling Emerging Global Mega Trends

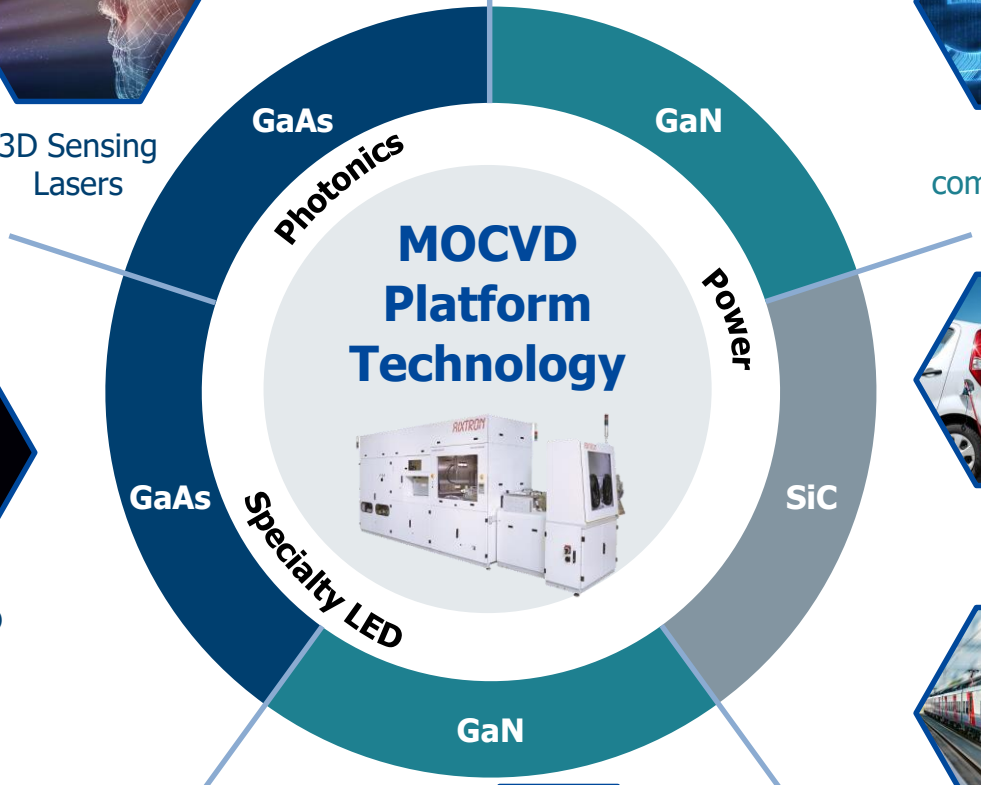
Automotive

Optical Communication

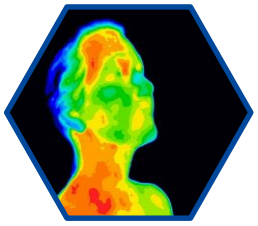
3D Sensing Lasers

Mobile communication

Power Supplies for Consumer Electronics



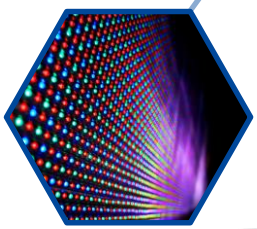
Fine Pitch & MiniLED Displays



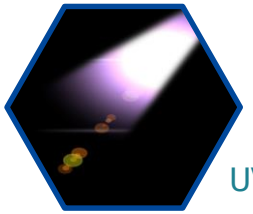
Infrared LED

Electric Vehicles

Solar



MicroLED Displays



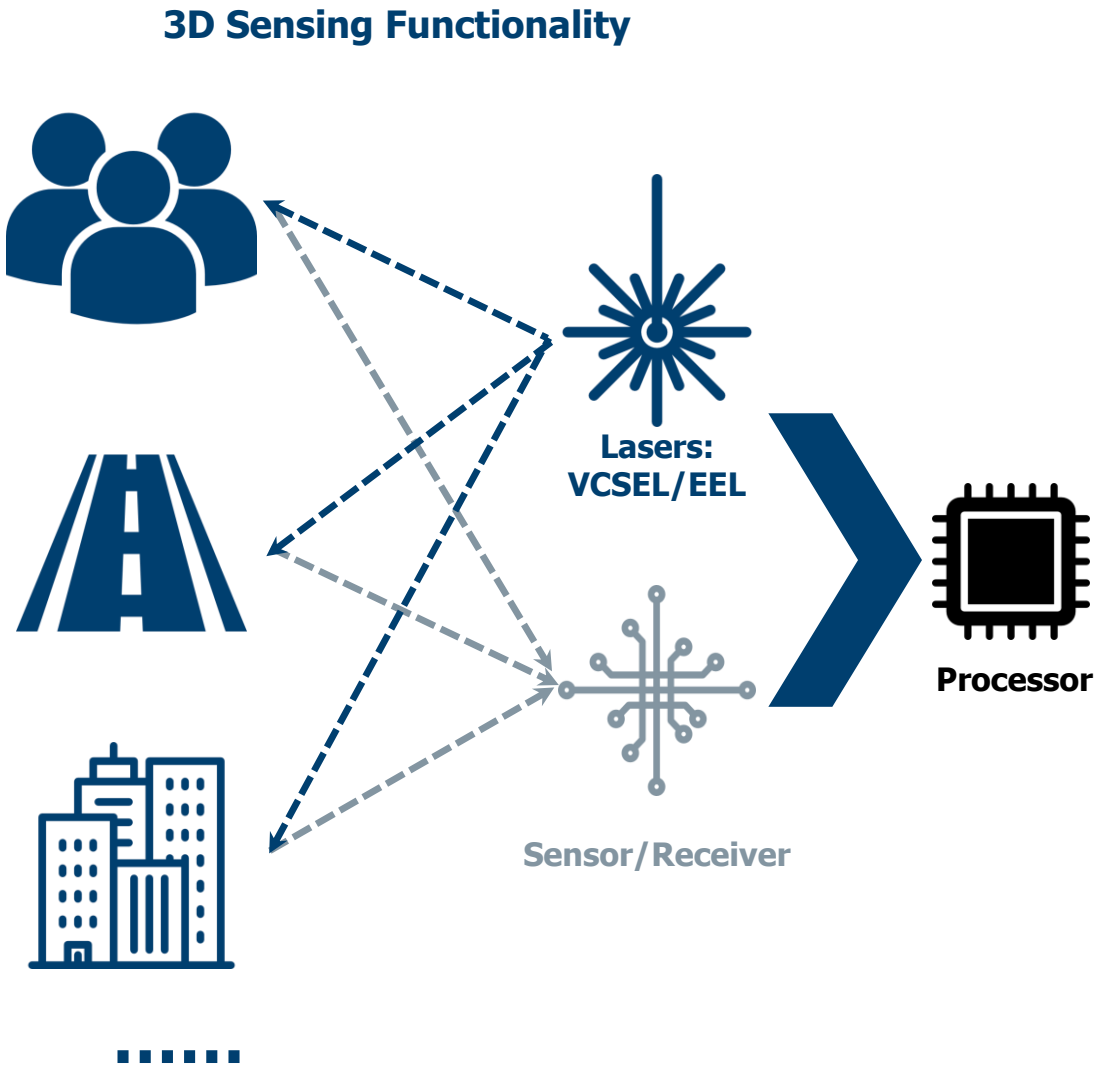
UV LED

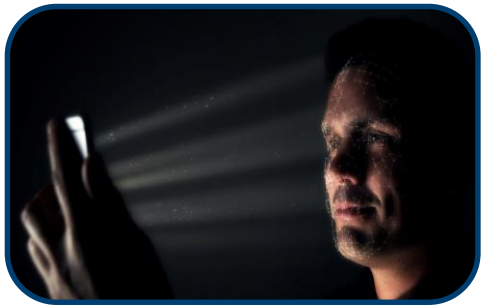
Electric Trains

Industry Power Supplies

