

AIXTRON Investor Presentation



Image courtesy of Fraunhofer IISB/Kurt Fuchs

IR Presentation – First Nine Months 2020

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The AIXTRON logo, consisting of the word 'AIXTRON' in a stylized, red, sans-serif font.

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
- Over 3,500 deposition systems sold worldwide

Where we are



- AIXTRON Group
- Representation

What We Do




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

For Optoelectronics and Power Electronics

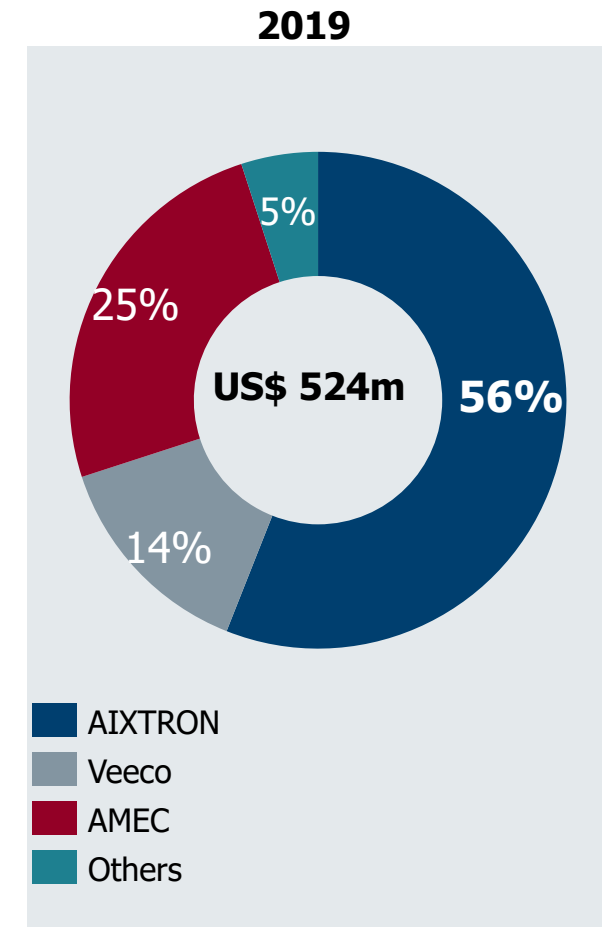
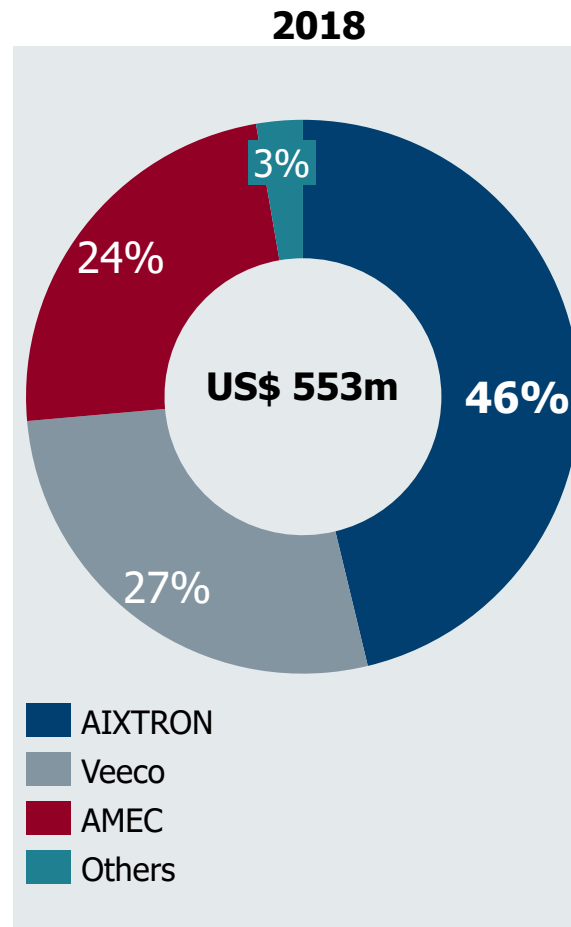
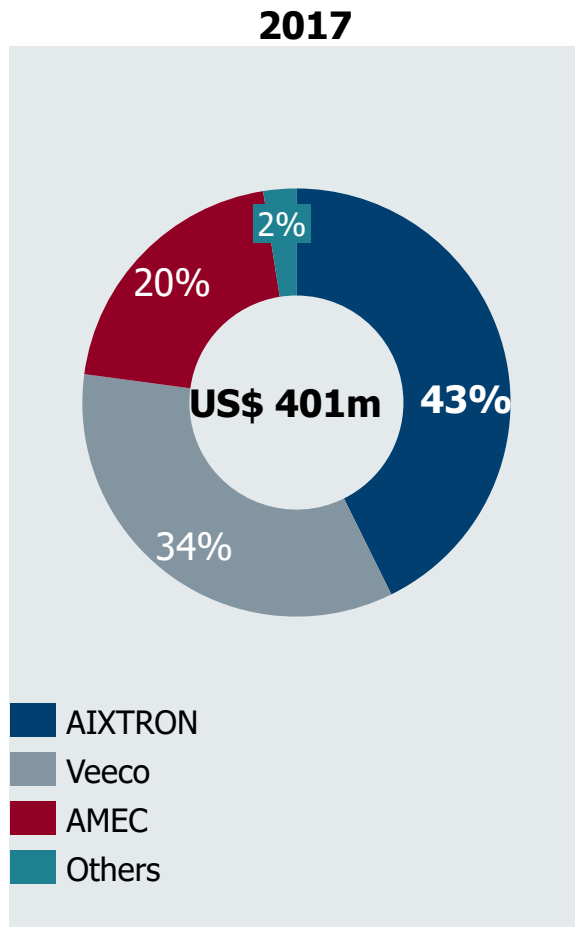
- **Metal-Organic Chemical Vapor Deposition (MOCVD)** for the deposition of compound materials to produce for instance Lasers, LEDs, GaN and SiC Power Electronics or other Optoelectronic components
- **Plasma-enhanced Chemical Vapor Deposition (PECVD)** for the deposition of Carbon Nanostructures and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



Source: Gartner (2017; 2018), Company reports, AIXTRON estimates

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)



Specialty LEDs

(e.g. Fine Pitch-, MiniLED-Displays, UV-LED Disinfection, Micro LED-Displays)



