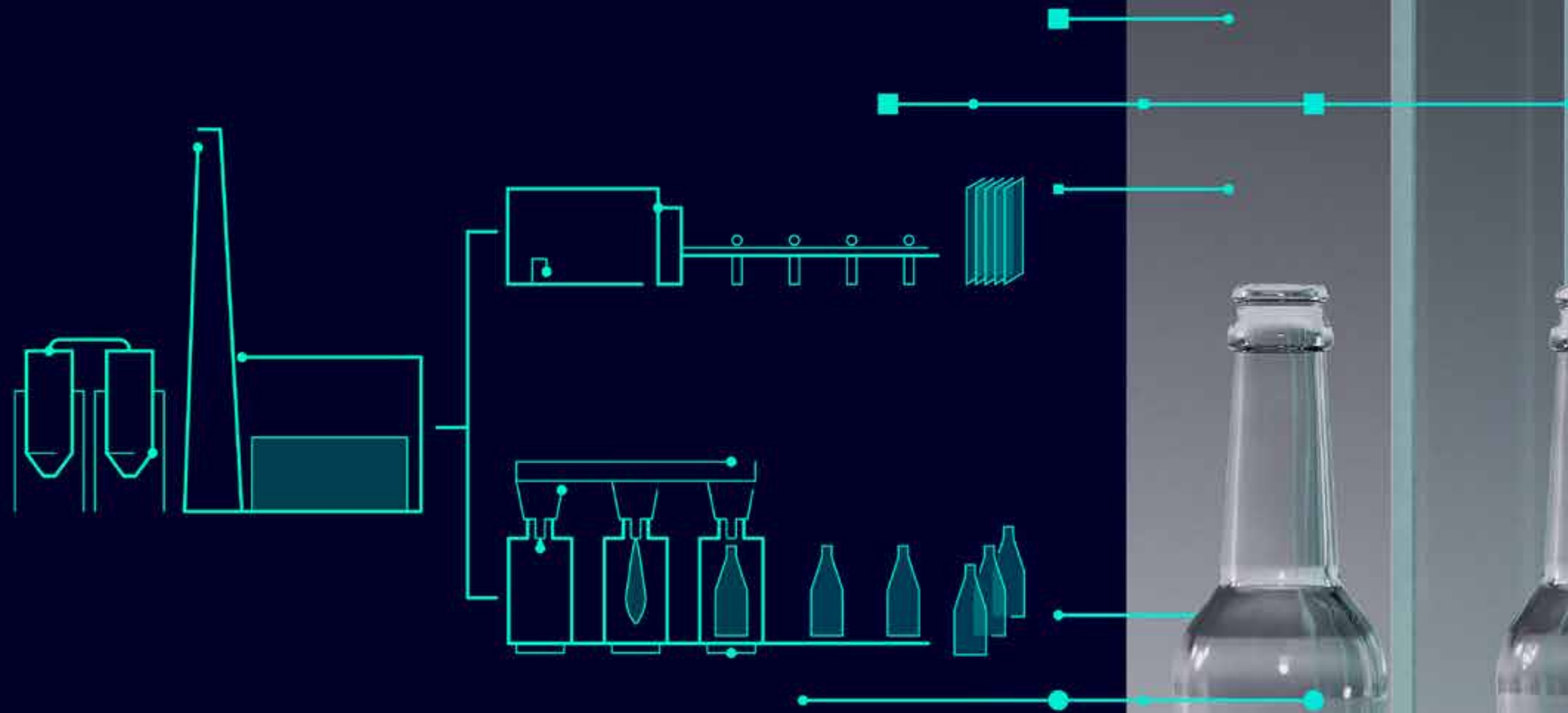


# SIEMENS



GLASSFOCUS 2026

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# 1

## Embracing the future makes all the difference

Right now, at a time of great uncertainty, the glass industry is under considerable cost and innovation pressures. Siemens is tackling these challenges with a clear strategy that combines experience and partnership with open technological ecosystems that create peace of mind and added value for customers. In this interview, Tobias Wachtmann, Head of Global Glass & Solar at Siemens in Karlsruhe, explains how the intelligent networking of automation, electrification, and digitalization secures a crucial competitive edge for glass manufacturers and the entire partner and supplier network, such as machine builders.

Tobias Wachtmann,  
Head of Glass & Solar  
at Siemens in Karlsruhe

## Interview

**Mr. Wachtmann, what are the biggest issues for your customers in the glass industry at present?**

In my 15 years in the glass industry, I've never encountered the kind of market dynamics and pressures we're seeing at the moment. There are lots of reasons for that. On the one hand, it's virtually impossible to calculate medium-term and long-term energy costs with any certainty. On the other, the rising demand for raw materials is putting considerable cost pressures on manufacturers. At the same time, lots of companies are having to meet their own ambitious sustainability targets. That requires investment and the introduction of new technologies that initially make processes more complex and bring additional integration outlay – but that absolutely pay off for customers. It's also getting increasingly difficult to predict how the market is going to develop. For example, the automotive industry is subject to global shifts, and that's affecting its demand for automotive glass. In some regions, changes in consumer behavior are switching the priorities in container glass production, which is leading to excess capacity in some areas. All these issues create layers of complexity that glass manufacturers need to work through. That situation has become more extreme.

**As a company, how are you responding to that?**

What really matters in this situation is that we offer our customers exactly the added value and certainty that they so badly need right now. More than ever, we're really leveraging our comprehensive experience in the glass industry. Our colleagues have an in-depth understanding of the industry – in terms of both the finer details and the bigger picture. We're also maintaining our decades-long, trusting cooperation with all the various players in the sector – end customers, plant and mechanical engineers, partners, system integrators, and research and technology organizations. That benefits everyone. It's always been a key principle for us to operate on a sustainable basis in terms of both our solutions and our business relationships. Fundamentally, when it comes to our solutions, we look at the entire lifecycle of the plant and take care of all the issues at the investment stage as well as everything during operation, including all aspects of maintenance and service.

**What kind of customer expectations do you encounter that might be different from the past?**

Expectations are very varied, but one question is always front and center: How will what we're proposing and putting together provide added value? A solution needs to reduce costs or improve energy efficiency,



Tobias Wachtmann has been Head of Global Glass & Solar at Siemens in Karlsruhe since June 2020. He sets great store by open and trusting dialog aimed at collaborating on forward-looking solutions for the glass industry.



## Interview

for example – or enhance performance. Our aim is to optimize the plant and safeguard its stability – and this then has a positive impact on energy consumption and costs. Production quality needs to stay consistently high, and we can make a measurable contribution to that, too. Our solutions also need to boost productivity and production efficiency. When flexibility is required, it may mean it's no longer an option for a plant to permanently manufacture the same product. Instead, production cycles, products, and their composition vary. The use of products and the properties they need to provide can also change, which makes it essential that plants are dynamic and adaptable. We can address all these issues by offering support in the form of advice and technologies. One focal point is transparency. Glass manufacturers are increasingly looking for ways to establish their plants on a data-transparent basis and keep them like that if, for example, production changes or a plant needs to be made suitable for use by less experienced personnel.

**What is your answer?**

Being there for our customers – offering them comprehensive and, most importantly, dependable support, and doing so worldwide. Our specific focal points are automation, electrification, and digitalization. We offer a broad, end-to-end, and inclusive portfolio across all these areas.

When it comes to **automation**, our philosophy has long since centered on the question of how we can optimize plants and make them transparent so that all their constituent elements can communicate. How can we network plants with each other? Instead of changing the various parts of the plant, we make sure they can be integrated. The term for that is “plant-wide automation”. It really pays off in engineering and during operation because operators can get a complete overview of their plant. We look at the plant from the customer's perspective. We won't automate a tried-and-tested function that's been working without any problems for many years unless that will bring about a measurable improvement.

When it comes to **electrification**, we also help glass manufacturers who want to make more extensive use of electric melting processes pursue this transformation. For example, these processes can generate less CO<sub>2</sub> if they use renewable electricity. That gives glass manufacturers an additional energy source that they need to control. The energy can come from solar panels, wind turbines, or the grid. Battery systems are used to store energy. This also introduces more complexity into the power supply scenario and electrification. Through its energy management solutions, digital twins for energy systems, and special

applications, Siemens helps all customers achieve the best possible cost and production efficiency.

When it comes to **digitalization**, plant-wide networking creates a basis for making data usable. We condense it and make it readily accessible. The next logical step is to make the data accessible beyond the automation unit. We achieve that by networking additional machines, connecting data systems to the server, and making more systems accessible via open platforms, interfaces, and functions. These functions can come from Siemens itself, from partners, or from other companies, and can be used on the open platform.

The more open the systems are, the more important the issues of security and cybersecurity become. Those are areas where Siemens also offers standardized products and services that suit the glass industry extremely well. We also take a holistic approach to security issues for our customers by developing concepts, providing advice, implementing solutions, and offering all ancillary services.

**How much progress have your AI solutions made in this context?**

There isn't “an AI solution”, as such. My view is that AI should be a natural part of solutions when it

brings added value. Usage scenarios range from virtual sensors and functions in automation to intelligent data applications and user support. AI is found in all the plant's electrical engineering equipment and in the industrial software. It helps us that Siemens has had a strong strategic focus on industrial software for close to 20 years now. That covers simulations and digital twins, for instance, from product development and machines to plants and processes. Added to that are standardized and plant-wide platforms that can collate this data from every area from engineering through to operation and service.

