voxeljet AG

Industrial 3D Printing

NYSE: VJET



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Non-IFRS Measure

The Company uses Adjusted EBITDA as a supplemental financial measure of its financial performance. As calculated under International Financial Reporting Standards ("IFRS") accounting principles, Adjusted EBITDA is defined as net income (loss), interest (income) expense, provision (benefit) for income taxes, depreciation and amortization, and excluding other (income) expense resulting from foreign exchange gains or losses on the intercompany loans granted to the subsidiaries. Management believes Adjusted EBITDA to be an important financial measure because it excludes the effects of fluctuating foreign exchange gains or losses on the intercompany loans granted to its subsidiaries which are difficult to forecast for future periods. Management regularly uses both IFRS and non-IFRS results and expectations internally to assess its overall performance of the business, making operating decisions, and forecasting and planning for future periods. Management believes that Adjusted EBITDA is a useful financial measure to the Company's investors as it helps investors better understand and evaluate the projections our management board provides. The Company's calculation of Adjusted EBITDA may not be comparable to similarly titled financial measures reported by other peer companies. Adjusted EBITDA should not be considered as a substitute to financial measures prepared in accordance with IFRS.

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New, large-format 3D printer for high-volume production of direct functional parts from High Speed Sintering (VX1000 HSS) expected to be launched towards the end of 2020. Prototype version presented at Formnext show in Frankfurt, November 2019 (link to video).



AGENDA

- **Company & business model**
- Technology & products
- Market, customers & applications
- Growth drivers
- Financials

Investment highlights

- Addressing Large and Global Market Opportunity for Additive Manufacturing
- Differentiated Technology, Uniquely Focused on Large-Scale, Additive Series Production
- Long-term Relationship with Global Industry Leaders such as BMW, Daimler, VW and Nike
- Business at Inflection Point as Key Customers Are Entering Additive Series Production
- Visionary Leadership Team with Long Track-Record of Success
- Starting to Commercialize New Innovations for Additive Series Production: VJET X and VX1000 HSS

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Management board



Dr. Ingo Ederer

CEO, founder and shareholder

21 years with voxeljet
27 years of industry experience

Management combined
holds ~20% of VJET shares

Rudolf Franz



CFO and shareholder

17 years with voxeljet
25 years of industry experience

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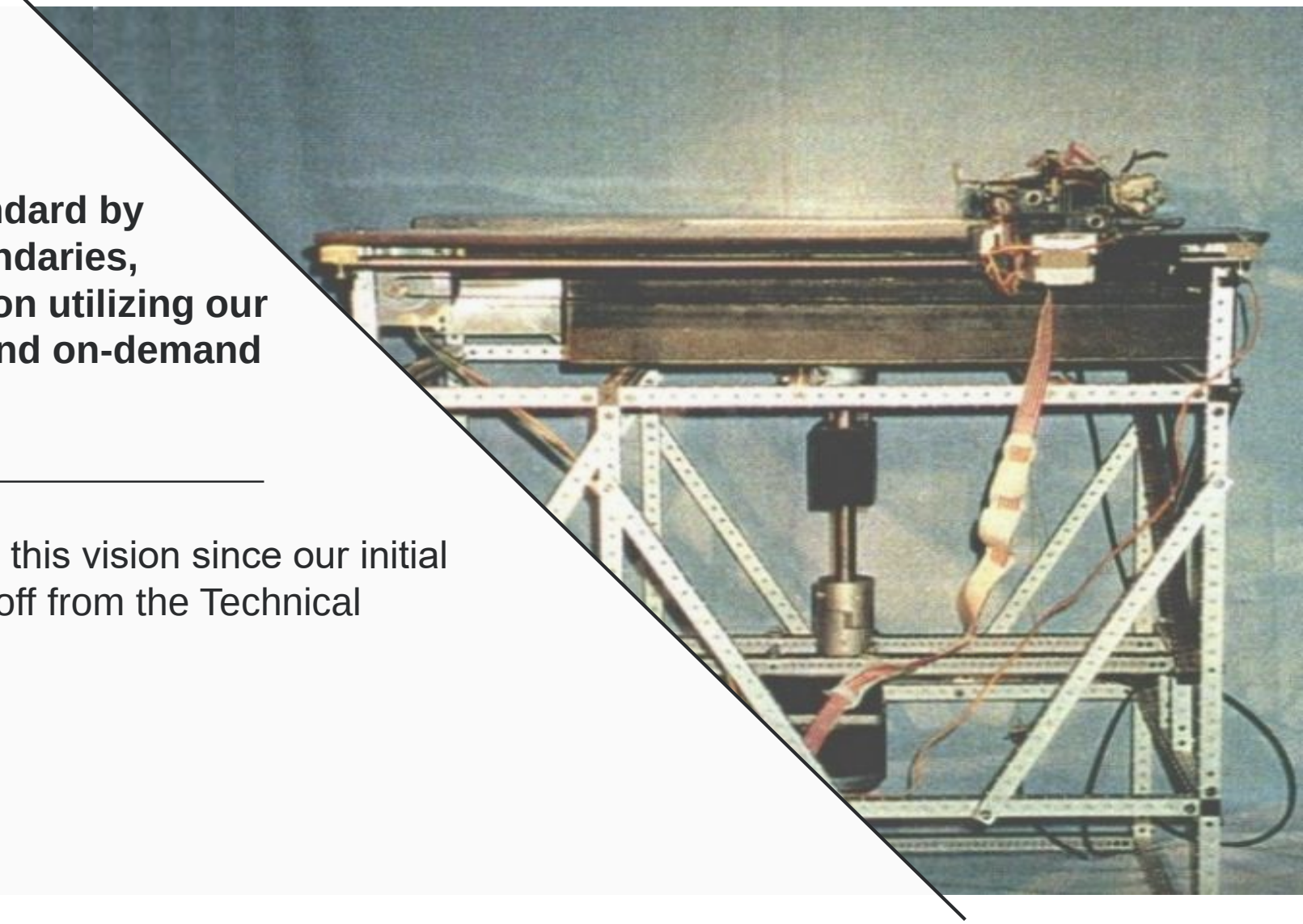
Our vision



To establish a new manufacturing standard by constantly pushing technological boundaries, enabling cost-effective mass-production utilizing our high-speed, large-format 3D printers and on-demand parts services.

“We have been working towards realizing this vision since our initial days in 1999, when we started as a spin-off from the Technical University in Munich.”

Dr. Ingo Ederer, CEO and founder of voxeljet

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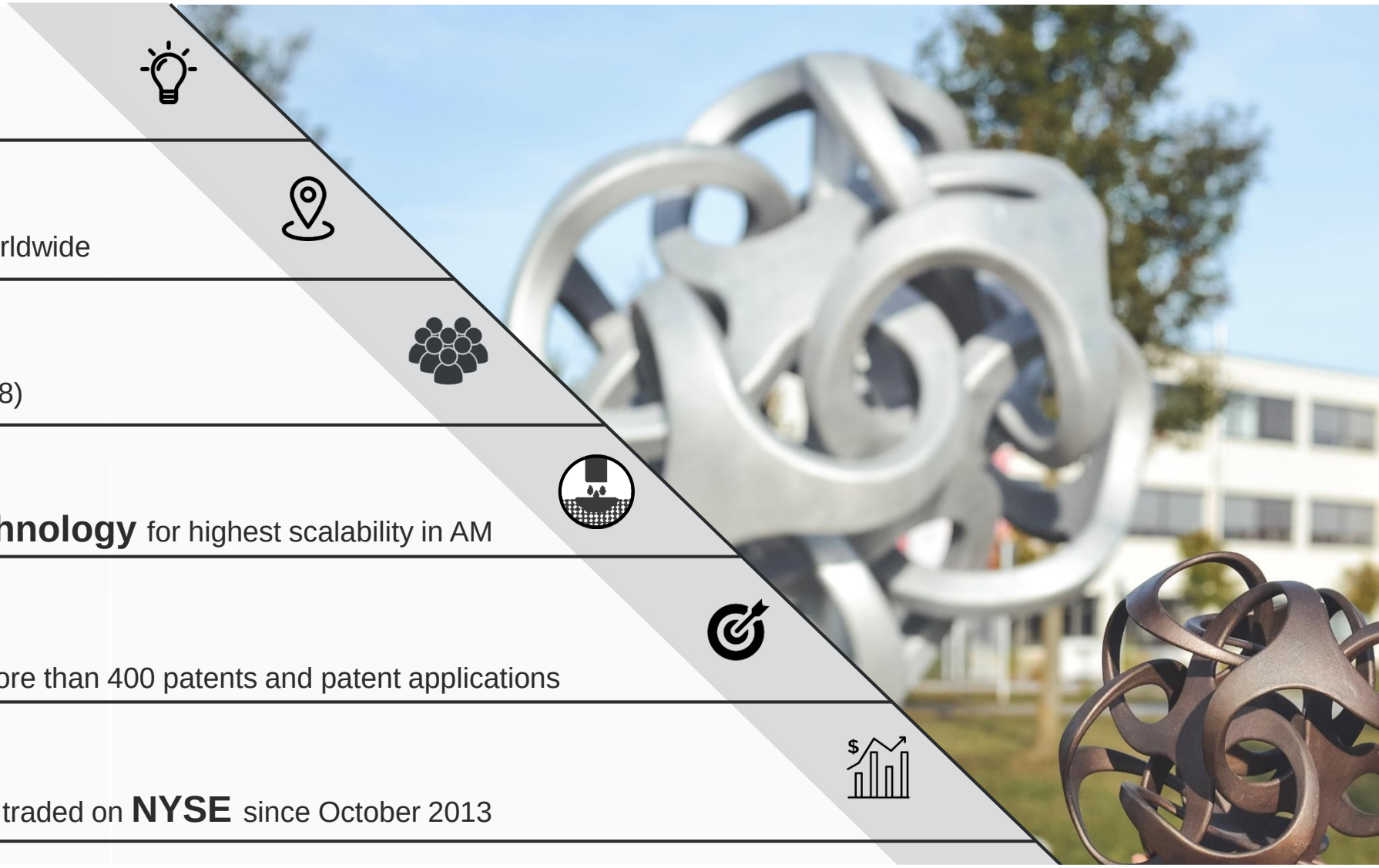
voxeljet today

