Oerlikon Surface Solutions
Division

Division Surface Solutions

Dr. Markus Tacke

CEO Surface Solutions

Joined Oerlikon: 2020

Grow the business and drive profitability - supported by technology leadership and customer proximity

There is not a Single Day Without Oerlikon

Mission: Sustainable Surface Solutions Make the World More Durable

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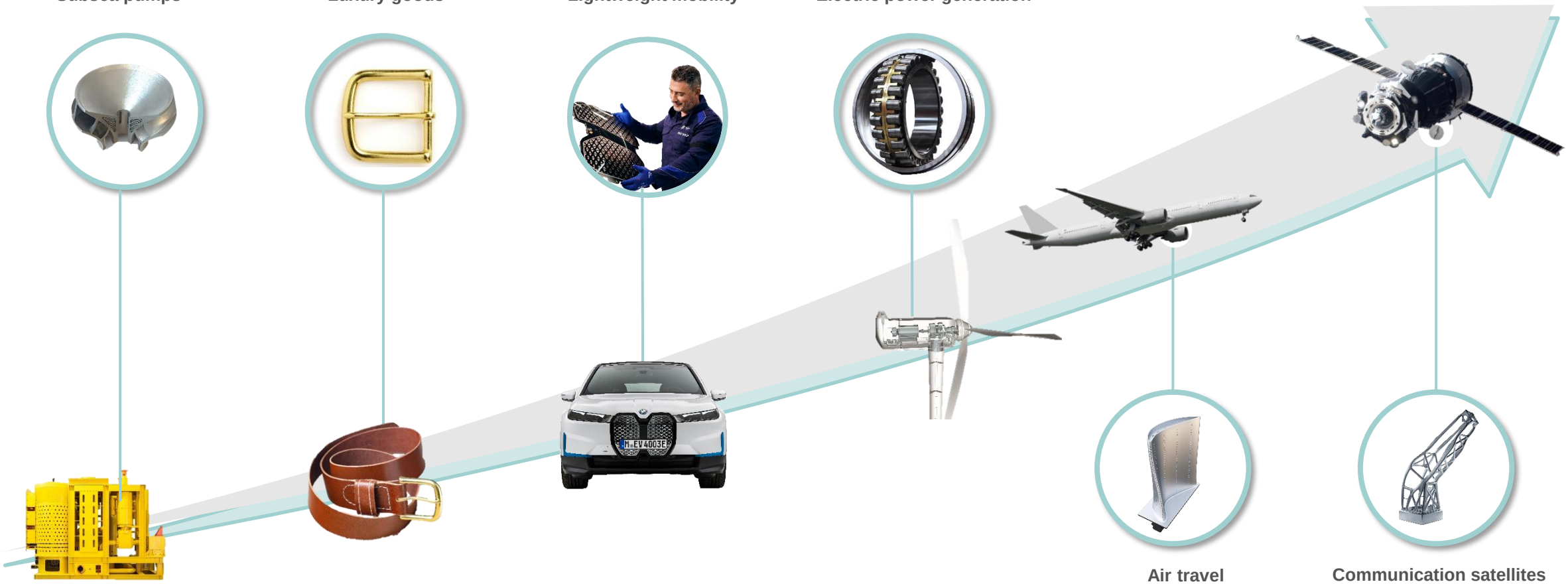
… to outer space