In my experience, focusing on individual AI applications means missing out on too many opportunities. We ought to look at the bigger picture and work out what kind of effective AI application we need for our customers' tasks. It's well known that glass production is a hybrid industry. It covers everything from preparing and processing raw materials and running process and production plants through to downstream processing and logistics. There are hundreds of solutions across all these areas. The question is – how can I link them all up so I can achieve the maximum effect while ensuring the system as a whole is still manageable? Otherwise, I'd need AI to help me understand the AI.



## Interview

**What kind of boost are you looking to get from glasstec?**

Coming around every two years, glasstec is a real high-light for my team and me. Even if it sounds a bit sappy, at Siemens, we do see ourselves as a member of the glass industry family. That's because we've developed such a lot of close business relationships over the decades. We all know and trust each other. We have a long history in the sector stretching back 170 years, from our first innovations to running our own glass plants and our role as a technology supplier. So, firstly, the trade show is a bit like a family gathering. You have time to talk to people in person and discuss the latest innovations.

Secondly, it tells us whether our work is heading in the right direction. glasstec provides an efficient way to talk to a lot of our customers face to face. That helps us get an even better understanding of their requirements and check how effective our solutions are. That's important.

Thirdly, the event helps us safeguard the high quality of our solutions. I can only maximize my efficiency if I'm operating in a stable internal and external network. Our portfolio is very broad and virtually nobody can maintain a complete, worldwide overview. A trade show therefore gives us the opportunity to

bring together in one place all the various disciplines that we cover at Siemens.

**If we were to meet for another interview in a few years' time, what would be the signs that would tell you the sector is heading in the right direction?**

I think the most important metric is the productivity of glass plants. After all, we only have a limited influence on the markets. Another key indicator is the degree of data networking. As a glass manufacturer, am I using the available technology to its full potential? That starts with digital product development. How can digital twins be used to better meet existing customer demand or even identify new types of demand? Ultimately, what really matters is consistently transferring these opportunities to actual plants. That's how I measure the progress that we can help drive. And all of that has to work out for market prices and be anchored on a sustainable basis. Lots of ideas seem good at first sight, but need to prove themselves in live operation – that's where we can help.

In the end, it's a shared journey with customers and partners. Trust, openness, and transparency are crucial, as is the courage to strike out in new directions. Embracing the future is what makes all the difference.

**Thank you, Mr. Wachtmann!**



**Trust, openness, and transparency are crucial, as is the courage to strike out in new directions. Embracing the future is what makes all the difference.**

# Vivix is transforming glass production through low-code, data, and industrial AI



All images: Vivix

**By drawing up a clear strategic transformation roadmap and pursuing it rigorously, Vivix Vidros Planos in Brazil has taken just a few years to successfully make the leap from isolated paper-based solutions to an integrated low-code-driven digital factory. The result is better data quality, greater efficiency, and an organization that is now systematically driving innovations in its glass production operations. Siemens also played a role by supplying technology, advising the company, and laying the necessary foundations for automation, digitalization, and energy management.**

Vivix Vidros Planos – the only flat-glass production plant in Brazil that is fully funded by Brazilian capital and operates its own raw materials plant – has a strong strategical position. However, the company identified a number of areas where there was potential to further enhance the organization of its factory. By embracing digitalization in key areas, Vivix set out to boost the speed and quality of its decision-making and fine-tune levels 3 and 4 of the automation pyramid.

In 2021, Vivix, with the support of its Industrial Top Leadership and Innovation department, launched a strategic digital transformation roadmap. Its goals were to reduce operating costs, boost the industrial teams' productivity, make the organization data driven, and improve resilience to global changes. In 2022, after evaluating more than 18 options, the company opted for the Mendix low-code platform. It did so because the platform covers complex in-

dustrial requirements, operates on-premises and at the edge of production, and can be closely integrated with the existing Siemens and SAP-S/4HANA ecosystem. "The Mendix platform is easy to learn and speeds up how quickly you can add value," says Aristoteles Terceiro Neto, Industrial Transformation Manager at Vivix.

A short time later, modular applications were created throughout the value chain. These include digital checklists that reduce manual maintenance and monitoring processes by several hours per shift, an application for real-time monitoring of furnace temperatures, and the Glass DNA solution that links quality data on thickness, color, and defects with process and layer information to massively boost transparency in production. Integrating these apps with Data Lake, Power BI, and SAP replaces paper-based processes, creates end-to-end traceability, and enables active management of anomalies and damage.

At the same time, Vivix professionalized its IT and development culture. Now, industrial engineers become productive Mendix developers in just a few weeks, agile methods and microservice architectures are reducing the time-to-value, and cloud-native deployments (initially Azure, subsequently AWS) are providing flexibility in the infrastructure. Vivix then took the next step by building its Virtual Engineer AI chatbot, which is based on foundation models such as Claude and is embedded in the Glass DNA application. As a result, customer complaints and internal issues are now resolved within hours rather than days.



This transformation has received significant external recognition. In 2026, Vivix was awarded Brazil’s National Innovation Award (PNI) in the Digital Transformation category. Siemens Digital Industries Software also presented Neto with the Innovation Leader Award at the Siemens Techcellence Awards, held during Realize LIVE Americas 2024 in Las Vegas.

The leap from isolated paper-based solutions to data-driven production

“By drawing up this clear transformation roadmap and pursuing it rigorously, we have taken just a few years to successfully make the leap from isolated paper-based solutions to an integrated low-code-driven digital factory. The result is better data quality, greater efficiency, and an organization that is now systematically driving innovations in its glass production operations,” says Neto with satisfaction. “What’s more, thanks to Siemens, we managed to do that as part of a large ecosystem,” he continues.

Besides choosing the Mendix low-code platform, Vivix also opted early on for a whole range of Siemens solutions and technologies for its digitally transformed glass production plant. Examples include Simatic PCS neo, the completely web-based distributed control system for process plants. This automation solution offers Vivix web-based engineering,

operations, and monitoring, without any local software installation, thus enabling remote access from any location. The architecture is object-oriented, scalable, and designed for both maximum efficiency and global collaboration.

Vivix also has Siemens Advanced Process Control (APC) at its disposal – an advanced method within the automation system that optimizes processes through intelligent control algorithms. It reduces fluctuations, boosts quality and productivity, minimizes energy consumption, and makes it possible to operate plants closer to their optimum limits.

Simulation is another important part of Vivix’s transformation journey. Using Simcenter STAR-CCM+, which is the Siemens comprehensive simulation software for computational fluid dynamics, heat transfer, and multiphysics applications, Vivix engineers can

analyze and visualize complex physical phenomena related to glass production, such as fluid dynamics, heat transfer, combustion, and process behavior.

One important example is the development of a furnace digital twin, designed to simulate and provide a better understanding of the thermal and operational behavior of the glass melting process. By combining physics-based simulation with industrial data and advanced AI capabilities, Vivix is exploring how technologies such as physics-informed neural networks, in collaboration with NVIDIA, can help create faster, more adaptive, and more intelligent simulation models.

This approach has the potential to support better engineering decisions, improve process understanding, accelerate scenario analysis, and optimize furnace performance, energy efficiency, and product quality.

Vivix uses Siemens Senseye as part of its asset performance management strategy. By applying predictive and prescriptive maintenance capabilities, Senseye supports the monitoring of asset health, the early identification of potential failures, and the prioritization of maintenance actions based on risk, criticality, and operational impact. Through this approach, maintenance teams can make better-informed decisions, reduce unplanned downtime, improve asset availability, and strengthen the connection between operational data, maintenance planning, and industrial performance.

Besides focusing on automation and simulation technology, Vivix also prioritizes intelligent energy management. Thanks to open energy intelligence from Siemens, the Brazilian company is saving on energy costs and reducing its emissions. At Vivix, comprehensive, scalable Simatic solutions track

Project overview



From paper-based silos to digital glass production

Challenge

- Fragmented processes.
- Limited transparency.
- Slower decisions.

Goal

- Reduce cost.
- Improve productivity.
- Become data-driven.
- Strengthen resilience.

Solution

Low-code + industrial data + automation + simulation + AI + energy intelligence.

Siemens contribution

Technology, advisory support, and the digital foundation for scale.

Impact

- Better data.
- Greater efficiency.
- Faster resolution.
- More innovation.

What's next

AI agents, robotics, digital twins, and industrial intelligence at scale.



**“With a clear roadmap and Siemens as part of a broader ecosystem, the company moved from paper-based silos to an integrated digital factory.”**

**Aristoteles Terceiro Neto,  
Industrial Transformation  
Manager at Vivix.**

consumption data system-wide and automate key controls to conserve energy, meet reporting requirements, and achieve the company’s sustainability goals.