GaN Power | GaN/GaAs RF

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



SiC Power

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

Power Management

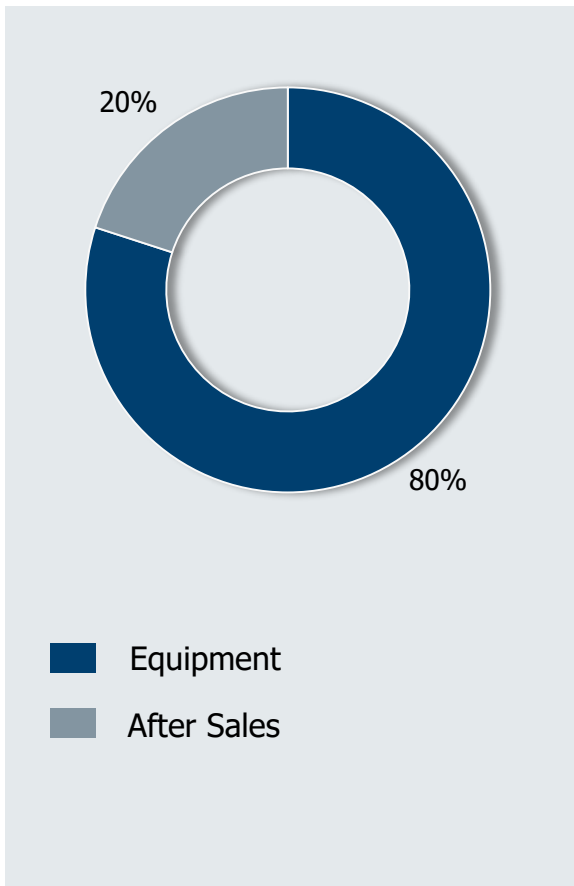
MOCVD Core Technology



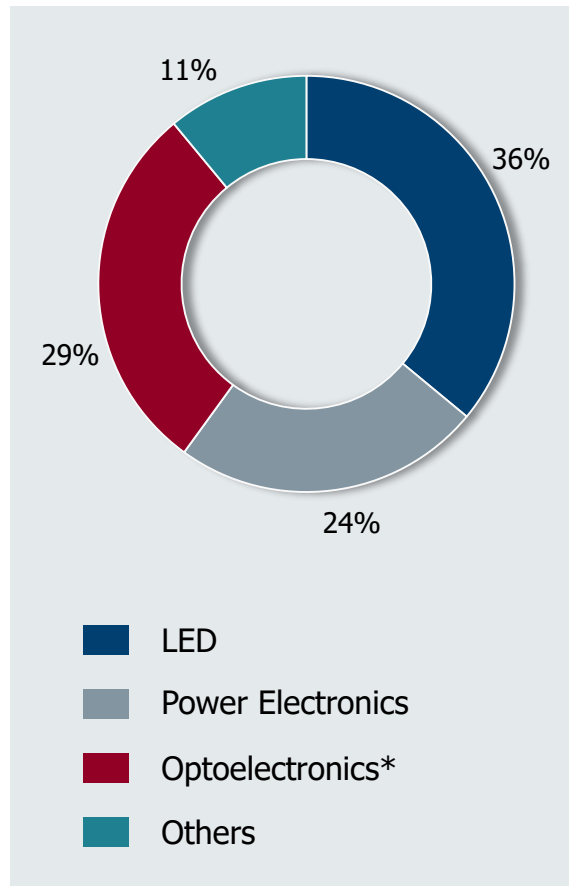
Revenue Analysis*

* Rounded figures; may not add up

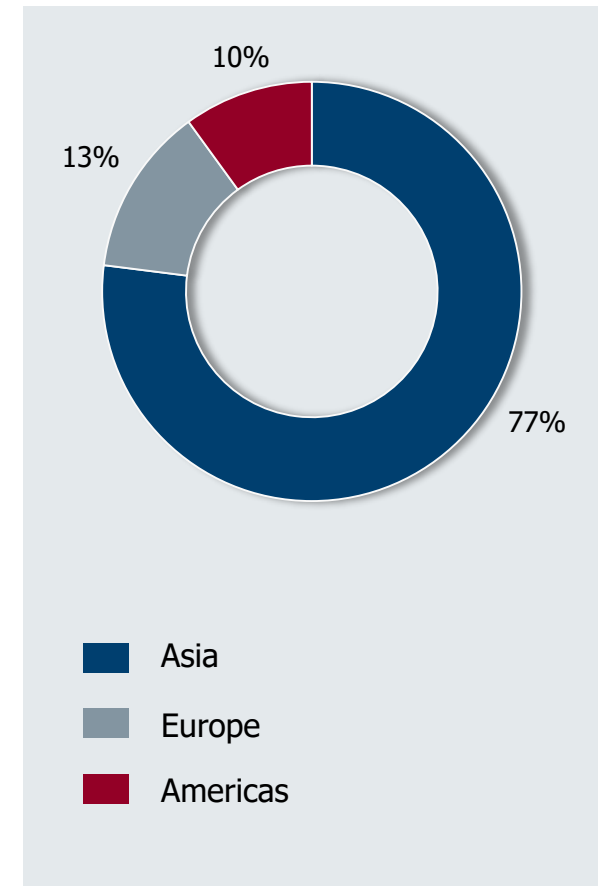
9M/2020:
by equipment & after sales



9M/2020:
by end application
(equipment only)



9M/2020:
by region

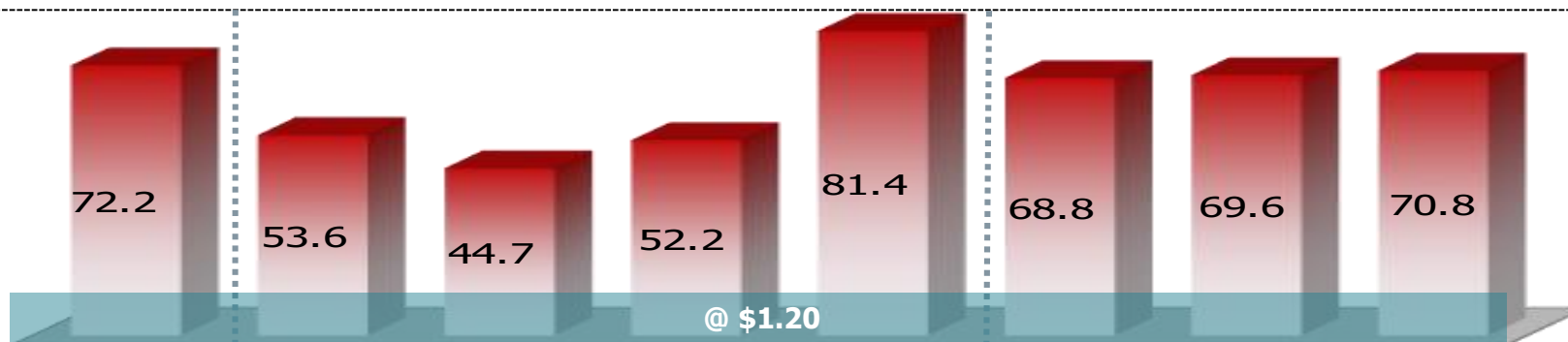


* Optoelectronics includes applications in Consumer Optoelectronics, Telecom/Datacom and Solar

24 - Month Business Development (Q4/2018 – Q3/2020)

(€ million)

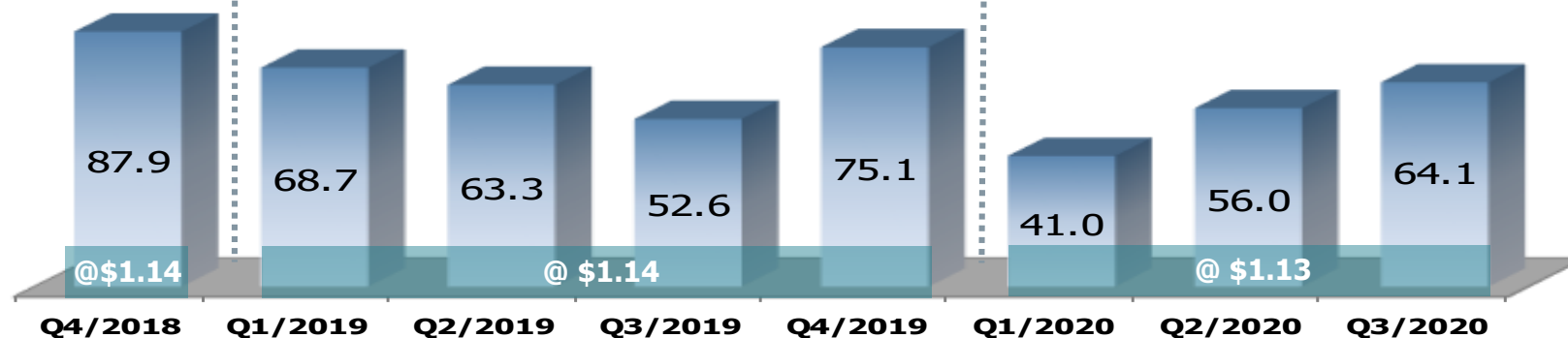
Order Intake
(incl. Equipment & After Sales)



