

AIXTRON Investor Presentation

5G
Networks

Energy
Storage

Renewable
Energy

**AIXTRON
ENABLES
INNOVATION**

Autonomous
Driving

Internet
of Things

NextGen
Displays

IR Presentation – FY/2018

(FSE: AIXA, ISIN DE000A0WMPJ6)

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
- ~ 600 employees
- Company founded in 1983 – 35 years of experience
- Technology leader in deposition systems
- More than 2,700 deposition systems installed worldwide

Global Presence



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; Telecom/Datacom)



GaN Power | GaN RF

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



Specialty LEDs

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



SiC Power

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

Power Management

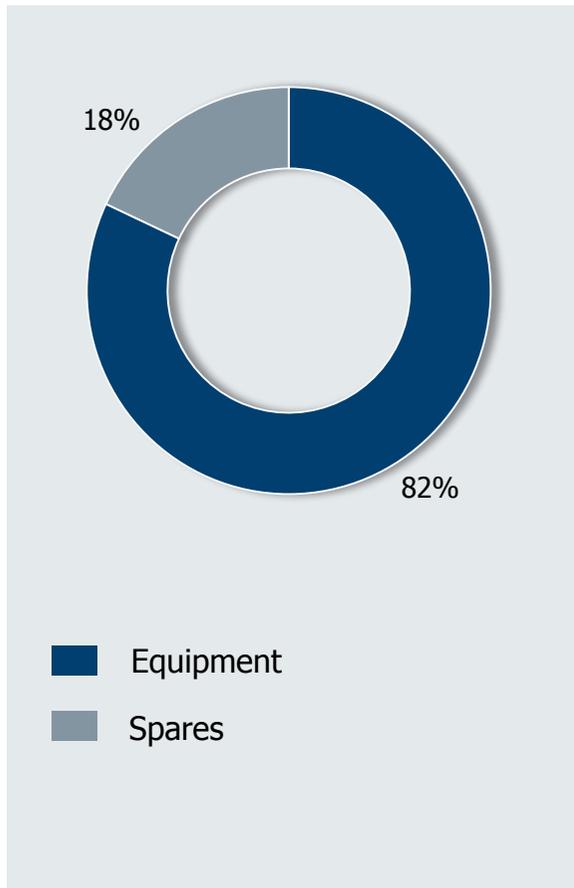
MOCVD Core Technology



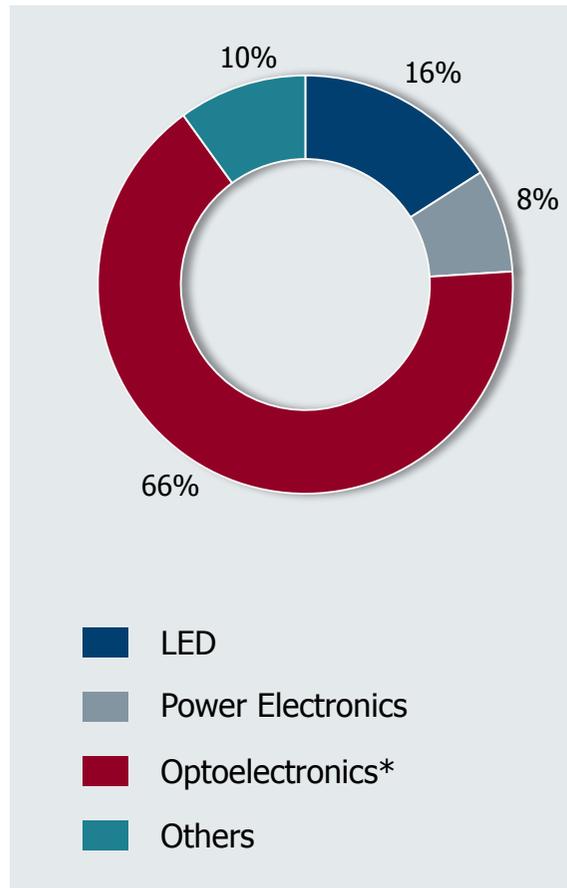
Revenue Analysis*

* Rounded figures; may not add up

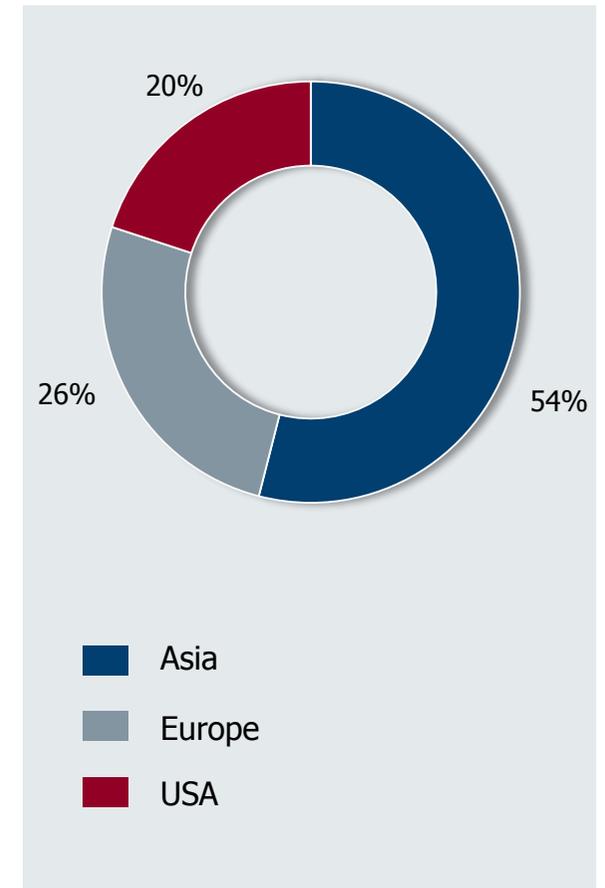
FY/2018:
by equipment & spares



FY/2018:
by end application
(equipment only)



FY/2018:
by region

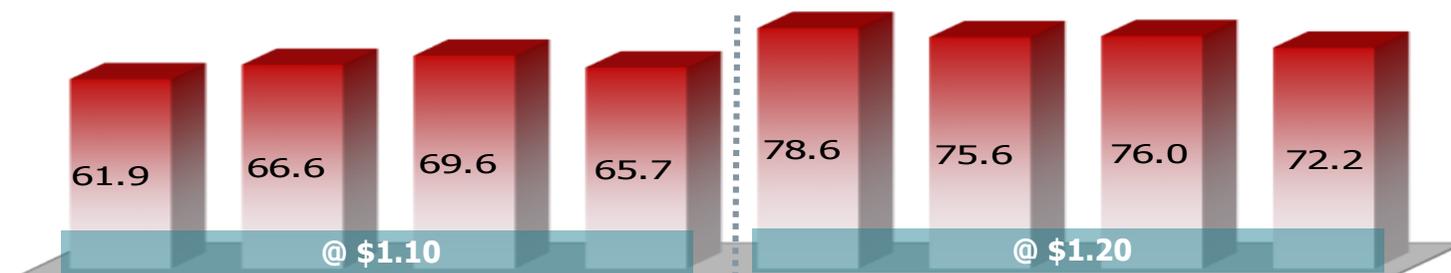


* Optoelectronics includes applications in Consumer Optoelectronics, Telecom/Datacom and Solar