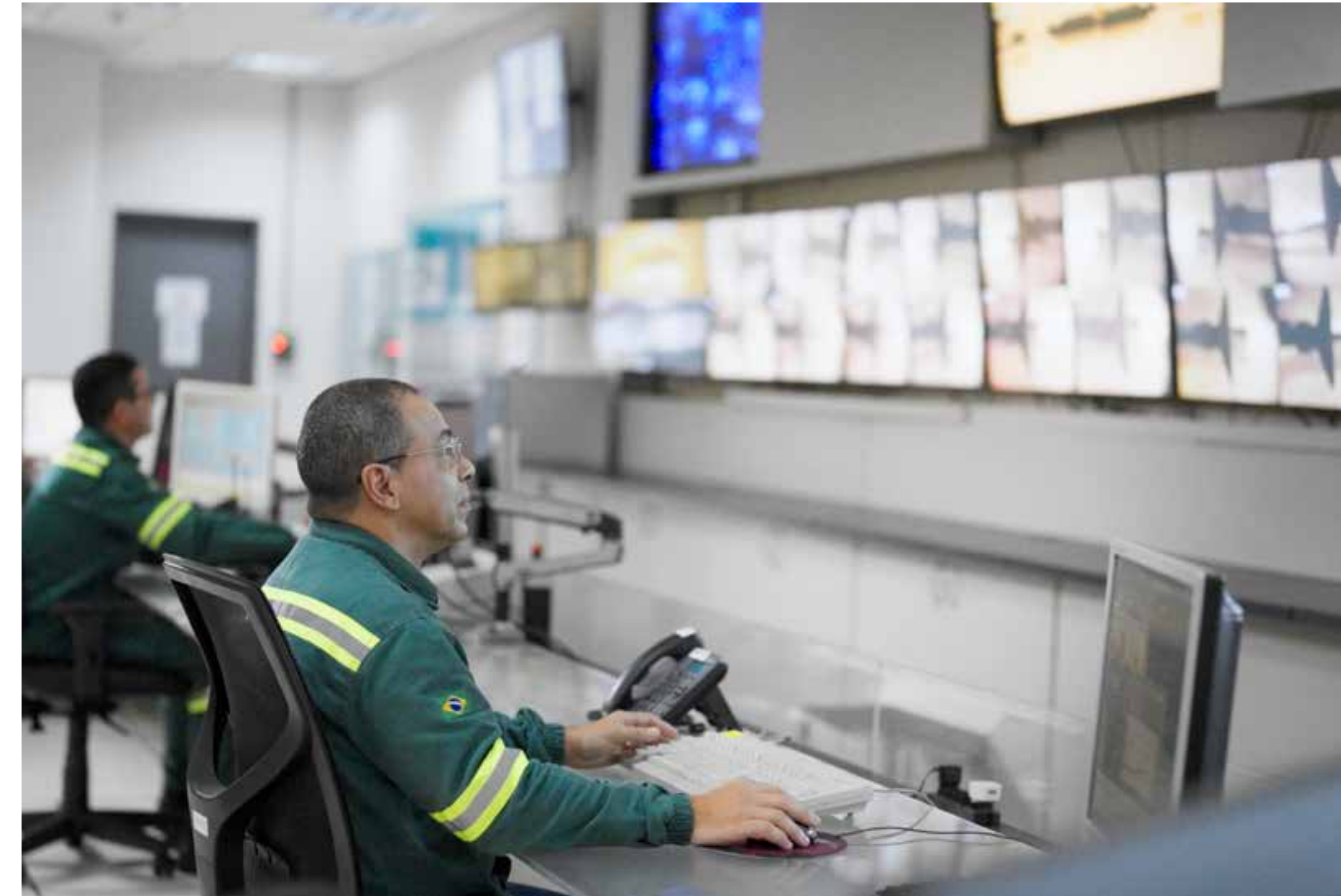
### **Rigorous ongoing transformation**

Vivix is delighted with its technological achievements in terms of automation, simulation, digitalization, and energy management. “We greatly value the industry-specific expertise provided by Siemens. Our contacts give us practical help and advice, including when it comes to discussing promising glass products for the market,” says Neto.

At the same time, Vivix is continuing on its industrial transformation journey this year, too. In 2026, Vivix’s industrial transformation journey is moving on from the digital foundations to implementation at scale. The company’s focus is now on applying its industrial data, automation, and digital capabilities to high-impact use cases, including generative AI and industrial agents, robotics and physical AI, and digital twins and plant simulation.

Besides taking the use of AI agents to the next level to support decision-making, knowledge management, and operational workflows, Vivix is also exploring robotics and physical AI, including humanoids

For Vivix, the transformation represents a clear step toward the future of glass manufacturing – production operations that are more transparent, more efficient, more resilient, and increasingly powered by data and industrial AI.



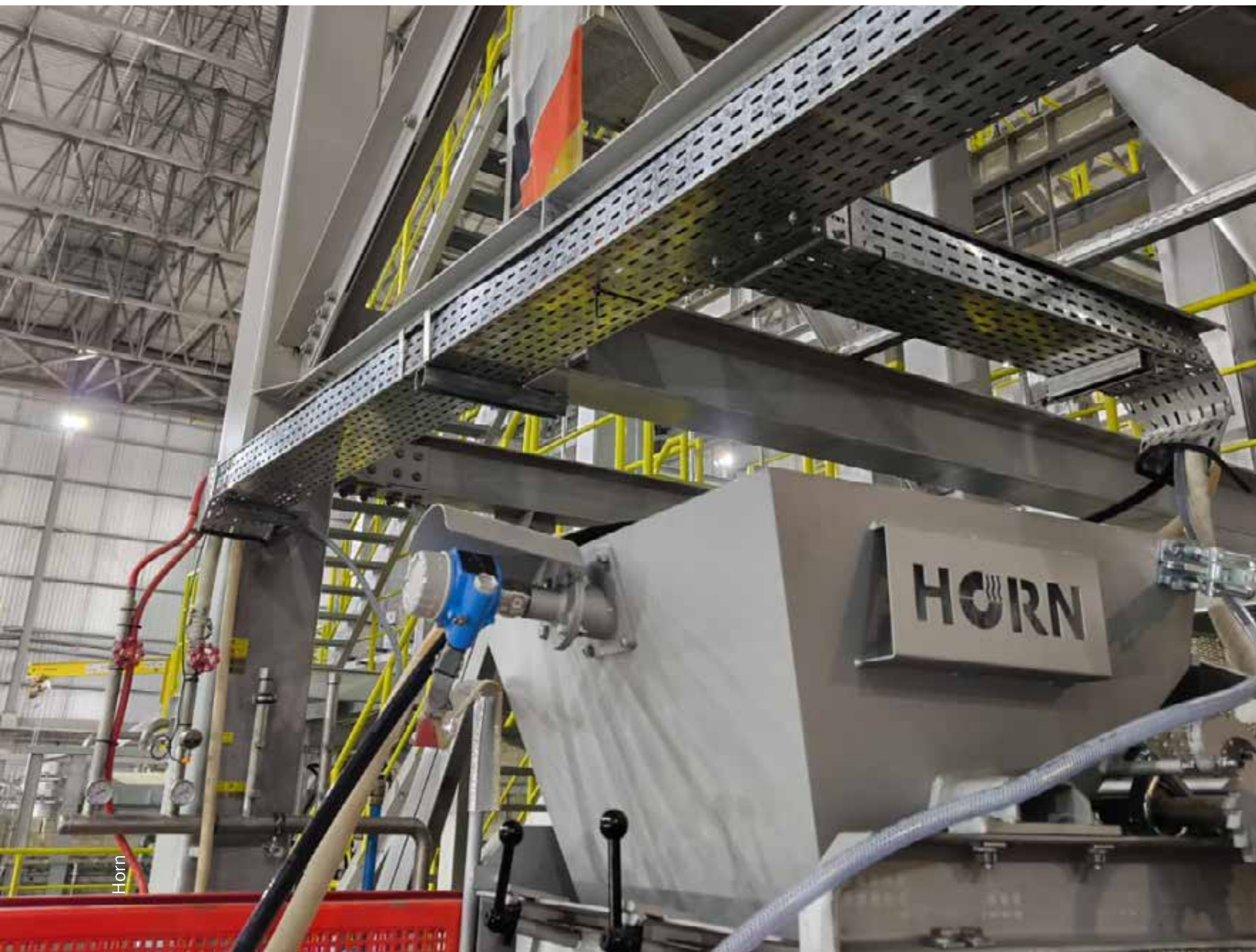
and quadrupeds, to support industrial inspection and field operations. In addition, it is expanding digital twin and simulation capabilities to improve process understanding, scenario analysis, energy efficiency, emissions, and production performance.

With Siemens technologies and its broader open ecosystem of partners – including Snowflake, Highbyte, AWS, and NVIDIA – Vivix is strengthening the connection between industrial data, automation, simulation, cloud infrastructure, and artificial

intelligence. Together, these capabilities are helping Vivix build a more connected, intelligent, efficient, and sustainable glass manufacturing model, where data, AI, simulation, and automation work together to create measurable operational value.

For Vivix, this transformation represents a clear step toward the future of glass manufacturing – production operations that are more transparent, more efficient, more resilient, and increasingly powered by data and industrial AI. •

# Automation and sustainability – the perfect pair



**The new glass bottle plant opened by Ambev in Carambeí, in Brazil's Paraná state, is the company's first factory to feature a fully integrated, plant-wide automation concept based on the Simatic PCS 7 process control system. The concept delivers a whole host of advantages that supported the Anheuser-Busch Inbev subsidiary during the planning phase, are boosting its operations right now, and will continue to pay dividends in the future. It is also helping Ambev work toward its sustainability targets.**

Ambev opened its Carambeí glass plant in Brazil's Paraná state at the end of 2025. The facility is the second glass plant the company has established in Brazil in addition to its main factory in Rio de Janeiro. In just a few months, the new-build site has already earned a name for itself as an exceptionally sustainable glass plant. For example, it runs on 100 percent renewable electricity and has also been designed to utilize biofuels. Added to that, the up to 600 million bottles it is set to manufacture each year will be composed of up to 80 percent recycled glass. Ambev supplies glass products from Carambeí to various customers, including its own breweries in a number of Brazilian states. In total, Ambev has over 30 beverage brands in its portfolio, such as Budweiser, Brahma, and Michelob Ultra. The global player is represented in 19 countries and employs more than 30,000 staff in Brazil alone.

