

AIXTRON Investor Presentation



IR Presentation – First Quarter 2020

(April 30, 2020)

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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 to 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 registered trademarks: AIXACT[®], AIXTRON[®], APEVA[®]; Atomic Level SolutionS[®], Close Coupled Showerhead[®], CRIUS[®], EXP[®], EPISON[®], Gas Foil Rotation[®], Optacap[™], OVPD[®], Planetary Reactor[®], PVPD[®], STExS[®], TriJet[®]

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



- 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

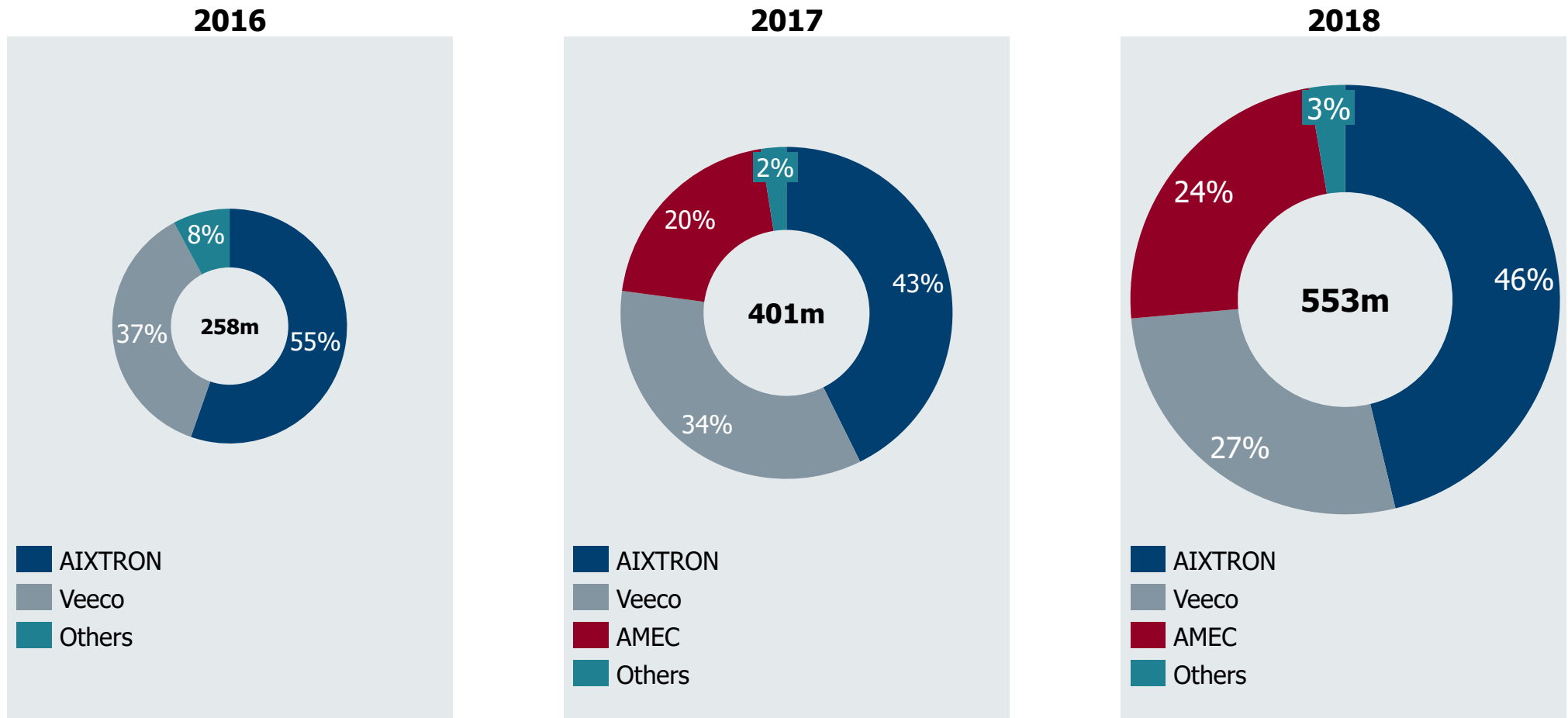
- **Organic Vapor Phase Deposition (OVPD)** for the deposition of Organic Light Emitting Diodes (OLED) based displays for smartphones to TV

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



Our MOCVD Market Position

(Market Size in USD)



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

Technology Portfolio for Complex Material Deposition

OLED: OVPD®/PVPD®



Our technology. Your future.

Carbon – PECVD

NANO: Innovation Pool

LEDs / Optoelectronics



Lasers (VCSEL/EEL)

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



GaN Power | GaN RF

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

Power Management



Specialty LEDs

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



SiC Power

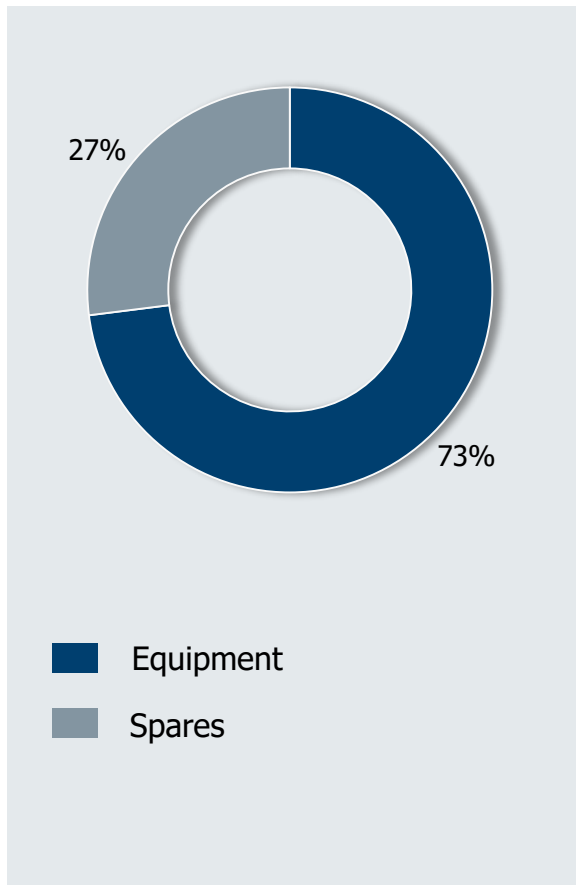
(e.g. Electric Vehicles, Charging Stations, Infrastructure)