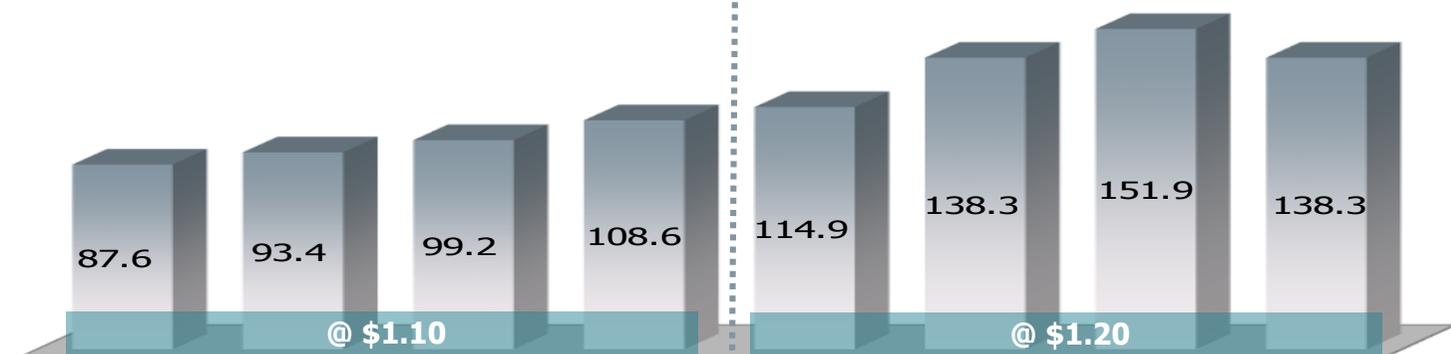
24 - Month Business Development

(€ million)

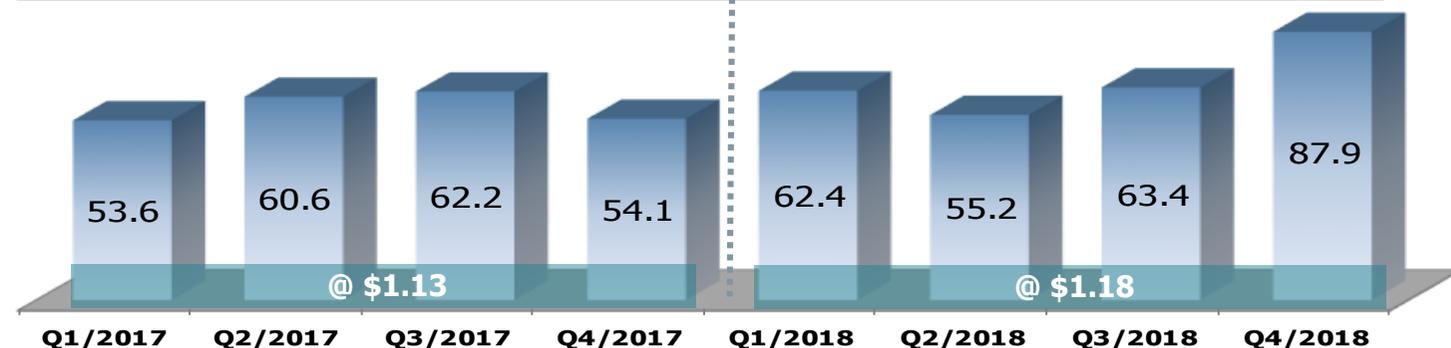
Order Intake
(incl. equipment,
service, spare parts)



Order Backlog
(equipment only)



Revenues
(incl. equipment,
service, spare parts)



USD order intake and backlog were recorded at the prevailing budget rate (2017: \$1.10/€; 2018: \$1.20/€)

USD revenues were converted at the actual period average FX rate (2017: \$1.13/€; 2018: \$1.18/€)

Consolidated Income Statement*

* Rounded figures; may not add up

(€ million)	2018	2017 ¹	+/- %	Q4/18	Q3/18	+/- %
Revenues	268.8	230.4	17	87.9	63.4	39
Cost of sales	151.2	156.4	-3	48.5	35.8	35
Gross profit	117.6	74.0	59	39.4	27.6	43
%	44 %	32 %	12 pp	45	44	1 pp
Selling expenses	9.4	10.2	-8	2.7	2.1	29
General & admin expenses	18.4	17.1	8	5.0	4.6	9
R&D	52.2	68.8	-24	12.2	13.1	-7
Net other operating income	3.8	27.0	-86	1.3	-0.9	244
EBIT	41.5	4.9	n.m.	20.8	8.7	139
%	15 %	2 %	13 pp	24	14	10 pp
Net result	45.9	6.5	n.m.	18.2	11.7	56
%	17 %	3 %	14 pp	21	18	3 pp

¹ Includes EUR 35.6m revenues of the ALD/CVD product line sold in 2017

Balance Sheet*

* Rounded figures; may not add up

(€ million)	31/12/18	30/09/18	31/12/17
Property, plant & equipment	63.1	63.8	64.3
Goodwill	71.6	71.5	71.2
Other intangible assets	2.1	1.6	1.8
Others	13.3	12.9	4.0
Non-current assets	150.1	149.8	141.3
Inventories	73.5	71.4	43.0
Trade receivables	40.1	35.4	19.3
Others	11.5	7.1	5.0
Cash & Cash Deposits	263.7	245.4	246.5
Current Assets	388.8	359.2	313.8
Equity	429.7	399.5	368.9
Non-current liabilities	1.8	1.7	2.0
Trade payables	27.8	17.0	14.3
Advance payments from customers	53.3	63.7	30.3
Others	26.3	27.2	39.7
Current liabilities	107.4	107.9	84.2
Balance Sheet total	538.9	509.0	455.1

Consolidated Statement of Cash Flows*

* Rounded figures; may not add up

(€ million)	2018	2017	Q4/18	Q3/18
Net Result	45.9	6.5	18.2	11.7
Adjust for				
Non Cash Items	1.7	-7.8	1.8	-0.1
Changes in Working Capital	-34.6	71.4	-12.4	2.3
Cash Flow from Operating Activities	13.0	70.1	7.6	13.9
Capital Expenditures/Disposals	-8.6	21.3	-1.8	-2.7
Free Cash Flow	4.4	91.4	5.8	11.2
FX/Other	12.8**	-5.0	12.5**	-0.5
Total Cash Flow	17.2	86.4	18.3	10.7
Cash & Deposits	263.7	246.5	263.7	245.4