## First automation concept with plant-wide integration

During the approximately four-year planning and

implementation phase for the new plant, Siemens was responsible for the plant-wide automation (PWA) solution, including its coordination and overall integration. That saw the company work closely with planners from cm.project.ing GmbH, plant engineering companies such as Zippe Industrieanlagen GmbH (Zippe) and HORN Glass Industries AG (Horn), and other partners in the ecosystem. One of the key features of a PWA solution is that it takes effect across the entire lifecycle of the production plant, including planning and services. The modular turnkey package for Ambev combined digitalization, automation, drive, instrumentation, and energy technologies. The focus was on integrating all the sub-plants and systems into one standardized automation structure with central data storage. At Siemens, the building blocks of plant-wide automation based on the Simatic PCS 7 process control system are established system architectures, including products and systems for optimum electrical power distribution. "Furthermore, Siemens has extensive technical knowledge of the sector, covering the entire supply chain, which facilitated synergy with other global suppliers in the sector. This really impressed us," explain Helton Pinto Monteiro and Rafael de Paula Lima from Ambev.

## The benefits of end-to-end solutions

Sustainability is a strategically important issue for Ambev and, right from the start of the project, the company appreciated the Siemens concept, which factored in environmental and collaborative dimensions as well as commercial aspects. This holistic approach encompassed the entire glass plant life- →

cycle, from consulting in the very earliest planning stage, through production, to comprehensive global services.

### Sustainable planning, commissioning, and production

Siemens supported Ambev from the early planning stage, ensuring that the PWA approach was put to good use from the outset and that all the essential conditions for achieving a cohesive plant were established. Industry insiders understand that a conventional glass plant is made up of many elements supplied by multiple engineering companies. There will often be components from a range of manufacturers and various different protocols, to name just two examples. Siemens is confident that all parties benefit most when the companies supplying systems, and even subsystems, offer the same hardware, software, and precisely specified interfaces. That conviction led to Zippe and Horn, both experienced companies, being brought on board as technology providers for the batch house and hot end respectively. This made it simple to integrate everything into one shared process control system, not least due to the clear stipulations Siemens laid down in the PWA design specification. As a result, it was possible to achieve data continuity throughout the entire plant. In other words, the groundwork

was laid during planning to ensure that all parties involved in the design and implementation processes were pulling in the same direction.

That included rolling out Simatic Virtualization as a Service (SiVaaS) at Ambev. In a PCS 7 environment, this is essentially a standard kit for virtual PCS 7 systems, and it greatly simplifies planning, construction, and operation. PCS 7 systems typically comprise several computers – an engineering station, OS server, OS clients, batch server, process historian, potentially Simit as a test system, etc. Instead of having to install several physical PCs and/or servers, virtual machines are run on shared server hardware. Simatic Virtualization as a Service provided corresponding templates that had been tested on site at Siemens in Karlsruhe and are supported there, as well as a clear architecture specifically for the Simatic PCS 7 system designed for Ambev.

Finally, Simit simulation software was used in the Factory Acceptance Test. Simit has become a kind of standard simulation tool for PCS 7 projects. It helped to reduce the commissioning time at Ambev, for example, and gave the operators a better understanding of the process and the control technology. Plant-wide automation is also bringing benefits in live operations at Ambev. Even though the initial in-

vestment was found to be higher during the CAPEX/OPEX analysis, the plant's running costs are much lower when viewed over the course of a lifecycle that can often stretch to 15 years.

If the plant operators at Ambev are to optimize their production processes, they need to know them inside out, and the central data storage system offered by Siemens gives glass manufacturers the data transparency they need for that. For instance, they can see how much energy and what volume of raw materials the plant is using where, and draw conclusions that will help them run the plant more efficiently. Thanks to centralized data storage, Ambev also has access to detailed information on the condition of plant components, which is crucial when trying to safeguard availability. Repairs and preventive maintenance can also be implemented in good time and adapted to actual requirements.

### Project overview



The Siemens concept also covers a standardized operating and monitoring philosophy for processes and standardized user interfaces throughout the entire plant. This has reduced the necessary outlay for engineering, commissioning, and training.

### Contributing to the overall concept

As part of this holistic concept, Zippe contributed to the standardized automation philosophy at Ambev through its technologies. Besides machinery and electrical control and monitoring systems, the company also supplied a batch plant with an automated pre-mix system and a capacity of 450 metric tons per day, which can be extended to 900 metric tons per day. Also included in the company's scope of supply was an integrated internal cullet return system that maximizes the plant's ability to utilize recycled glass and reduces the volume of raw materials required. "By integrating an advanced cullet

**“By integrating an advanced cullet return system and external cullet into the production process, Ambev significantly reduces raw material consumption and energy usage while reinforcing its commitment to sustainability and resource efficiency.”**

**Joachim Ullrich, Director of the Process Automation Department at Zippe.**

return system and external cullet into the production process, Ambev significantly reduces raw material consumption and energy usage while reinforcing its commitment to sustainability and resource efficiency,” says Joachim Ullrich, Director of the Process Automation Department at Zippe.



Horn, a specialist in glass melting technology, was commissioned under the integrated holistic concept to supply an innovative and energy-efficient glass melting furnace with three forehearths. The

**“Moreover, the furnace can be run on natural gas, liquefied gas, or biofuels and utilizes cutting-edge technologies to achieve the best possible energy efficiency standards.”**

**Joachim Ullrich, Director of the Process Automation Department at Zippe.**

new furnace is designed to produce 400 metric tons of bottles per day in flint, amber, and green. Horn e-Fusion power boosting technology ensures that all three colors can be manufactured using between 6 and 20 percent electrical energy. “Moreover, the furnace can be run on natural gas, liquefied gas, or biofuels and utilizes cutting-edge technologies to achieve the best possible energy efficiency standards,” says Markus Frank, Deputy Director Glass Plant Technology at Horn. All in all, Horn was responsible for supplying the furnace design, all refractory materials, the steelwork, the e-Fusion power boosting technology, and the furnace equipment. It also supervised the construction and provided staff for the construction project and tools for the installation and commissioning phases.

“We were really happy with the coordination and overall integration of the subsystems by Siemens. The result is an integrated automation system and



we have been really impressed by the approach,” say Helton Pinto Monteiro and Rafael de Paula Lima from Ambev, adding: “The groundwork has been laid for further connectivity.” •

**“Siemens has extensive technical knowledge of the sector, covering the entire supply chain, which facilitated synergy with other global suppliers in the sector. This really impressed us.”**

**Helton Pinto Monteiro and Rafael de Paula Lima from Ambev.**

# Bits and bytes provide the proof



All images: Schott

**By leveraging simulation, SCHOTT has succeeded in rapidly improving a handling step for the production of CERAN® cooktops at its Mainz site, adding a new delta robot that has optimized cycle times. The end result is higher throughput and enhanced flexibility – thanks to a perfectly coordinated concept comprising kinematics, drive technology, and control systems. Rolled out in just a few months, the solution can serve as a blueprint for further projects at the company.**

International technology group SCHOTT, which is headquartered in Mainz, Germany, is a global leader in specialty glass, glass-ceramic, and high-tech materials. SCHOTT CERAN® cooktops have been a bestseller for more than 50 years, thanks to a whole range of impressive technical properties. Made of glass-ceramic, they exhibit exceptional heat resistance and dimensional stability. To meet growing global demand for the cooktops, SCHOTT was looking to boost the throughput of its glass-ceramic panels at the manufacturing plant in Mainz. The bottleneck in production was the cycle time of a linear robot that was being used at the stage when panels are broken, turned, and reoriented for downstream processing.

## **Simulating additional robot kinematics**

SCHOTT suspected it would be possible to cut the cycle time for these turning and reorienting steps but couldn't prove it. Assistance came in the form of a final-year project that was part of a degree program at the Duale Hochschule Baden-Württemberg

(DHBW), where SCHOTT is an industry partner that provides practical work experience. Exceptionally user-friendly Tecnomatix Process Simulate software was used to simulate and validate the cycle time when using alternative robot kinematics in the form of a delta picker – a predefined kinematics model for delta robots. These systems are designed for gripping and moving products with extreme speed and precision. Conducting the simulation was a relatively quick and easy task, which ultimately showed that adding a delta picker to the process would help to optimize the cycle time.

## **Opting for delta kinematics with coordinated drive technology and control systems**

The simulation results persuaded SCHOTT – the motivating force behind the development of the concept and solution – to invest in a highly dynamic parallel kinematics robot paired with Robot Control Suite software for Simatic S7-1500T from Siemens, a strong partner for exceptionally well-integrated components. Unlike serial robots, the chosen hardware consists of several arms arranged in parallel that steer the workpiece holder via a closed kinematic system. This design considerably reduces the moved mass, which leads to higher speed, improved repeat accuracy, and low inertia. The variety of panel formats is now also much larger, because SCHOTT can handle any sizes and orientations more smoothly and with optimized timing. Another advantage is that the robot mechanics can be fully integrated into the drive and automation world of Siemens that is used at SCHOTT – no additional robot control system is required. Keeping →

the familiar technology environment also saves time and money and means no additional training is needed. A Simatic Technology CPU (Simatic S7-1500T) takes care of interpolation, while programming and configuration are handled in the TIA Portal. Robot mechanics at SCHOTT are always manufacturer-neutral, and Siemens was given the responsibility of integrating them into the control environment across the board. The robot mechanics were seamlessly combined with the compact and highly dynamic Simotics S 1FK2 servomotors, which boast excellent power density, appropriate degrees of protection, and the necessary overload capacity. Sinamics S120 components are also used as modular, high-performance frequency inverters for the demanding motion control tasks at SCHOTT.