MOCVD Core Technology

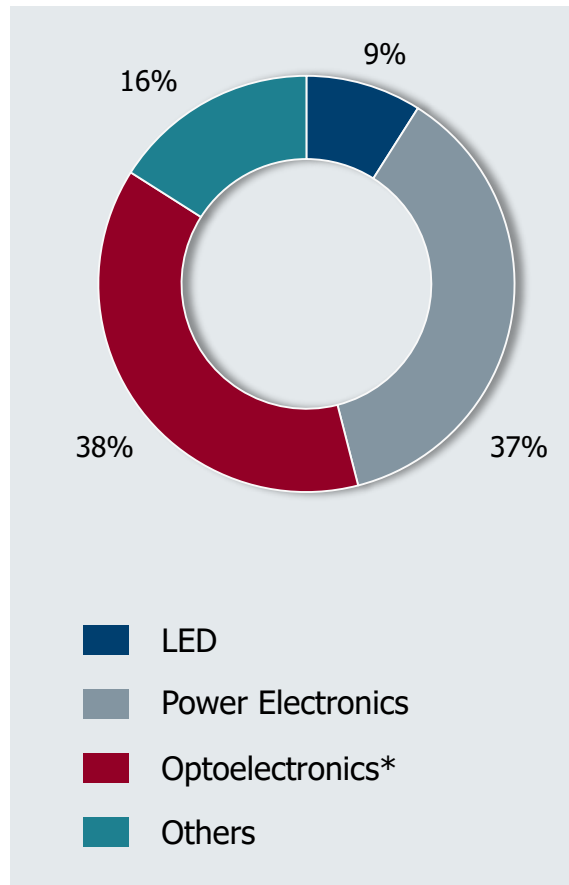
Revenue Analysis*

* Rounded figures; may not add up

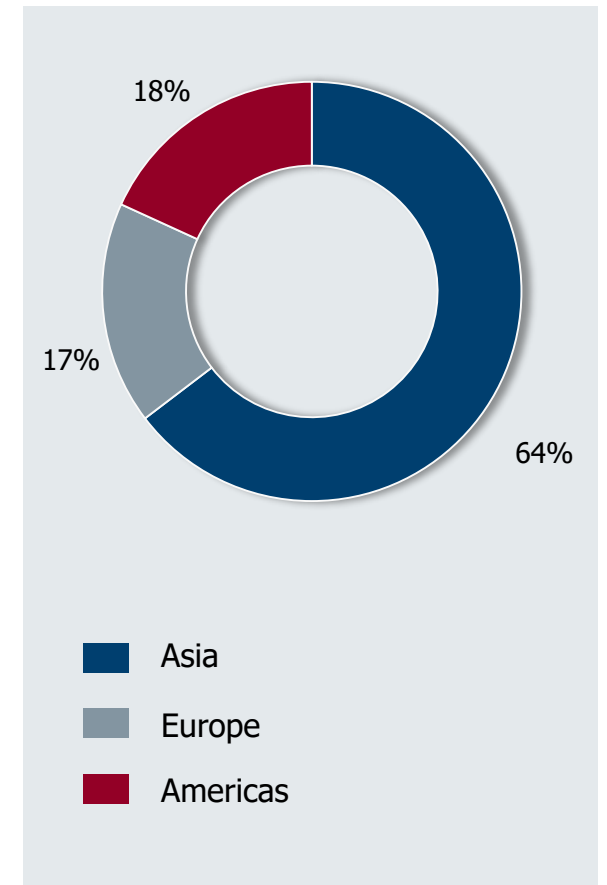
Q1/2020:
by equipment & spares



Q1/2020:
by end application
(equipment only)



Q1/2020:
by region

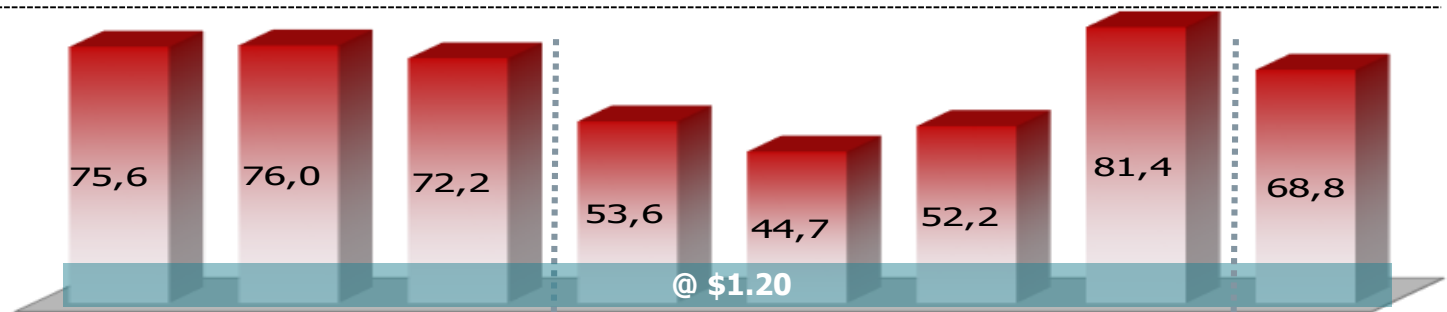


* Optoelectronics includes applications in Consumer Optoelectronics, Telecom/Datacom and Solar

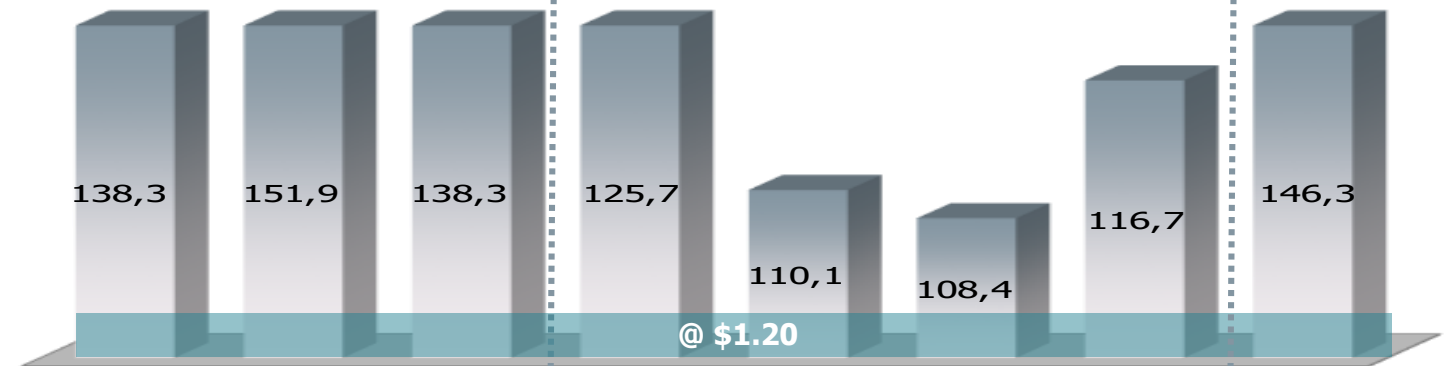
24 - Month Business Development

(€ million)

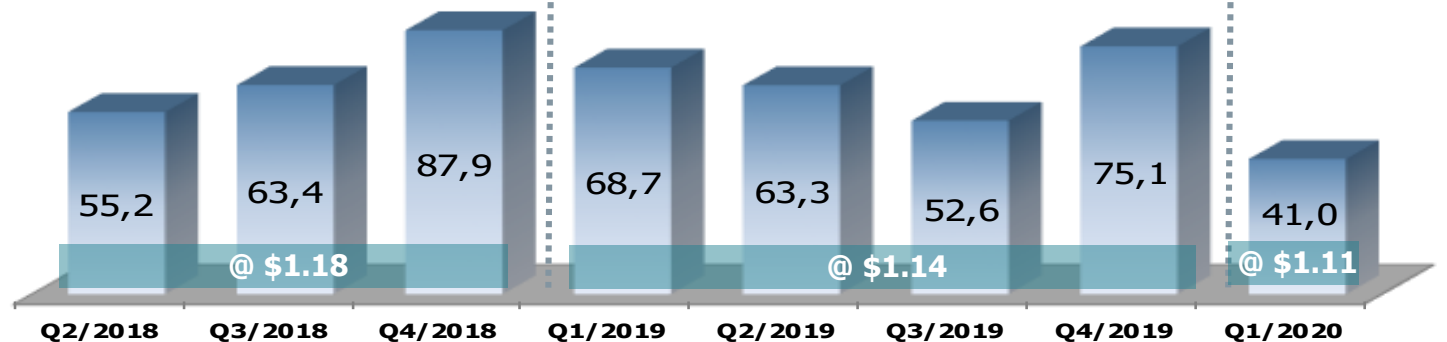
Order Intake
(incl. equipment,
service, spare parts)



Order Backlog
(equipment only)



Revenues
(incl. equipment,
service, spare parts)



USD order intake and backlog were recorded at the prevailing budget rate (2018-2020: \$1.20/€)