Order Backlog
(equipment only)



Revenues
(incl. Equipment & After Sales)



USD revenues were converted at the actual period average FX rate (Q4/2018: \$1.14/€; 2019: \$1.14/€; 9M/2020: \$1.13/€)

USD order intake and backlog were recorded at the prevailing budget rate of USD 1.20/EUR

Consolidated Income Statement*

* Rounded figures; may not add up

(€ million)	9M/20	9M/19	+/- %	Q3/20	Q2/20	+/- %
Revenues	161.1	184.6	-13	64.1	56.0	14
Cost of Sales	97.9	109.8	-11	38.4	33.2	16
Gross profit	63.3	74.7	-15	25.8	22.9	13
%	39	40	-1 pp	40	41	-1 pp
Selling expenses	7.3	7.1	3	1.9	2.8	-31
General & admin expenses	13.7	12.4	10	4.4	4.6	-4
R&D	41.2	40.0	3	12.6	14.2	-12
Net other operating income	(9.3)	(9.4)	0	(1.2)	(1.9)	-36
EBIT	10.3	24.5	-58	8.2	3.3	>100
%	6	13	-7 pp	13	6	7 pp
Net result	9.6	20.2	-53	7.1	3.3	>100
%	6	11	-5 pp	11	6	5 pp

Balance Sheet*

* Rounded figures; may not add up

(€ million)	30/09/20	31/12/19	30/09/19
Property, plant & equipment	66.9	64.5	64.8
Goodwill	71.2	72.4	72.2
Other intangible assets	2.7	2.4	2.2
Non-current financial assets	30.0	0	0
Others	11.8	11.7	12.5
Non-current assets	182.7	151.0	151.8
Inventories	101.6	79.0	87.9
Trade receivables	19.0	29.2	33.2
Others	10.9	5.4	6.5
Cash, financial investments and deposits	262.8	298.3	260.6
Current assets	394.3	412.0	388.2
Equity	471.4	464.1	451.0
Non-current liabilities	4.8	4.5	4.8
Trade payables	14.7	19.4	14.0
Advance payments from customers	63.2	51.1	44.4
Others	22.9	23.9	25.9
Current liabilities	100.8	94.3	84.3
Balance Sheet total	577.0	563.0	540.1

Consolidated Statement of Cash Flows*

* Rounded figures; may not add up

(€ million)	9M/20	9M/19	Q3/20	Q2/20
Net Result	9.6	20.2	7.1	3.3
Adjust for				
Non-Cash Items	6.1	9.3	3.2	3.0
Changes in Working Capital**	(10.8)	(22.7)	(2.2)	(14.2)
Cash Flow from Operating Activities**	4.9	6.8	8.1	(7.9)
Capital Expenditures/Disposals	(8.2)	(9.2)	(3.0)	(3.4)
Free Cash Flow	(3.3)	(2.4)	5.0	(11.3)
FX Effects/Other	(1.8)	(0.5)	(0.7)	(0.7)
Cash, financial investments & deposits	292.8	260.6	292.8	288.6

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

**Excludes changes in financial assets

AIXTRON – 2020 Guidance*: Firmed Up

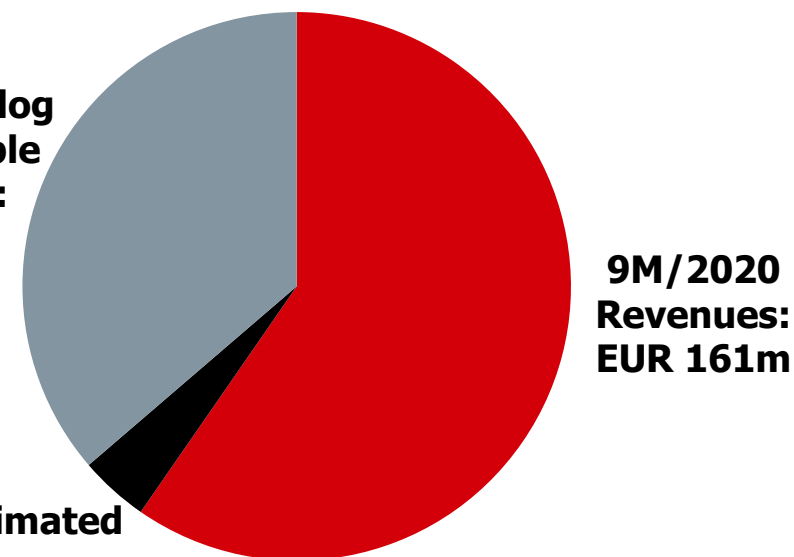
2020 Guidance* ranges narrowed, taking 9M Results and the current environment into account:

- **Total Order Intake** now between EUR 270 ~ 300 million (from EUR 260 ~ 300 million)
- **Revenues** now between EUR 260 ~ 280 million (from EUR 260 ~ 300 million)
- **Gross Margin** of around 40%
- **EBIT** 10% ~ 15% of Revenues

2020 Guidance*

Equipment Order Backlog (EUR 164m) convertible into 2020 Revenues: EUR 88m-108m

Q4/2020 Estimated After Sales Revenues: ca. EUR 11m



* 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, disinfection 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.