When it comes to safety-critical applications, SCHOTT can rely on a TÜV-certified solution for safe work envelope monitoring, in the form of Simatic Safe Kinematics.

### The blueprint – a concept comprising hardware and software with supporting simulations

Using Tecnomatix Process Simulate software for simulations delivered a great many additional benefits. For example, advance simulation helped reduce the on-site commissioning time for the hardware

and software at SCHOTT in Mainz by around three weeks. Besides saving time, that also cut costs and conserved resources, because SCHOTT did not have any downtime and could ensure that everything simulated in advance actually worked in practice.

SCHOTT reports that the Siemens solutions are working very well. The company has been particularly impressed by the combination of coordinated kinematics, Siemens Sinamics and Simotics S drive technology, Simatic S7-1500T, and Tecnomatix Process Simulate. The concept is now in place and can be transferred relatively easily to other handling scenarios at any number of SCHOTT sites. For SCHOTT, another key aspect of this project's success was collaborative partnership and a shared openness to innovative approaches. •

**“Advance simulation helped reduce the on-site commissioning time for the hardware and software at SCHOTT in Mainz by around 3 weeks.”**

## Project overview

**SCHOTT concept based on coordination and simulation** delivers winning combination of a delta picker, drive technology and control systems



### Objectives

- Overcome cycle-time limits
- Validate stability under real conditions
- Enable fast line integration



### Solution

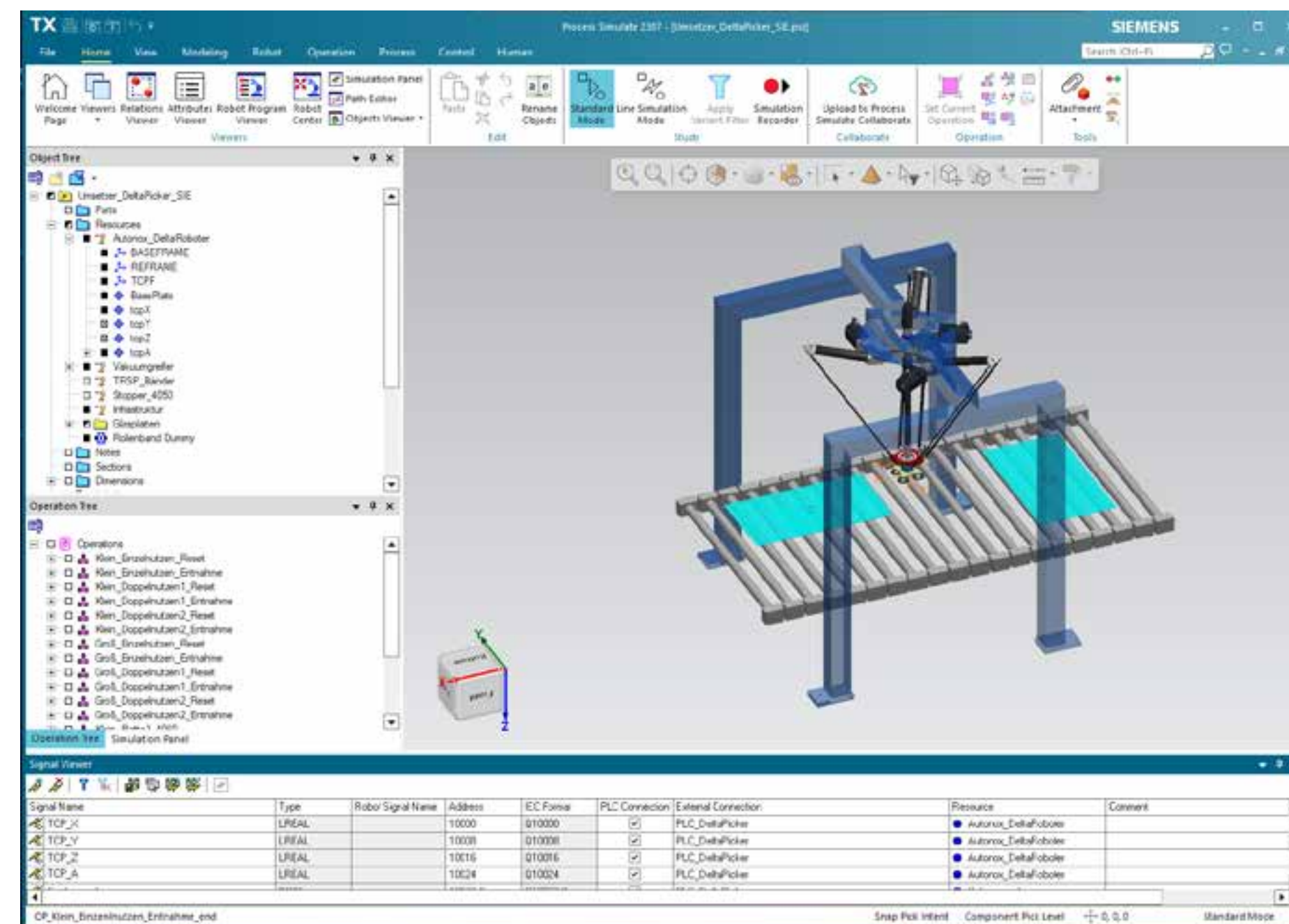
- Simatic S7-1500T, Sinamics S120, Simotics S-1FK2
- Tecnomatix Process Simulate
- Robot Control Suite
- Safe Kinematics



### Customer benefit

- Faster cycles, higher throughput, more flexibility
- Early validation saves time, cost, and resources
- Commissioning cut by approx. 3 weeks
- Quick integration into the existing line

SCHOTT has improved the production of CERAN® cooktops at its Mainz site with a carefully coordinated concept that combines a delta picker, drive technology, and control systems – all developed through simulation.



# Flourishing from the furnace



**In glass production, the melting furnace is the deciding factor for everything – glass quality, energy consumption, carbon footprint, and how cost-effectively recycled glass can be used. By achieving optimum control of their furnaces, companies can truly flourish when it comes to efficiency and competitiveness – especially when running large float glass production lines continuously. This is where expert Mohammad Sadeghi – CEO of engineering company B4U, which has sites in Dubai and Türkiye – comes in. For around two decades now, he has been opting for the Simatic PCS 7 process control system from Siemens for projects in the Middle East, North Africa, and further afield. What’s more, he always pursues the same aim, namely plant-wide automation. This approach generates practical benefits, as shown by numerous examples, including the float glass plants belonging to Orda Glass in Kazakhstan and Düzce Cam in Türkiye.**

It’s no secret that the melting furnace is the beating heart of every glass production facility. Operating at extremely high temperatures, it melts silica sand, soda ash, limestone, and recycled glass down into a homogeneous, low-bubble molten mass with exactly the right viscosity for the subsequent shaping process. Featuring precisely adjusted temperature zones, the furnace not only controls the quality and optical clarity of the glass, but also regulates process stability during continuous operation – which often amounts to non-stop use over many months and years. The design of the furnace also plays a key role in deter-

mining energy consumption, CO<sub>2</sub> emissions, and how cost-effectively recycled glass can be used. It stands to reason, then, that anybody who wants to manufacture or treat glass, or produce it more sustainably, first needs to understand the furnace.

This is exactly where expert engineer Mohammad Sadeghi comes in. He is the CEO of B4U, which was founded in 2012 and has sites in Dubai and Türkiye. Over recent decades, Sadeghi has built up a wealth of expertise in process automation in general and furnace control in particular. For around 20 years, he has been putting his trust in Siemens automation and drive technology for his projects, which he primarily carries out in the Middle East and North Africa (MENA). He has always been particularly impressed by the Simatic PCS 7 process control system. “I’ve been using it for around 20 years now – and there are various reasons for that. I see it as the internationally established control system for the process industry. Ongoing updates are provided, and we engineers and system integrators find it really user-friendly. What’s more, the system is robust, versatile, and adapts to suit all kinds of glass plants. Besides controlling processes throughout the entire lifecycle, it improves availability and boosts efficiency, so glass manufacturers are happy, too,” Sadeghi explains. As a long-standing Siemens Solution Partner, Siemens Technology Partner for Process Control Systems & Advanced Factory Automation, and Industry Partner Glass, B4U, with its team of around 30 employees, consistently pursues a plant-wide automation approach that glass manufacturers also appreciate. All systems and subsystems in a glass production plant are integrated into an end- →



## Project overview

Flourishing  
from the  
furnace

How glass plants improve quality, efficiency, and competitiveness



## Challenge

The melting furnace shapes everything: quality, energy use, CO<sub>2</sub> footprint, and cullet efficiency.



## Goal

Create stable processes, more transparency, and better plant performance.



## Solution

Plant-wide automation with Simatic PCS 7 across furnace, tin bath, and lehr.

Customer  
benefit

- More availability.
- More efficiency.
- Better continuous production.
- Strengthen resilience.

Orda Glass Ltd. started up Kazakhstan's first float glass plant in October 2022 in the city of Kyzylorda. The company operates a float glass production line that is the biggest glass production line in Central Asia.

to-end automation architecture with central data storage, which is based on the process control system. Below are two practical examples that highlight the advantages.