USD revenues were converted at the actual period average FX rate (2018: \$1.18/€; 2019: \$1.14/€; Q1/2020: \$1.11/€)

Consolidated Income Statement*

* Rounded figures; may not add up

(€ million)	Q1/20	Q1/19	+/- %	Q1/20	Q4/19	+/- %
Revenues	41.0	68.7	-40	41.0	75.1	-45
Cost of sales	26.4	42.0	-37	26.4	41.1	-36
Gross profit	14.6	26.7	-45	14.6	34.0	-57
%	36	39	-3 pp	36	45	-9 pp
Selling expenses	2.7	2.3	17	2.7	2.8	-6
General & admin expenses	4.8	3.8	26	4.8	4.0	18
R&D	14.4	12.8	13	14.4	15.0	-4
Net other operating income	-6.2	-1.9	223	-6,2	-2.3	173
EBIT	-1.1	9.7	n.m.	-1.1	14.4	n.m.
%	-3	14	-17 pp	-3	19	-22 pp
Net result	-0.8	8.5	n.m.	-0.8	12.2	n.m.
%	-2	12	-14 pp	-2	16	-18 pp

Balance Sheet*

* Rounded figures; may not add up

(€ million)	31/03/20	31/12/19	31/03/19
Property, plant & equipment	65.9	64.5	66.3
Goodwill	72.2	72.4	72.2
Other intangible assets	2.8	2.4	2.4
Others	11.9	11.7	13.5
Non-current assets	152.8	151.0	154.4
Inventories	85.2	79.0	80.2
Trade receivables	17.1	29.2	34.8
Others	9.7	5.4	15.5
Cash & Cash Deposits	300.8	298.3	247.9
Current Assets	412.8	412.0	378.4
Equity	462.9	464.1	441.2
Non-current liabilities	4.1	4.5	4.9
Trade payables	15.9	19.4	15.5
Contract liabilities for advance payments	60.2	51.1	45.2
Others	22.4	23.9	25.8
Current liabilities	98.5	94.3	86.6
Balance Sheet total	565.6	563.0	532.7

Consolidated Statement of Cash Flows*

Rounded figures; may not add up

(€ million)	Q1/20	Q1/19	Q1/20	Q4/19
Net Result	-0.8	8.5	-0.8	12.2
Adjust for				
Non Cash Items	-0.1	2.5	-0.1	3.9
Changes in Working Capital	5.6	-22.8	5.6	20.0
Cash Flow from Operating Activities	4.7	-11.9	4.7	36.3
Capital Expenditures, investing	-1.5	-5.4	-1.5	1.7
FX Effects & financing	-0.6	2.0	-0.6	0.0
Free Cash Flow	3.0	-17.5	3.0	37.6
Cash & Deposits	300.8	247.9	300.8	298.3

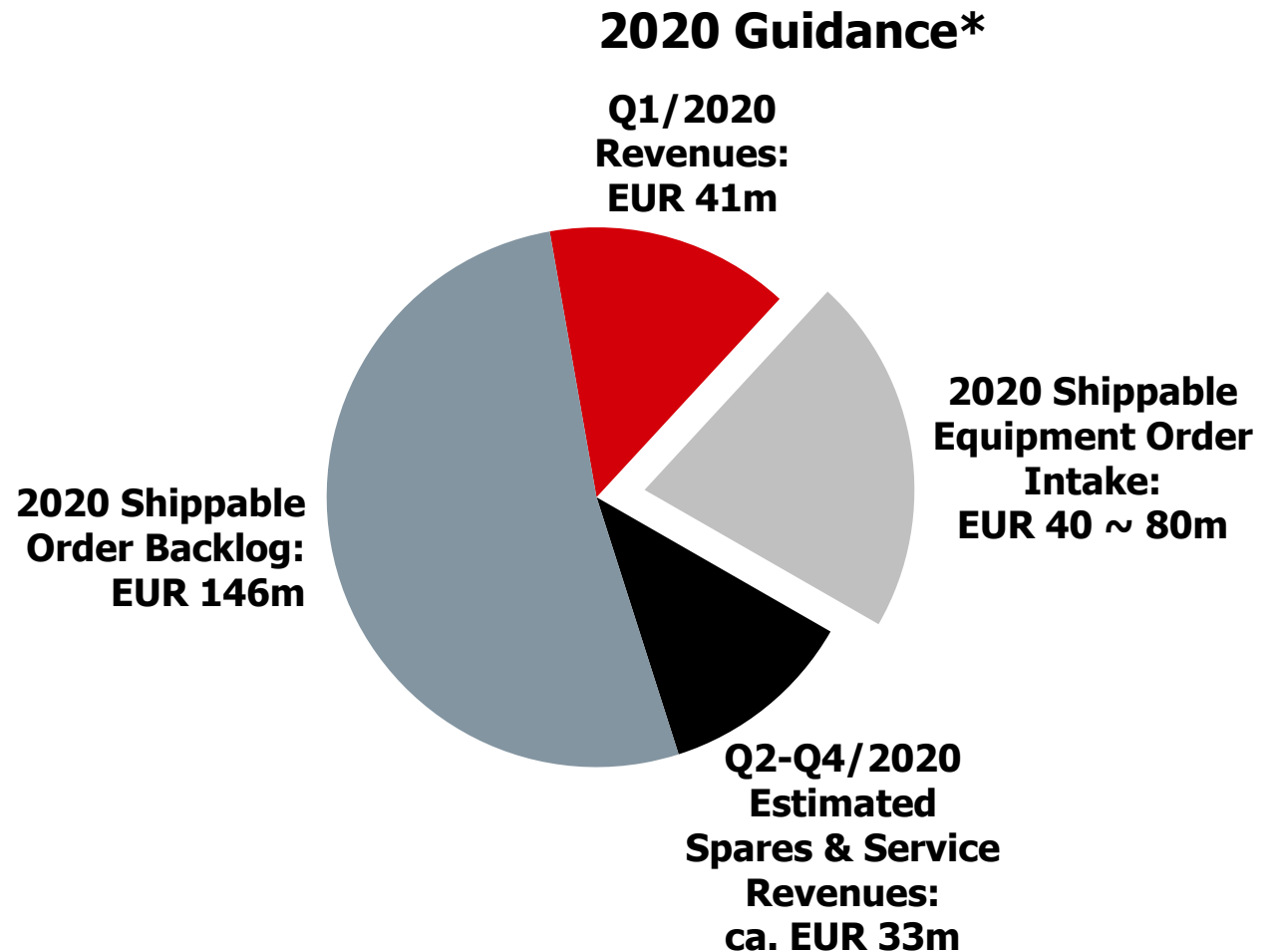
* 2019 figures reflect the changed presentation of cash flow in the 2019 Annual Report

AIXTRON – 2020 Guidance*: Confirmed

2020 Guidance* confirmed

taking Q1 Results, the current order situation and current environment into account:

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



• At 1.20 USD/EUR Budget Rate for the remainder of the year; please refer to "Expected Results of Operations and Financial Position" in the AIXTRON 2019 Annual Report for further information

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.

