

Outgrowing the market through technology

The generation, collection, analysis and display of digital information has become the lifeblood of global society. Every aspect of our lives revolves around this ceaseless flow of unimaginable amounts of data, and there is no end in sight to its growth. One small example: according to the International Telecommunication Union, there are now more mobile phone subscriptions globally than there are people on the planet, and the number of 5G mobile network subscriptions is expected to grow more than 10 times from 2020 to 2025. Artificial intelligence, self-driving cars, smart homes, wearable digital devices, the countless applications of connected smart devices in almost every industrial sector: all of these developments depend on the availability of increasingly powerful semiconductors.

VAT plays a key role in this indispensable technology. Semiconductors contain huge numbers of transistors for storing and processing data. The newest semiconductors contain billions of transistors, or nodes, on a single chip. Nodes can be as small as a few nanometers (nm) – billionths of a meter – comparable in size to a protein molecule or a virus. Manufacturing such tiny components can only be accomplished in the purest of vacuums, as empty as possible of any particles that could interfere with the fabrication of the microchip. Our valve technology enables the creation and maintenance of such pure vacuums, and the efficient and clean transfer of wafers between vacuum chambers as they go through different fabrication processes, such as lithography, etching, deposition and cleaning. And as nodes continue to decrease in size – to get more processing power into a smaller space – the need for more fabrication steps under vacuum and ever purer vacuums grows as well.

The market and growth drivers

VAT's largest end market is the global semiconductor segment, which generates approximately 80% of the company's revenues. We serve this industry mainly through original equipment manufacturers (OEMs) who design and build the equipment used in semiconductor plants, known as wafer fabs. Our offering comprises 140 valve series, 2,500 standard products and 8,000 customized solutions designed for specific wafer manufacturing processes, as well as a growing number of service products. Similar vacuum-based manufacturing methods are also used to make digital displays, such as screens used in smart phones, tablets and televisions, as well as solar photovoltaic cells. We also deliver high-end valves used in advanced scientific research, such as particle accelerators and experimental nuclear fusion projects.

There are several growth drivers in this market. One is simply the raw demand for ever-increasing numbers of semiconductor chips which have become integral parts in almost every industrial and consumer product. We expect this market to grow at a compound annual growth rate (CAGR) of 8% over the next 5 years to more than USD 640 billion, reaching USD 1 trillion by the end of the decade. This is being driven by long-term technology developments, such as artificial intelligence, the Internet of Things and cloud computing. A more recent driver is the global roll-out of 5G networks. Semiconductor sales to the 5G market alone are expected to grow at a CAGR of more than 60% over the next five years.

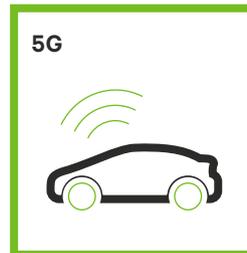
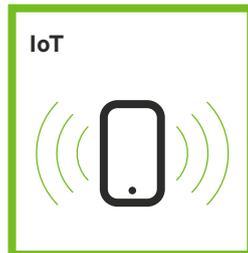
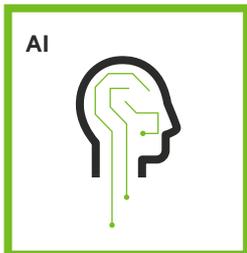
These trends, in turn, will require strong growth in capital expenditures for wafer fabrication equipment (WFE). WFE investments are expected to grow at a CAGR of at least 6% from now to 2025. This drives not only the volume of valves but also the services needed to keep them running at peak performance, which accounts for some 18% of VAT's revenues.

Another growth driver is the steady reduction of node sizes, which have declined in recent years from 10 nm to 7 nm and more recently down to 5 nm, with the industry heading to 3 nm nodes. This plays directly to VAT's technology strengths. The smaller the nodes on a wafer, the purer the vacuum needs to be in the process chamber, and the more processing steps are needed under vacuum, including new processes such as extreme ultraviolet lithography (EUV) and atomic layer deposition (ALD). Similar trends are taking place in the display and solar segments. Organic light-emitting diode (OLED) technology in displays and high-efficiency heterojunction solar cells both require more processing steps under vacuum and both are expected to become more dominant technologies in the medium term.

VAT's market share across all industry segments is about 55%, or 10 times larger than its closest competitor. In the high-end segment, primarily the semiconductor equipment market, the company's market share is around 70%. VAT is the market leader in all process technologies, including deposition, etching, lithography and metrology, and in equipment for both memory and logic chips.