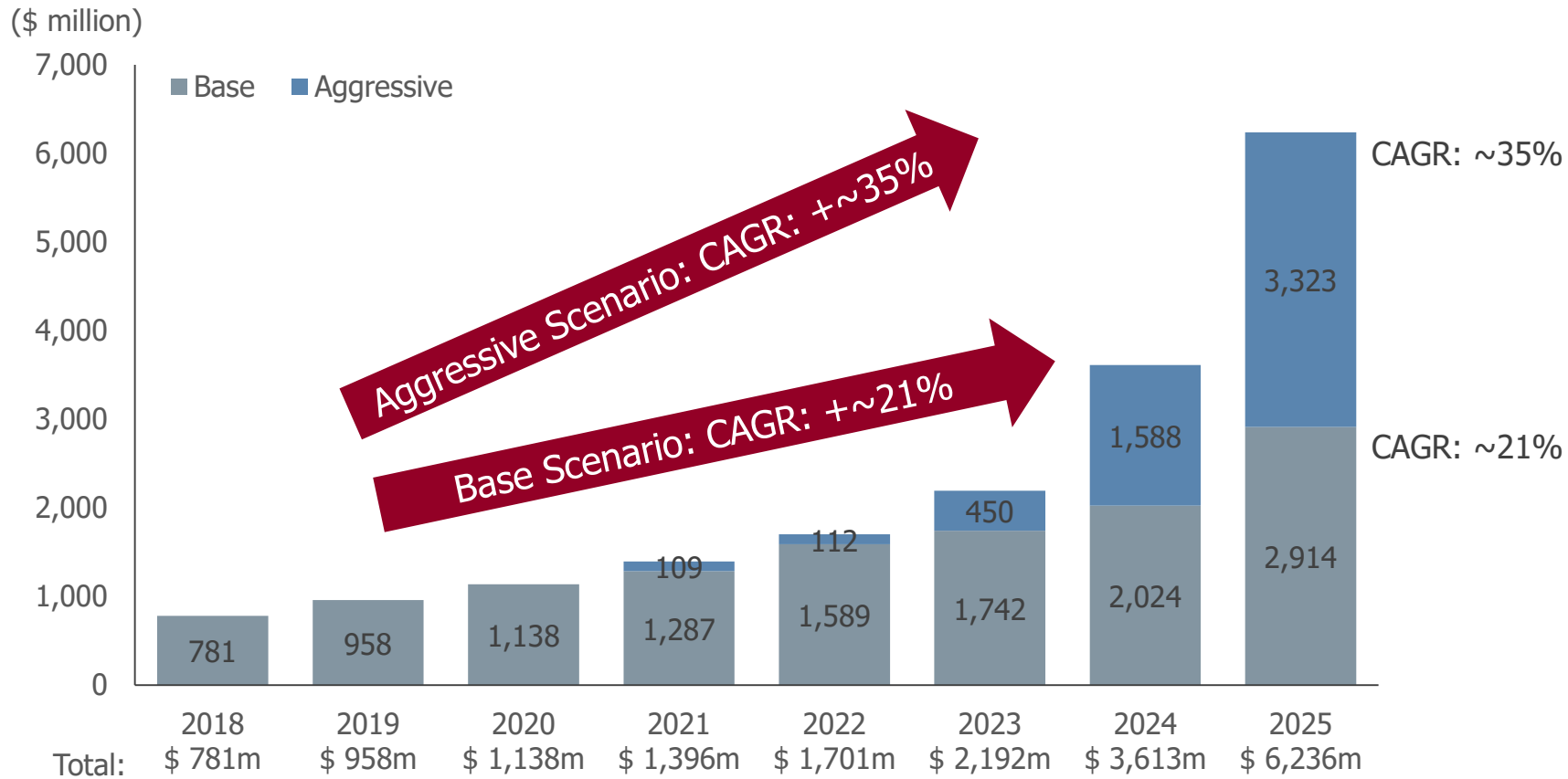
Mid- to Long-Term

- 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.

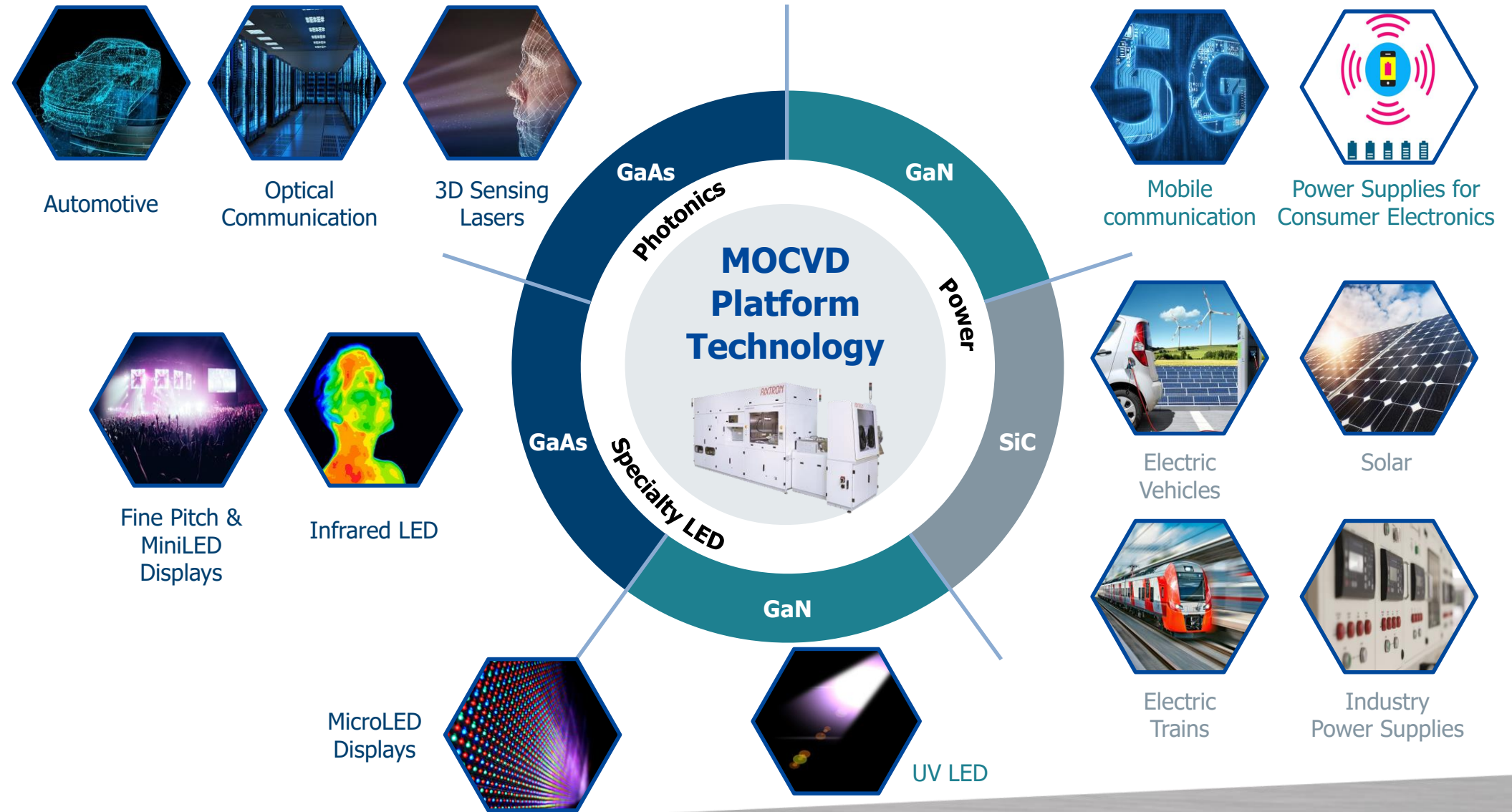
Epitaxial Growth Equipment Market Forecast*