- Established in **1999**
- **5** locations worldwide
- **327** employees (FY18)
- **Powder Binder/Ink Jetting Technology** for highest scalability in AM
- **Industrial 3D-Printing:** more than 400 patents and patent applications
- Public company traded on **NYSE** since October 2013



3D printed and casted in aluminum and bronze; German HQs 2019

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Synergies built on integrated business model

Services
(On-Demand Printing)

Systems

- 2018 Sales: EUR 13.8m
- Volume contracts
- Strong competitive position:
  global footprint/largest printers in the industry
- Optimized CAPEX and OPEX for own assets
- Low barriers to entry
  send data → receive printed parts; from n=1

Synergies

Risk balancing
- Capture business either as 3D-Printer sale or on-demand printing contract
- Balance long with short sales cycles

Customer
- Early awareness of new projects
- Strong customer relationships

Operations
- Long track record of executing large-scale projects
- High cost competitiveness and efficiency

Innovation
- Improvement of applications and solutions
- Insights into customer processes

- 2018 Sales: EUR 12.2m
- Multi-system sales
- After sales activities
- Direct parts technology
  High Speed Sintering
- Indirect metals technology via Hybrid AM

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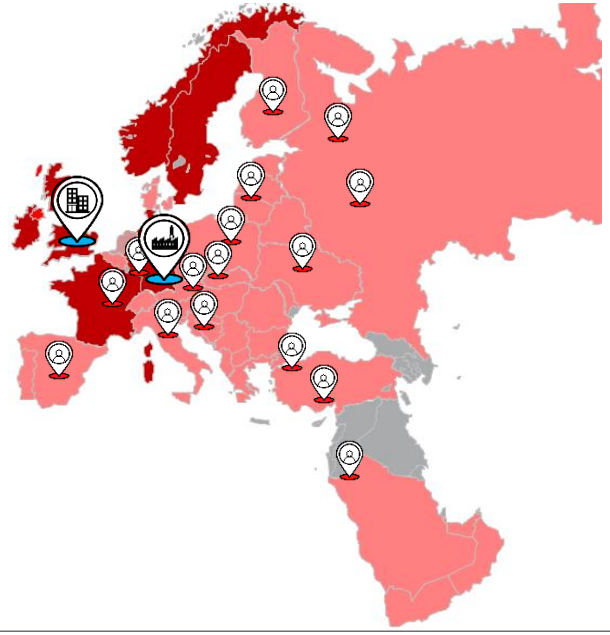
Powerful global sales network and production footprint

Americas: 32% of Sales

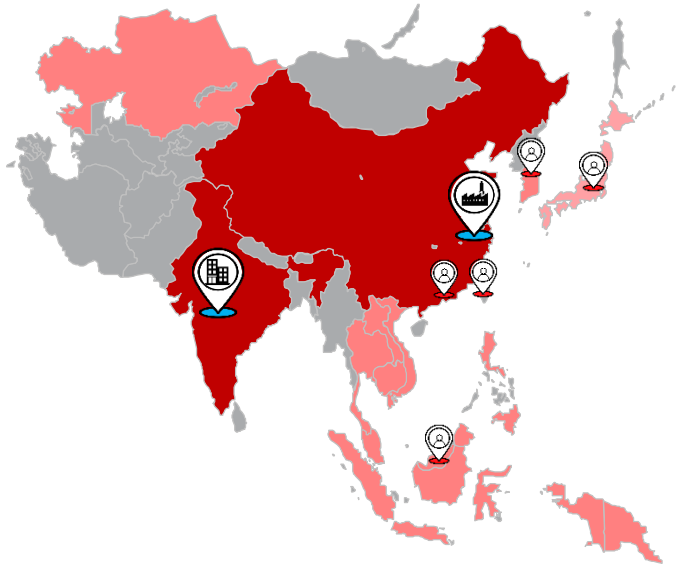
[based on 3Q19 sales]



EMEA: 58% of Sales



Asia: 10% of Sales



3 voxeljet plants / 2 sales offices (UK, India)

22 voxeljet sales partners

voxeljet direct sales

voxeljet sales partner coverage

Facilities in US and Asia focus on local and regional customers:
Key advantages of overseas facilities include: geographic proximity reduces transportation costs and purchase lead-time; provides timely value-added services for customers; staffs local engineers to promptly deliver technical and maintenance support

50,000 Sq. Feet	*1,000 Sq. Feet*	*135,000 Sq. Feet*	*1,000 Sq. Feet*	*78,000 Sq. Feet*
USA *3D Parts Production Center*	**UK** *Office*	**Germany** *HQs, R&D/Engineering, 3D Parts Production Center*	**India** *Office*	**China** *3D Parts Production Center*

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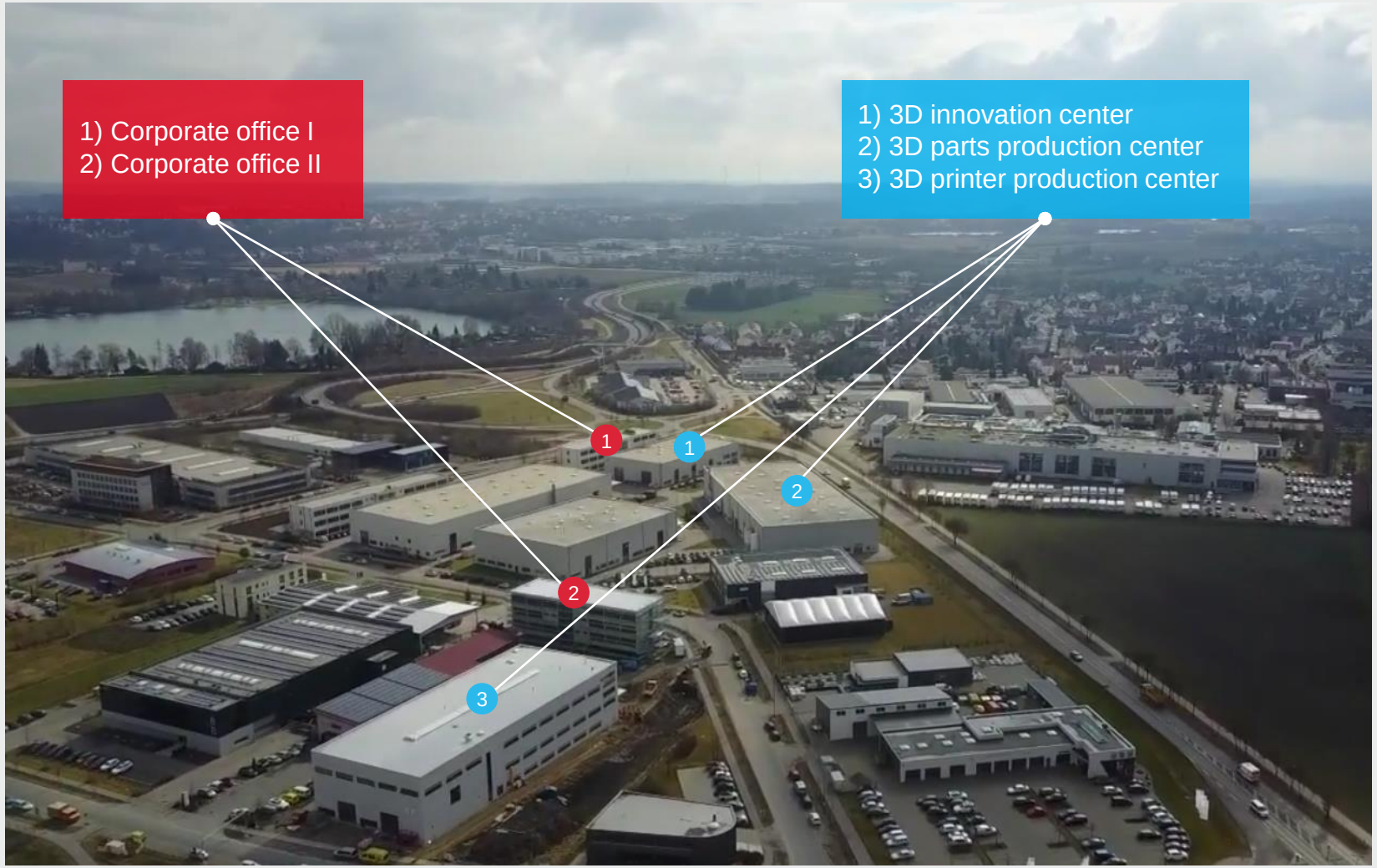
HQs in Germany (nearby Munich)



Comments

> One of the largest 3D parts production centers in Europe (> 100,000 parts p.a.)