Gaining and maintaining that strong position requires deep customer relationships, a fast and responsive global footprint, a commitment to quality and reliability, and most importantly, a profound understanding of vacuum technology and the ability to innovate quickly. VAT invests the equivalent of about 6% of net sales into research and development, roughly equal to the total valves sales of its nearest competitor. Much of this is focused on developing products with the precision and purity required for the coming era of nodes of 5 nm and smaller. The fabrication of such wafers can involve more than 1,500 process steps – some involving extreme temperatures and pressures – and take up to three months. Given the capital investment needed for advanced wafer fabs, profitability can only be secured through the highest yield and lowest downtime.

VAT's growth driven by long-term megatrends

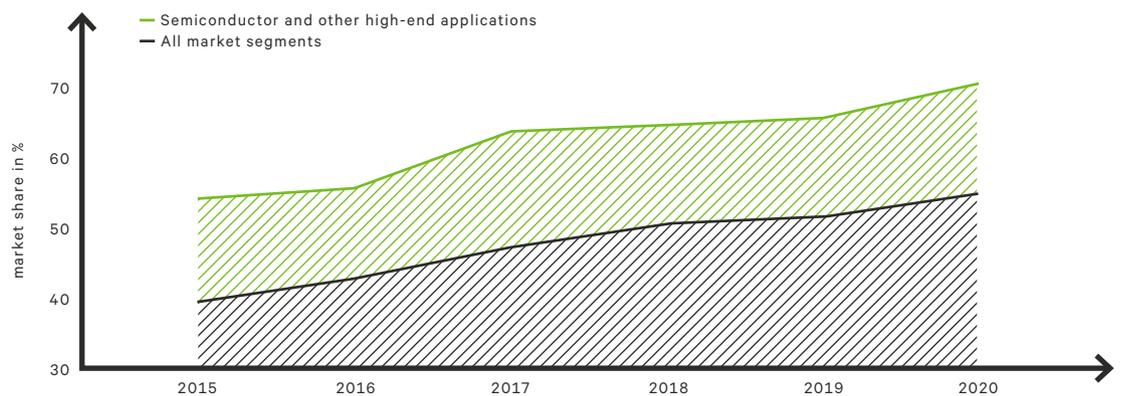


VAT's contribution to its customers' success is based on its ability to produce vacuum products that can meet this challenge. Valve vibration, vacuum sealing, speed and precision of operation, control algorithms and serviceability are all key to reliable equipment operation. Customers also value innovations that help them reduce their equipment footprint and extend their operational lifetime. Vacuum purity is of ultimate importance and VAT is the only company in its sector with a dedicated particle lab capable of measuring valve performance in the more demanding process chamber conditions needed for the next generation of ultra-small nodes. At the same time, customers need new products faster. This drives VAT's R&D efforts to improve its own manufacturing processes. In 2020, R&D investments amounted to CHF 41 million, or 6% of sales.

The company measures the value of its R&D investments in part through the number of specification wins. These are agreements between VAT and its customers on new product designs developed in close cooperation and aimed at addressing specific customer technology requirements for upcoming generations of new equipment. Spec wins translate into revenues as the customer rolls out its new equipment for the semiconductor, display and solar markets. VAT achieved more than 100 spec wins in 2020, more than twice as many as just two years ago. In recent years, the company has won some 80% of the specification projects it has tendered to the top ten wafer fab equipment OEMs.

Intellectual property protection is a high priority in this innovation-based business and VAT currently owns more than 400 active patents worldwide, and more vacuum valve-related patents than all of its competitors combined.

VAT Market Share



Tapping the growing service opportunity

With the industry’s largest and fastest-growing installed base – there are currently close to 1.2 million VAT valves installed worldwide, and growing by more than 100,000 a year – there are increasing opportunities to grow our global service business.

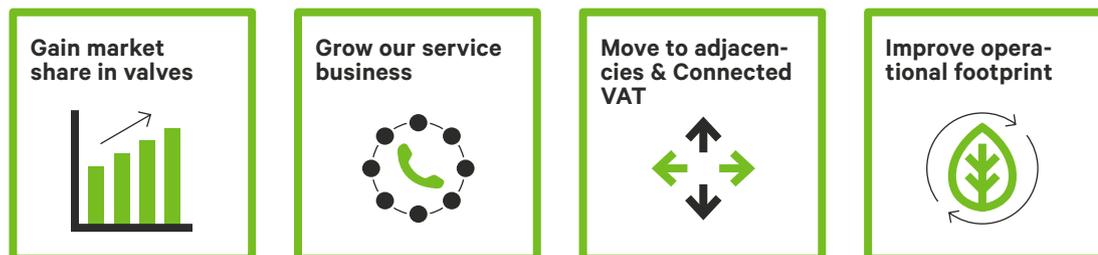
The business is attractive because it allows VAT to strengthen its customer relationships, acts as an important channel to market for new or upgraded equipment, and provides the company with a steady revenue stream even during market downturns. For example, we estimate that a serviceable valve could generate up to five times its original sales price in service revenues over a typical 20-year lifetime. Our ambition is to increase our market share in this business from about 35% today to more than 50% by 2025.