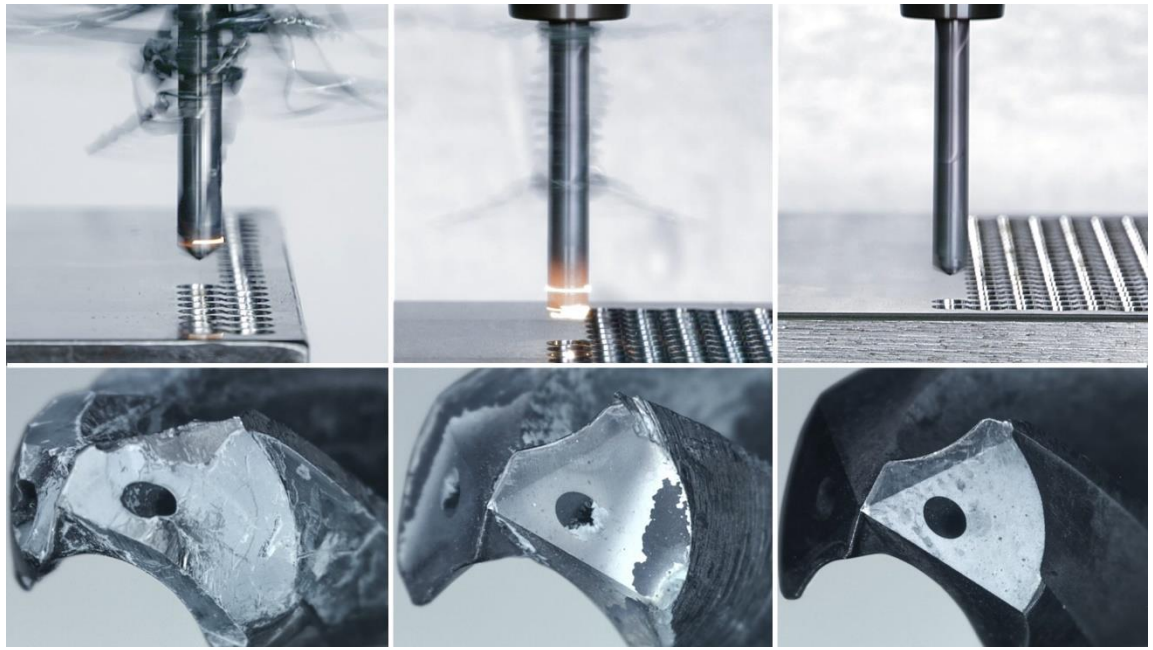


From the bottom of the ocean …

Coatings Improve Efficiency and Durability, Driving Sustainability

Oerlikon enables the modern world

Uncoated › Older standard Coating › Oerlikon Coating



Coatings **protect tools** after >4500 holes drilled

corrosion protection | environmental protection | strength | abrasion protection | hardness | chemical stability | conduction control | permeability control | anti-sticking | color flexibility | decorative enhancement | thermal stability | antibacterial | bio-compatibility | magnetism control | anti-reflection | easy cleaning | safety | wear resistance | insulation control | thermal protection | thermal protection | clearance control | erosion protection

Unique value proposition

160x lifetime extension of a metal tool through coating… equaling metal saving of 13.7kg per tool, which is the **weight of 2 bowling balls**

5% efficiency increase in aero turbines through coatings… equaling ~26 mt of CO_2 reduction annually or **80% of Swiss CO_2** emissions

Coatings **enable lightweight** materials… 10% less weight extends car driving range by 5-7%...for a 650 km EV this is equivalent to a **marathon**

Surface Solutions at a Glance

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Key metrics
2021

#1
Market leader
in coating solutions

CHF 1.3bn
Sales

18%
EBITDA margin

7’250
FTE’s

Market leader in coating solutions

Offering


Coating services


Coating materials


Coating equipment

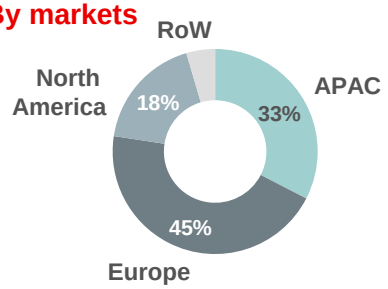

Components


Additive manufacturing

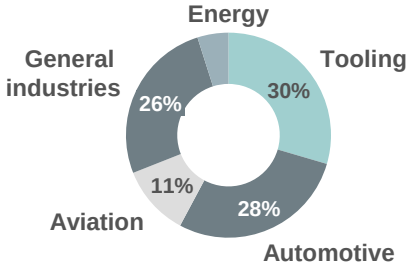
Integrated high-tech offering

Sales split
2021

By markets



By industry



Global and diverse end markets

Customers

>30k active customers including industry leaders

Serving top players

- **100%** in Tooling
- **75%** in Automotive
- **75%** in Aviation
- **100%** in Power Generation

Top 10 customers account for ~14% of sales

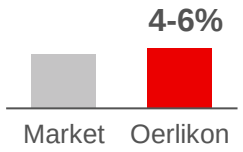
Broad and stable customer base

Oerlikon With Untapped Potential Across All End Markets

Tooling

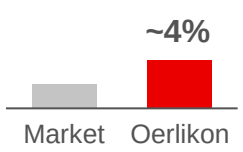
Market penetration[1]

Mid-term Growth[2]



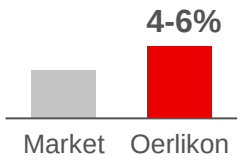
- Expand footprint in Americas and APAC
- Grow in plastic forming tools and ‘difficult to machine’ materials
- Penetrating markets with next generation of Alcrona Pro

Automotive



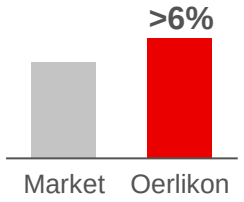
- High-performance diamond-like coatings (DLC) for powertrain components in electric powered vehicles
- Innovative heat shield solution for battery modules (HS 900)

General Industries



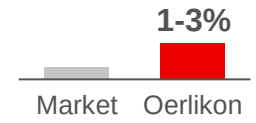
- Expand footprint in Americas and APAC
- Scaling of 1000+ applications in new industry segments
- Focus on key industries (see next page)

Aviation & Space



- Expand footprint in Americas
- Coating materials (thermal barriers / abradables) based on RAD™ technology
- AM components with beneficial geometry and weight reduction