> R&D hub: 51 (FY18) colleagues working on new and improved processes and 3D printers

> Production of print heads as the most critical part of a 3D printer

> Assembly of 3D printers

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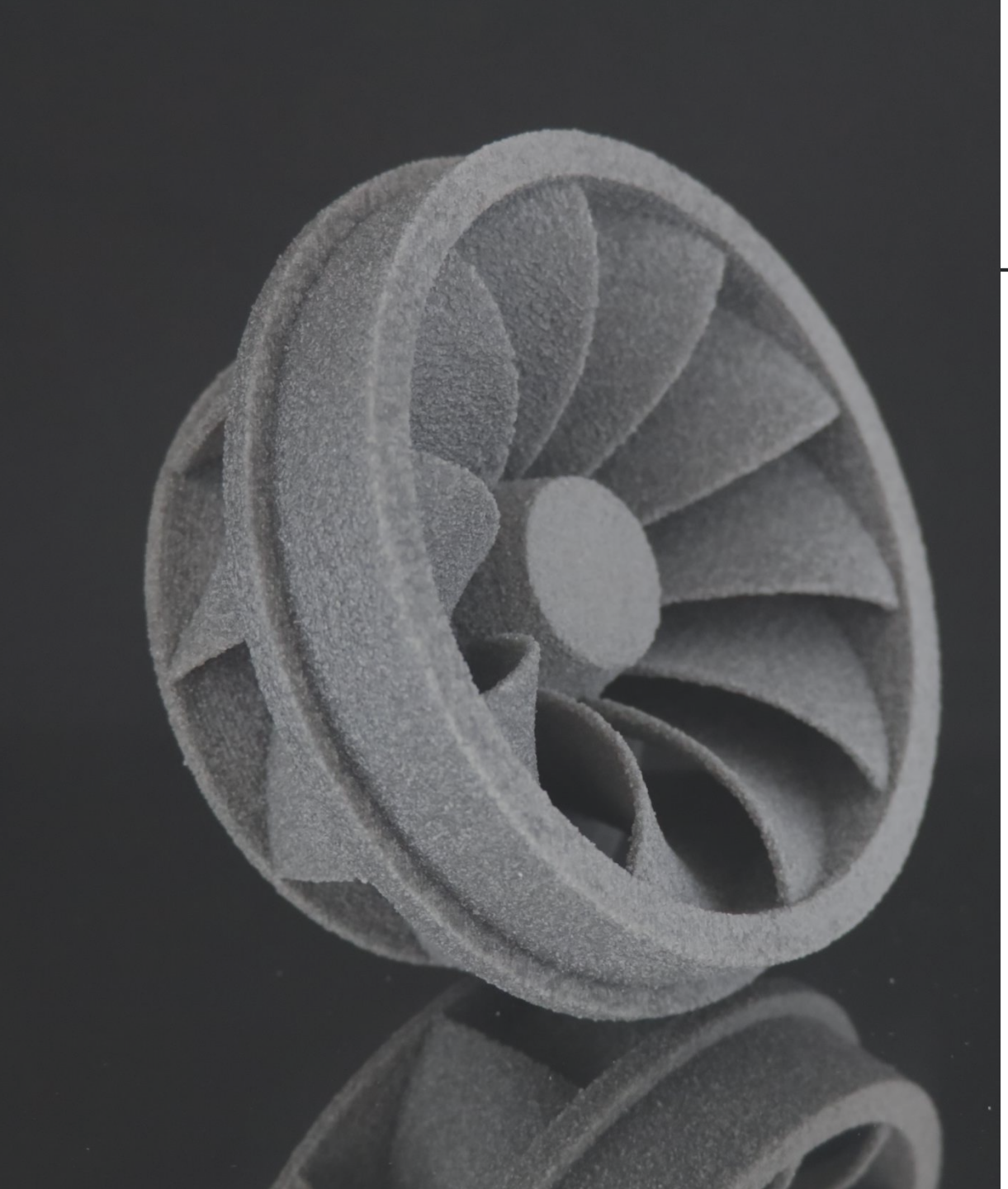
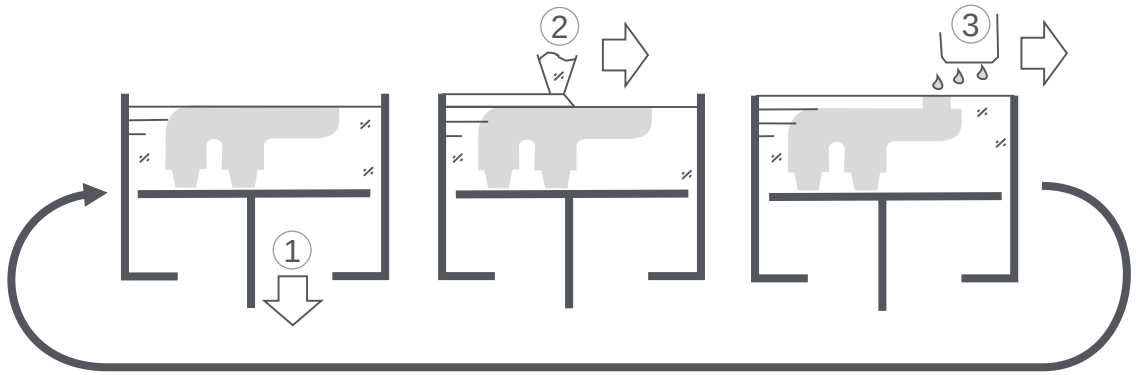


AGENDA

- Company & business model
- **Technology & products**
- Market, customers & applications
- Growth drivers
- Financials

Powder binder/ink jetting technology

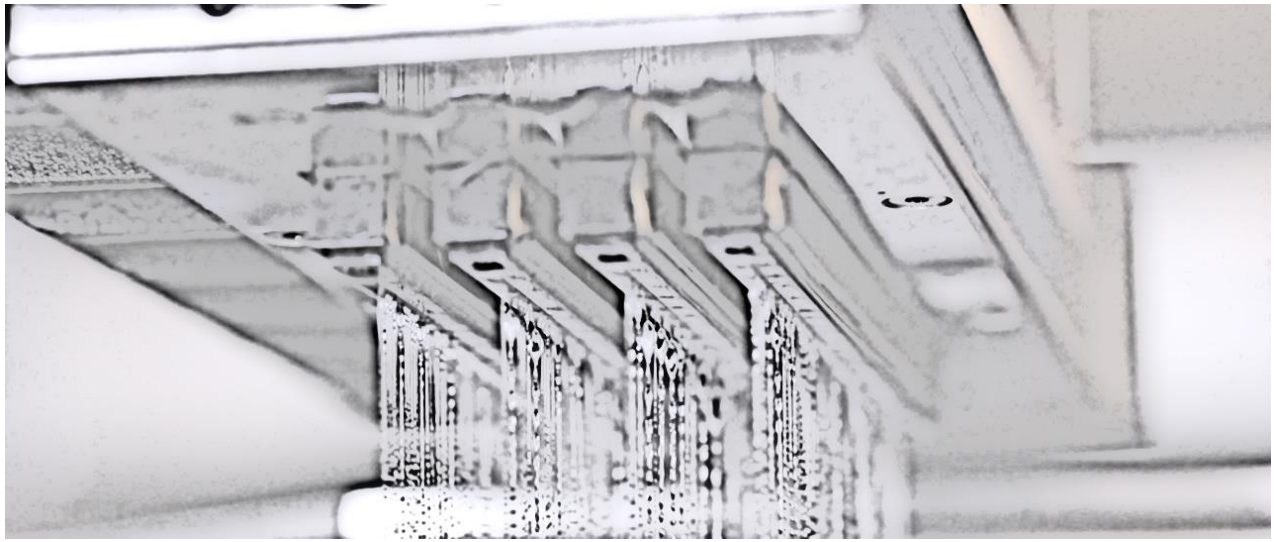


In additive manufacturing, shaped bodies are built up layer by layer. Powder binder/ink jetting repeats the steps:

1) Lower the layer

2) Coating with particle material such as sand or plastic

3) Printing with a binding agent or ink



Key advantages as compared to other additive manufacturing technologies:

> **Scalability: number, size and performance of printheads**

> **Ready for large-scale manufacturing**

> **Material diversity: various industrial grade materials**

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Product portfolio



VJET X *Layer Time* ***< 5*** *seconds*
https://www.youtube.com/watch?v=xZpmNZ3LCEM



VX4000 4,000 x 2,000 x 1,000 | 60 | 144 |
$2,100,000



VX2000 2,000 x 1,000 x 1,000 | 37 - 84 | 21 - 58 |
$950,000 – 2,000,000



VX1000 1,000 x 600 x 500 | 15 - 65 | 9 - 43|
$840,000 – 1,000,000



VXC800 850 x 500 x ∞ | 78 | 12 |
$735,000



VX500 500 x 400 x 300 | 25 – 35 | 4 - 7 |
$445,000 – 505,000



VX200 300 x 200 x 150 | 20 – 40 | 0,6 - 2 |
$150,000 - 260,000

Build Box Size (L x W x H) (millimeters) | Layer Time (seconds)[(1)] | Volumetric Output Rate (liters per hour)[(2)] | List Price[(3)]