**Orda Glass Ltd. in Kazakhstan**

Orda Glass Ltd. started up Kazakhstan's first float glass plant in October 2022 in the city of Kyzylorda. The company operates a float glass production line that is the biggest glass production line in Central Asia. It boasts a maximum daily output of 600 metric tons and an annual production capacity of some 197,100 metric tons of float glass. Its main products are colorless, transparent float glass, colored float glass, and coated glass. In June 2024, the company launched its second project in Kyzylorda – the production of energy-saving glass with a low E coating. Sadeghi and his colleagues were responsible for the Simatic PCS 7 (V9.1) process control system, which ensures optimum control

of the melting furnace, the tin bath, and the lehr. "We opted for the CPU 410H high-availability, high-end controller for the Siemens process automation," Sadeghi explains. "When combined with the scalable ET 200SP HA (High Availability) I/O system, it offers a compact, redundant architecture for large-scale applications, such as those in place at Orda Glass," he continues.

**Düzce Cam in Türkiye**

Düzce Float Glass runs a factory with integrated production facilities in Düzce that extends across an area of 468,000 m<sup>2</sup> and employs over 500 members of staff. Its current maximum daily output is around 800 metric tons, with this figure set to rise to up to 1,750 metric tons in the long term. To achieve this, the company has plans for three production lines with three melting furnaces. One is already up and running, the second is under construction, and





Düzce Float Glass runs a factory with integrated production facilities in Düzce that extends across an area of 468,000 m<sup>2</sup> and employs over 500 members of staff.



Düzce Cam currently sells 21 different types of product, including flat glass, colored glass, coated glass, laminated glass, and mirror products for the architecture and automotive sectors.

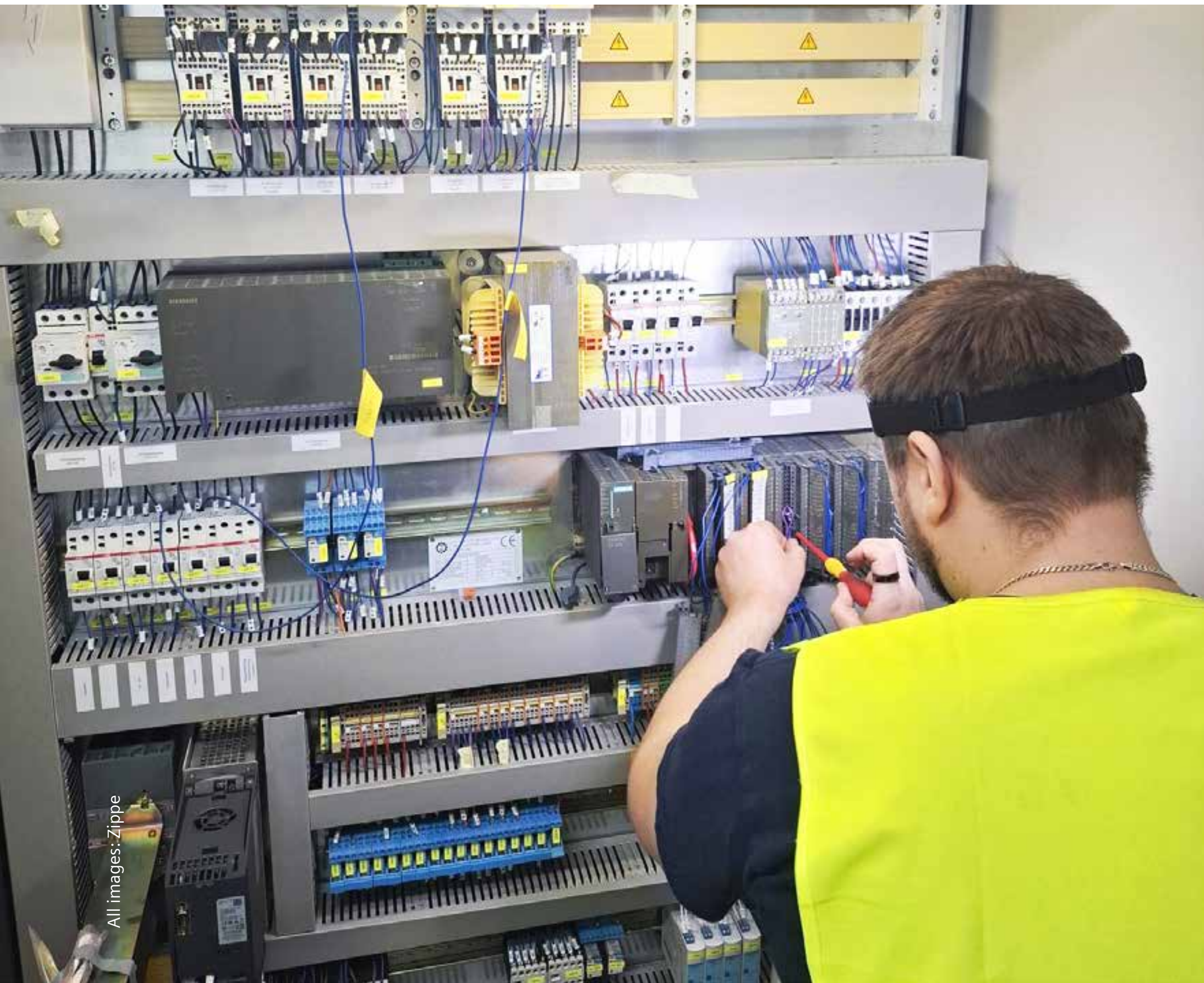
**“For me, Simatic PCS 7 is the established control system for the process industry — robust, versatile, and built for efficiency.”**

**Mohammad Sadeghi, CEO of engineering company B4U**

future plans are being laid for the third. The company currently sells 21 different types of product, including flat glass, colored glass, coated glass, laminated glass, and mirror products for the architecture and automotive sectors. B4U was given overall responsibility for the process control system in this project, too. PCS 7 also controls the melting furnace, the tin bath, and the lehr at this factory.

“We always strive to achieve the very best results for our customers – and that often means a complex interplay of maximum quality, capacity, and energy optimization. Thanks to our in-depth knowledge of interdependencies in the process industry and the support we receive from Siemens as our partner, we feel ideally equipped for the coming years,” Sadeghi says. •

# Dependable reliability



All images: Zippe

**In uncertain times, it can help to spell out exactly what “reliability” looks like for the glass industry – planning certainty, investment security, sound concepts, operational reliability, protection against cyberattacks, and of course the peace of mind that comes from working with an experienced and dependable partner. Recent projects completed by the batch and cullet plant specialists at Zippe are model examples for the glass industry. And naturally, they all feature automation and digitalization solutions from the Siemens portfolio.**

Zippe Industrieanlagen GmbH (Zippe), which is based in Wertheim, Germany, has been developing and building batch and cullet plants for the glass industry for over 100 years, and is a leading global supplier in the segment. The company creates turnkey batch and cullet plants that cover the entire process from raw material and cullet handling, weighing technology, and crushing and conveying technology through to preheating, automation, and control systems. It also provides services that span the entire life cycle. As a mid-sized family company with several hundred employees, Zippe is a one-stop supplier for consulting, engineering, in-house software and hardware production, installation, and commissioning. It has successfully positioned itself as a technology partner for efficient, highly automated, digitalized, resource-friendly, and future-proof glass production. One key technological factor that helps Zippe deliver on its promises to customers worldwide is its consistent commitment to

plant-wide automation as a longstanding Siemens Solution Partner. All systems and subsystems in a glass production plant are integrated into an end-to-end automation architecture with central data storage, which is based on the Simatic PCS 7 process control system. “As a global player, besides customer-focused system openness, we also need a partner that operates internationally – and we have an important one of those in Siemens. That’s why we decided many years ago to become a Siemens Solution Partner. Our aim is to continuously develop interfaces and technologies for batch plants and cullet preparation so that we can offer the best support possible for the downstream melting process. Thanks to our efficient components, plant extensions that can be flexibly scaled, and lifecycle-extending measures such as intelligently planned maintenance, we are making a very real contribution to investment security for our customers,” explains Joachim Ullrich, who is responsible for process automation at Zippe. Recent projects the company has carried out for Ambev, the NSG Group, and Ritzenhoff are model examples of this approach in action.

## **A future-proof batch plant for Ambev in Carambeí, Brazil**

As part of an ongoing project to optimize the preparation of raw materials for glass production, Ambev has established a new, high-performance batch plant at its site in Carambeí, Brazil. The company awarded the contract for the associated planning, engineering, and automation work to the plant engineers at Zippe, who developed and implemented an integrated concept for a highly automated batch →

plant that incorporates silo feeding and cullet re- turn. “The aim was to achieve dependable, repro- ducible dosing for all raw and secondary materials, all- owing for their respective material properties. That provides an important lever for melt quality, energy efficiency, and plant availability,” says Ullrich.

To achieve this aim, Zippe combined its process technology, which has been tried and tested over many years, with a consistently structured automa- tion architecture. A virtual Siemens system was used right from the engineering phase as a means of tes- ting and rapidly optimizing processes, interfaces, and operating statuses.

Zippe weighing technology, which has a reputation as a robust solution in the glass industry, played a key role. It ensures excellent dosing accuracy and a stable, consistent batch quality, even when recipes are changing and cullet proportions are variable.