Energy



- Expand footprint in APAC (incl. Middle East)
- Grow in thin film applications (MCrAlYs) and combined solutions on turbines and pumps

Higher performance requirements leading to more coated parts and GDP outperformance

(1) 75% = relatively high, 50% = middle, 25% = relatively low, refers to addressable markets excluding in-house market which is un-served; (2) Mid-term annual sales growth potential of Oerlikon beyond 2022

Broadening and Diversifying into Growth Markets

Batteries

Coatings for solid-state batteries to cover an area >10x of Paris by 2030

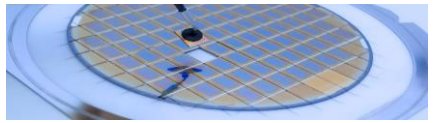
- Lithium PVD solution significantly more sustainable than carbon slurry with harmful solvents
- Nano-materials and coatings under development for 4th generation lithium batteries
- Improved materials for thermal insulation systems (HS 900) with market entry 2022

Hydrogen

69 GW of hydrogen capacity addition by 2030… equivalent to 25'000 wind turbines

- Strong requirements for PVD and thermal spray coatings to enable the hydrogen economy
- Developing coating solutions to double lifetime to >15k hours for bipolar plates
- RAD™ (Rapid Alloy Development) to identify unique solutions

Semiconductors



Semiconductor equipment market to grow from USD 70bn to ~100bn in 2020-25E

- Launch of new PVD equipment targeting sub 10nm chip technology
- Continuous business growth in large market of thermal spray equipment, after-sales services and materials
- Additive Manufacturing of components with unique geometries and intricate cooling channels

Medical

>50m surgeries in 2023E with growing requirements on instruments

- Increasing market penetration in instruments with high-performance coatings (BALIMED)
- Unique materials for Additive Manufacturing (i.e.. Titanium-based)
- New PVD coatings for medical robots under development

Luxury

Luxury metalware market to grow with +7% CAGR to CHF 1.8bn by 2026

- Capitalizing on trend towards stainless steel applications in leather wear through recent Coeurdor acquisition
- PVD based ta-C coatings for fashionable and persistent black surfaces
- Utilizing combined binder jetting know-how

Applying Oerlikon technology across new markets

Growth Strategy

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Increasing demand for surface solutions driven by efficiency and sustainability

Accelerate regional expansion

pg. 9 – 11

- **Realize >20% sales upside** in Americas and Asia with new regional organization
- Leverage competitive advantages of integrated offering and broad technology portfolio

>20% sales upside

Capitalize on new technologies

pg. 12 – 20

- **+10% sales upside** from extending technology leadership and diversifying business
- Focus on growth opportunities in future mobility, luxury, semiconductor, cleantech and additive manufacturing industries

+10% sales upside

Optimize portfolio

pg. 21

- **Actively manage portfolio** towards high-margin solutions
- Envision selective and accretive bolt-on acquisitions, opportunistically

M&A & operational upside

Drive cost stewardship

pg. 22

- **+300 bps upside …** 20-22% EBITDA margin target in mid-term
- Drive operating leverage based on structurally reduced cost base and continue to focus on cost efficiency

+300bps margin upside[1]

4 - 6% profitable sales growth

Mid-term growth potential p.a.

(1) Comparing mid-end of 20-22% mid-term guidance with 2021 EBITDA margin

Regional Expansion

Sales Upside From Expansion Into Americas and APAC …

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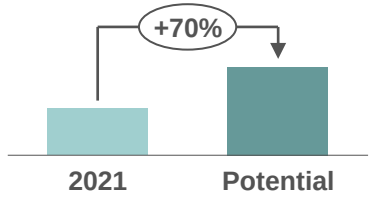
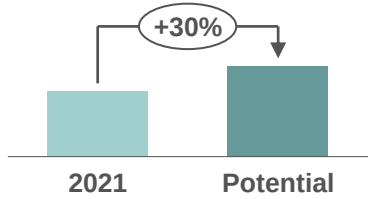
	Oerlikon market penetration[1]	Growth opportunities
Europe	30-50%	**Well represented across key markets** ▪ Expand into luxury and clean tech coatings ▪ Expand share of wallet with existing accounts supported by integrated offering
Americas	10-30%	**Upside beyond East Coast** ▪ Expand into semiconductor, medical and aviation & space ▪ Geographic expansion on the West Coast and in Northern Mexico; acquire new accounts supported by new geographic organization
APAC	20-40%	**Upside beyond major industrial centers** ▪ Expand into semiconductors, medical and e-mobility ▪ Geographic expansion into Southeast Asia following industrial development ▪ Mega centers being established with integrated offering under one roof in India and Japan

>20% upside to divisional sales

Sales Americas



Sales APAC



Upside from bringing market share in Americas and APAC close to European levels, in long-term