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(1) Layer times are indicative and depend on system configuration and materials
(2) Volumetric output rates are approximated and depend on, among other factors, layer thickness
(3) Prices are indicative, depend on system configuration and materials and are subject to change



AGENDA

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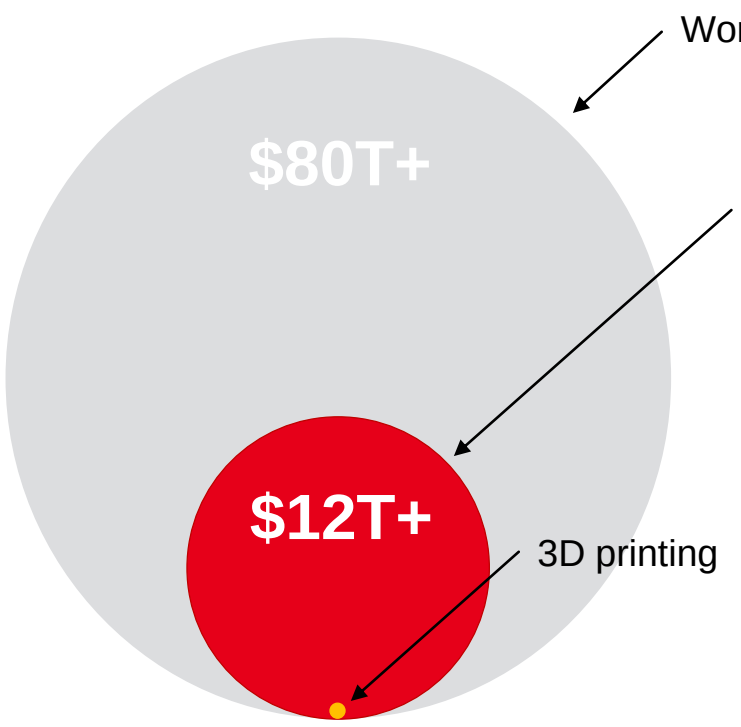
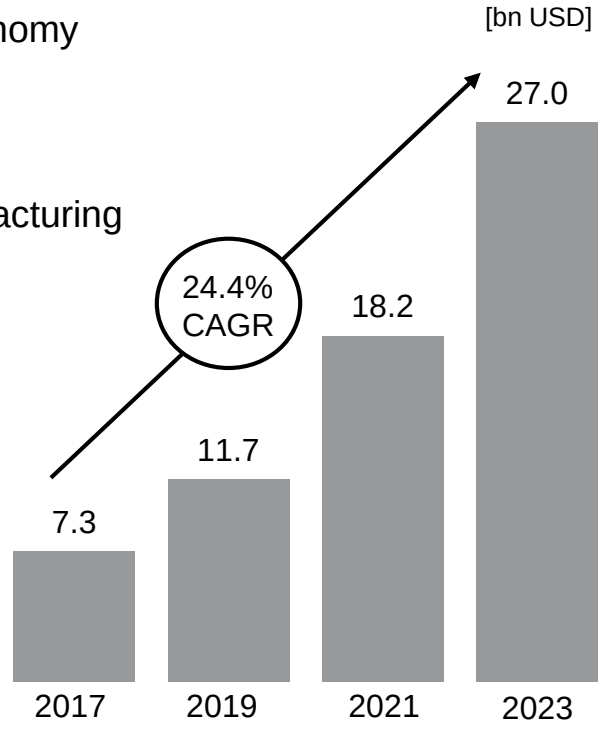
Substantial addressable market for 3D printing

Manufacturing sector offers great potential for 3D printing

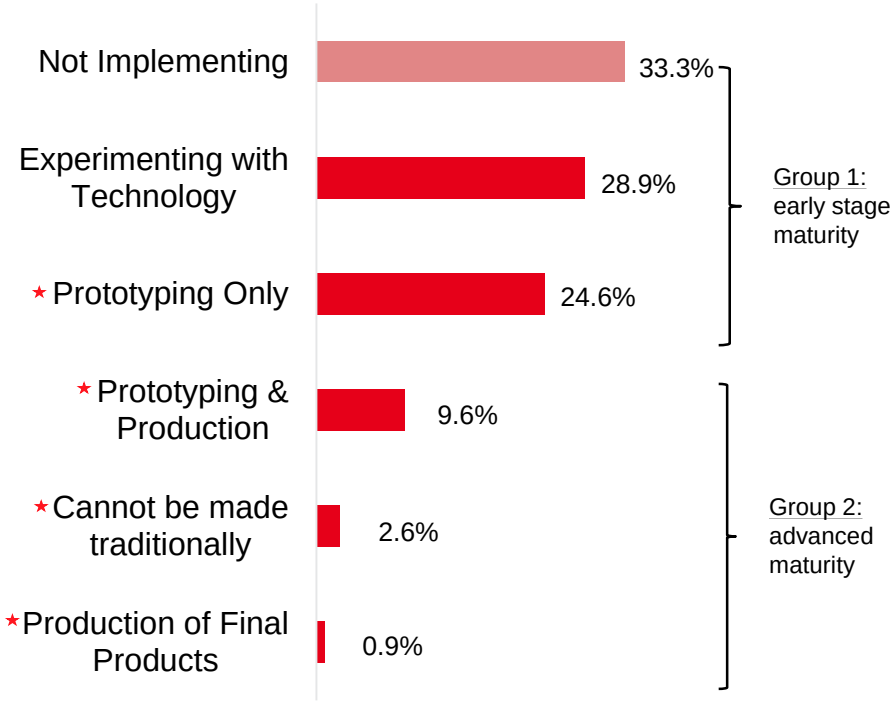


3D Printing market expected to continue strong growth



Industrial Uses

Significant Runway for Further Adoption



★ Targets for Systems sales

Source: Wohler's Associates (2018), HPQ, ATKearney, VJET

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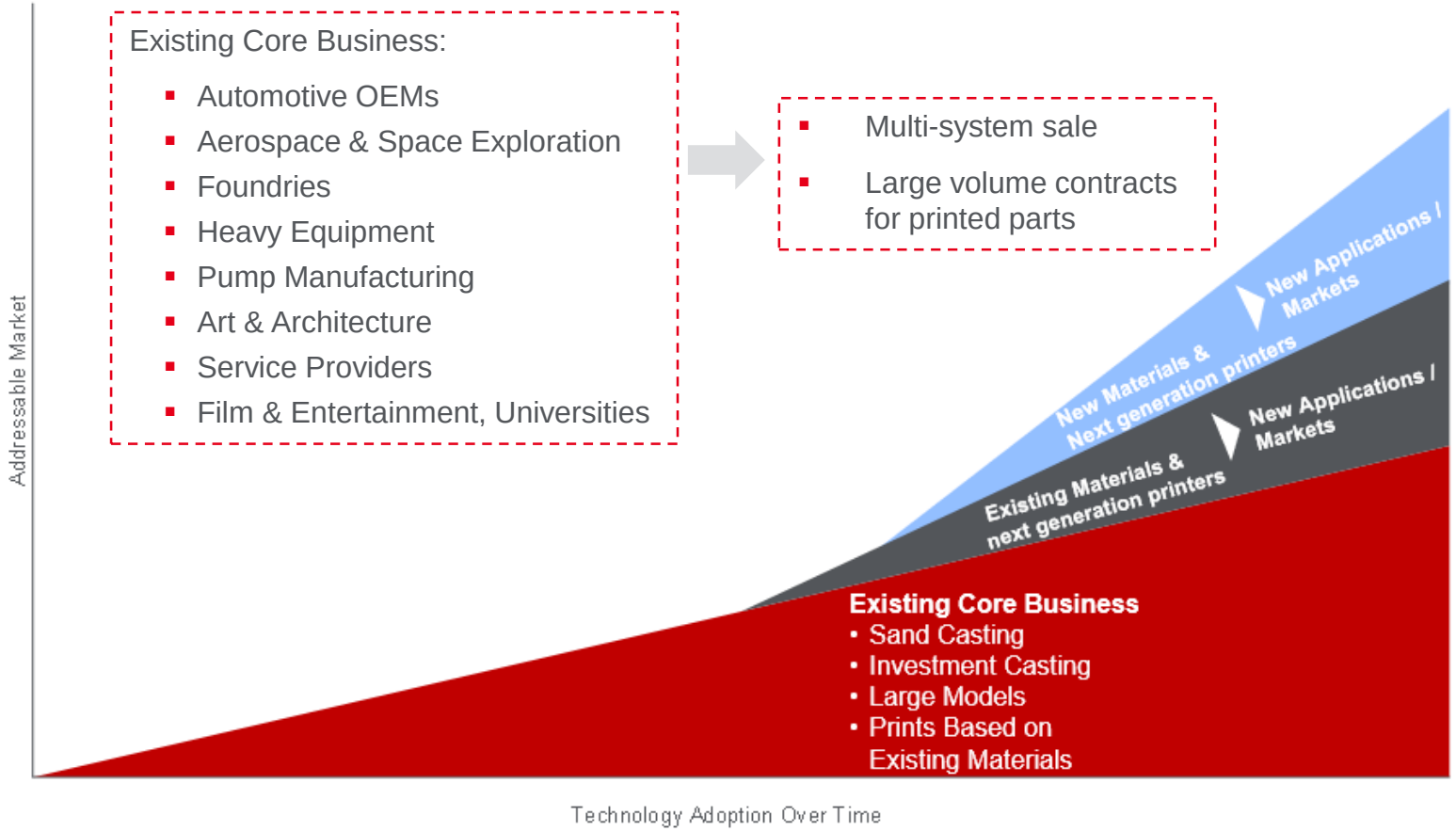
Our growth strategy remains unchanged