Devices: VCSEL/EEL – 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: GaN/SiC Power Electronics – Superior Performance

Source: icons from www.flaticon.com

More Efficient

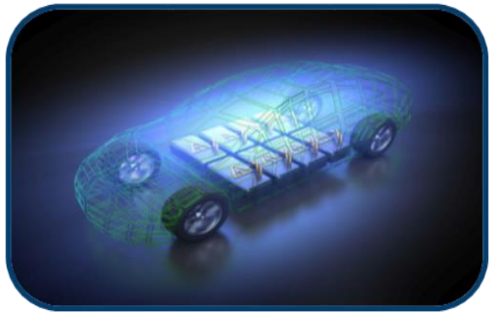
Smaller

Energy Saving

Less Heat

Light Weight

Lower System Cost



Electric Vehicles

EV-charging

Data Centers

Renewable Energy

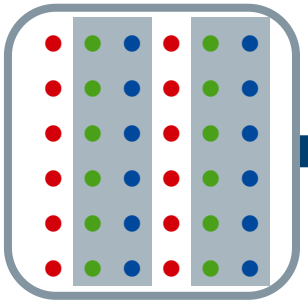
Wireless Charging

Fast Charging

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

Source: LEDinside, Yole Développement

RGB* LED DISPLAYS



Stadium Outdoor Display

(Pixel Pitch ≥10mm)
(Chip size: ≥ 200µm)