** Includes €10.4m shares issued in APEVA

AIXTRON – 2018 Operational Performance

- ✓ **Guidance vs Actuals: Achieved in all Metrics**

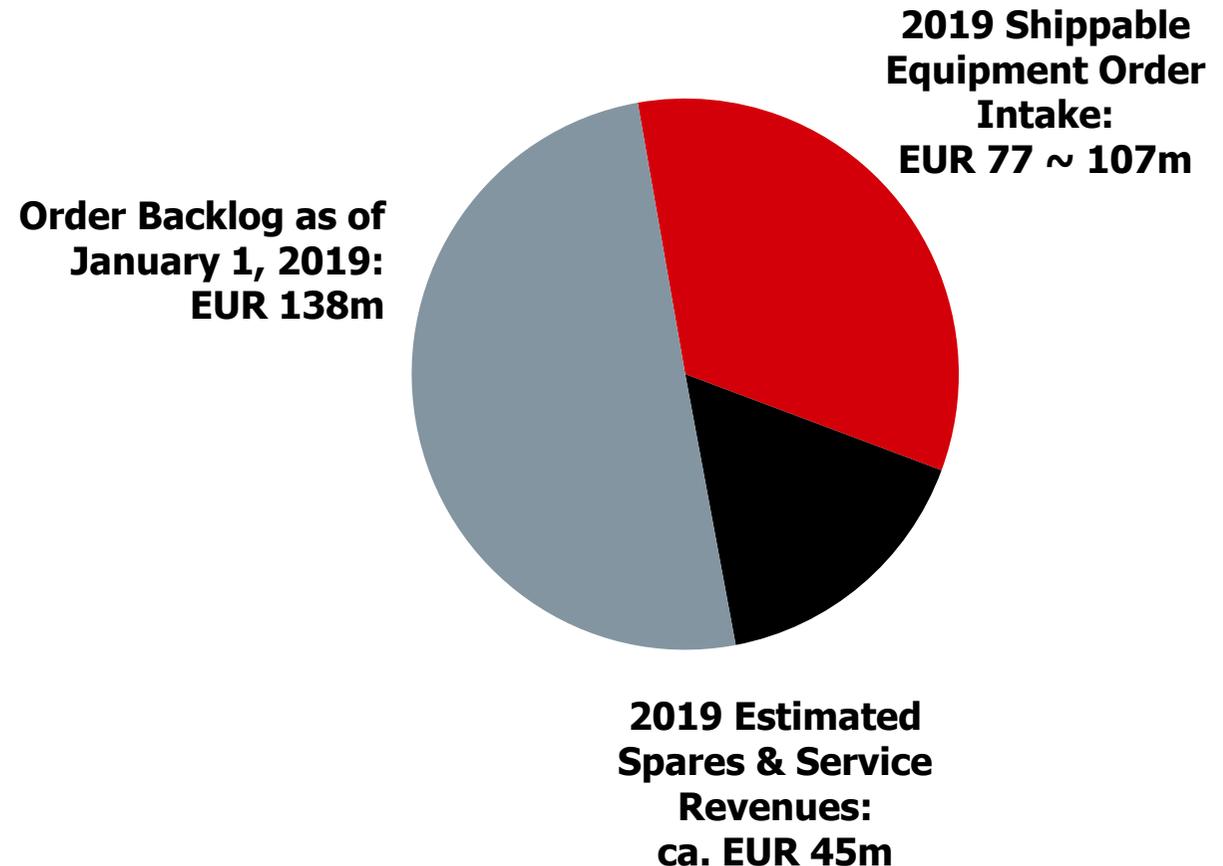
- ✓ **Upper-ends of 2018 Full Year Guidance Ranges reached without exception:**
 - **Order Intake:** Around EUR 290 million Guided – EUR 302.5 million Reported
 - **Revenues:** Around EUR 260 million Guided – EUR 268.8 million Reported
 - **Gross Margin:** Around 40% Guided – 44% Reported
 - **EBIT:** EUR 35 ~ 40 million Guided – EUR 41.5 million Reported
 - Positive **Total Cash Flow** Guided – EUR 17.2 million Reported

AIXTRON – 2019 Guidance*

Based on current order situation and customer reticence, Management expects for 2019:

- Total Order Intake between EUR 220 ~ 260 million
- Revenues between EUR 260 ~ 290 million
- Gross Margin of 35% to 40%
- EBIT between 8% and 13% of Revenues
- Free Cash Flow between EUR 15 ~ 25 million

2019 Guidance*



• Based on 1.20 USD/EUR Budget Rate; please refer to "Expected Results of Operations and Financial Position" in the AIXTRON 2018 Annual Report for further information

Market Prospects

Short- to Mid-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 communication and power management in autos, consumer electronics and mobile devices.
- Progress in the development of OLED displays that require an efficient deposition technology.

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 semi-conductors.
- 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.



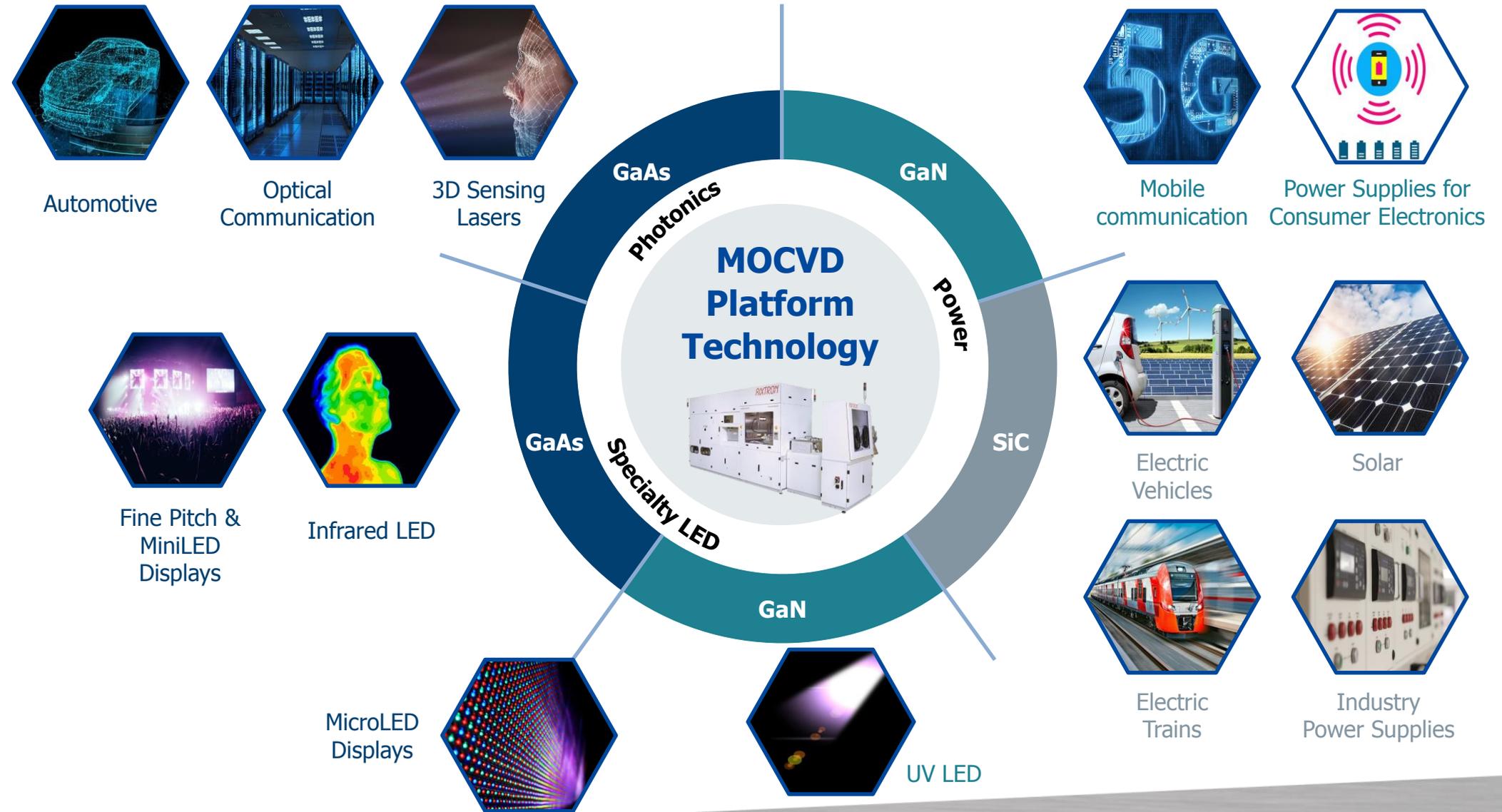
Our *technology*. YOUR FUTURE.