Zippe implemented all the control and automation technology independently. The batch plant and its silo feeding system run on a Siemens CPU 410 5H with two IM155 6PN decentralized peripheral sys- tems. Meanwhile, the cullet return system is con- trolled by an autonomous CPU 410E and associated peripherals. This clear separation of the automation

Project overview

Dependable reliability in action

How Ambev, NSG Group, and Ritzenhoff benefit from working with Zippe

Ambev

New batch plant. Better control. More efficiency.

- Precise, reproducible dosing
- Stable batch quality
- Higher energy efficiency
- Stronger plant availability

A future-ready plant for reliable production.

NSG Group

Modernization with low disruption.

- Higher plant availability
- Less risk of unplanned downtime
- Better cybersecurity
- Stronger investment security

A modernized plant built for long-term performance.

Ritzenhoff

Upgrade prepared with minimal production risk.

- More reliable operations
- Structured, low-risk migration
- Transparent commissioning
- Flexible basis for future expansion

A stable platform for long-term growth.

areas produces transparent structures, increases availability, and makes it easier to carry out focused maintenance on individual parts of the plant.

A particular emphasis was put on the cullet return system that Zippe designed as an integral compo- nent of the overall plant. “The controlled return and dosing of glass cullet stabilizes melt conditions, lo- wers energy consumption, and contributes to con- sistently high glass quality,” points out Ullrich. During the project, it became clear that outstanding operational reliability is crucial, particularly when dealing with critical materials and demanding con- veying conditions. For example, Ambev and Zippe carried on making adjustments to the silo feeding system during hot commissioning, in order to fur- ther improve conveying stability. “That’s a good example of how trusting and well-oiled the collabo- ration with Ambev was,” sums up Ullrich.

**Sustainable modernization for the NSG Group in Gladbeck**  
Pilkington Deutschland AG, which is part of the NSG Group, operates a central production and further processing hub for flat glass at its site in Gladbeck, Germany. The plant utilizes the float process to manu- facture flat glass that is primarily used in the construc- tion industry, including high-quality functional glasses with thermal and solar control coatings. In late 2025, a new production line for laminated safety glass was added to the Gladbeck plant so that the flat glass ma- nufactured there could also be laminated and coated on site. Besides being home to production operations, the site also fulfills a key logistics function, as the NSG Group has one of its largest European warehouses there, from which it supplies both construction glass businesses and automotive sites. To maximize plant availability and process stability for the future, Zippe has spent the past two years or so bringing the site’s

automation technology up to scratch for the NSG Group. “The plant has been in operation for around 20 years, so we were tasked with future-proofing it by rolling out targeted retrofits,” explains Ullrich. Thanks to decades of experience, Zippe was able to imple- ment all the necessary conversions and upgrades in Gladbeck while the plant was still operational. “When downtime can be minimized, it saves our customers money. What’s more, forward-looking and proportio- nate modernization also eliminates costly emergency repairs. By choosing Siemens components, and the- refore using cutting-edge concepts and solutions, we could both guarantee the availability of spare parts and cover all aspects of cybersecurity for the NSG Group. Right now, investment security is more import- ant than ever for glass manufacturers,” says Ullrich.

The large-scale automation project involved conver- ting 16 control systems to the Simatic S7 1500, one →

of the fastest controllers on the market, with system performance that guarantees the fastest reaction times and maximum control quality. Zippe modernized 16 CPUs and chose the Simatic ET 200MP as a modular system for peripherals – one that is ideal for the kind of complex, innovative manufacturing processes used by the NSG Group, where speed and precision are crucial. This also required the rapid replacement of 28 frequency inverters based on the

plug-and-play principle. The Sinamics G120C that was used combines an extremely compact design with an integrated safety function. This was paired with the Scalance XC106-2, which is the ideal switch for ensuring a reliable and robust network infrastructure at the NSG Group. Two new redundant SCADA stations have closed potential security gaps and 13 new HMI panels are providing optimum human-machine interaction. Last but not least, Zippe took care of replacing all the weighing electronics with 32 of its own weighing systems. “Thanks to this fully comprehensive system, the plant is technologically fit for many more years to come,” concludes Ullrich.

#### Preparation paves the way for PCS 7 upgrade in the batch plant control system at Ritzenhoff in Essentho

Ritzenhoff’s central glass plant is located at its Essentho site in Marsberg, Germany, where it manufactures high-quality crystal glassware – particularly beer, wine, champagne, spirit, and water glasses – for the international beverage industry. Production operations at the site span the entire process chain. Ritzenhoff melts the raw materials, uses pressing and blowing techniques to shape the glass, connects together bowls and stems, grinds and polishes surfaces, and applies finishes such as

Zippe has shown how reliability can be achieved in glass production – in the form of stable processes, high plant availability, and planable and dependable modernization steps that focus on the future. Over 100 years of experience and a close technological partnership with Siemens are a solid foundation for any kind of project, whether a new-build or a retrofit.



patterns, printed motifs, and gold rims to the glasses as required. Other aspects of work carried out at the site include quality checks, warehousing, and global distribution of the finished glasses.

In February 2026, Zippe extensively modernized the Simatic-PCS-7-based control system for the batch plant at the Essentho site. The aim was to consistently switch over the automation systems to Simatic PCS 7 Version 10 in order to lay the groundwork for high-performance operations that will be reliable for the long term and also enable expansion. Among ot-

her things, the new PCS-7 generation offers a more robust engineering environment, extended function blocks for complex drives and operating concepts, and integrated safety functions designed specifically for the modernization of existing systems.

However, technological advances in terms of hardware and software were not the only focal point. The project also had to be carefully prepared, implemented with minimal risk for ongoing operations, and executed with a clearly structured commissioning strategy. To achieve that, the old and new



Recent customer projects completed by the batch and cullet plant specialists at Zippe called for automation and digitalization solutions from the Siemens portfolio.



Joachim Ullrich (left), head of the Process Automation department at Zippe Industrieanlagen GmbH: "As a longstanding Siemens Solution Partner, we consistently support a plant-wide automation approach."

control systems had to be temporarily run in parallel. This made it possible to continuously compare target and actual values, identify deviations early on, and make the necessary corrections without having to interrupt production.

The project shows how a strategically planned PCS-7 upgrade to version 10 can be achieved even in complex, established plants – provided technology, organization, and collaboration are in lockstep from the start. "Upgrading to Simatic PCS 7 V10 was a strategic move for us, in order to secure operational reliability and achieve long-term future-proofing. Thorough preparations, structured parallel operation, and close cooperation with Zippe enabled us to get the new control system up and running without putting production at risk. We are now operating on a stable and transparent automation platform that we can expand on a flexible basis," says Marco Schröder, Head of Electrical & Automation at Ritzenhoff.

#### Summary and outlook

Zippe has shown how reliability can be achieved in glass production – in the form of stable processes, high plant availability, and plannable and dependable modernization steps that focus on the future. Over 100 years of experience and a close techno-

**"As a global player, besides customer-focused system openness, we also need a partner that operates internationally – and we have an important one of those in Siemens."**

**Joachim Ullrich, Director of the Process Automation Department at Zippe.**

logical partnership with Siemens are a solid foundation for any kind of project, whether a new-build or a retrofit. It's also true that now is the time to think about solutions for tomorrow and the day after. "Edge computing means three things in particular for the glass industry: making processes more transparent, making production more stable, and using data in a much more precise way – without having to move everything to some far-off cloud," says Ullrich, describing another way that "reliability" could be spelled out in the near future. •

# Upgrade today to gain the advantage tomorrow



Grenzebach

**Grenzebach is helping glass manufacturers set new standards with respect to efficiency, transparency, performance, and cybersecurity using AI-powered, digital, and adaptive solutions. And a decades-long technology partnership with Siemens plays a pivotal role, too.**

The Grenzebach Group is one of the leading providers of automation solutions for the international glass and building materials industry. In addition to this core business, the group of companies is also active in further fields including casting technology, energy infrastructure, data center solutions, friction stir welding, the automation of industrial additive manufacturing, and digital networking. Grenzebach ranks among the international technology leaders in its markets, and its global production and service network ensures that customers can be assisted on site wherever they are in the world.

A clear picture is emerging in the European glass industry. Hardly any new glass factories are being built at present. That makes it all the more important to continuously develop the technology in existing plants and get them fit for the future. This approach enables glass manufacturers to use targeted investments to extend the service life of their plants, carry on manufacturing for the long term, and safeguard their competitiveness on a sustainable basis.

With this in mind, Grenzebach has developed AI-powered, digital, and adaptive solutions that span the entire value chain of a glass plant. These solutions help glass manufacturers make targeted improvements to efficiency, transparency, performance, and cybersecurity with relatively low levels of investment. The company's decades-long technology partnership with Siemens also plays a key role here. Selected examples demonstrate the concrete advantages arising from the close interaction of know-how, future technologies, and well-versed teams at both companies.

## **Software-defined tool for creating the control code used in cutting technology**

It is well known that cutting technology lies at the heart of the cold end of a flat glass production line. Combined with the breaking system, the cutting heads, force-regulated controls, and an intelligent optimization system form a superbly efficient unit. It is therefore all the more crucial for glass manufacturers to maximize its running time. One solution approach that Grenzebach and Siemens are driving forward together is the switch to an advanced, IT-oriented engineering ecosystem. With Simatic AX (Automation Xpansion), Siemens is bringing methods and mechanisms from software development into automation – ushering in a new generation in technology and achieving a paradigm shift in terms of strategy.