Comments

> **New materials:**

- for High Speed Sintering (HSS): polypropylene (PP), thermoplastic polyurethane (TPU), polyether block amide (PEBA), customer specific materials
- For sand casting: environmentally friendly binder system for zero emissions during casting

> **New applications for HSS**

- Consumer goods & electronics (sports equipment, footwear, prosthetics)
- Industrial & Services (enclosures, fluid & air ducts, pneumatic robotics)
- Automotive (customized interior parts, fluid vessels, snap fits and exterior components)

> **Next generation printers:**

- From small series production to large-scale manufacturing via new printers (see next slide)

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Commercialization of new growth drivers has started

Long-term relationship with global industry leaders

Company	Length of business relationship (years)
BMW	18
DAIMLER	18
VW	16
PORSCHE	14
Ford	8
PSA GROUPE	7
HYUNDAI	6
NIKE	3
RICOH imagine. change.	3

Metal parts from Hybrid Additive Manufacturing

VJET X printers are **10x faster** than previous models, which results in a layering speed of less than 5 seconds. An inorganic binder system is used for **zero emissions** during core printing, storage and when using the sand cores in the casting process. Commercialization of VJET X started at the end of 2018 through a frame-contract with a premium German car maker. **Key benefit**: By combining high-speed 3D printing with conventional casting, highly-complex metal components can be manufactured at scale at significantly lower costs per part as compared to other additive manufacturing technologies (link to video).

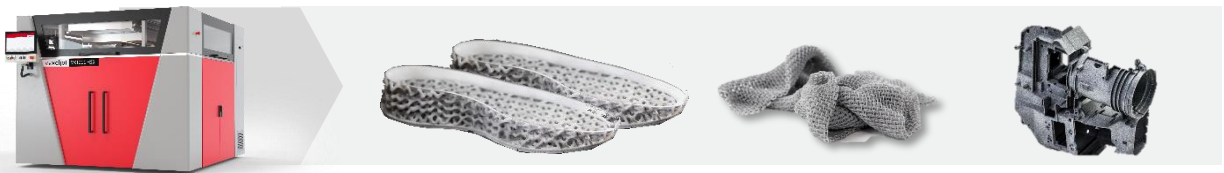


VJET X 3D printer | 3D printed sand core | Casting line | Casted aluminum component

Polymer parts from High Speed Sintering (HSS)

voxeljet's High Speed Sintering (HSS) technology **combines the advantages** of two existing additive processes: selective laser sintering (end products) and binder jetting (high throughput). Applications include sporting goods like shoes, speakers, automotive interiors and exteriors, sealings, gaskets, grippers and other consumer products. A large HSS printer (VX1000 HSS) for series production is currently under development and a prototype was presented to the public in November 2019 at the Formnext show in Frankfurt (link to video as filmed at exhibition). Because of its size, speed and low operating costs, the new 3D printer is **suited for additive series production**.

Commercialization of the new printer is expected to start towards the end of 2020.



VX1000 HSS 3D printer

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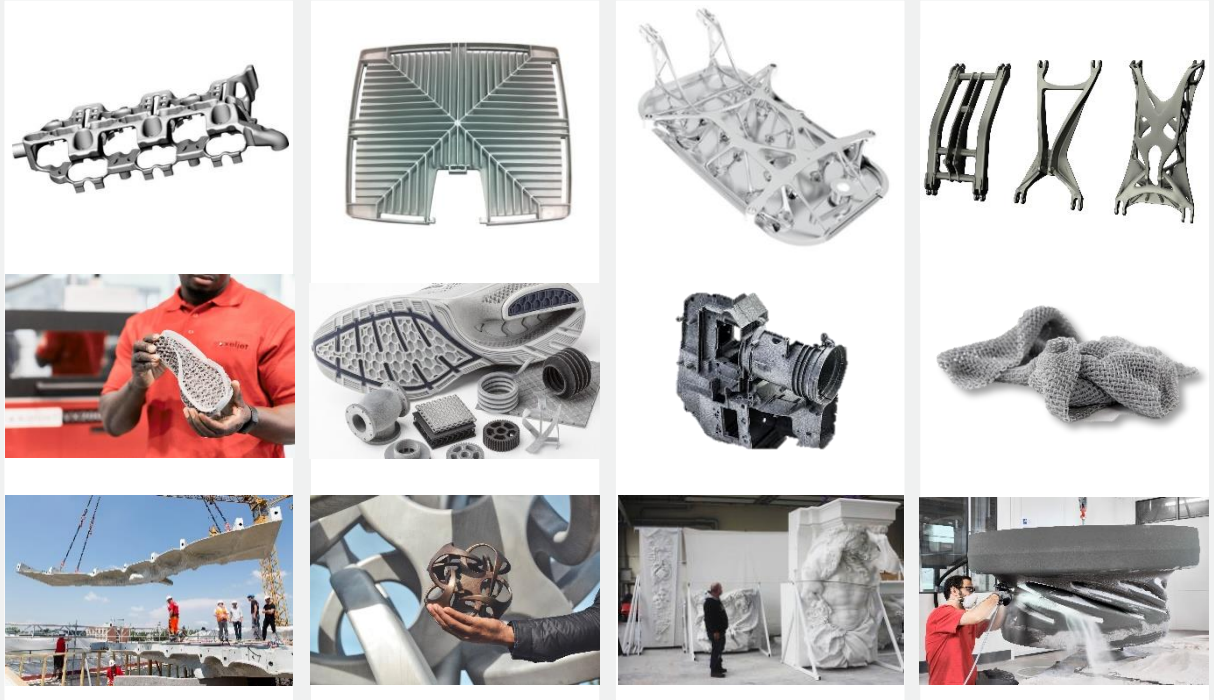
Applications

- **AUTOMOTIVE, AEROSPACE, GENERAL ENGINEERING**
- **SPORTING & CONSUMER**
- **DESIGN, ART & ARCHITECTURE**



Speed
High speed printing and fast availability

Size
Largest 3D printing systems in the market

PRODUCTIVITY IN 3D

Material diversity
Various applications, processes and materials

Cost efficiency
Optimization of cost of ownership

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Using voxeljet’s hybrid additive manufacturing technology, super-complex metal parts in all sizes can be manufactured at costs similar to conventional manufacturing



AGENDA

- Company & business model
- Technology & products
- Market, customers & applications
- **Growth drivers**
- Financials

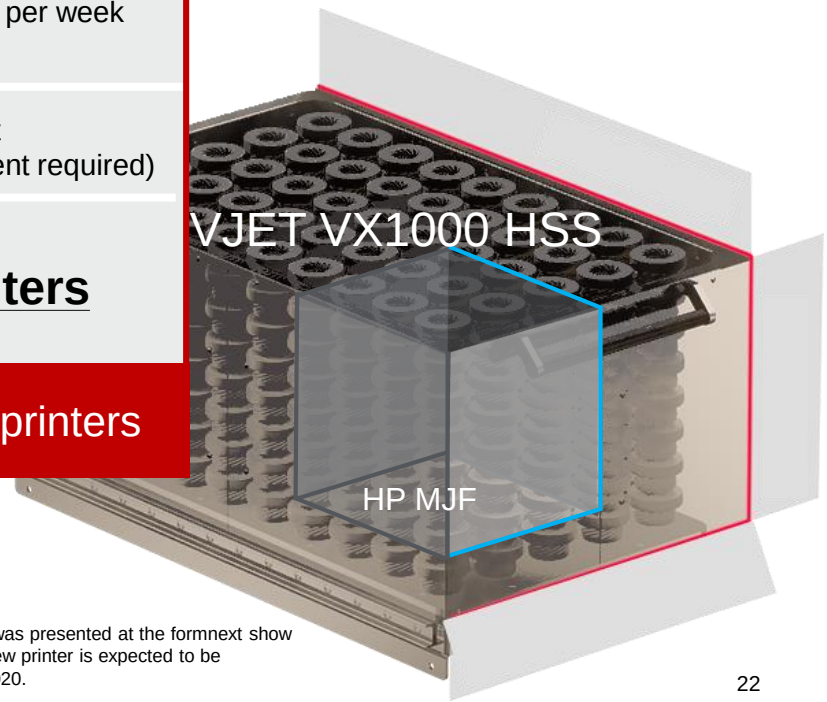
voxeljet‘s new VX1000 HSS 3D printer is geared towards additive series production of final parts

	HP Jet Fusion 5210	HP Jet Fusion 4200	voxeljet VX200 HSS	voxeljet VX1000 HSS
				
Ideal for	Mid-volume production environments producing over 550 parts per week	Industrial prototyping and final part production environments producing up to 200 parts per week	Industrial prototyping and final part production environments producing up to 100 parts per week	High-volume, series production of final parts > 5,000 parts per week
Running costs	Better	Good	Fair (no detailing agent required)	Best (no detailing agent required)
Effective build volume	41 liters		9 liters	**248 liters**

Source for HP data: HP Inc. 4AA7-4999ENA, May 2019

Source: voxeljet AG

New voxeljet VX1000 HSS with 6x larger build volume than comparable 3D printers



A prototype of the new voxeljet HSS printer was presented at the formnext show in Frankfurt, November 19 – 22, 2019; the new printer is expected to be commercially available towards the end of 2020.