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



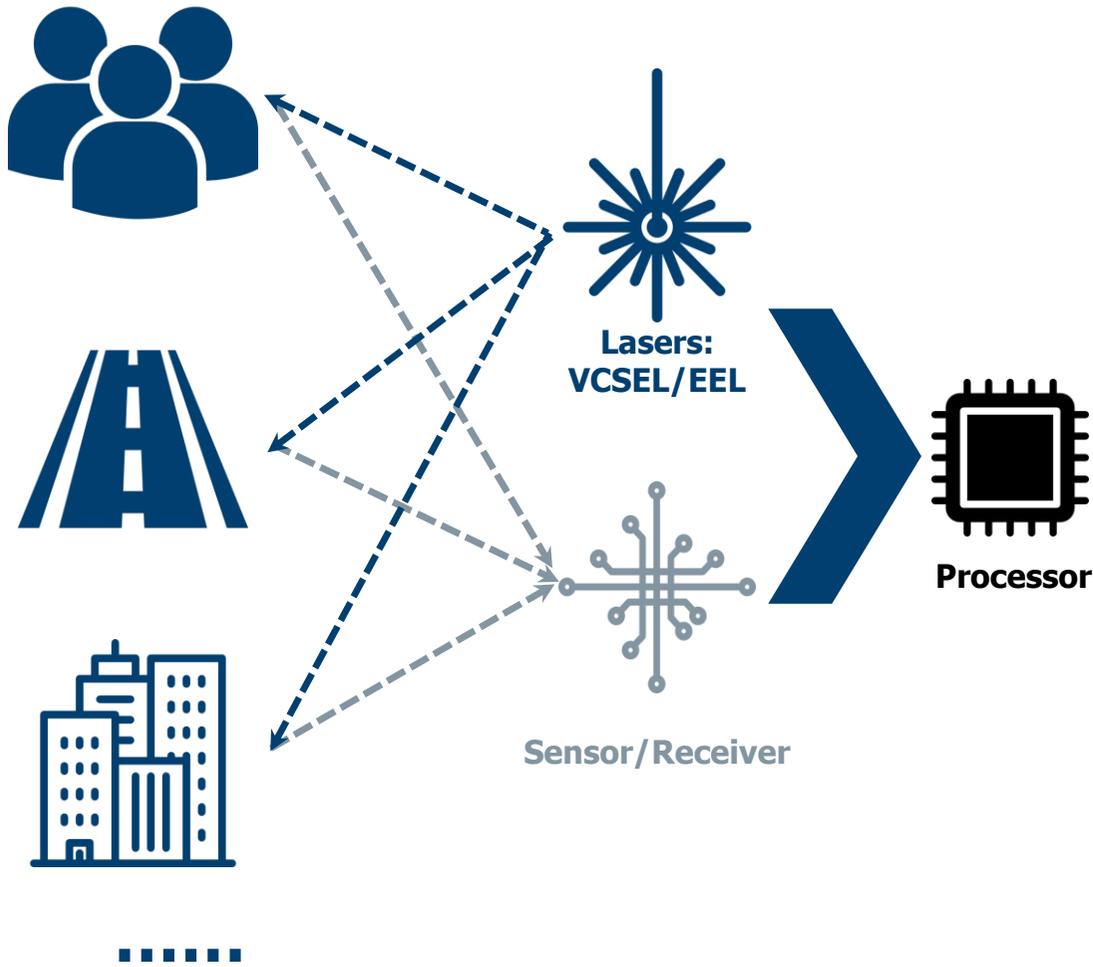
AIXTRON – Enabling Emerging Global Mega Trends



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

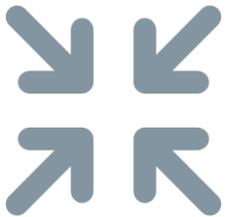


Energy Saving

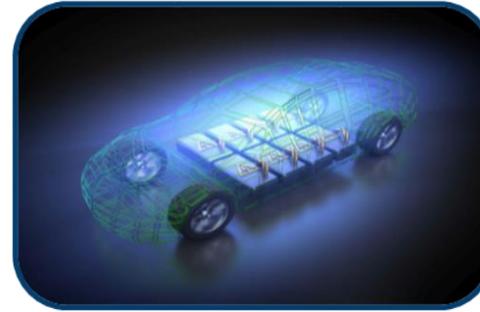
Less Heat

Light Weight

Lower System Cost



Smaller



Electric Vehicles



EV-charging



Data Centers



Renewable Energy



Wireless Charging

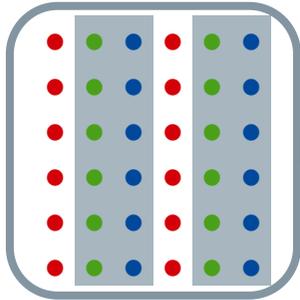


Fast Charging

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

Source: LEDinside, Yole Développement

RGB* LED DISPLAYS



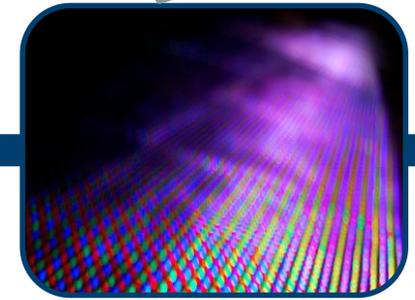
Stadium Outdoor Display
(Pixel Pitch $\geq 10\text{mm}$)
(Chip size: $\geq 200\mu\text{m}$)