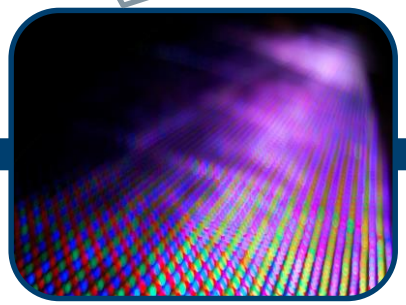
Fine Pitch Indoor Display

(Pixel Pitch ≤2.5mm)
(Chip size: ≥ 200µm)

MiniLED for Consumer Electronics

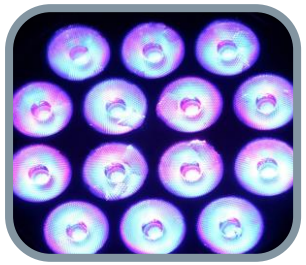
(Chip size: ≤ 200µm)

Initial Introduction Expected



MicroLED for Consumer Electronics

(Chip size: ≤ 50µm)



UV LED

Curing

Water Disinfection

Air Purifier

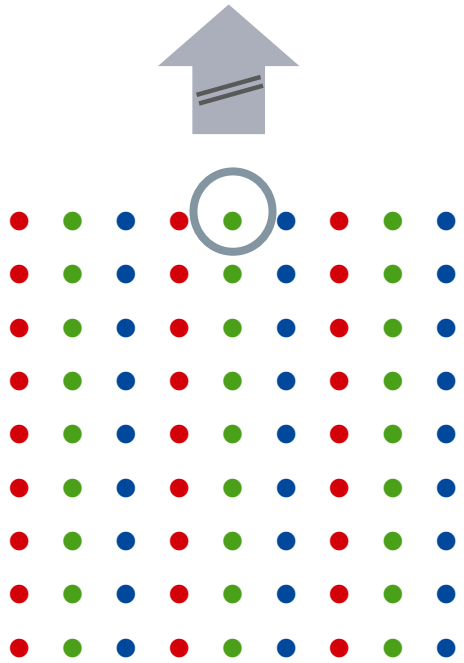
*RGB = Red, Green & Blue

Devices: MiniLED & MicroLED – The Perfect Future Display Technology

Source: LEDinside

RGB* MicroLED Display

$\approx \frac{1}{100}$

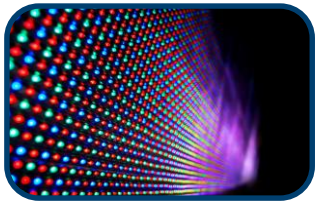


RGB* LED Display