Spare parts is the largest service business, accounting for just over half of service sales. A typical spare part is the valve gate, which is valve component that actually performs the sealing function when the valve is closed. As the gate is exposed to processes within the chamber, such as etching or deposition, it has to be regularly replaced.

Repairs is the smallest part of the business and includes valve refurbishment. Regular service of this type is recommended on about 35–40% of all valves sold, primarily transfer and control valves. A serviceable valve typically needs servicing every 5 to 7 years, depending on the valve type and process conditions.

Upgrades and retrofits are the most technologically demanding service activities as they often involve working with the customer to develop a customized solution that allows them to increase the yield and throughput of their existing capital-intensive fab assets. This includes adapting an existing fab to produce wafers with smaller nodes, repurposing the fab and machines for new applications or relocating machines to a different fab.

Four levers to gain sustainable profitable growth



VAT delivers its services offering through the industry's largest service and repair network, operating from eight service centers located close to our major customers. Not only does it allow us to respond quickly, but we can guarantee a standard level of service and product quality in all of their facilities worldwide and copy-exactly factory-produced OEM parts, a critically important feature in an industry with extremely low tolerances for even the smallest variation in component size and performance.

Adjacencies & Connectivity

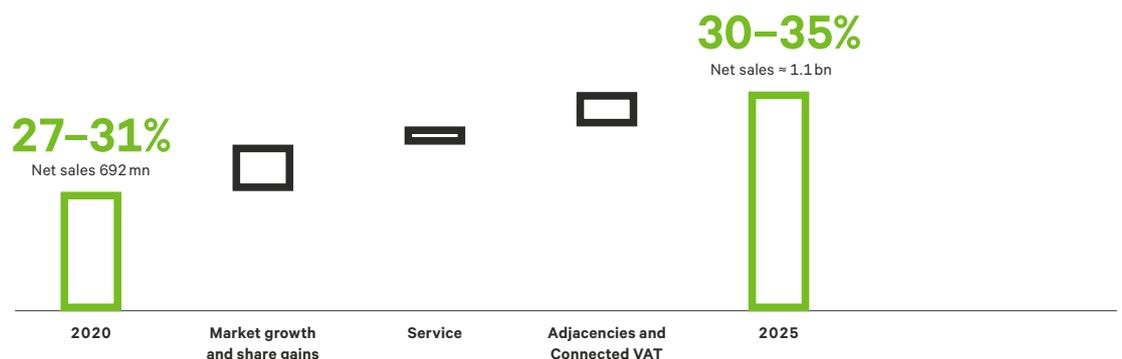
Our deep, long-term customer relationships, strengthened by our fast local service capabilities, allows us to understand exactly what our customers need and where the technology trends are leading. This domain expertise provides additional growth opportunities by allowing us to identify additional ways to deliver more customer value. Our approach is to find innovative valve solutions that build on our existing technology strengths in areas such as mechatronics, actuation, sealing, material science and control technology. That gives us confidence that we can win business and generate attractive financial returns.

So far, we have identified three promising adjacencies: motion components, such as customized mechatronic pin lifters that optimize the wafer path through various process chambers; advanced modules that reduce the footprint and add functionality to our existing multi-valve modules, such as heating and cooling, increased pump speed and plug-and-play solutions; and upstream valves that use technology similar to that in our downstream process valves for upstream applications such as wafer cleaning using charged chemical plasma.

The next step in the adjacency story is to create a new digital platform for VAT products and solutions in order to meet growing customer demand for production data to control and optimize yield. We call this Connected VAT and it will give our products the capability to monitor their own performance, in some cases to automatically fine-tune their performance in line with changing conditions within the vacuum chamber, and to communicate with other products and with our customers' process automation systems to provide even greater control for increasing yields and reducing downtime.

Our growth plan to 2025

EBITDA margin band over the cycle



In concrete terms, this will involve in a first stage adding sensors and analytics to all our VAT valve products so they can diagnose potential problems before they occur, allowing us to provide much faster predictive maintenance and develop new service products. In a second phase, we will add intelligence to the valves, such as algorithms that will allow valves to perform additional functions within an application. In the final phase, valves will be fully interconnected within a dynamic process control system. This will allow equipment makers to deliver even higher levels of yield improvement and will open up new component markets and value propositions for VAT. Based on our current product development pipeline, we estimate that over 50% of our new products will have digital features by 2025.

Fast and flexible operations

Delivering this added value to our customers while generating stronger and more resilient financial returns through the cycle requires a high-performance operational footprint.