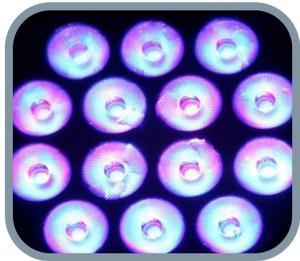
Fine Pitch Indoor Display
(Pixel Pitch $\leq 2.5\text{mm}$)
(Chip size: $\geq 200\mu\text{m}$)



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



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



UV LED



Curing



Water Disinfection

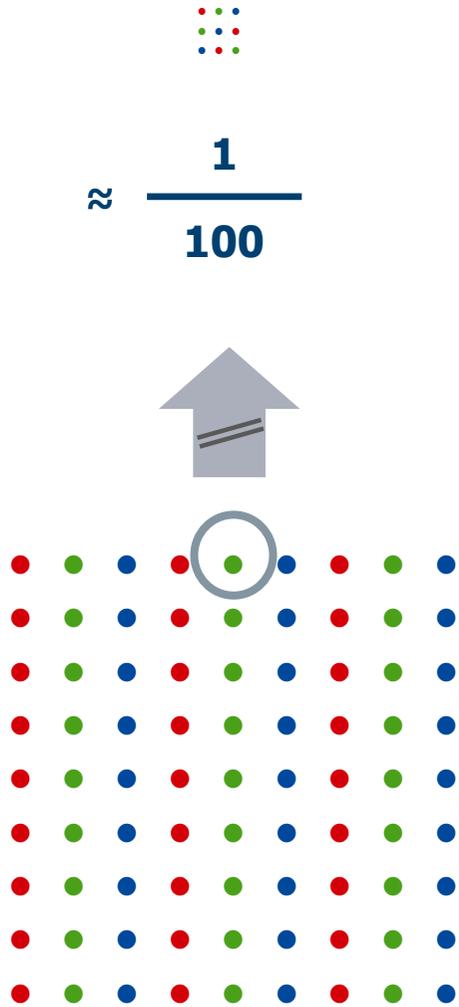


Air Purifier

*RGB = Red, Green & Blue

Devices: MiniLED & MicroLED – The Perfect Future Display Technology

RGB*
MicroLED
Display



RGB*
LED
Display

Self-Emissive

Low Power
Consumption

Perfect
Contrast

High
Brightness

Fast
Response

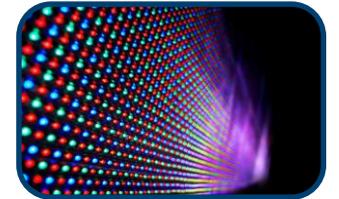
Source: LEDinside



Wearables