(1) Market shares depending on applications; based on current addressable market

Regional Expansion

… Supported by New Geographical Organization Implemented in January 2022

Increased customer proximity & one face to the customer

- Global strategic account managers and local key account managers with dedicated relationships across product portfolio
- Strong basis for cross-selling across integrated coating offering
- Faster response to customer requests and shorter lead times
- Higher level of customer interaction – combining local market access with global technology organization

Increased regional entrepreneurship

- More local responsibility and accountability, empowering local decision making and speed
- More local P&L responsibility and incentivized cost consciousness
- More effective use of Capex due to customer proximity

Moved from a functional to a geographical organization, enabling higher market penetration

Regional Expansion

One Face to the Customer Benefitting from Integrated Portfolio

Technology leadership in materials and equipment drives profitable growth in services

Coating services

- Global network of 150+ coating centers; customer proximity and response time is key
- Pick-up and return within 1-2 days
- Bespoke solution offering
- Technologies including thermal spray and thin film

Coating materials

- Manufacturing and sale of powders used in thermal spray and additive manufacturing
- New material development using Scoperta's artificial intelligence platform
- Tailored solutions to specific needs

Coating equipment

- Manufacturing and sale of coating machines including thermal spray and thin film
- Largest installed base of coating machines with global coverage
- Aftermarket: spare parts and field services

Components

- Produce high-performance components
- High-end special materials knowhow: In-house competence center for coated and printed components
- Customer synergies with integrated offering

Additive Manufacturing

- Pioneering the industrialization of additive manufacturing, in series
- Offering 3D printing services for customers in focus application areas

Coatings for polymer auto grill

Coated mold

Materials & equipment for turbine blade

Materials & equipment for landing gear

Thermal insulation system

Printed support structure for satellite radio antenna

New technologies

Global #1 Position in Cutting and Forming Tools

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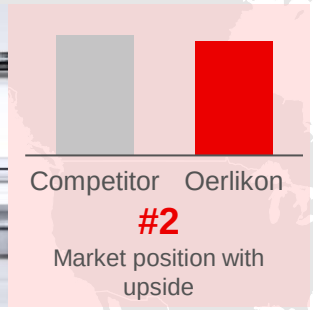
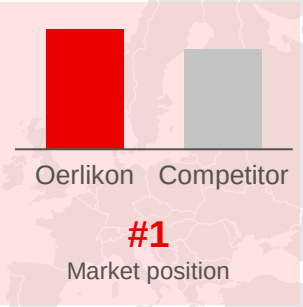
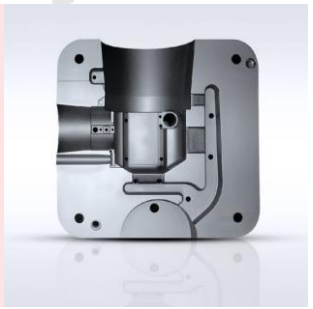
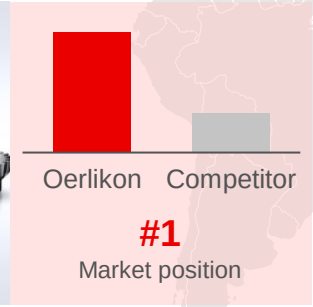








Leverage strong Tooling position to expand technology into General Industries

(*) In served markets

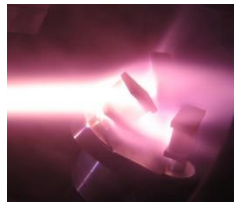
New technologies

Unparalleled Ability to Innovate Across Multiple End-markets

Services, materials and equipment based on leading-edge coating technologies

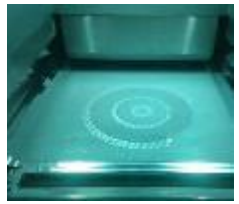
Thin film (PVD[1])

- **Metals are deposited onto the surface of a component or tool serving as coating; bonding to the surface occurs in a high temperature vacuum**
- Environmentally friendly technology
- Includes carbon-, nitride- and oxide-based coatings



Thermal spraying

- **Powder materials are applied with 'spray guns' at high velocity onto a component or tool through a plasma stream; resulting in an additional layer of material on top of the surface**
- Highly efficient coating method
- Includes iron-, nickel-, titanium-, copper- oxide-based coatings



Additive manufacturing

- **(Multi) lasers are building complex structures layer by layer from a metal-powder-bed (3D printing)**
- Reduces weight and increases functionality of components

CHF 96m R&D expense spent in 2021

Competitive advantage

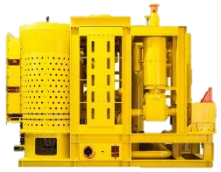
Integrated technology offering tailored to the customer's needs

(1) Physical Vapor Deposition (PVD)

New technologies

Combining Technologies Tailored to the Customer's Needs

Subsea impellers



- Additive manufacturing of highly complex part with slots for better flow in wet gas compressors
- Combined with high performance PVD coating TURBOCOAT and pre-processing through etching