* Excluding MBE

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



AIXTRON – Enabling Emerging Global Mega Trends



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



Devices: GaN/SiC Power Electronics – Superior Performance

Source: icons from www.flaticon.com



More Efficient



Energy Saving

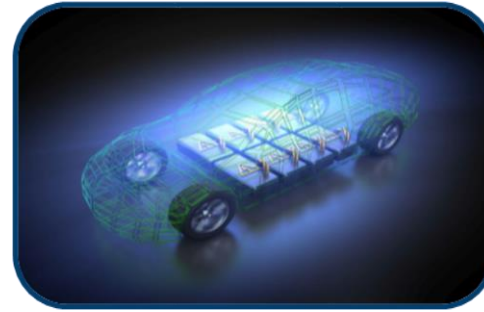
Less Heat

Light Weight

Lower System Cost



Smaller



Electric Vehicles



EV-charging



Data Centers



Renewable Energy








Wireless Charging



Fast Charging

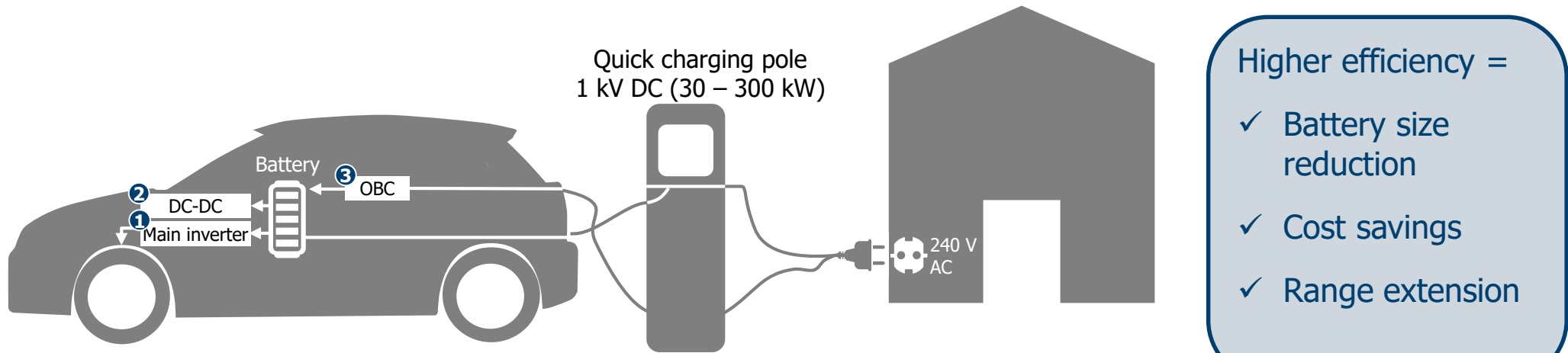
Overview: GaN/SiC as Wide Band Gap (WBG) Power Electronics

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



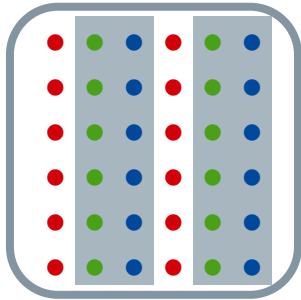
Component	Power (kW)	Fraction 6" wafer*	Comment
Main inverter	20 ~ 150	0.1 ~ 0.5	Brings energy from battery to the electric motor
DC-DC Converter	1 ~ 3	<0.01	Brings energy from battery for car electronics
On Board Charger (OBC)	5 ~ 30	0.01	Brings 240 V AC energy from wall plug to battery
(Quick) Charging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

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

Source: LEDinside, Yole Développement

RGB* LED DISPLAYS



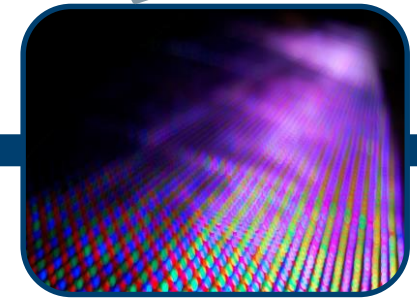
Stadium Outdoor Display
 (Pixel Pitch $\geq 10\text{mm}$)
 (Chip size: $\geq 200\mu\text{m}$)



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

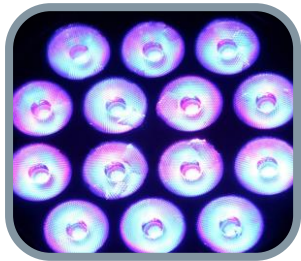


MiniLED for Consumer Electronics
 (Chip size: $\leq 200\mu\text{m}$)