AR/VR



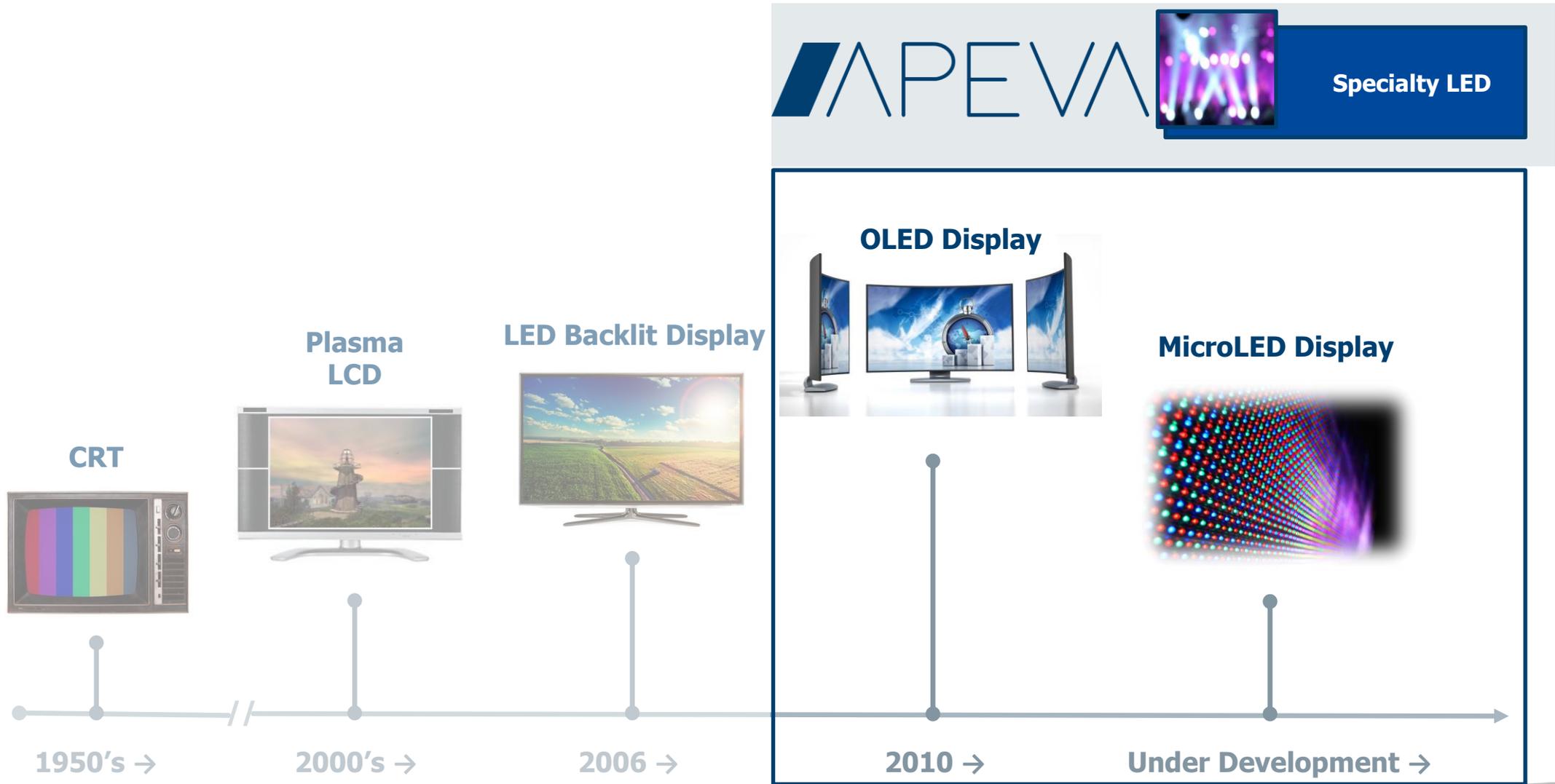
Signage



Smartphones/Tablets/TVs

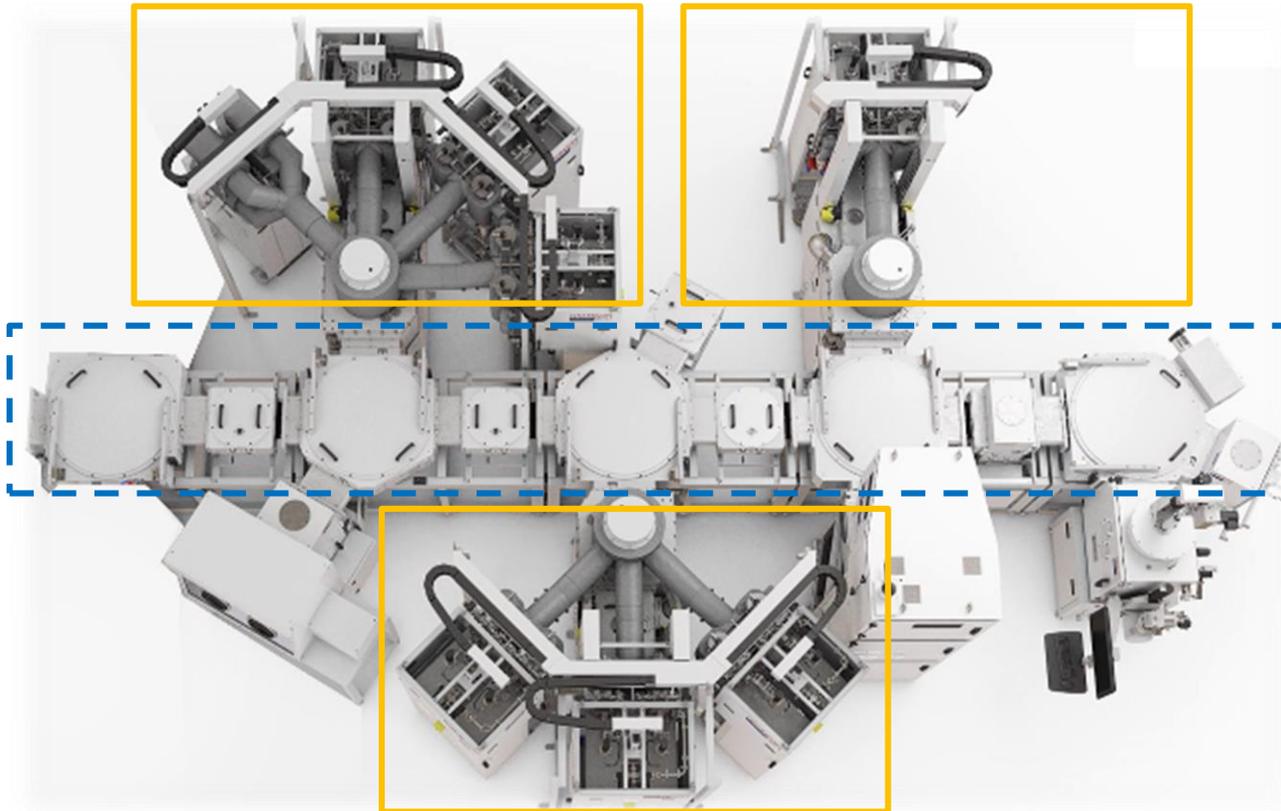
*RGB = Red, Green & Blue

AIXTRON – Instrumental in Evolving Display Technologies



APEVA: Complete OLED Deposition System Provider

OVPD Deposition Line*



 OVPD Deposition



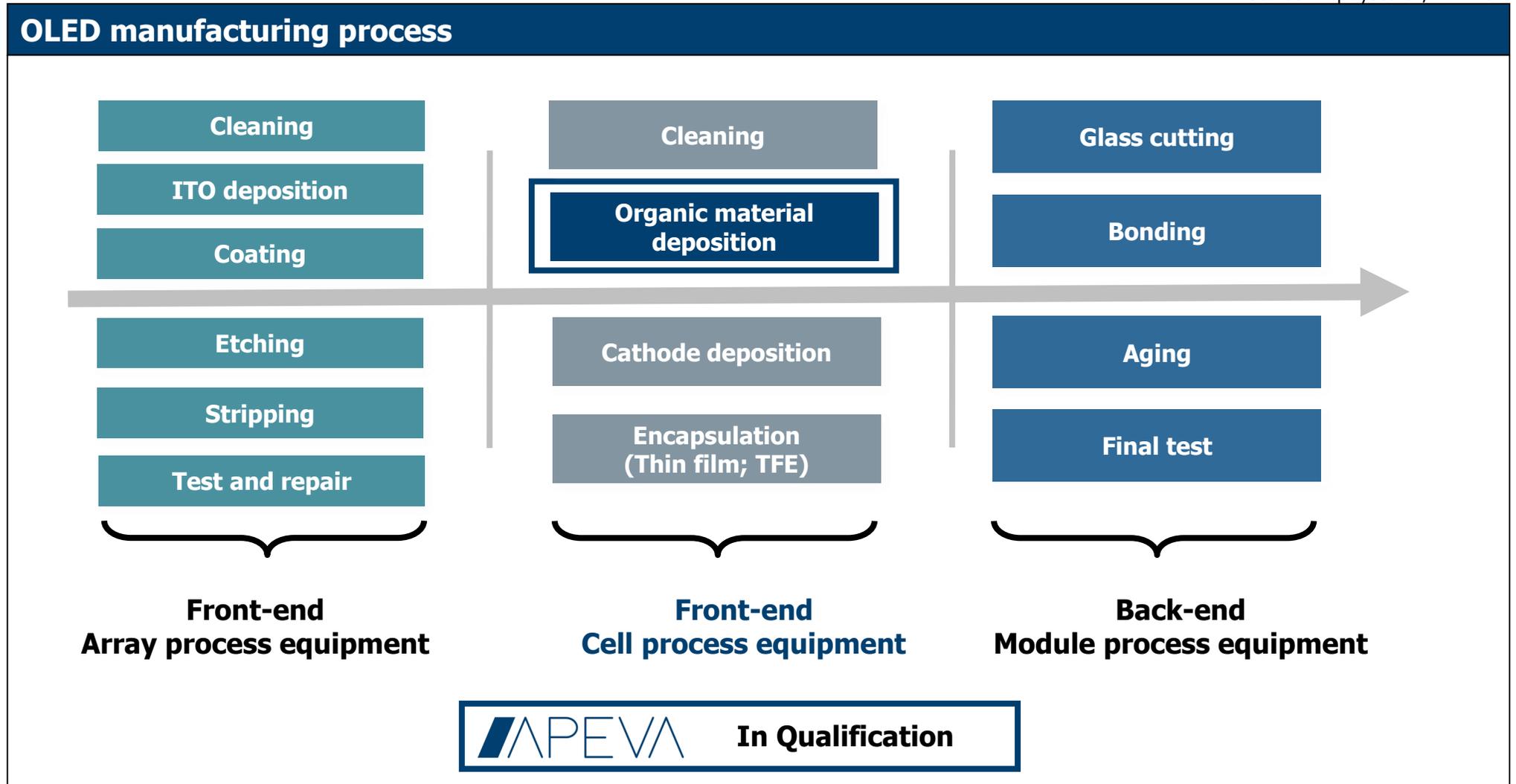
 Automation & Handling 

- 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



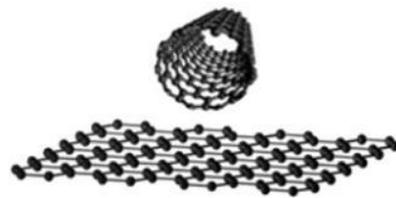
Carbon Nanomaterials – PECVD

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

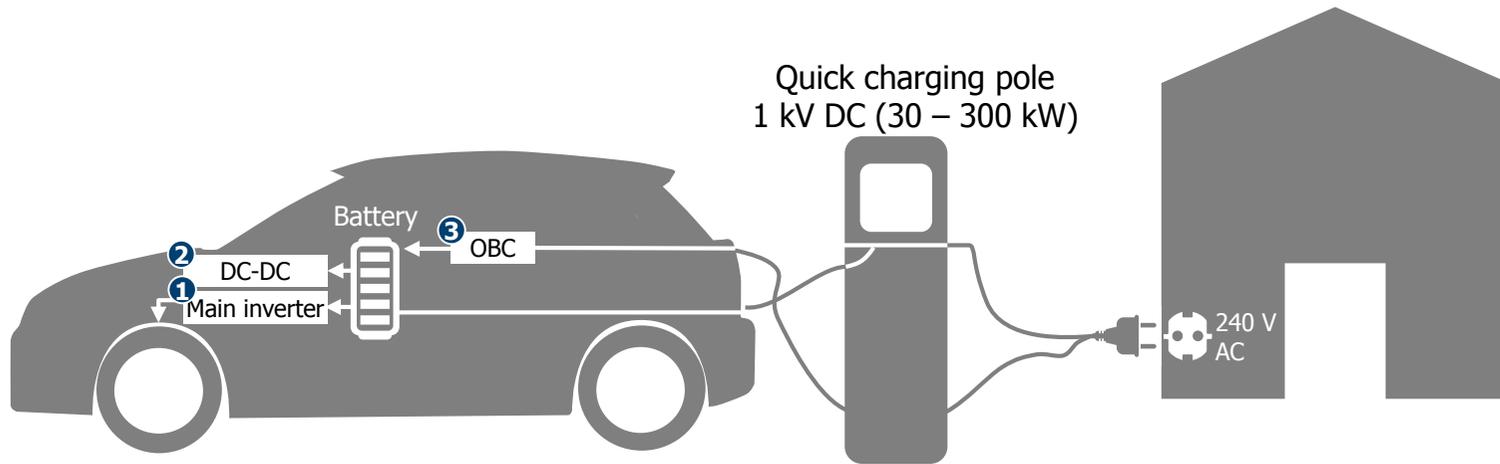
Overview: GaN/SiC as Wide Band Gap (WBG) Power Electronics