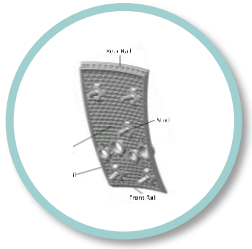
URWAHN Gravel E-Bike

- Finetuned material to additive manufacturing with seamless welds and breathtaking geometries
- Coated impact-resistant BALINIT Croma Plus provided by Oerlikon's aerospace branch

Automotive kidney grill

- Broad offer of wear resistant PVD coatings for molds; ePD(TM) technology to provide decorative and functional coatings
- Sustainable sensor-transparent coatings and coatings for molding tools (BALINIT FUTURA NANO) contributed to the design award 2021 BMW iX

Combustor heat shield



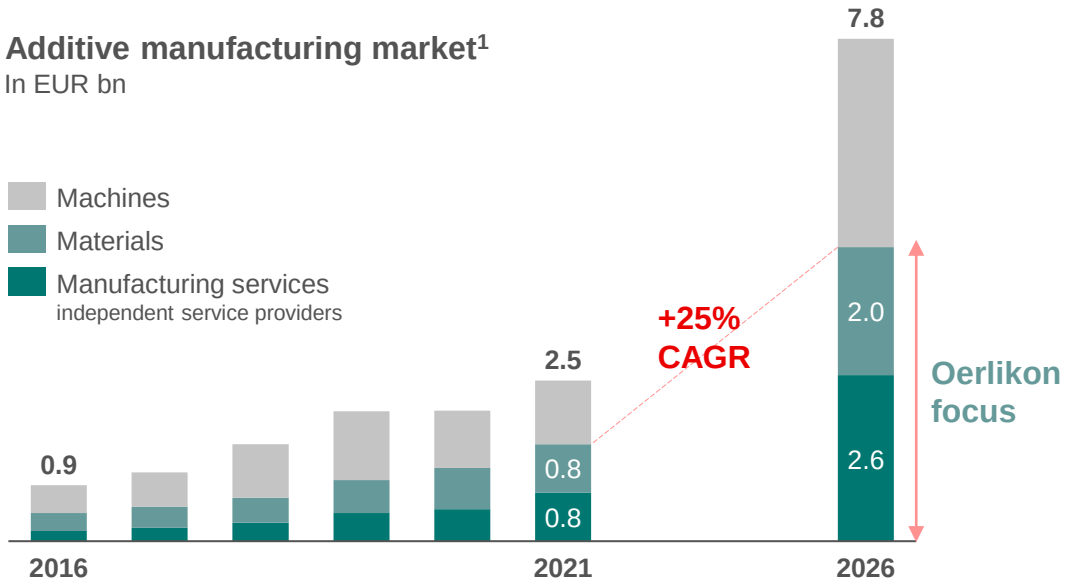
- Additive manufacturing of highly complex part
- Machining of printed component
- Application of thermal barrier coating

New technologies

Additive Manufacturing - Small Series Gaining Traction

AM about to move beyond prototyping

- AM focusing on significant functional and cost advantages over traditional manufacturing
- ~90% of business still on research and prototyping – longer development time than markets predicted in order to meet customer specifications
- Small series production initiated by in-house manufacturers (medical, aero); independent service providers (ISP) like Oerlikon focusing on special applications



(1) Source: AMPOWER GmbH & Co, KG

Oerlikon focusing on series production potential

- Oerlikon providing services and materials for metal-based AM
- Gaining traction in smaller series production (100-10k parts), supporting profitable commercialization
- Competitive advantage in integrated setup, proprietary AM materials and know-how; synergies with components engineering and surface technologies
- Ability to cross-sell via key customers, promoted by new regional organization

Rocket parts

Coated e-chucks for semiconductor machines

New technologies

Additive Manufacturing Reaching Commercialization

Gained momentum in 2021 orders

Impeller for subsea pumps

- **Increased flow performance** in subsea equipment, enabling more efficient pumps
- **Shorter lead times** in manufacturing pumps, compared to casting for MRO