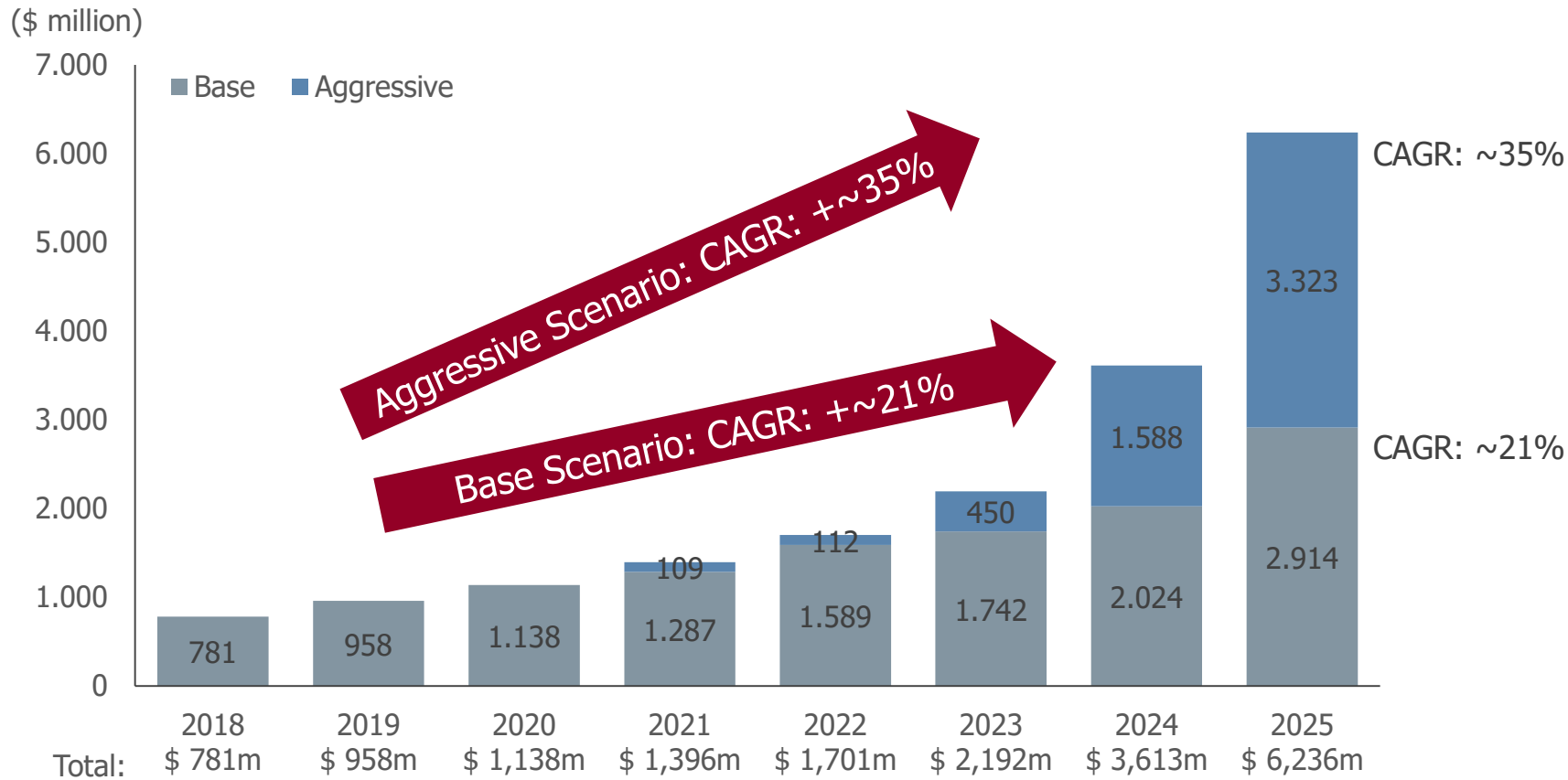
Mid- to Long-Term

- 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**





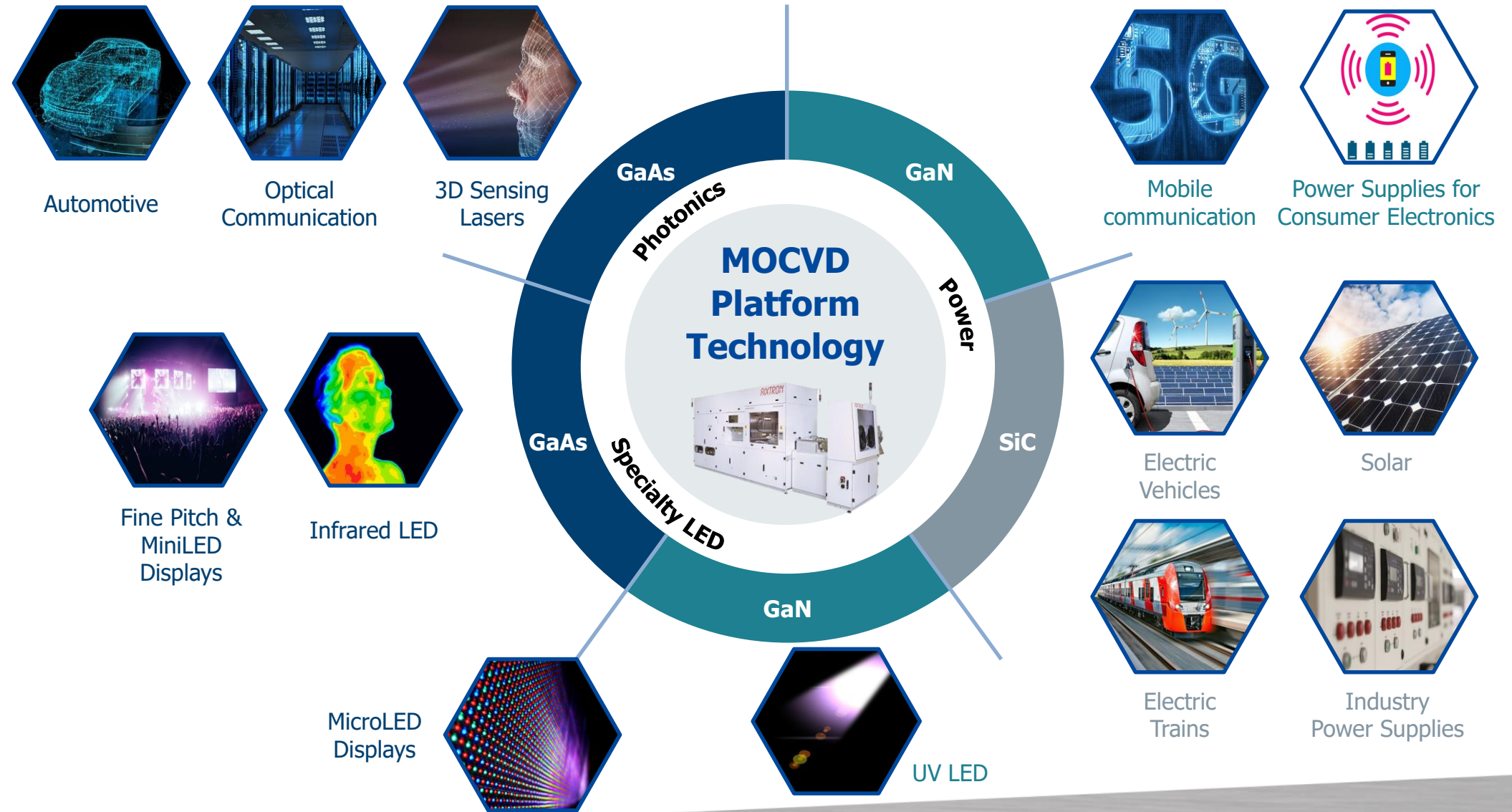
Our *technology*. YOUR FUTURE.