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

Initial Introduction Expected



UV LED



Curing



Water Disinfection



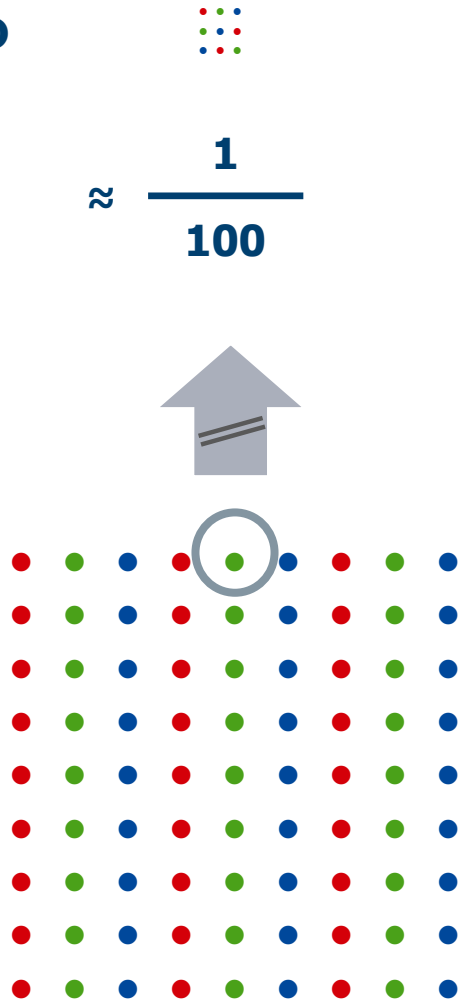
Air Purifier

*RGB = Red, Green & Blue

Devices: Micro LED – The Perfect Future Display Technology

Source: LEDinside

RGB*
Micro LED
Display



RGB*
LED
Display

Self-Emissive

Low Power
Consumption

Perfect
Contrast

High
Brightness

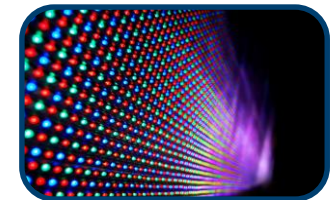
Fast
Response



Wearables



AR/VR



Signage



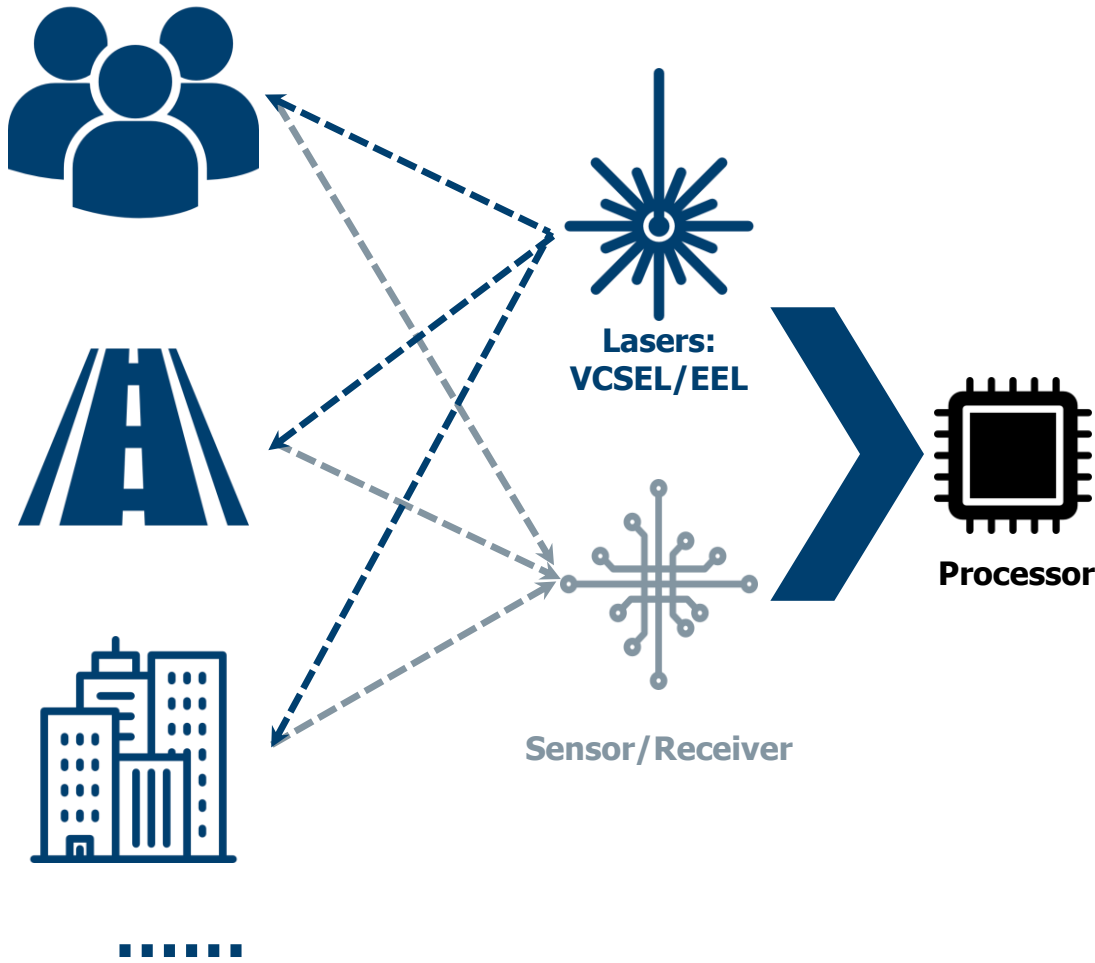
Smartphones/Tablets/TVs

*RGB = Red, Green & Blue

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

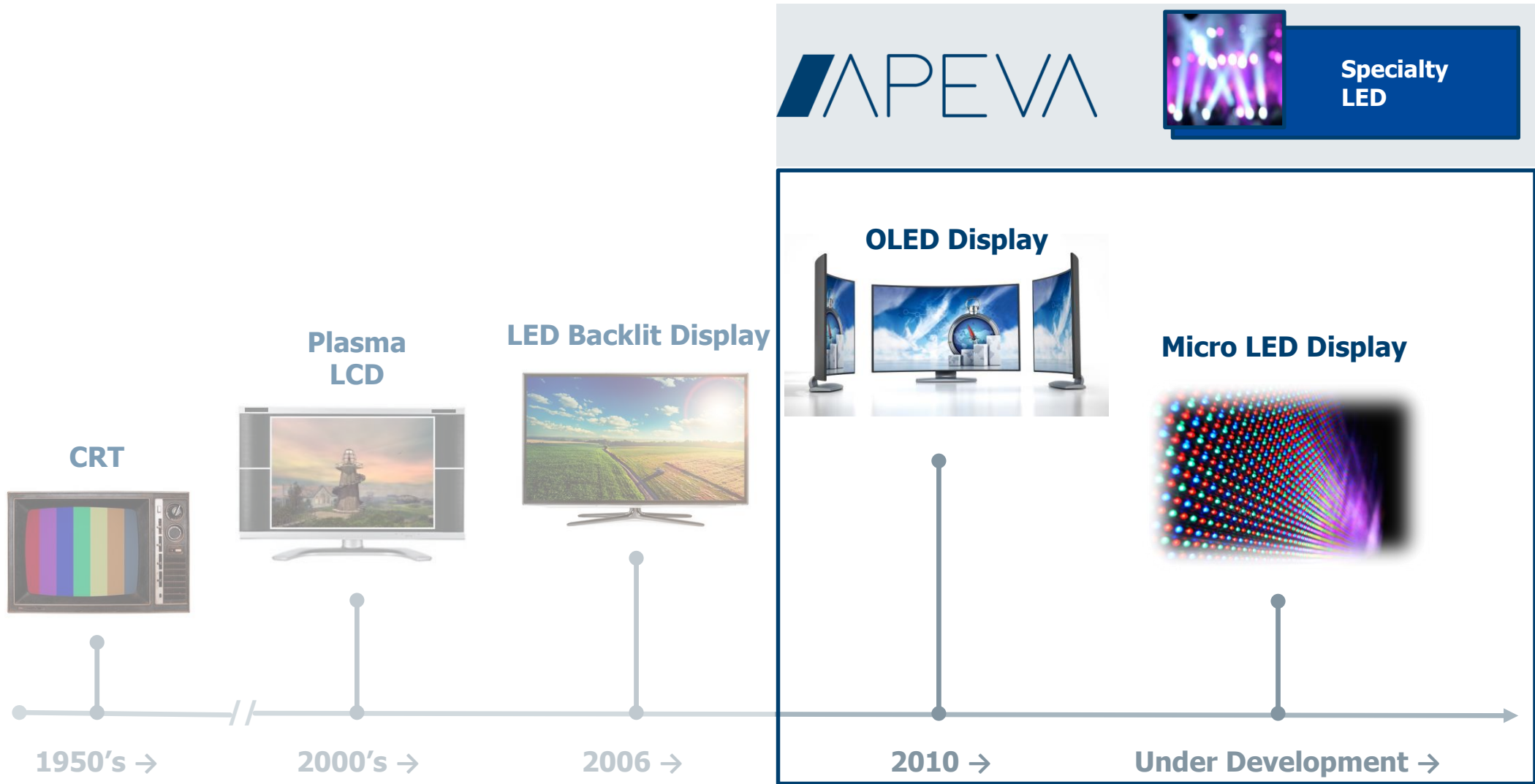