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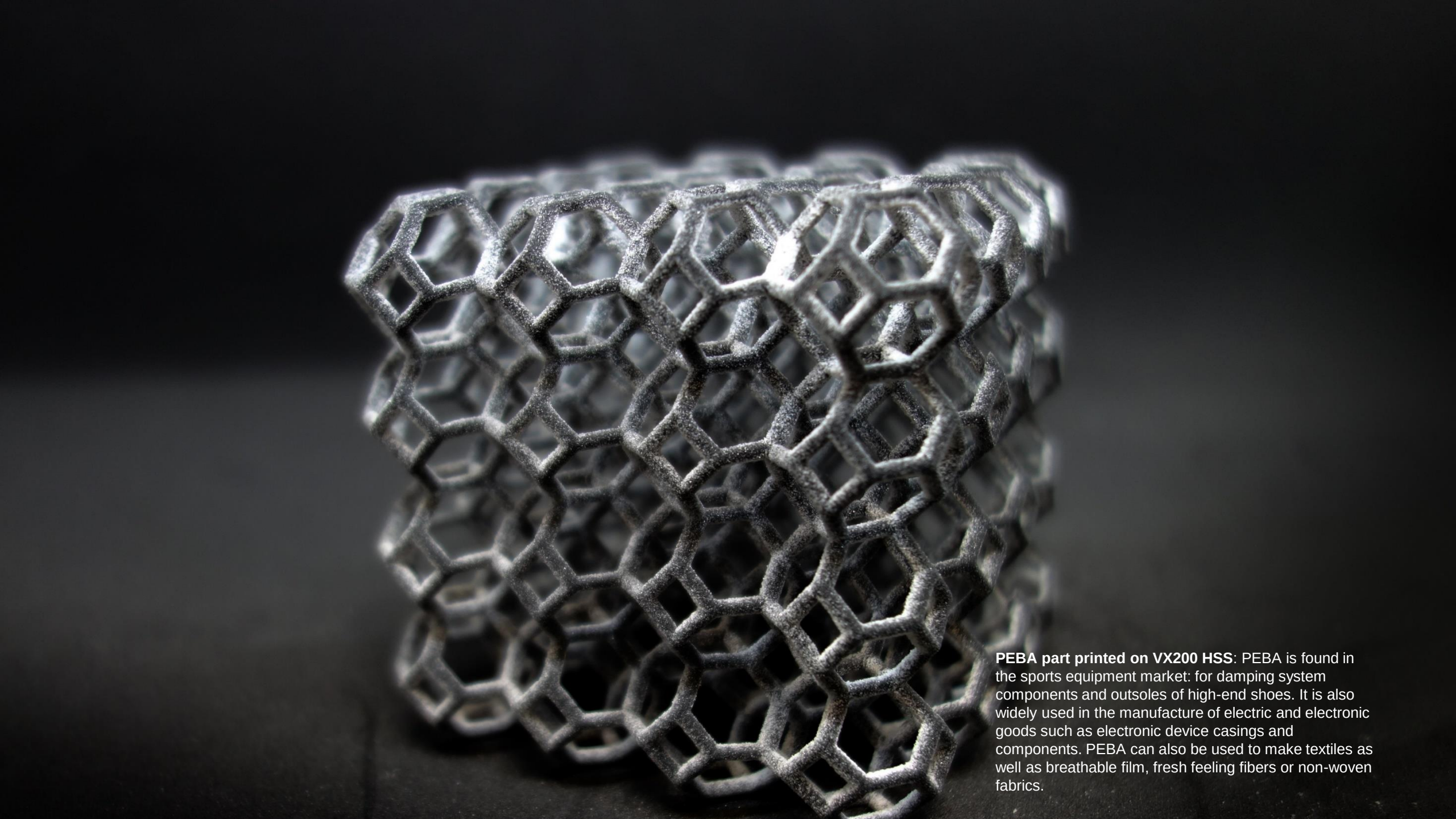
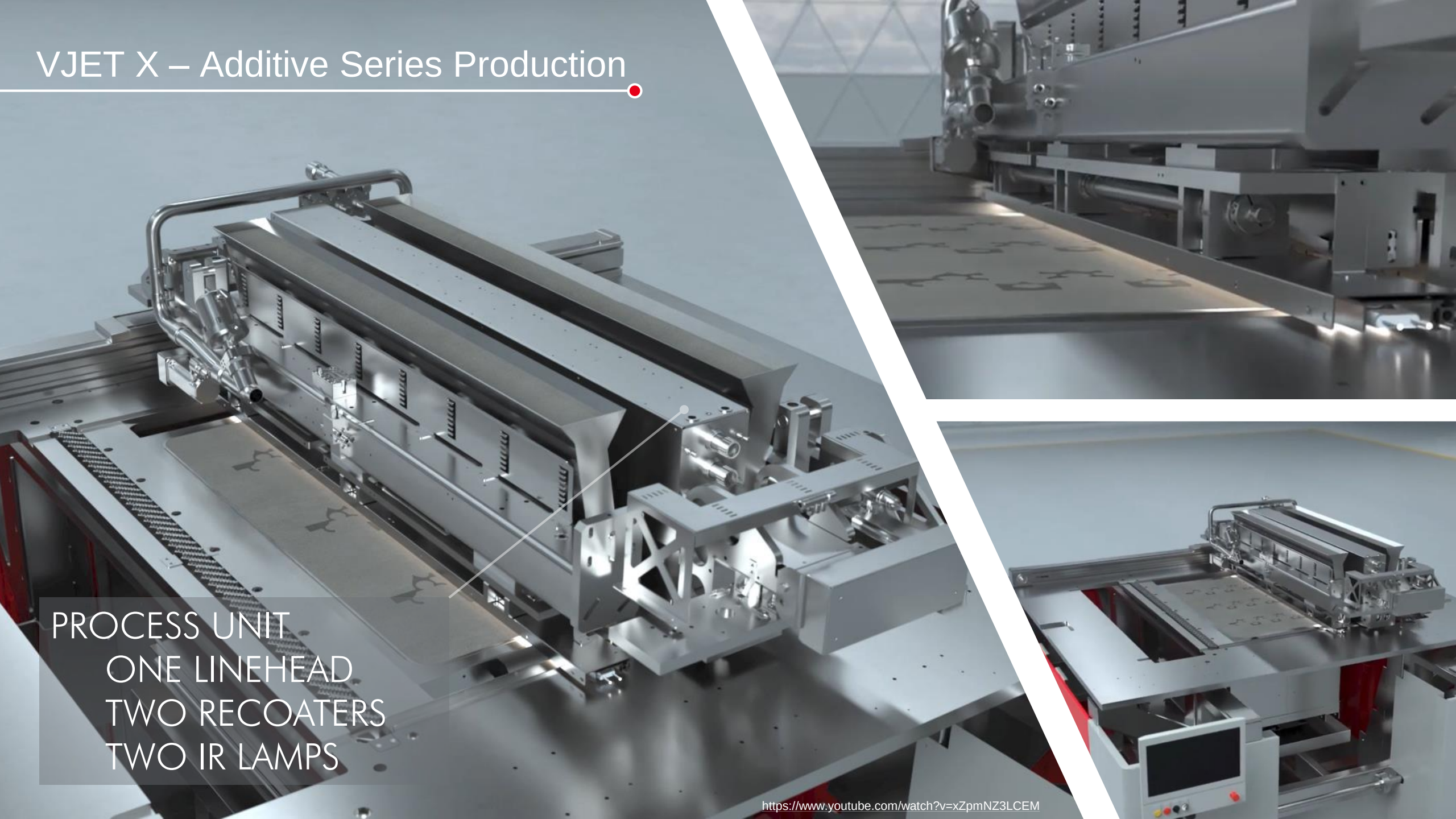


PEBA part printed on VX200 HSS: PEBA is found in the sports equipment market: for damping system components and outsoles of high-end shoes. It is also widely used in the manufacture of electric and electronic goods such as electronic device casings and components. PEBA can also be used to make textiles as well as breathable film, fresh feeling fibers or non-woven fabrics.