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



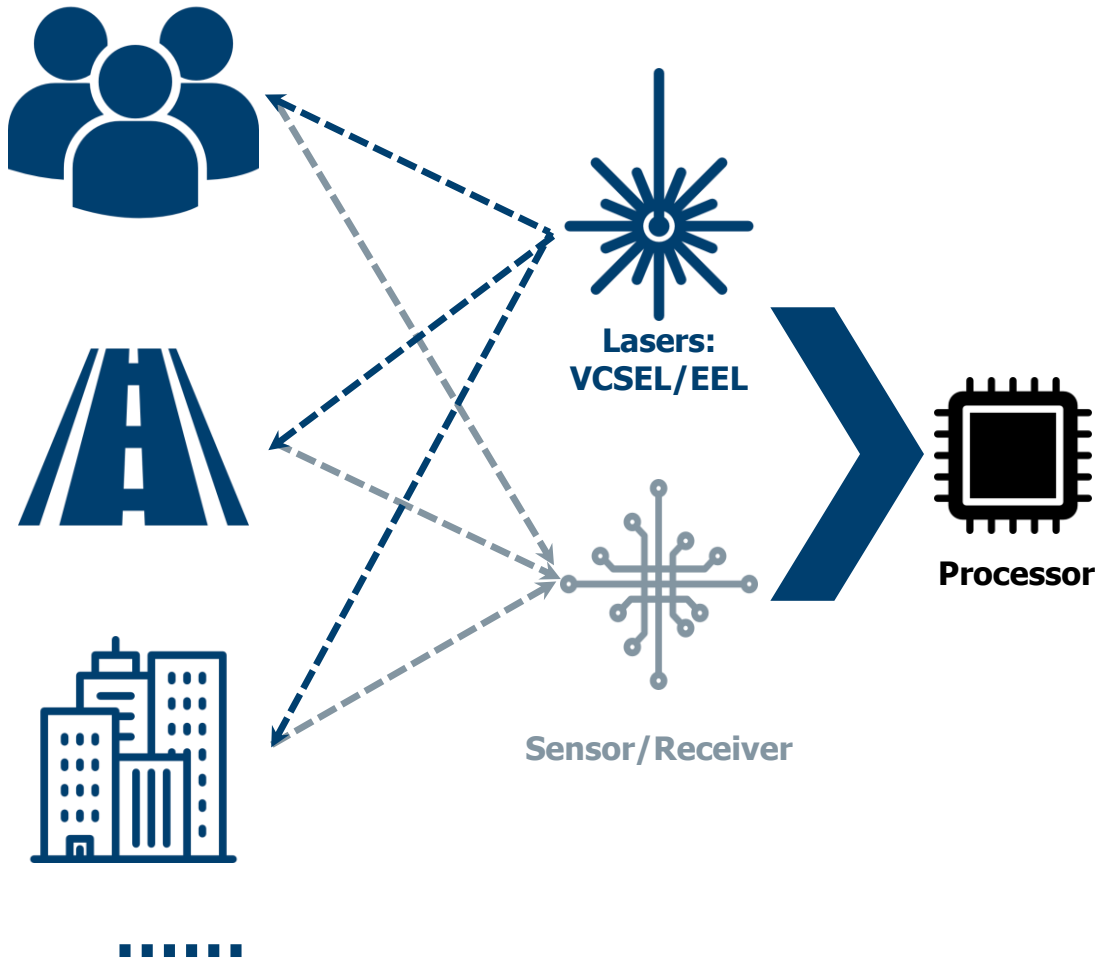
AIXTRON – Enabling Emerging Global Mega Trends



Devices: VCSEL/EEL – Internet of Things Creates New Opportunities

Source: icons from www.flaticon.com

3D Sensing Functionality



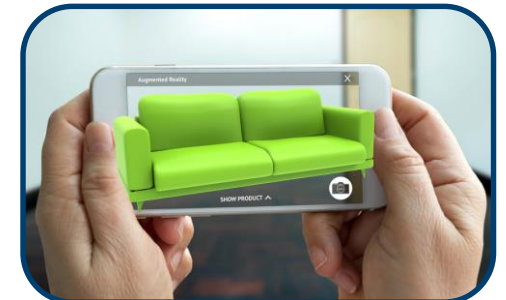
Facial Recognition



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



Energy Saving

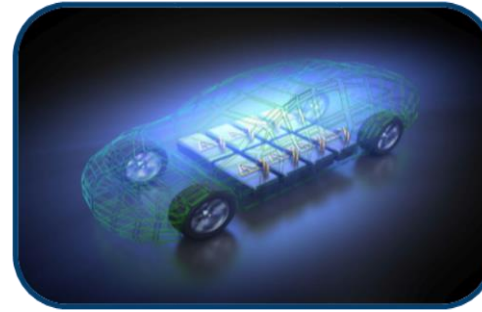
Less Heat

Light Weight

Lower System Cost



Smaller



Electric Vehicles



EV-charging



Data Centers



Renewable Energy



Wireless Charging

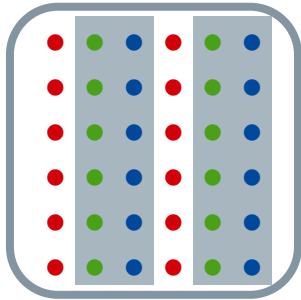


Fast Charging

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

Source: LEDinside, Yole Développement

RGB* LED DISPLAYS



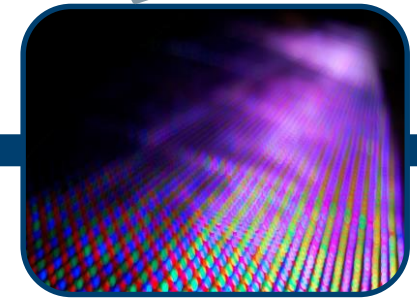
Stadium Outdoor Display
(Pixel Pitch $\geq 10\text{mm}$)
(Chip size: $\geq 200\mu\text{m}$)



Fine Pitch Indoor Display
(Pixel Pitch $\leq 2.5\text{mm}$)
(Chip size: $\geq 200\mu\text{m}$)

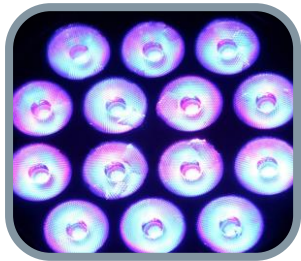


MiniLED for Consumer Electronics
(Chip size: $\leq 200\mu\text{m}$)



MicroLED for Consumer Electronics
(Chip size: $\leq 50\mu\text{m}$)