Mapping



Industry 4.0

AIXTRON – Instrumental in Evolving Display Technologies



APEVA: OLED Deposition System Provider

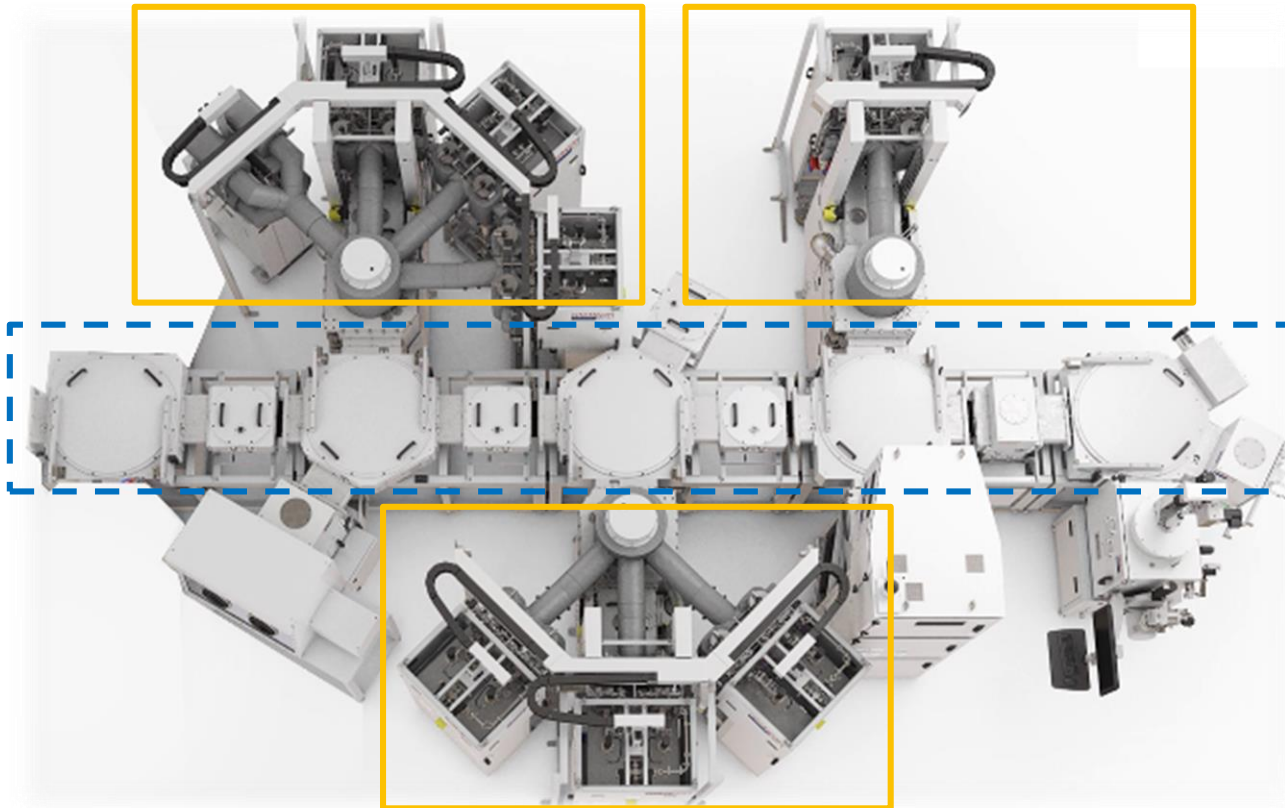


OVPD Deposition Line*

 OVPD Deposition

AIXTRON

 Automation & Handling  H&iruja



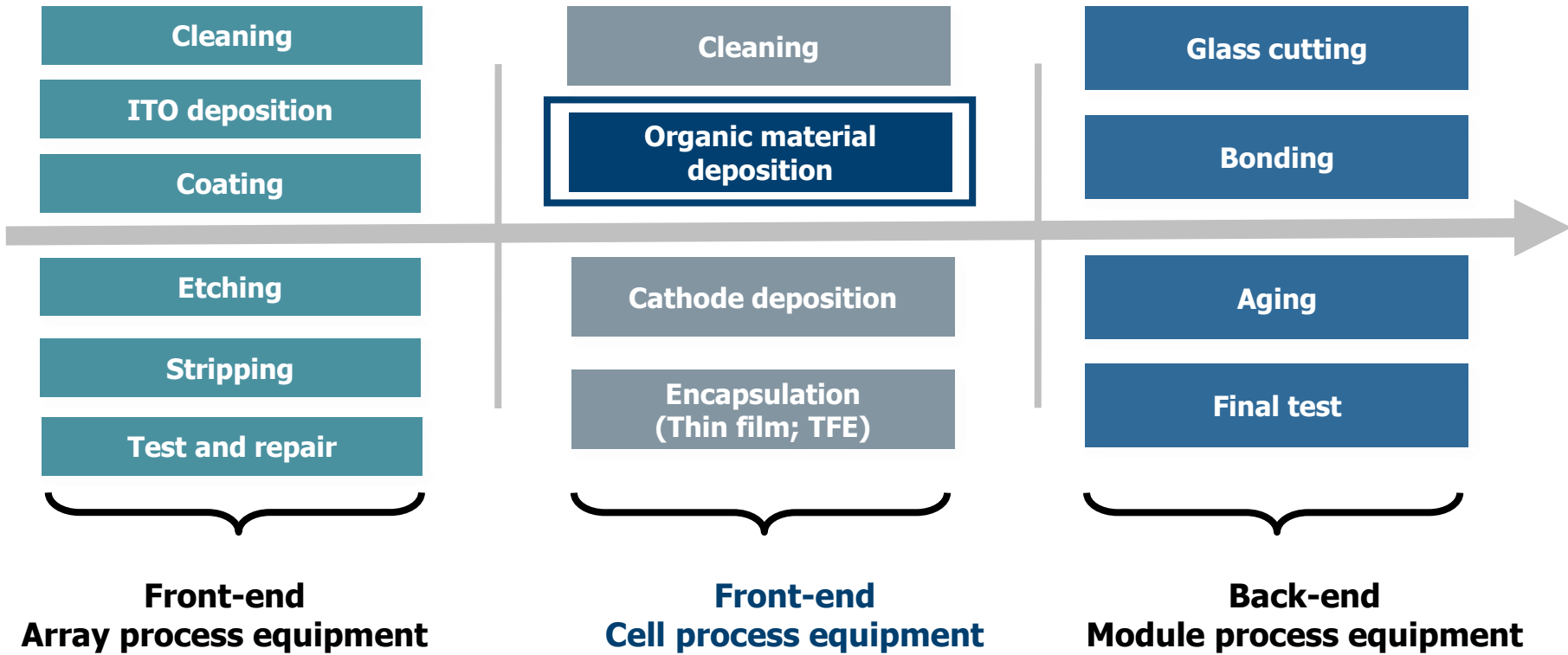
- Fully Automated OLED Deposition Lines and Fab Integration as a Complete System Provider
- Innovative Deposition Technology with
 - Higher Efficiency of OLED Material Deposition
 - Mixing and Doping of Materials via Multiple Material Deposition in One Chamber
 - Maintaining the Delicate Organic Material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