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



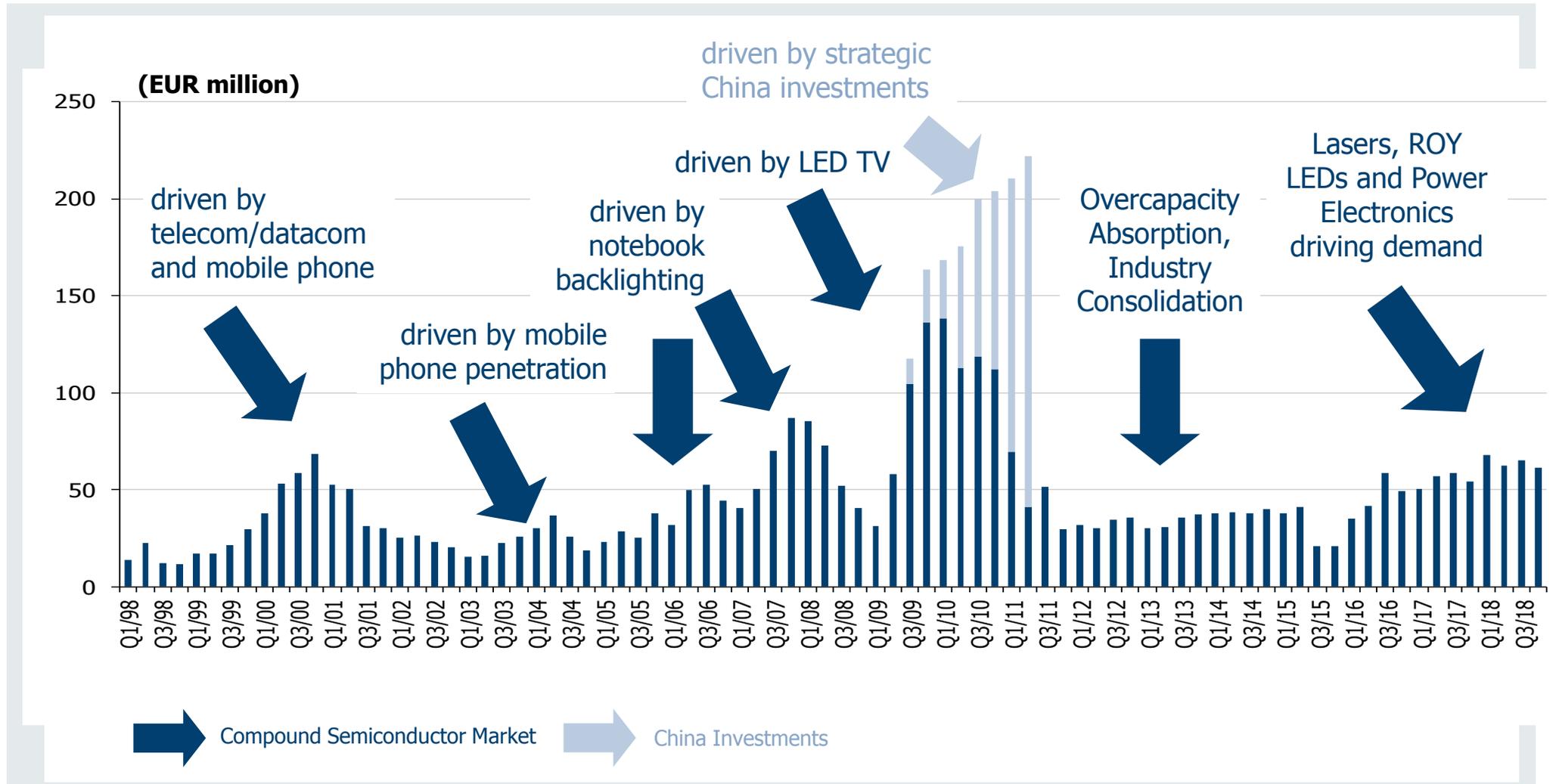
Higher efficiency =

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

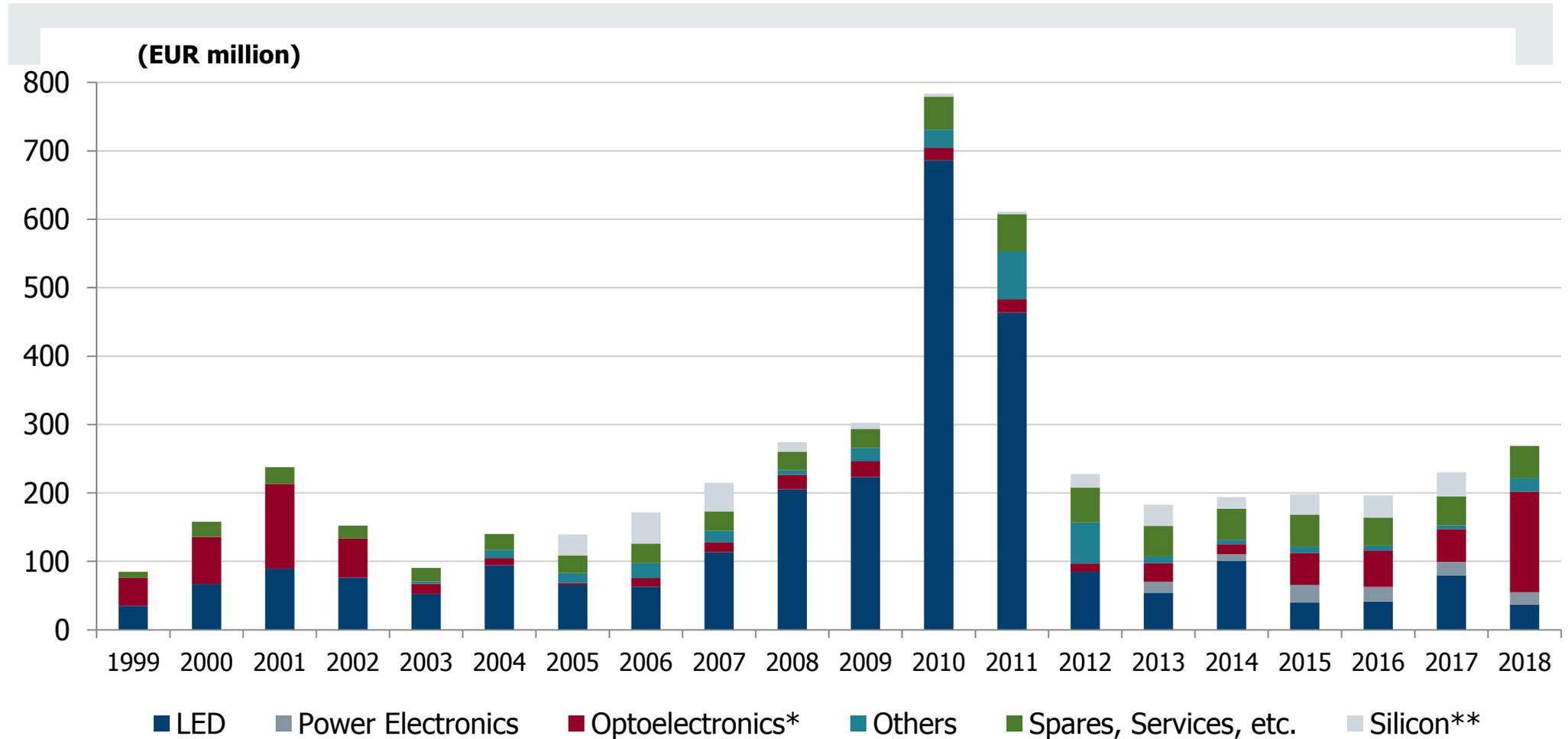
Component	Power (kW)	Fraction 6" wafer*	Comment
Main inverter	20 ~ 150	0.1 ~ 0.5	Brings energy from battery to the electric motor
DC-DC Converter	1 ~ 3	<0.01	Brings energy from battery for car electronics
On Board Charger (OBC)	5 ~ 30	0.01	Brings 240 V AC energy from wall plug to battery
(Quick) Charging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

Equipment Order Intake per Quarter



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



Our *technology*. YOUR FUTURE.

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)	2018	2017	2016
Revenues	268.8	230.4	196.5
Cost of sales	151.2	156.4	140.2
Gross profit	117.6	74.0	56.3
%	44%	32%	29%
Selling expenses	9.4	10.2	13.8
General & admin expenses	18.4	17.1	17.1
R&D	52.2	68.8	53.9
Net other operating income	3.8	27.0	7.2
EBIT	41.5	4.9	-21.4
%	15%	2%	-11%
Net result	45.9	6.5	-24.0
%	17%	3%	-12%

Balance Sheet*

* Rounded figures; may not add up

(€ million)	31/12/18	31/12/17	31/12/16
Property, plant & equipment	63.1	64.3	74.2
Goodwill	71.6	71.2	74.6
Other intangible assets	2.1	1.8	5.4
Others	13.3	4.0	2.4
Non-current assets	150.1	141.3	156.5
Inventories	73.5	43.0	54.2
Trade receivables	40.1	19.3	60.2