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

Wearables

AR/VR



Signage

Smartphones/Tablets/TVs

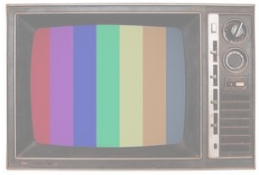
*RGB = Red, Green & Blue

AIXTRON – Instrumental in Evolving Display Technologies

APEVA

Specialty LED

CRT



1950's →

Plasma LCD

2000's →

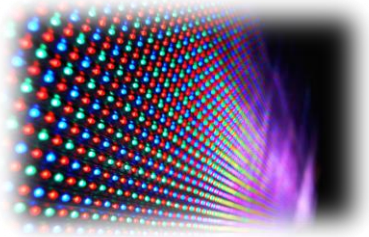
LED Backlit Display

2006 →

OLED Display

2010 →

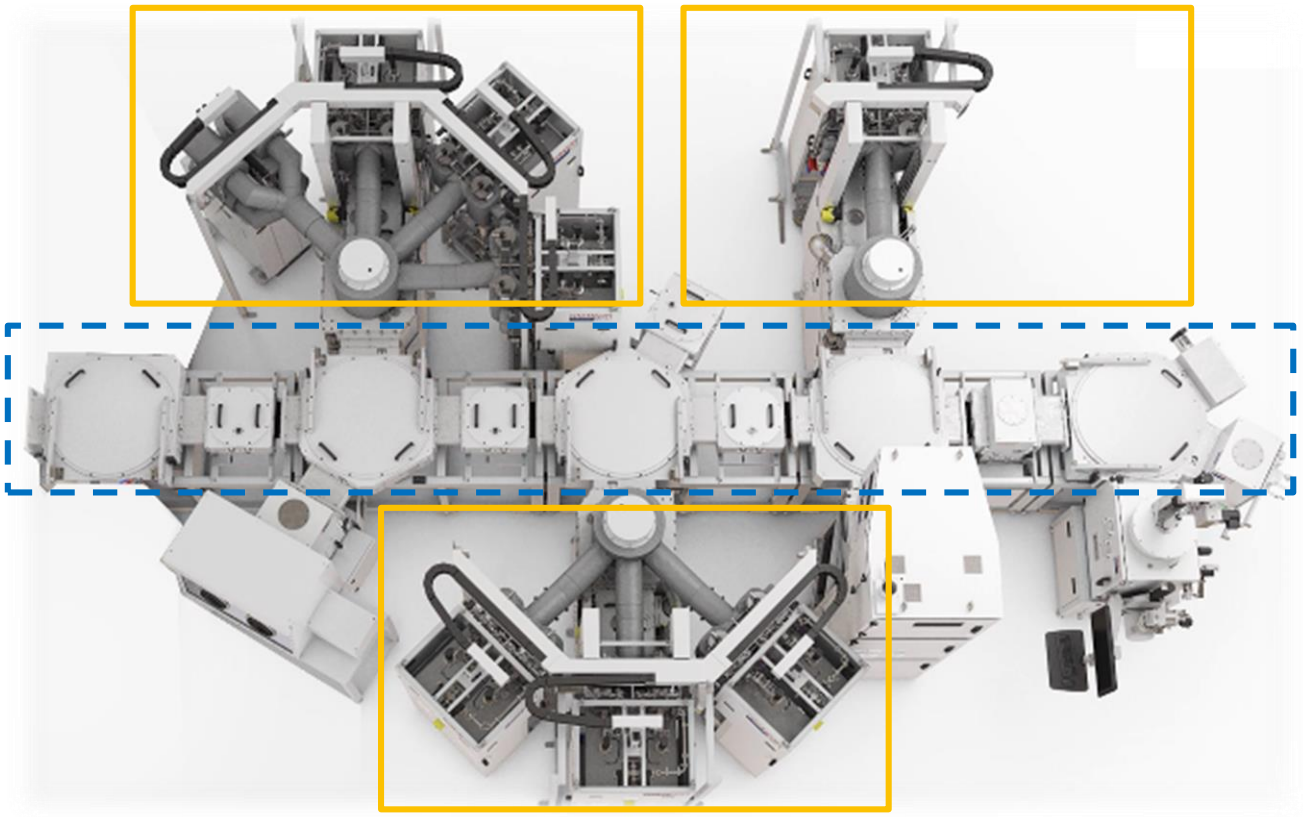
MicroLED Display



Under Development →

APEVA: Complete OLED Deposition System Provider

OVPD Deposition Line*



OVPD Deposition

Automation & Handling