Rocket engine components

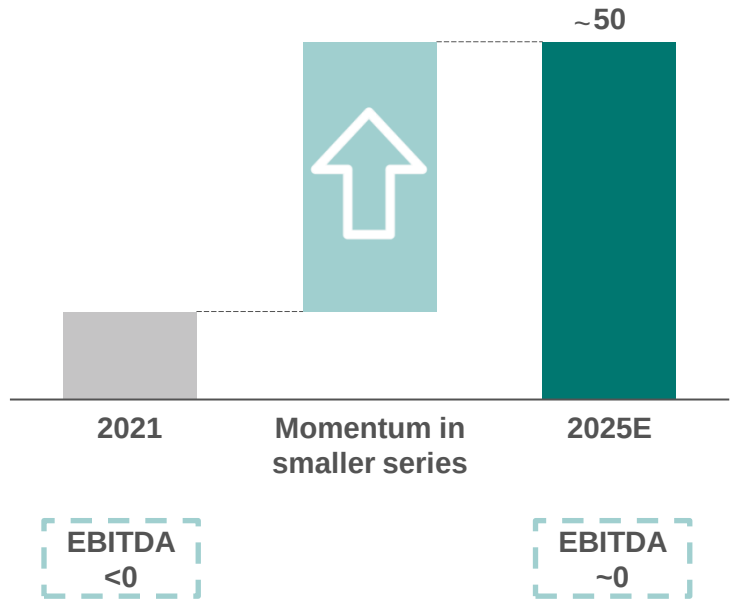
- **Weight reduction** vs. traditional manufacturing, enabling lighter rockets
- **New functionality** e.g. cooling channels so that the rocket does not overheat

Radio frequency components

- **40-50% weight reduction** and volume optimisation of antenna, making it easier and cost effective to launch a satellite into space
- **Better radio frequency performance**

Break-even to be reached 2025

Oerlikon AM services sales
CHF m



New technologies

Investing Into Future of Mobility

Batteries & Charging

- **Battery thermal insulation systems:** solutions (e.g. heat shield, cell separators) that enable battery stacking (Mica alternative)
- Coatings for solid oxide **fuel cells** (SOFC) used in stationary e-mobility infrastructure

2026 Outlook

New Growth Area

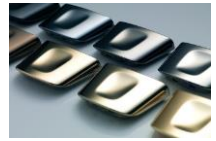
Powertrain

- **E-mobility:** less cutting tools to coat than in an ICE; opportunities from new applications that require coatings e.g., e-axles, e-gears
- **Hybrid**: more parts needed than in ICE, leading to upside for coatings
- **ICE:** fuel efficiency requirements leading to more coated applications

Manage e-mobility transition

Vehicle Body

- **Forming tool coatings** to increase due to need for more lightweight polymer and aluminium parts, particularly in e-mobility
- **Polymer coatings**: trend to lightweight and functional polymer parts to drive need for high-quality decorative coatings
- **Functional proposition**, e.g. reduce friction and extend life in steering and suspension parts; coated sensors for the digitalization of vehicles



Upside from lightweight parts and functionality

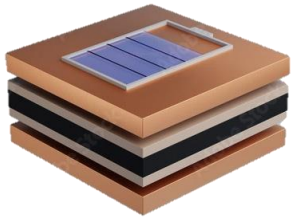
Realizing upside from future mobility transition

New technologies

Coatings Enabling Cleantech

Coatings for solid-state lithium batteries

Coatings replacing discrete layers of materials in solid-state batteries across anode, electrolyte and barrier layers

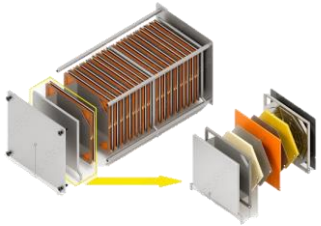


In 2030 it is estimated that coatings for solid-state batteries would cover ~1200km^2… equivalent an area >10x of Paris

- Oerlikon PVD technology leadership being used to help develop solution for 4th generation solid-state batteries
- PVD deposition of lithium has technical advantages over lithium foil and carbon slurry alternatives: uniform, precise layering and cleaner
- May require more than 300 PVD coating machines

Coatings for hydrogen economy

Coatings replacing discrete layers of materials in fuel cells, across bipolar plates, electrodes, cathodes and separators



69 GW of clean hydrogen capacity addition announced by 2030… equivalent to 25'000 utility grade 2.75MW wind turbines

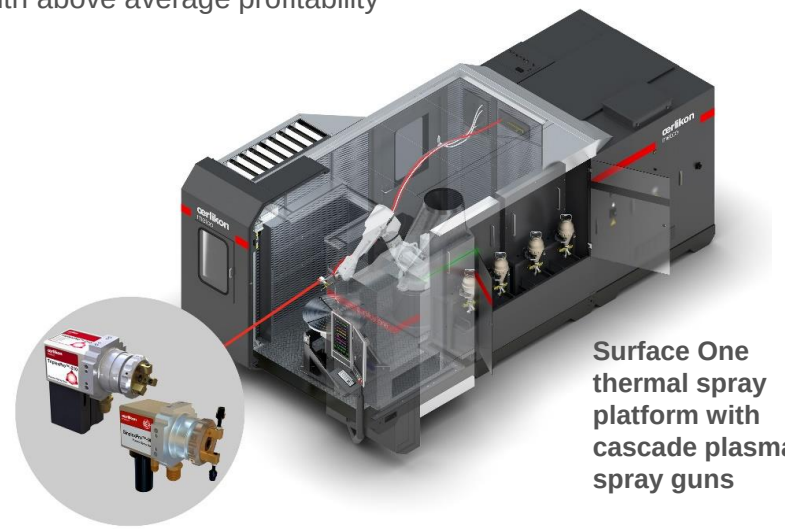
- Strong requirement for PVD and thermal spray coatings to enable the hydrogen economy
- Customers seeking solutions for electrolyzers (PEM, SOEC and Alkaline)
- Solid oxide fuel cells (SOFCs, PEM FCs, PAFC *phosphoric acid) and other fuel cells needed for heavy vehicles and stationary charging