Initial Introduction Expected



UV LED



Curing



Water Disinfection

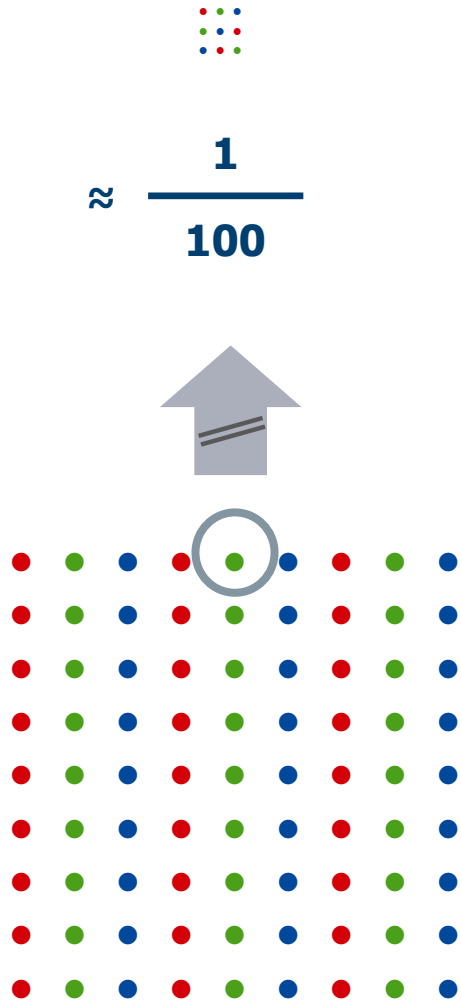


Air Purifier

*RGB = Red, Green & Blue

Devices: MiniLED & MicroLED – The Perfect Future Display Technology

RGB*
MicroLED
Display



Self-Emissive

Low Power
Consumption

Perfect
Contrast

High
Brightness

Fast
Response

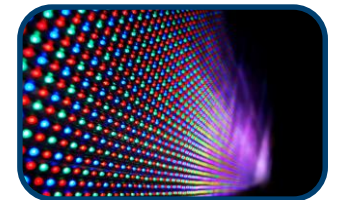
Source: LEDinside



Wearables



AR/VR



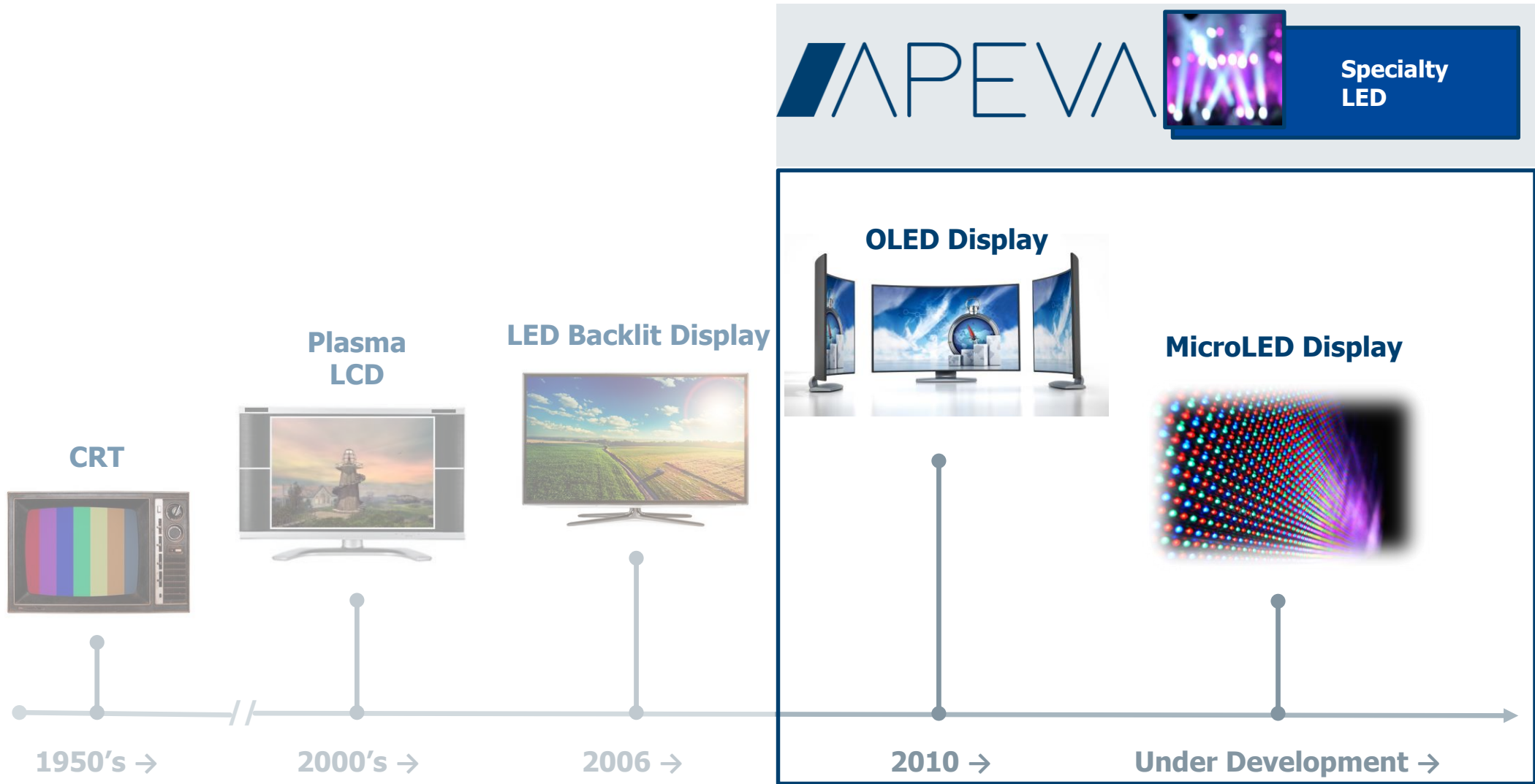
Signage



Smartphones/Tablets/TVs

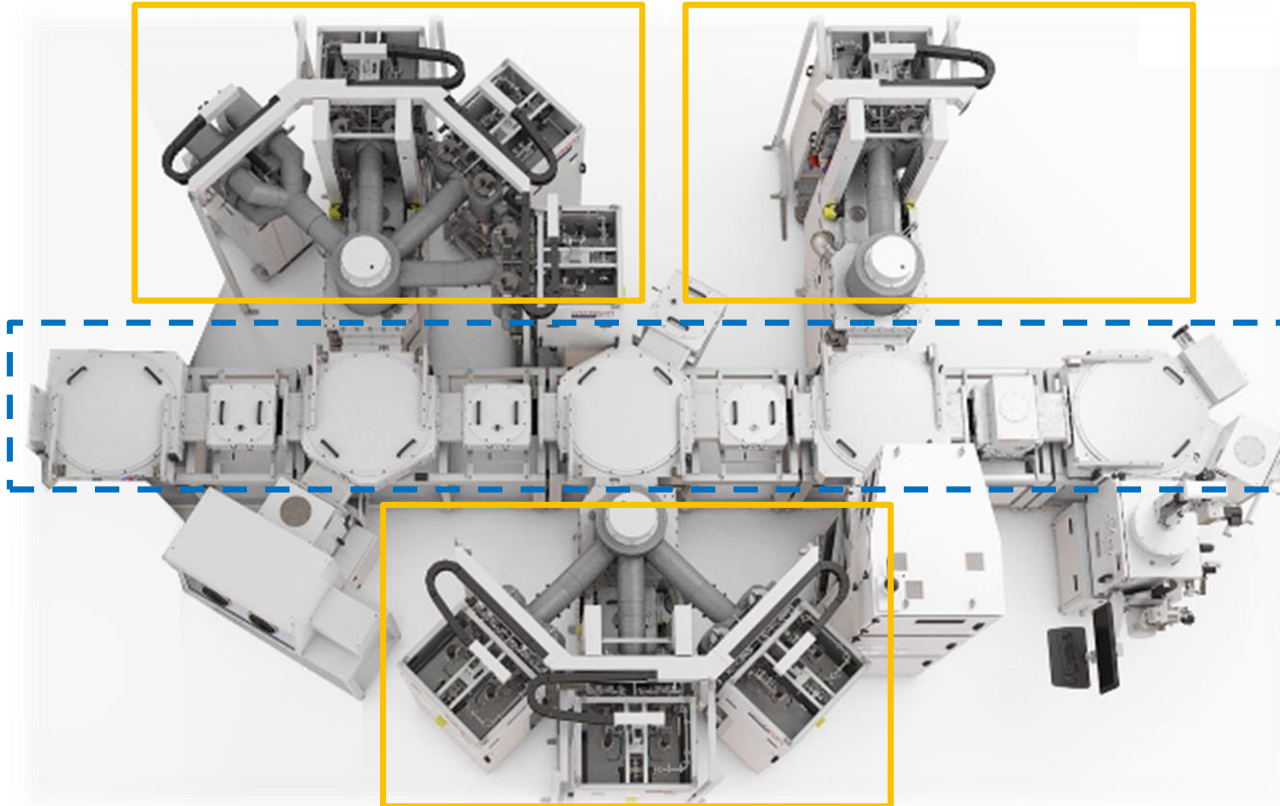
*RGB = Red, Green & Blue

AIXTRON – Instrumental in Evolving Display Technologies



APEVA: Complete OLED Deposition System Provider

OVPD Deposition Line*



 OVPD Deposition

AIXTRON

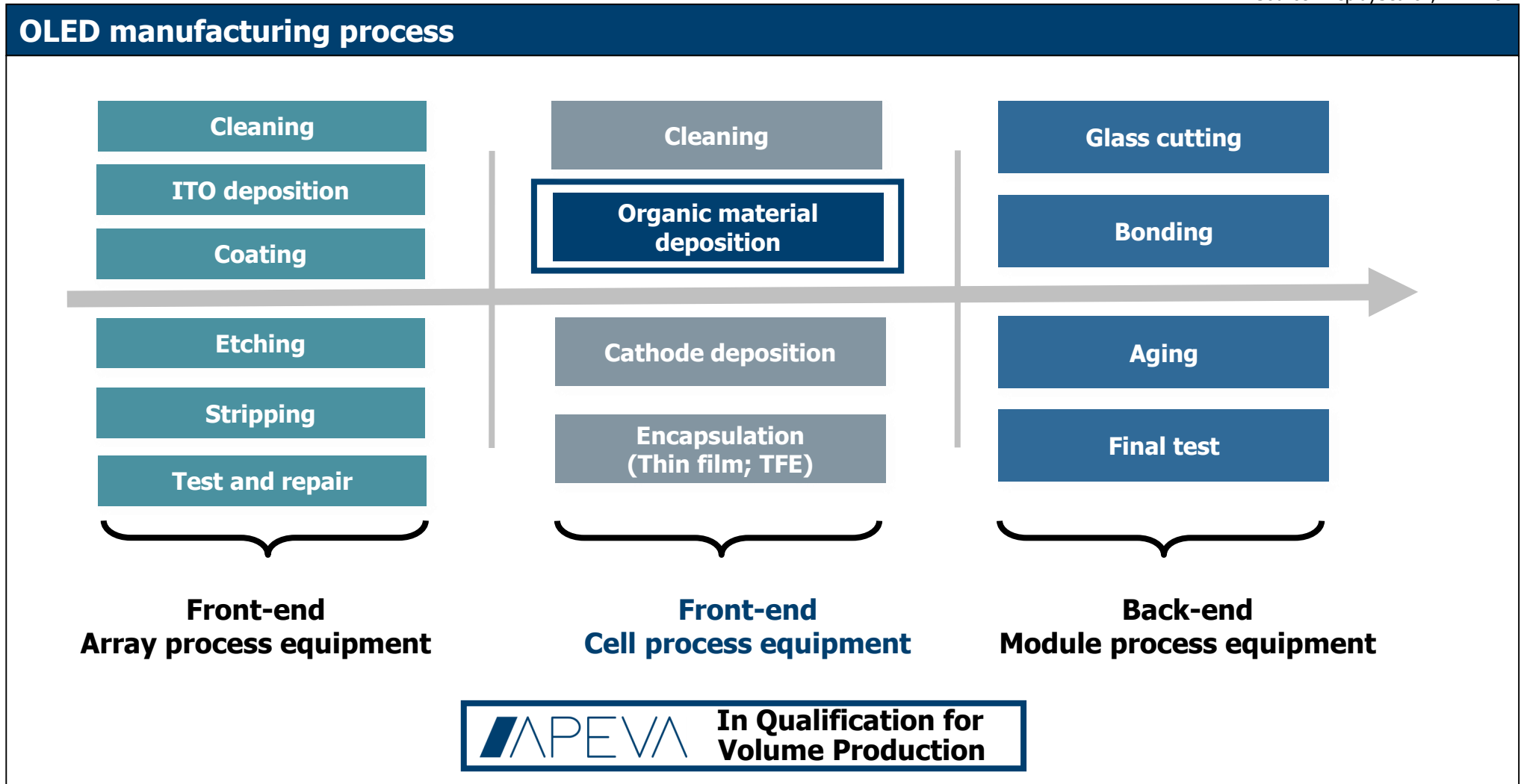
 Automation & Handling  H&iruja

- 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