An important lever to get more value from our global footprint is to optimize our supply chain and factory footprint. This means developing both our supplier base and manufacturing capabilities in best-cost countries – primarily in Asia and Eastern Europe – where we can secure a competitive cost base while still delivering the highest quality. This also allows us to adjust cost and capacity more quickly through the ups and downs of the business cycle by shifting supply and manufacturing across the value chain.

VAT's footprint consists of three factories in Switzerland, Malaysia and Romania. Our Swiss factory in Haag has historically been the company's technology hub, set up to produce a wide variety of products using a high degree of automation. Our plant in Penang, Malaysia, has so far focused on

producing higher volumes. We have begun to build up additional capabilities there with testing and engineering facilities, for example, and expect the plant eventually to be able to produce VAT's complete product line. Our Romanian factory acts as an internal and flexible component supplier and serves as a regional hub for engineering and purchasing activities. We also have an applications center in California, including a nano-particle lab, and we are planning to add a new applications lab in Japan in 2021.

In line with this approach, our investments in Switzerland are aimed primarily at increasing the level of factory automation and building out the Group's technology center. In Malaysia we plan to invest in additional machining and clean room capacity to broaden our product portfolio that can be manufactured locally. We also intend to establish a research lab for application engineering so that we can speed up product development together with our customers in the region. We are also investing in additional capacity from our facility in Romania to support our best-cost supply approach.

Our ambition over the next five years is to significantly increase purchase volumes from best-cost countries for our plant in Switzerland, from less than 5% to some 30%, and for our Malaysia plant from 60% to 80%. At the same time, we plan to grow factory output from our best-cost country operations from less than 20% of total net sales today to more than 50% by 2025, while output from our Swiss factory remains stable. In addition, our goal is to be able to ramp up or reduce factory output by 20% during any given quarter without significantly impacting customer service or profitability.

Achieving these goals also involves further improvements to the way we do business within the company. We are currently in the process of revamping our internal enterprise resource planning system, a project we expect to have fully rolled out by 2022. This will give us a seamless end-to-end process for speeding up orders and deliveries, product development and time-to-market, and for improving product quality, for example. It will also enable the company's transition to a more digitalized and "smart" manufacturer. Ultimately, it will free up our people to focus more of their time on meeting the rapidly-changing needs of our customers.

Included in this approach is an understanding that sustainable value creation requires a long-term view of our social and environmental responsibilities. VAT is continuing to build a sustainability culture within the company, in part by showing how reducing material waste, switching to more renewable energy sources and investing in the communities where we operate contributes to improved environmental and social performance as well as business success. We see significant opportunities to do more in this area and our management team is committed to improving our sustainability performance even further.

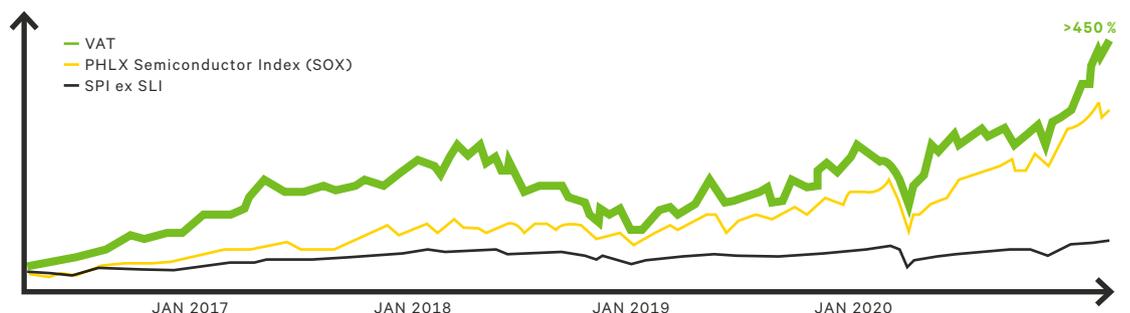
Long-term value creation

We're optimistic about what the future holds. VAT is in a strong, long-term growth market with a leading market share and a strong competitive advantage in technology, one of the market's key growth drivers. We have a long-term track record of success with all of the leading OEM customers in the industry. Our global value chain is becoming stronger, faster and more flexible year by year. And our people have repeatedly shown their ability to adjust quickly to change and a commitment to serve our customers at the highest level.

VAT also has clear financial targets and a straightforward strategy to achieve them by gaining market share in our core valve business, expanding global services, moving into profitable adjacent businesses and driving further operational improvements. With this combination, we believe we can continue to create value for all of our stakeholders well into the future.

VAT has created significant shareholder return since the IPO in 2016

Total shareholder return (normalized to VAT price at the time of IPO)



Note: SPI = Swiss Performance Index, SLI = Swiss Leader Index, VAT includes dividends 2017–2020, values as of February 8, 2021.