New technologies

Driving New Coating Solutions for Semiconductor Machines

Equipment & materials to benefit from semiconductor capacity expansion

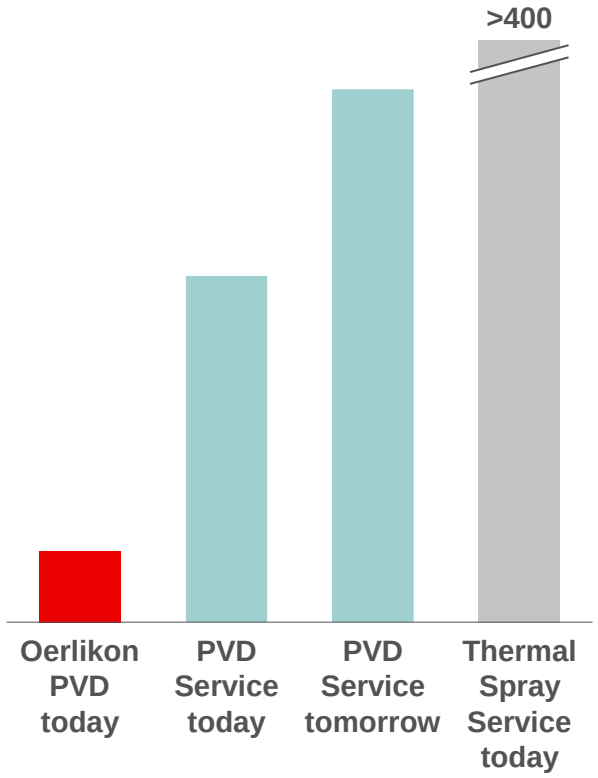
- **Cutting-edge thermal spray equipment** – Oerlikon's patented cascade technology has been established as the industry standard for coating etch liners (in >10nm chip environment)
- Developing specific PVD coating equipment (Magneton sputtering) for next generation edging chambers
- **Significant capacity expansion** and localization in global semiconductor equipment market in coming years
- **Provides tailwind** for Oerlikon coating equipment, materials and spares with above average profitability



Surface One thermal spray platform with cascade plasma spray guns

Services to benefit from increasing use of PVD

Semiconductor market for PVD coating services in CHFm



- **Increasing use of PVD coatings** as next generation chips (<10nm) require more advanced operating environments[1]
- **Oerlikon well positioned** to gain PVD services due to technology leadership and existing customer relationships
- R&D project to develop next generation Sapphire coatings
- **White spots** to enter CHF >0.4bn Thermal Spray service market

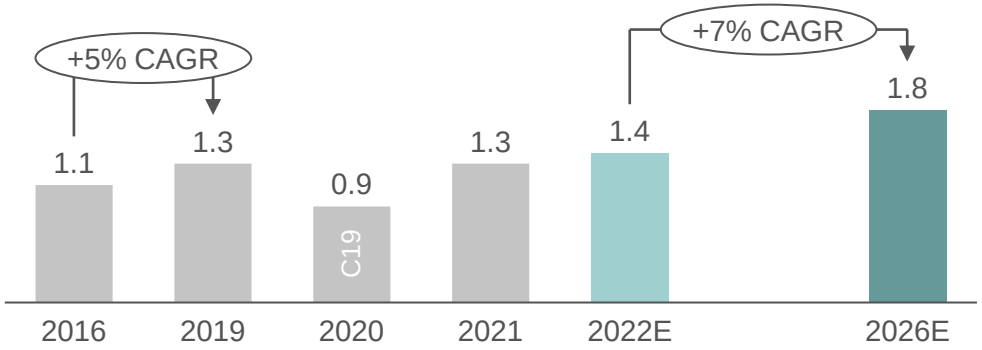
(1) Thermal spray to retain place in higher volume and less technically demanding applications; (2) Source: IDC, Citi; SIA, Oerlikon estimates

New technologies

Expanding Into Luxury and High-end Deco

Luxury metalware market to grow +7%

CHF bn[1]



Acquisition of Coeurdor opened-up luxury market

- Coeurdor is a manufacturer of metalware with a focus on surface treatment and product design / engineering

COEURDOR SURFACES SYNERGIE

- Acquisition of Coeurdor in 2021 opened-up luxury market and brings customer access, application and process know-how
- Trusted long term customer relations and design expertise are key in luxury and high-end deco industry

Oerlikon well positioned to outperform market due to strong technology position in PVD