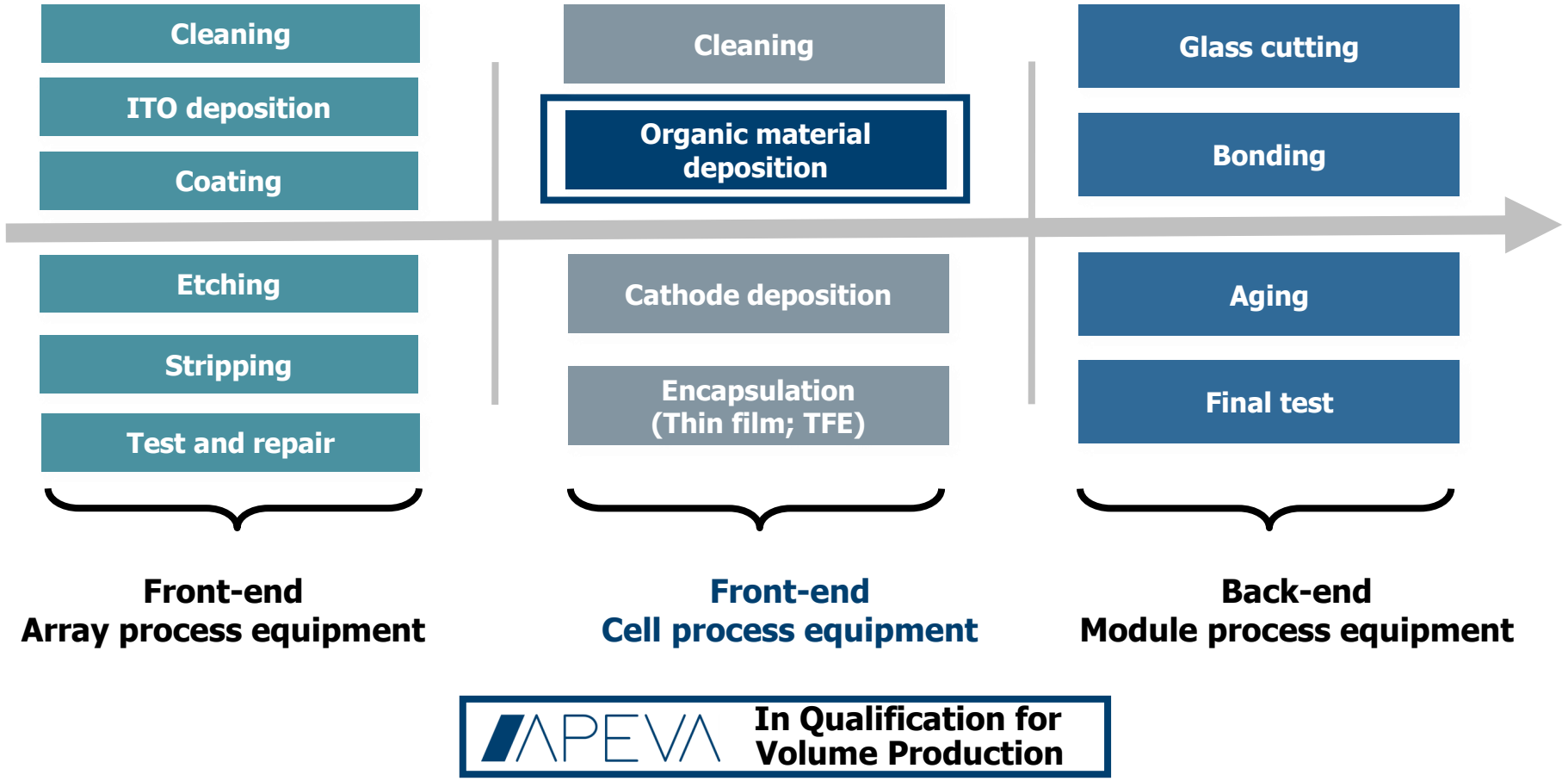
- Fully Automated OLED Deposition Lines and Fab Integration as a Complete System Provider
- Innovative Deposition Technology with
  - Higher Efficiency of OLED Material Deposition
  - Mixing and Doping of Materials via Multiple Material Deposition in One Chamber
  - Maintaining the Delicate Organic Material Properties improving Lifetime

* Pictures shown are for illustration purpose only

Organic Electronics – OVPD® – APEVA

Source: DisplaySearch, AIXTRON

OLED manufacturing process



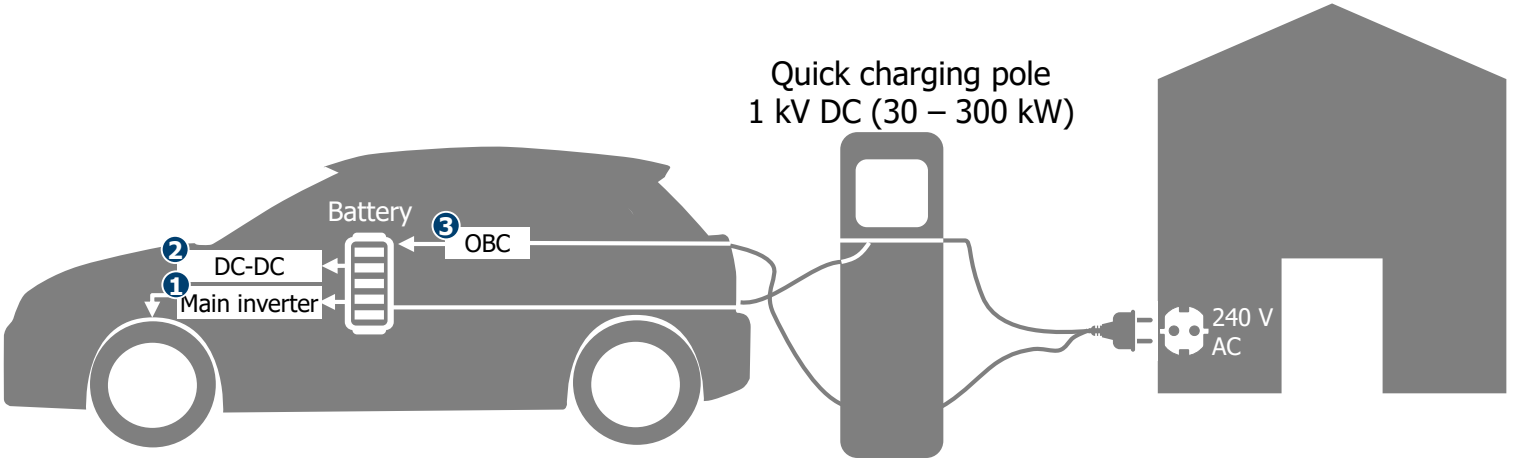
APEVA **In Qualification for Volume Production**