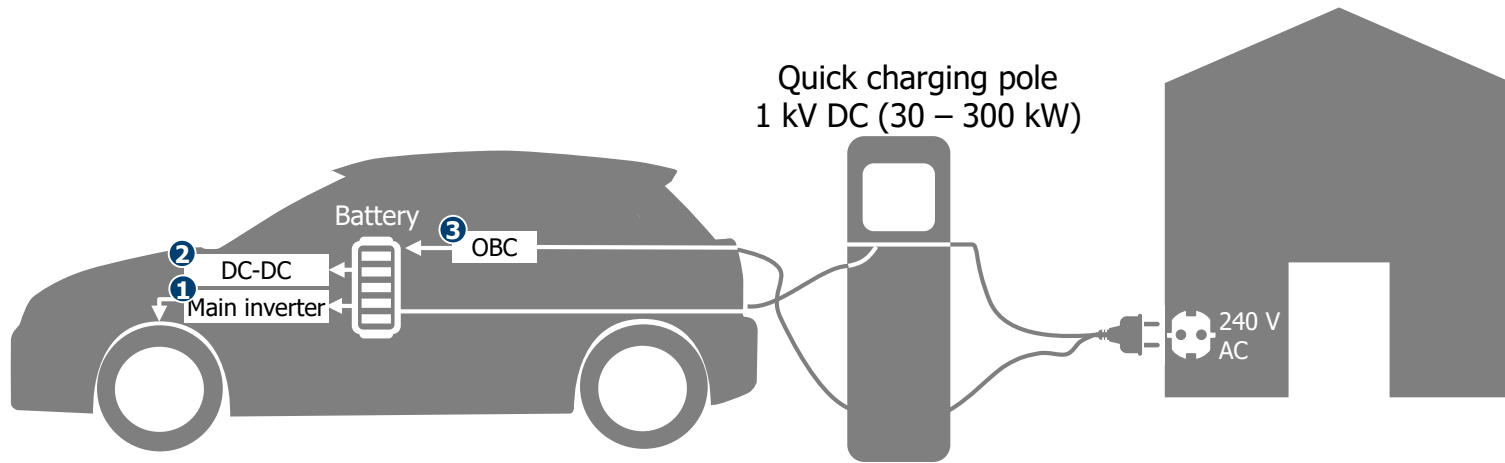
Overview: GaN/SiC as Wide Band Gap (WBG) Power Electronics

Consumer Electronics & IT		Automotive	Energy	Industrial
Power Management		Power Switching		
30V	600V	1.2 kV	≥2kV	
<ul style="list-style-type: none"> • Electronic appliances • Computing • Wireless charging • Power supplies • PFC 	<ul style="list-style-type: none"> • Infotainment • GPS • Connected car • Autonomous driving • EMI/EMC • Adaptive cruise control 	<ul style="list-style-type: none"> • General automotive electronic • HEV/EV • Charging station • Inverter / motor drives • Converter • Radar test applications 	<ul style="list-style-type: none"> • Power Grid / Smart meter / appliances • Solar / Wind inverters • Solar / Wind power DC distribution • storage • UPS 	<ul style="list-style-type: none"> • 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