VJET X – Additive Series Production



PROCESS UNIT
- ONE LINEHEAD
- TWO RECOATERS
- TWO IR LAMPS

https://www.youtube.com/watch?v=xZpmNZ3LCEM

VJET X in automotive series production

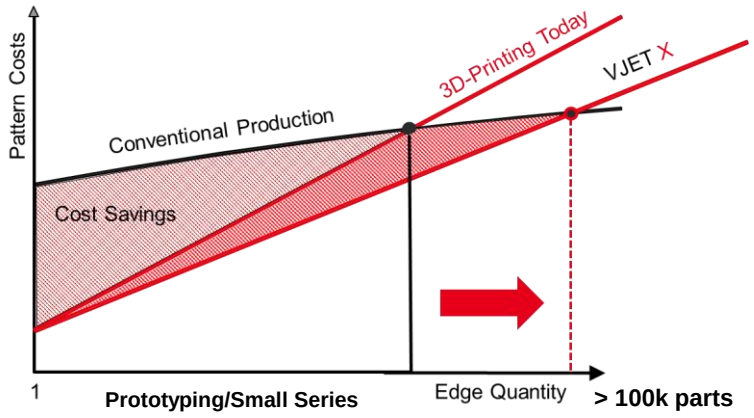
Dilemma for car manufacturers

> Increasing fuel-efficiency requirements mean that engines are becoming more complex (“downsizing”)

> Therefore, R&D departments of automotive OEMs developed new components for more efficient cooling of engines or batteries in EVs

> **BUT** the production departments could not produce them at scale: conventional production does not work because the component is too complex

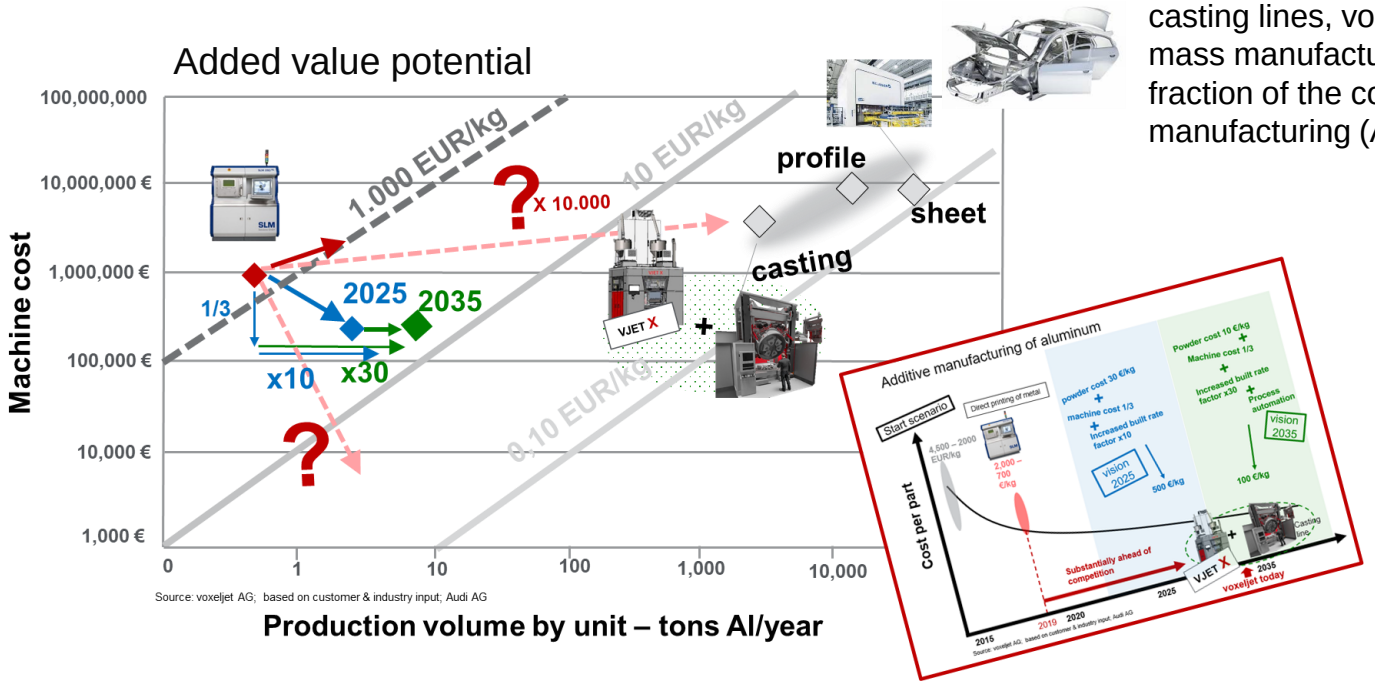
> Direct metal printing is too expensive/slow for series production



voxeljet solution: VJET X

> Because AM makes more complex geometries possible, these metal components have new features: applied to car production for example, components are lighter and have optimal geometric shapes for heat control: this can help to reduce vehicle CO_2 emissions substantially

> When combining VJET X and conventional casting lines, voxeljet can already today mass manufacture complex metal parts at a fraction of the costs of other additive manufacturing (AM) players in the market



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Frequently asked questions

Why did you reorganize voxeljet UK?

- At our 10,000 square feet facility in Milton Keynes in the UK, voxeljet UK operated two VX1000 printers and two VX200 HSS printers.
- Following a thorough analysis, we decided to consolidate European 3D printing in the German HQs and cancel the lease of the Milton Keynes facility.
- This will help to reduce overall costs and should lead to improved gross profit margins by realizing economies of scale in the German 3D parts production center.
- **voxeljet UK will expand its sales team and is focusing on selling 3D printed parts and 3D printers.**

What is the status of VJET X?

- The first two VJET X units are printing at the automotive OEMs facility in Germany. Together with our partners, we are currently improving the processes after the 3D printing to ensure reliable parts quality.
- We are optimistic to get this done in the near future and expect to book revenue for the first two VJET X units early next year. We also expect to receive an order for additional VJET X units.
- **We are being approached by other OEMs and Tier-1 suppliers, who are very keen to learn more about VJET X and its application in series production.**

What does the trend to e-mobility & reduced CO_2 emissions mean to you?

- The trend to e-mobility, reduced CO_2 emissions and improved fuel efficiency means three things: first, the demand for hybrid vehicles is growing. Hybrid vehicles need more parts in higher complexity than single internal combustion engines (ICE).
- Second, the demand for super-efficient ICEs with lower CO_2 emissions is growing as a result of stricter environmental regulations. Such engines have higher energy densities and need better cooling devices, which can only be made with 3D printing. This also applies to new battery and electric engine housings for electric cars. Third, the demand for light-weight, complex structural parts is growing.
- **The above can only be realized- at scale and in a cost-efficient way, by combining 3D printing and conventional manufacturing (voxeljet's hybrid AM).**

What are your growth drivers?

- **Large volume contracts for printed parts:** Our business strategy focuses on growing our on-demand parts production segment in order to print more parts for our existing customers and gain new customers in Europe, Asia Pacific and Americas. We are currently negotiating large volume contracts with several customers.
- **Multi-system sale:** We use our knowledge and market position to increase the sales of our 3D printers. With VJET X and the new VX1000 HSS printer, we believe to be in a position to sell multiple systems to individual customers. For example, we signed a frame contract for five VJET X units with a large German automotive OEM at the end of 2018. A big US sports equipment company is very keen to use the VX1000 HSS in the mass production of a new type of shoe component.

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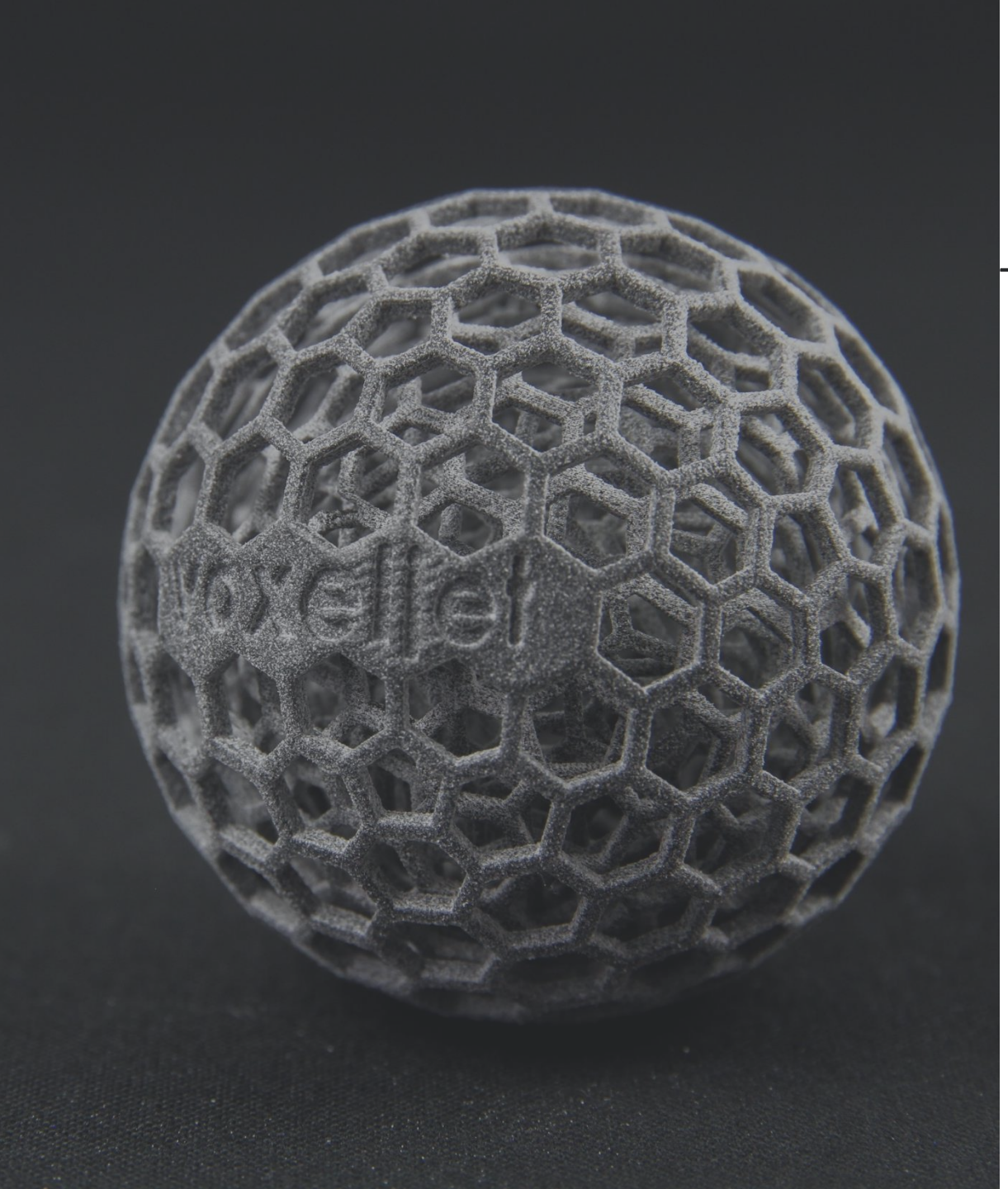