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**	

Low to Medium Voltages Medium to High Voltages

SiC in Automotive : Main Inverter as the Major Market Opportunity



Higher efficiency =

- ✓ Battery size reduction
- ✓ Cost savings
- ✓ Range extension

Component	Power (kW)	Fraction 6" wafer*	Comment
Main inverter	20 ~ 150	0.1 ~ 0.5	Brings energy from battery to the electric motor
DC-DC Converter	1 ~ 3	<0.01	Brings energy from battery for car electronics
On Board Charger (OBC)	5 ~ 30	0.01	Brings 240 V AC energy from wall plug to battery
(Quick) Charging Pole	30 ~ 300	0.1 ~ 1	Brings 1–3 kV DC energy directly from grid to battery

* Back-of-the-envelope order-of-magnitude estimates

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

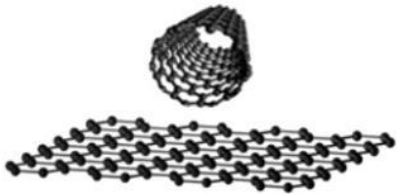
Product features

- 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

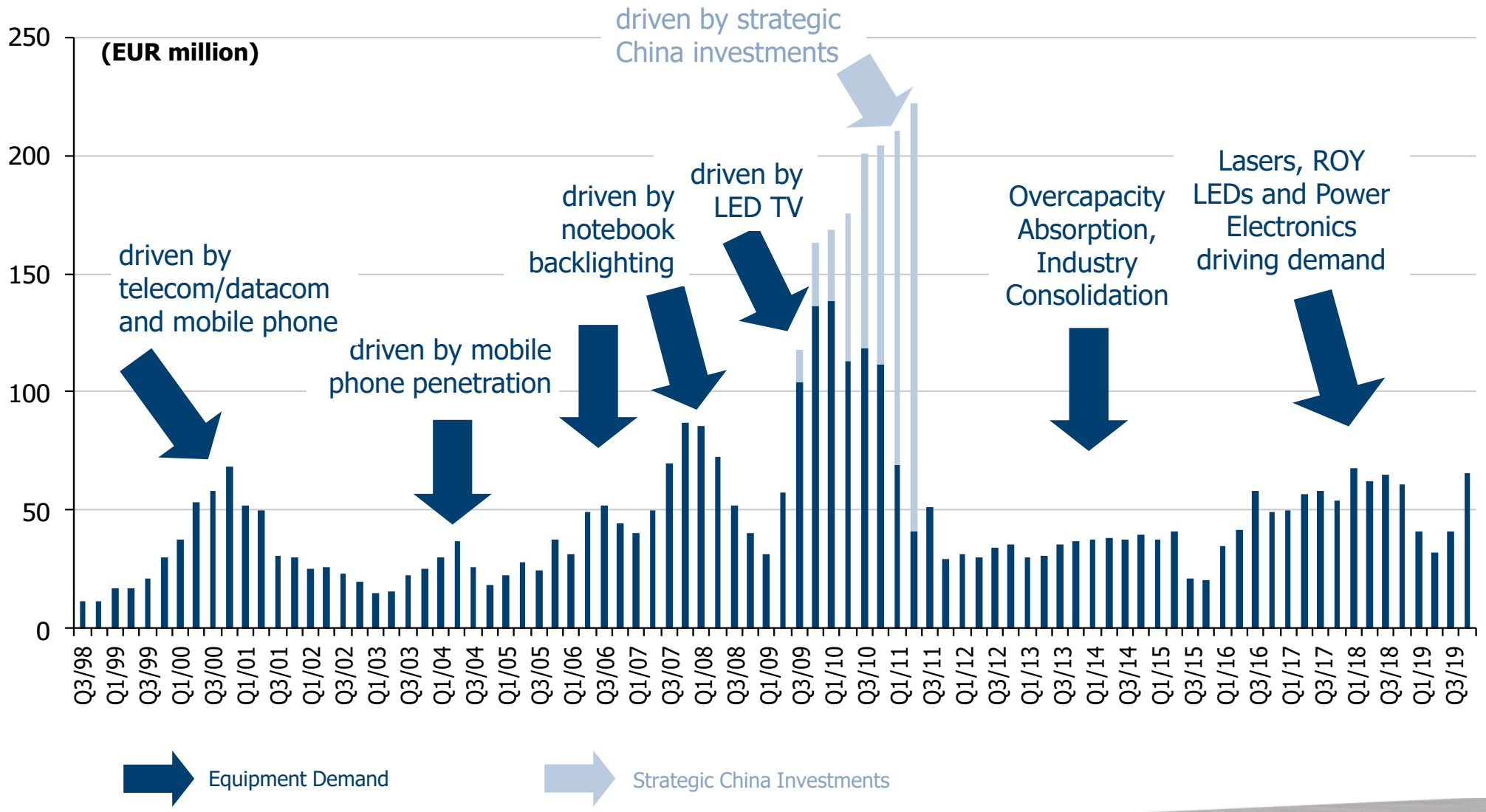
AIXTRON BM Pro

Production ready for tomorrow

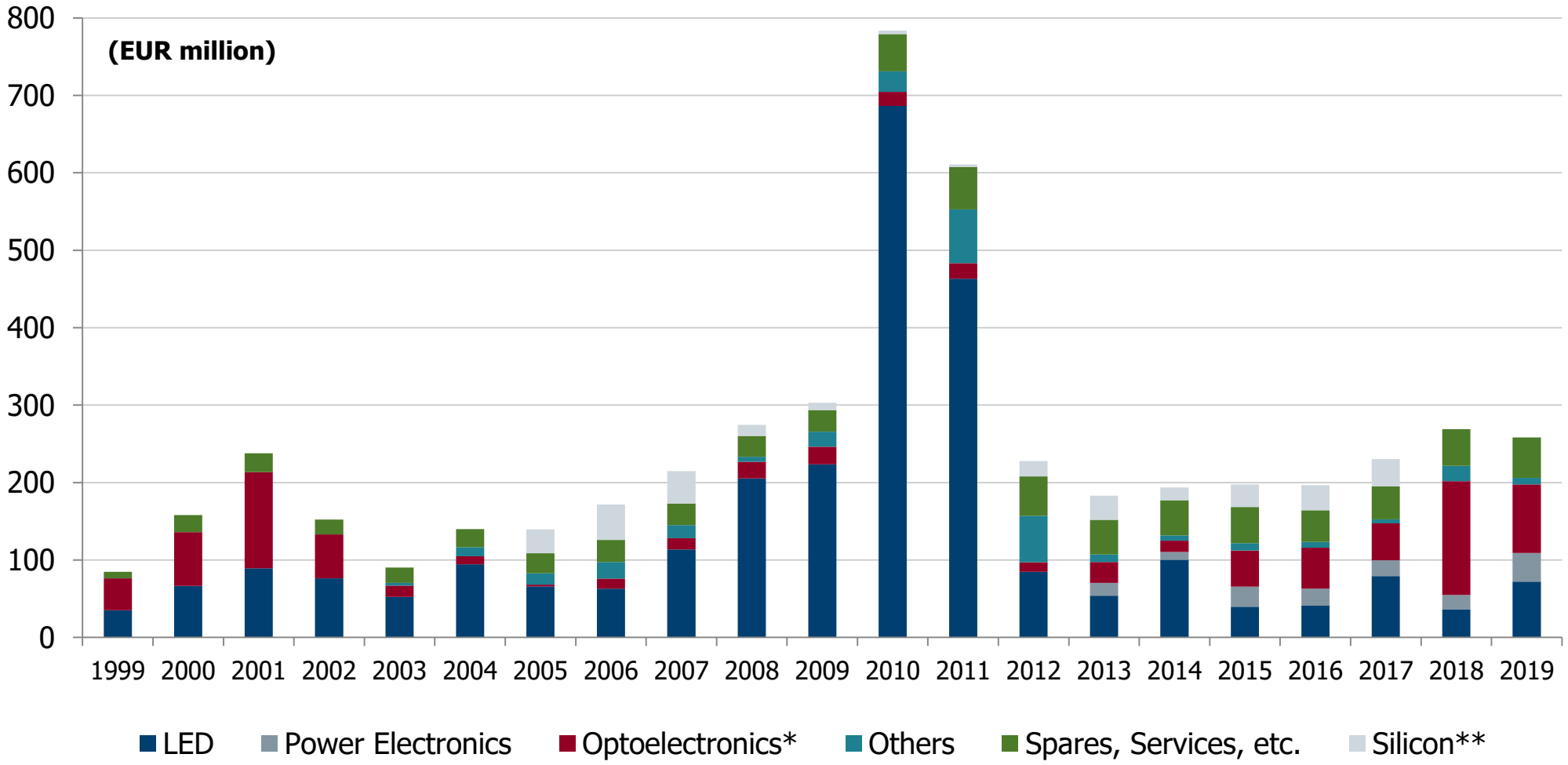
AIXTRON BM Pro 300

Our technology. YOUR FUTURE.

Order Intake per Quarter (Equipment Only)



Annual Total Revenues by Application (including spares)



* Optoelectronics includes applications in Consumer Optoelectronics, Telecom/Datacom and Solar
** Silicon: ALD/CVD product line sold in 2017

AIXTRON Competitive Landscape