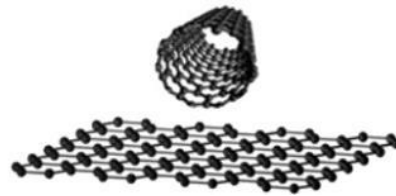
Carbon Nanomaterials – PECVD

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



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

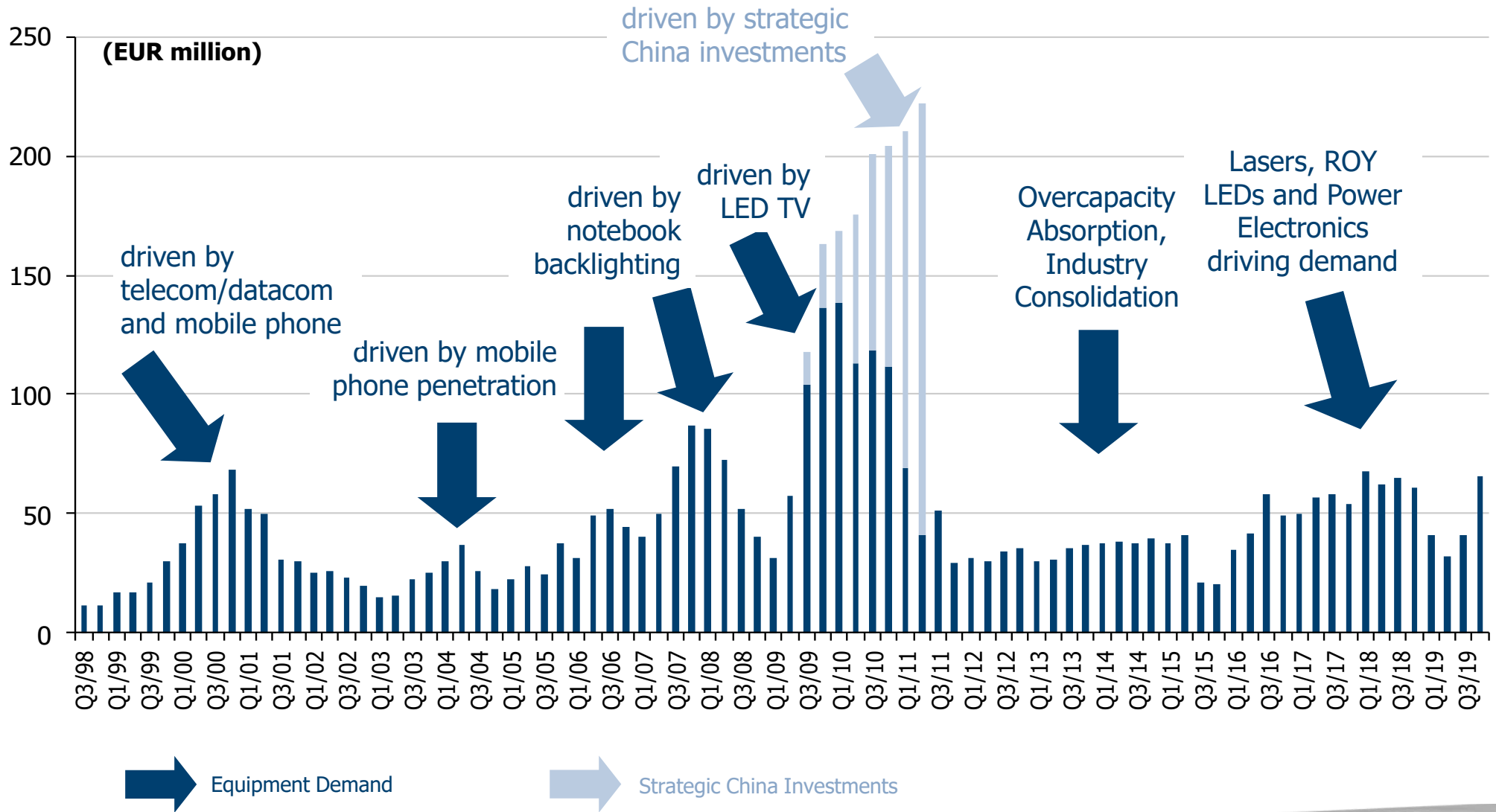


Production ready for tomorrow
 AIXTRON BM Pro 300

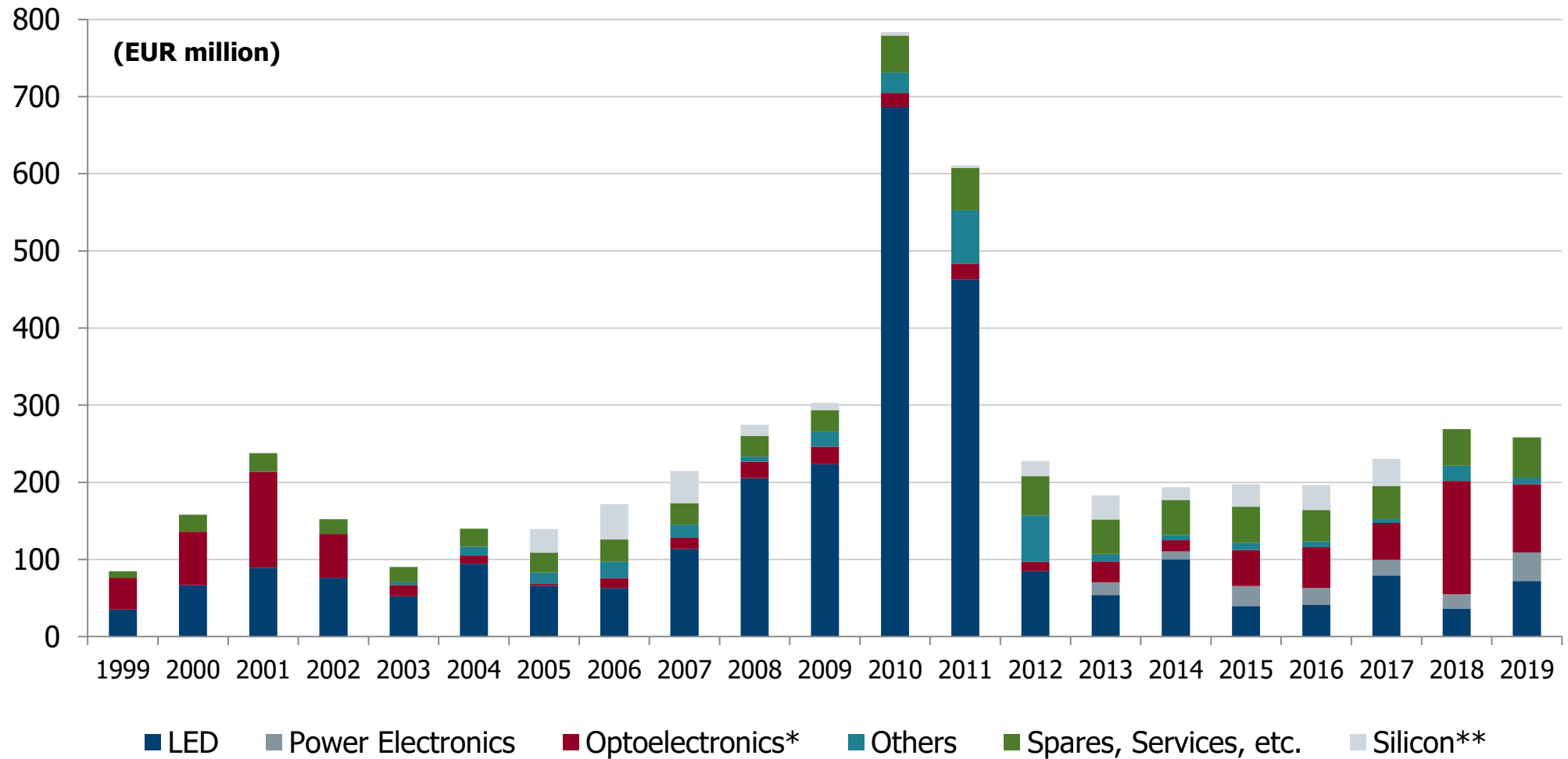


Our *technology*. YOUR FUTURE.

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					
	GaN LED			 		
Power	GaN Power					
	SiC Power					 
OLED		 				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

- May 20, 2020 Virtual Annual General Meeting www.aixtron.com/agm
- July 23, 2020 H1/2020 Results, Conference Call
- 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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AIXTRON