Others	11.5	5.0	5.3
Cash & Cash Deposits	263.7	246.5	160.1
Current Assets	388.8	313.8	279.7
Equity	429.7	368.9	369.7
Non-current liabilities	1.8	2.0	4.2
Trade payables	27.8	14.3	14.6
Advance payments from customers	53.3	30.3	26.1
Others	26.3	39.7	21.6
Current liabilities	107.4	84.2	62.3
Balance Sheet total	538.9	455.1	436.2

Consolidated Statement of Cash Flows*

* Rounded figures; may not add up

(€ million)	2018	2017	2016
Cash Flow from operating activities	13.0	70.1	-37.7
Cash Flow from investing activities	-16.1	40.7	43.4
Cash Flow from financing activities	10.4	1.2	0.3
Exchange rate changes	2.4	-5.5	-2.3
Net change in Cash & Cash Equivalents	9.7	106.5	3.7
Cash & Cash Equivalents (beginning of period)	226.5	120.0	116.3
Cash & Cash Equivalents (end of period)	236.2	226.5	120.0
Change in Cash deposits	7.5	-19.5	-52.8
Free Cash Flow**	4.4	91.4	-42.9
Capex	9.2	9.7	5.3

**) Operating CF, CapEx and Capital Divestments

Financial Calendar & Contact Data

- April 30, 2019 Q1/2019 Results, Conference Call
- May 15, 2019 Annual General Meeting, Aachen (Germany)
- July 25, 2019 H1/2019 Results, Conference Call
- October 24, 2019 9M/2019 Results, Conference Call
- February 2020 FY/2019 Results, Conference Call

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Technology. Materials. Performance.

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