		USA	Europe	China	Korea	Japan
Opto	GaAs/InP Optoelectronics, ROY LED	Veeco				TAIYO NIPPON SANSO The Gas Professionals
	GaN LED	Veeco		AMEC, TOPEC		TAIYO NIPPON SANSO The Gas Professionals
Power	GaN Power	Veeco				TAIYO NIPPON SANSO The Gas Professionals
	SiC Power		LPE			TEL TOKYO ELECTRON, NUFLARE
OLED		APPLIED MATERIALS, kateeva			YAS Your Artistic Solution	CANON TOKKI CORPORATION

Consolidated Income Statement*

* Rounded figures; may not add up

(€ million)	2019	2018	2017
Revenues	**259.6**	**268.8**	**230.4**
Cost of sales	150.9	151.2	156.4
Gross profit	**108.7**	**117.6**	**74.0**
%	*42 %*	*44 %*	*32 %*
Selling expenses	9.9	9.4	10.2
General & admin expenses	16.5	18.4	17.1
R&D	55.0	52.2	68.8
Net other operating income	11.6	3.8	27.0
EBIT	**39.0**	**41.5**	**4.9**
%	*15 %*	*15 %*	*2 %*
Net result	**32.5**	**45.9**	**6.5**
%	*13 %*	*17 %*	*3 %*

Balance Sheet*

* Rounded figures; may not add up

(€ million)	31/12/19	31/12/18	31/12/17
Property, plant & equipment	64.5	63.1	64.3
Goodwill	72.4	71.6	71.2
Other intangible assets	2.4	2.1	1.8
Others	11.7	13.3	4.0
Non-current assets	**151.0**	**150.1**	**141.3**
Inventories	79.0	73.5	43.0
Trade receivables	29.2	40.1	19.3
Others	5.4	11.5	5.0
Cash & Cash Deposits	298.3	263.7	246.5
Current Assets	**412.0**	**388.8**	**313.8**
