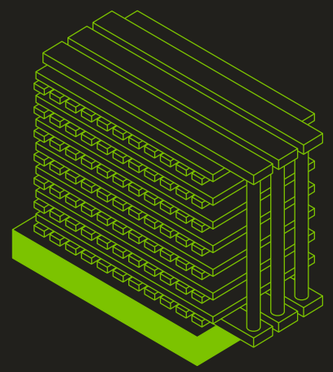
VAT'S TECHNOLOGY ADVANTAGE

VAT's ability to innovate quickly, in collaborative partnerships with customers, allows the company to stay ahead of the technology curve, build market leadership and generate sustainable profitable growth over the long-term.

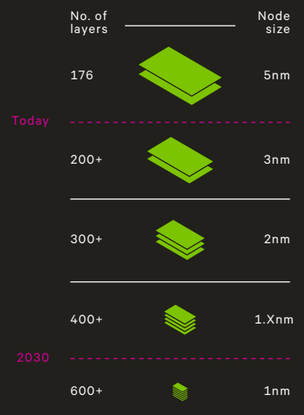
TECHNOLOGY DRIVERS

- More transistors per chip
- More layers per chip
- More process steps
- More steps under vacuum
- Purer vacuum
- New materials
- Lower power consumption

- More flexible tools
- Plug & Play
- Faster time-to-market
- More precise process control
- More customization
- Wireless connectivity
- Predictive maintenance



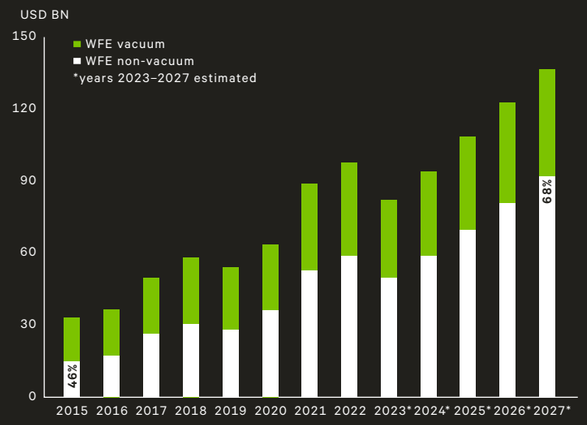
Expected trend in logic node sizes
Technology progression is a key growth driver as 90% of specification wins are at the leading-edge [1]



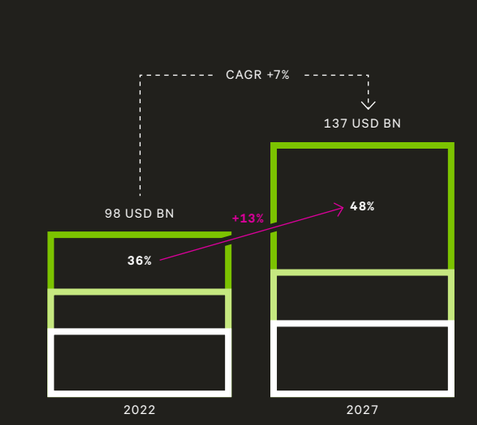
Node sizes on logic chips are falling towards 1 nm while the number of stacked layers in 3D chips continues to grow.

NEW CHIP DESIGNS NEED MORE VACUUM STEPS

WFE spend on vacuum vs. non-vacuum equipment, USD bn [2]



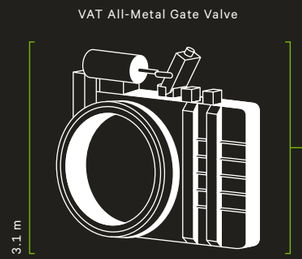
Smaller nodes require most advanced valves
Share of projected chip sales by node size 2022–2027 [3]

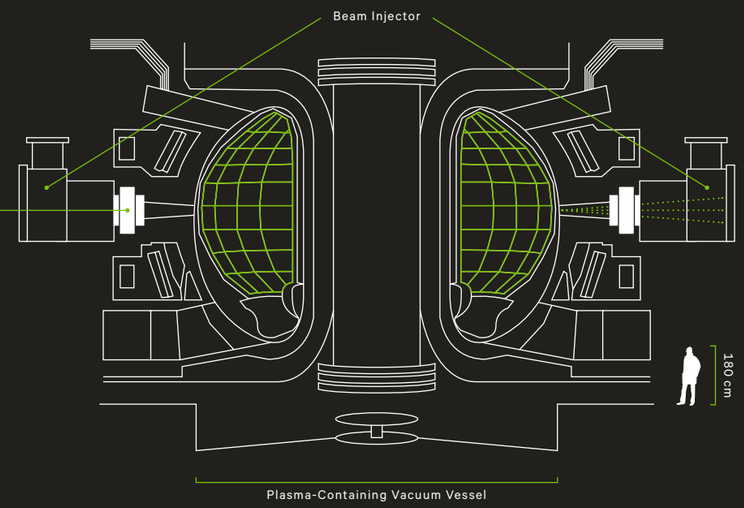


Source: 1 WFE growth forecast, Techinsights Inc. Nov. 2022; 2 VLSITechInsights Nov. 2022; 3 VLSITechInsights Nov. 2022

VAT'S ROLE IN FUSION ENERGY

At the ITER experimental fusion reactor in France, a beam of high-energy particles is shot into a plasma to create the conditions for nuclear fusion. Both the plasma and the particle beam are contained in extreme vacuum conditions.





VAT has developed one of the world's largest all-metal gate valves to separate the chambers so they can be vented independently. The 7,000 kg valve can withstand up to 27 tons of pressure.

Developing products for extreme applications provides VAT with technology insights that can be applied in the design of valves for wider commercial applications.

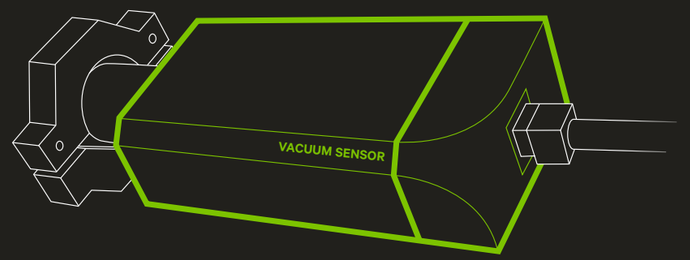
ALLOCATING CAPITAL TO INNOVATION SECURES GROWTH

Total R&D investment 2016–2022

>200m

INNOVATING FOR TOMORROW'S INDUSTRY CHALLENGE

Example: Microelectromechanical Systems (MEMS)



Current vacuum pressure sensor technology will soon reach its technical limits. MEMS technology allows new types of pressure measurement for coming chip generations.

Real-time pressure measurements during chip manufacture to:

- Improve precision and control of wafer polishing
- Reduce number of wafer defects
- Identify component wear and tear