* Pictures shown are for illustration purpose only

Organic Electronics – OVPD® – APEVA

Source: DisplaySearch, AIXTRON

OLED manufacturing process



APEVA In Qualification for Volume Production

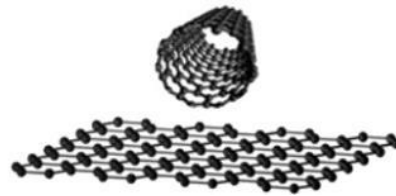
Carbon Nanomaterials – PECVD

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

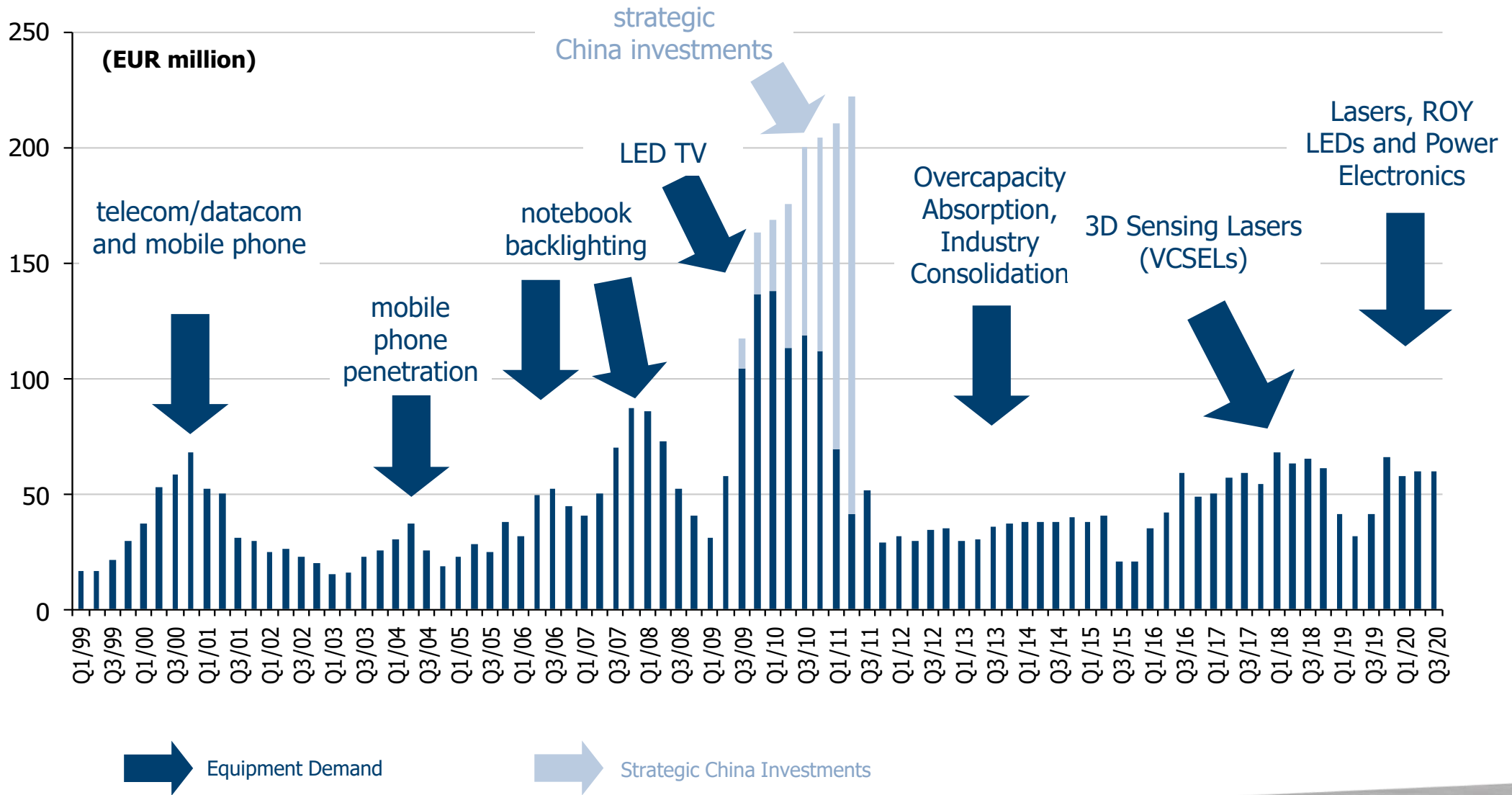


Production ready for tomorrow
 AIXTRON BM Pro 300

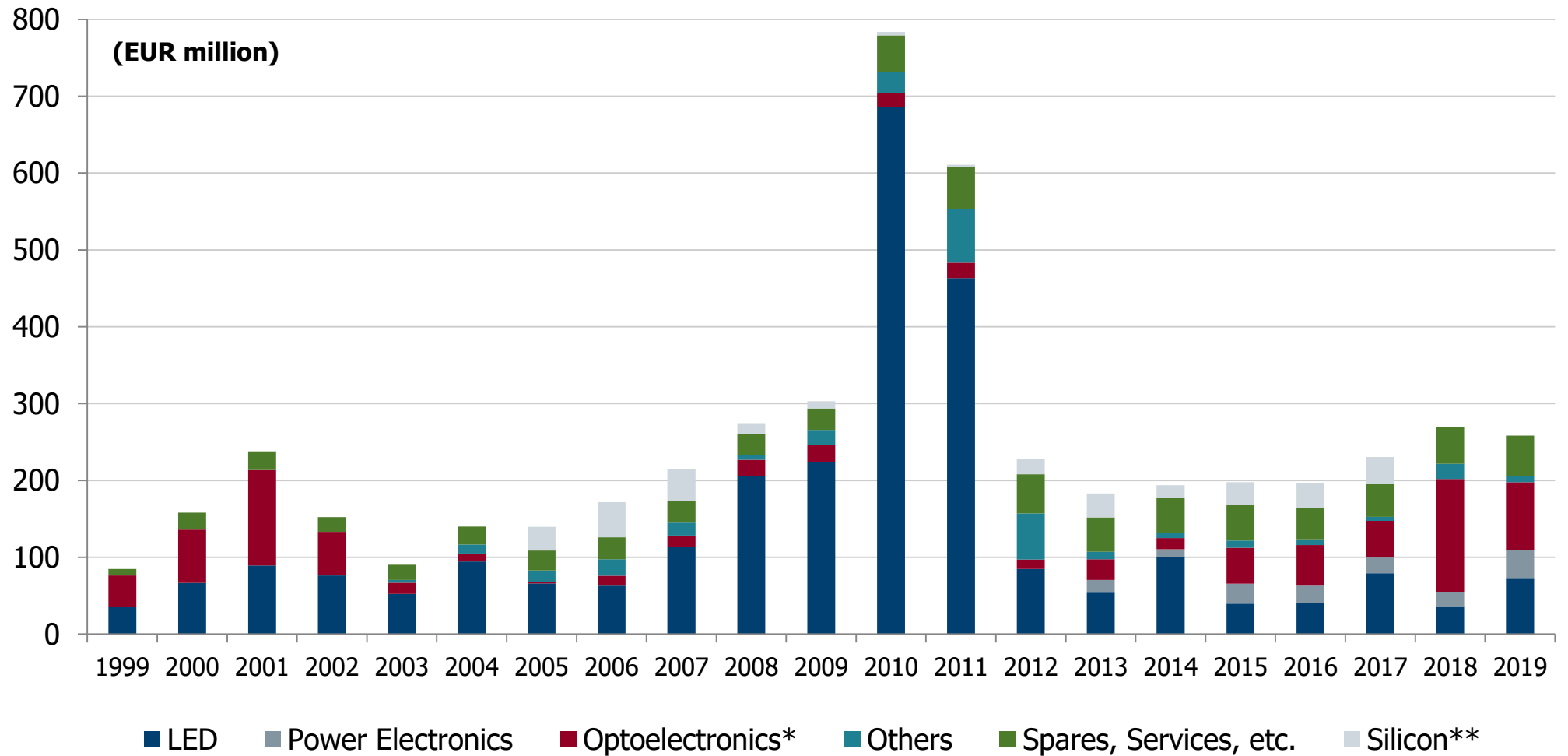


Our *technology*. YOUR FUTURE.

Demand Drivers on Order Intake per Quarter (Equipment Only)







Annual Total Revenues by Application (including After Sales)



* 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					 TAIYO NIPPON SANSO The Gas Professionals
	GaN LED			 		 TAIYO NIPPON SANSO The Gas Professionals
Power	GaN Power					 TAIYO NIPPON SANSO The Gas Professionals
	SiC Power					 TEL TOKYO ELECTRON  NUFLARE
OLED		 			 VAS 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

- February 25, 2021 FY/2020 Results, Conference Call
- April 29, 2021 Q1/2021 Results, Conference Call
- May 19, 2021 Virtual Annual General Meeting
- July 29, 2021 1H/2021 Results, Conference Call
- November 04, 2021 9M/2021 Results, Conference Call
- February 24, 2022 FY/2021 Results, Conference Call

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Technology. Materials. Performance.

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