- **PVD with higher degree of wear and scratch resistance**; offering a wide variety of colors; most environmentally friendly coating technology
- **PVD is expected to outperform** the luxury metalware market with high-teens CAGR, based on current 5% market share
- **Oerlikon** materials and surface treatment expertise (combining MIM / AM[2] with PVD) to accelerate industry transition from galvanic coatings to PVD
- High-end deco coatings for polymer design components and metal design components representing an additional adjacent market to luxury

PVD high-end deco coatings

PVD coated stainless steel chains

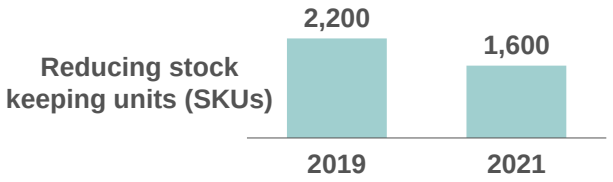
Metalware on leather bags

(1) Oerlikon estimates; (2) Metal injection molding (MIM) and Additive Manufacturing (AM) offer opportunity to offer turnkey service for luxury manufacturers from design through to manufacture, surface treatment and finishing as a one-stop-shop across substrates including stainless steel and titanium

Continuous Portfolio Optimization

Actively managing towards high-margin solutions

- **Renewing materials portfolio on an ongoing basis:** Abradables, Additive Manufacturing materials, and other thermal spray materials
- **Introducing bespoke coatings on precision components:** Medical, semiconductor, renewables, general engineering applications with significant benefits to customers
- Recently merged equipment competences between thin film and thermal spray, leading to modularization of components and purchasing synergies
- **Phasing out** commodity products across all product families



Envisioning selective and accretive bolt-on acquisitions

- **Product** lines with high growth and margin potential
- **Geographical** white spots
- Enhancing **technological** solution offering / deepening value creation
- Adding **application know-how** on coating services

citim

COEURDOR SURFACES SYNERGIE

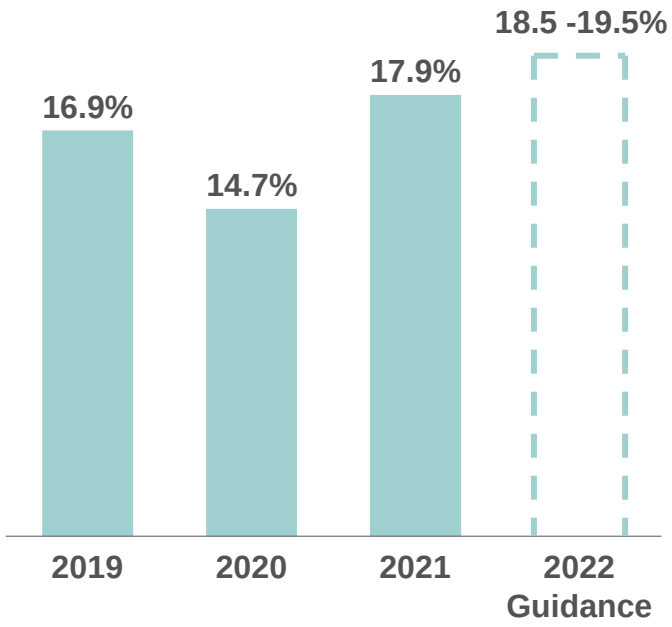
SCOPERTA Discovering Advanced Materials

Move towards a highly differentiated and unique offering

Cost Stewardship Driving New Mid-term Margin Guidance

Successful structural cost reduction in past 2 years

Operational EBITDA margin



Drive operating leverage on efficient cost base

- **+135 bps** (vs 2021) **from operational excellence** initiatives incl. footprint optimization (e.g. of coating centers) and lean initiatives
- **+130 bps from overhead efficiency** incl. global SAP platform introduction, reduction of local overhead footprint; improved sales force efficiency via new CRM
- **+35 bps from digitalization** incl. electronic customer interfaces, upgrade to ‘smart coating center’ and procurement digitalization
- **Product portfolio optimizations** with margin upside

20-22% operational EBITDA margin

Mid-term margin target (previous: 18-20%)

Surface Solutions is Well Poised for Profitable Growth

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1 Market leader

- **Global player** with local presence, broad customer base, diverse end markets
- Market leader with broad range of leading-edge coating technologies

2 Upside from accelerated regional expansion

- **>20% sales upside** in Asia and Americas to be realized with new regional organization
- Leverage competitive advantages of integrated offering and broad technology portfolio

3 Upside from new technologies

- **+10% sales upside** from extending technology leadership and diversifying business
- Growth opportunities in future mobility, cleantech, luxury, semiconductor and additive manufacturing

4 Upside on profitability

- **+300 bps upside** to 20-22% EBITDA margin target in mid-term
- Supported by operating leverage, cost focus and active management towards high-margin solutions

Q&A

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