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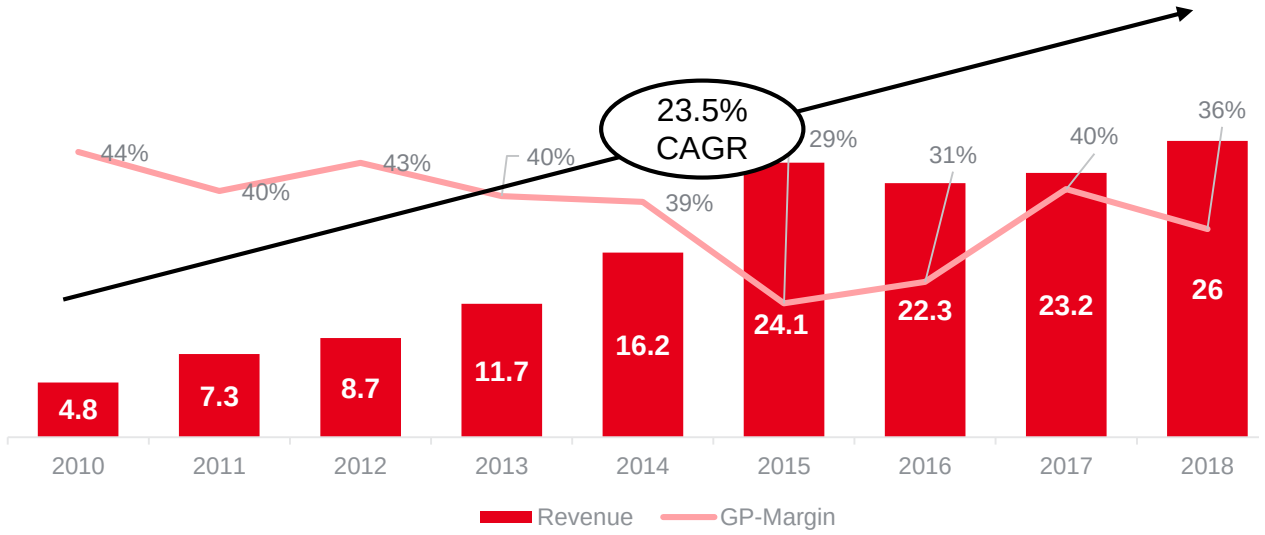
- **Financials**

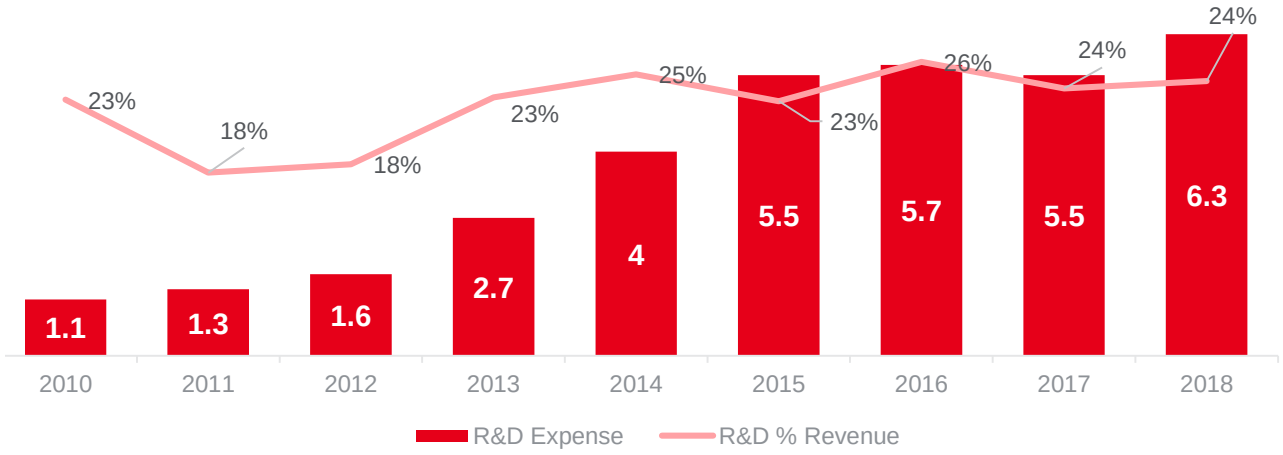
Long-term revenue growth supported by strong R&D

Long-term revenue growth

(€ in Millions)



Strong commitment to R&D



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Balance sheet (selected items)

Thousands of EUR (except per share data)	09/30/2019	12/31/2018
Cash and cash equivalents	6,573	7,402
Financial assets (bond funds)	6,408	12,905
Liquidity	12,981	20,307
Trade receivables	3,583	6,030
Inventories	13,002	10,064
Property, plant and equipment	29,757	27,675
Total debt and finance lease obligations	21,324	21,916
Equity	37,174	46,475
Weighted average shares outstanding	4,836,000	3,940,636
Weighted average ADSs outstanding	24,180,000	19,703,180

Comments

- Recent investment in infrastructure including the new Chinese service center requires little additional infrastructure investment in the near future
- Total debt of 21.3 million euros consists of 20 million euros of long-term debt, which includes 10 million euros from the EIB's *Horizon2020* venture debt program and 3.8 million euros of lease liabilities as a result of initially applying the IFRS 16 standard. These lease liabilities were previously classified as operating leases

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Projected long-term operating model 2025

- Expected revenue growth **15-20% p.a.**
- Projected gross margin **> 40%**
- Projected operating expenses

  R&D: 12.5% Revenue
  Sales: 10.0% Revenue
  Admin: 7.5% Revenue

- Expected EBITDA margin **20-22.5%**
  Expected EBIT margin **12.5-15.0%**

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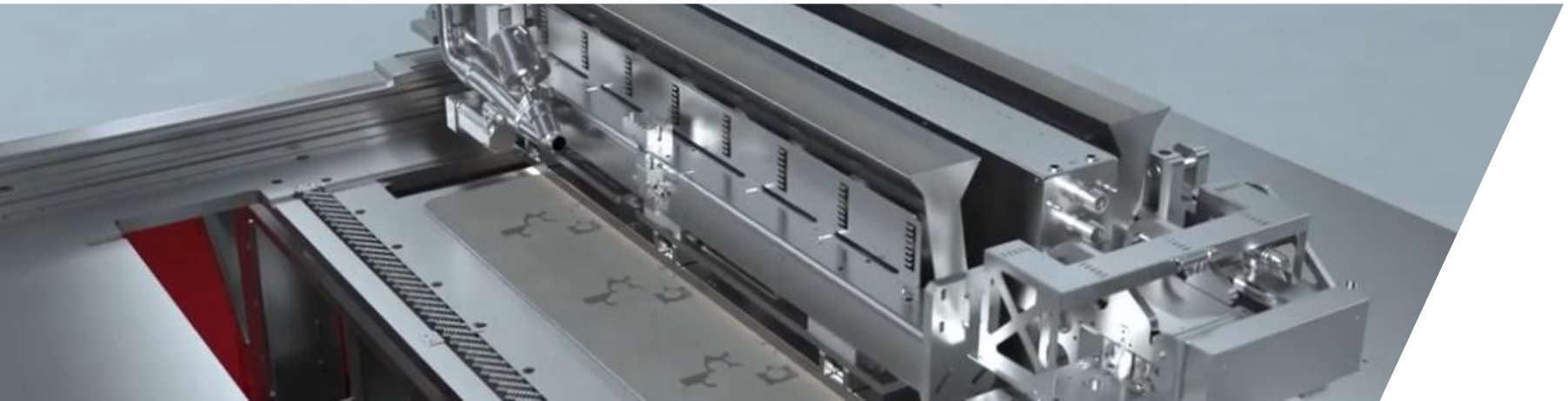
Industrial 3D Printing



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