Equity	**464.1**	**429.7**	**368.9**
Non-current liabilities	**4.5**	**1.8**	**2.0**
Trade payables	19.4	27.8	14.3
Contract liabilities for advance payments	51.1	53.3	30.3
Others	23.9	26.3	39.7
Current liabilities	**94.3**	**107.4**	**84.2**
Balance Sheet total	**563.0**	**538.9**	**455.1**

Consolidated Statement of Cash Flows*

* Rounded figures; may not add up

(€ million)	2019	2018	2017
Cash Flow from operating activities	42.8	13.0	70.1
Cash Flow from investing activities	-6.8	-16.1	40.7
Cash Flow from financing activities	-1.2	10.4	1.2
Exchange rate changes	-0.1	2.4	-5.5
Net change in Cash & Cash Equivalents	34.6	9.7	106.5
Cash & Cash Equivalents (beginning of period)	236.2	226.5	120.0
Cash & Cash Equivalents (end of period)	270.8	236.2	226.5
Change in Cash deposits	0.0	7.5	-19.5
Free Cash Flow	36.0	4.4	91.4
Capex	7.8	9.2	9.7

Financial Calendar & Contact Data

- April 30, 2020 — Q1/2020 Results, Conference Call
- May 20, 2020 — Annual General Meeting, Aachen, Germany
- October 29, 2020 — 9M/2020 Results, Conference Call
- February 2021 — FY/2020 Results, Conference Call

For further information please contact:

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Technology. Materials. Performance.

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