Direct loading ensures the automation code is loaded directly from the AX development environment into →



Cutting technology lies at the heart of the cold end of a flat glass production line and plays a decisive role in efficiency and running time. With Simatic AX, Grenzebach and Siemens are driving the transition to an advanced, IT-oriented engineering ecosystem.

the Simatic S7-1500 controller. “We suggested this workflow to Siemens in a kind of co-creation process, as Simatic AX was initially unable to do this,” explains Peter Stumpf, a software developer at Grenzebach.

One advantage of the new drive controllers is that they are fully replacement-compatible, compact, and fanless, which reduces the maintenance required. When it comes to implementing these highly complex

machine programs (that were previously programmed in Simotion Scout) in a modern and future-proof manner, this is where Simatic AX comes into play. It serves as the new, software-defined tool for creating the control code. “Glass manufacturers are able to implement a conversion of this nature very quickly, simply, and completely smoothly,” explains Stumpf.

Simatic AX is based on the open, agile Visual Studio Code development environment and provides users with innovative IT tools for automation tasks. “It is an excellent match with the qualifications of our colleagues, as the majority of those in our Cutting department are familiar with high-level programming languages,” says Stumpf. Simatic PLCs can be programmed and maintained using the toolchain. The concrete advantages for users include quick releases, improved quality management, and location-independent cooperation. This is achieved because Simatic AX makes proven methods and mechanisms from software development available for automation. As a result, Simatic AX offers a combination of IT-related functionalities such as object-oriented programming, automated unit testing, source control management, continuous integration, and advanced package management. “The version control is also perfect for Git and GitHub thanks to pure text code. Added to this, there are proven OT functions such as efficient

The Eigen Engineering Agent is an agentic industrial AI product developed by Siemens. The agent functions as an automated programming partner: In addition to generating suggestions, it executes complex tasks independently and checks and corrects itself.



motion control, industry standards, tracing, monitoring, modifying, and communication. We therefore have the right toolset to meet any challenges. This leads to improved quality and simpler scalability,” says Stumpf. Simatic AX does not replace TIA Portal – it works hand in hand with it. The object-oriented code is compiled and exported as a protected global library. A classic PLC programmer at Grenzebach, such as those who mainly work with transport and handling technology at Grenzebach, integrates this library into TIA Portal, links it to the controller’s hardware configuration, and loads the finished program onto the machine. “Grenzebach will also now be able to use the libraries for other areas in future,” says Stumpf, naming further advantages.

#### **Eigen Engineering Agent – the intelligent programming partner**

Meanwhile, the next step forward is just a mouse click away: “At a time when processes need to run

ever faster and more efficiently, we use all the tools that help us achieve this reliably and to a high standard of quality,” says Stumpf. One possible answer for the future is the Eigen Engineering Agent – an agentic industrial AI product developed by Siemens. The agent functions as an automated programming partner: In addition to generating suggestions, it executes complex tasks independently and checks and corrects itself. The Eigen Engineering Agent is able to draft test cases and test scripts for written software modules autonomously. Before the agent passes a result to the engineer, it validates the code against Siemens best practices and customer standards and corrects errors by itself in the background.

#### **Central data networking and efficient process control thanks to the Glass Business Suite**

Another crucial factor for consistent modernization is the ability to work on the basis of an integrated digitalization platform. The Sericy Glass Business

Suite (GBS) from Grenzebach is tailored to the glass industry and networks all production steps along the value chain, records operating data centrally, and, in doing so, creates a consistent data pool to achieve greater transparency and more efficient plant control. Siemens supports Grenzebach's analysis tools with its software tools. Grenzebach's GBS includes hardware, system architecture, data infrastructure, and perfectly matched software applications that are operated for each microservice from the large data pool. Through open and generic interfaces, GBS integrates both higher-level systems such as ERP and lower machine levels. "Using GBS, we are able to provide glass manufacturers with their production data in a straightforward and flexible manner so that they can make targeted use of it for analyses and optimizations," explains Markus Rauh, who is responsible for digital engineering solutions at Grenzebach.

In practice, the high-availability platform monitors production processes in real time, generates informative reports, and uses AI-powered applications such as anomaly detection. "During quality control, glass thickness is currently measured using samples that are removed from the process. Although these spot checks deliver precise individual values, they only permit a limited assessment of the ongoing

process. Continuous recording of the measured data combined with downstream anomaly detection opens up completely new possibilities for identifying deviations and subtle process changes at an early stage," explains Rauh. As a result, the diverse tools are helping plant operators reduce downtimes, optimize processes, and increase productivity accordingly. Moreover, the automation options are offsetting the shortage of skilled workers.

A further concrete example is the Recorder app that is integrated into GBS, and which is also available in the Siemens Xcelerator, which is an open, curated marketplace. The Recorder app digitizes measurements, events, and observations immediately – without requiring any programming knowledge. Users can quickly create their own forms and adapt them straight away to their application – for example, for service documentation, quality assurance, or error management. "A digital recipe management function that can be adapted to all production scenarios safeguards quality irrespective of the number of personnel and their expertise," says Rauh, naming a further example. "And the glass sheet ID enables glass manufacturers to read out all the parameters relating to their glass, raising quality assurance and traceability to a new level."

Combined with this advanced software approach from Grenzebach is an appropriately powerful and robust piece of hardware that offers long-term availability: "Industrial PCs (IPCs) from Siemens are ideal for combining with our software architecture," says Rauh, adding: "We compared the IPCs from many manufacturers, and the ones from Siemens (Simatic IPCs) are among the highest-performing and are also compact and fanless – something that increases the availability of the software." High availability is the crucial argument in this regard.

Grenzebach uses Kubernetes for this. Put simply, three servers or IPCs work together as a cluster. If

one of them fails, the remaining systems take over operation. This redundant architecture ensures a high level of availability and resilience.

### **New plant simulators based on S7-PLCSIM Advanced**

In order to make the digital mapping of the PLC level for float lines more realistic, Grenzebach puts its trust in simulation tools from Siemens. Previously, Grenzebach relied on self-programmed simulators that were primarily used for internal development processes. They delivered inputs and outputs, telegrams, and typical plant behavior, but reached the limits of their capabilities. Sometimes, they did not map real processes precisely enough and repeatedly



Grenzebach is helping glass manufacturers with AI-powered, digital, and adaptive solutions. The basis for this is the integrated Sericy digitalization platform and the Glass Business Suite (GBS). This approach includes hardware, system architecture, data infrastructure, and perfectly matched software applications such as the Recorder app. →

caused deviations in plant visualizations and process data in the showcase environment of Sericy and in GBS.

The previous solutions were replaced by S7-PLCSIM Advanced, creating a more realistic, permanently stable, and standardized plant model. S7-PLCSIM Advanced is a professional simulation software package for creating virtual control systems, testing control and PLC programs, and operating digital twins without requiring actual hardware.

The advantages for Grenzebach and its customers could not be clearer – reduced maintenance, no need for special adaptations for GBS, and the replacement of self-built demonstrators with functional, tested PLC programs from real projects. Error messages and information are transferred directly from the simulated PLC to the digitalization platform using the existing interfaces. “The Siemens solution demonstrates its advantages many times over. Our real-life commissioning work is faster thanks to the preliminary simulation, we can carry out in-house training sessions based on simulations, and when we are with our customers, we can use the software to conduct realistic plant simulations,” says Peter Seidl, Head of Product Management for the Glass business unit, summarizing the benefits.



„Our real-life commissioning work is faster thanks to the preliminary simulation, we can carry out in-house training sessions based on simulations, and when we are with our customers, we can use the Siemens software to conduct realistic plant simulations,” says Peter Seidl, Head of Product Management for the Glass business unit, Grenzebach.

### Comprehensive protection concept following consistent standards

A further modernization topic that is becoming increasingly relevant, not least due to legal requirements, is cybersecurity. It is well known that it plays a central role in glass plants because it is not just office IT that needs to run reliably – the same requirement applies to production management, control technology, sensors, and networked machines in particular. If unauthorized parties penetrate these systems, there is the threat not only of data loss, but also of production stoppages, quality defects, and – in the worst-case scenario – safety risks for people and plants. This is particularly serious in the glass industry because many processes run continuously and hot units, melting furnaces, and lehrs cannot be stopped and restarted in an instant. This is where Grenzebach relies, for example, on PRONETA (PROfessional NETwork Analysis), a software tool from Siemens for the commissioning, network analysis, and diagnosis of Profinet networks and decentralized peripherals.

When it comes to their respective cybersecurity concepts, Grenzebach and Siemens follow the same strategy – and glass manufacturers benefit from this consistency. With this in mind, Siemens has devised a cybersecurity blueprint for the glass industry. This is a practical guide for the comprehensive protection of production and automation systems in glass factories – along the entire value chain and across the entire lifecycle. In the guide, Siemens describes how operators can safeguard their OT environment based on the defense-in-depth principle. It focuses on the security of the plant itself, the protection of industrial networks, and the integrity of the systems beings used. The blueprint aims to help glass manufacturers take a structured approach to planning and implementing security measures and aligning them with established industry standards. The key EU regulations for the industry are the NIS2 Directive, the Cyber Resilience Act (CRA), and the new Machinery Regulation. These pieces of legislation govern the security of companies, supply chains, and digital products.

“For companies, this means, for example, that they have to segment networks, strictly control access, harden systems, plan updates, and detect threats at an early stage. In this way, cybersecurity protects plant availability, the integrity of recipes and process data, secure remote access for maintenance, and the separation between IT and OT, for instance. For glass manufacturers, it is highly advantageous that Grenzebach and Siemens are speaking the same language when it comes to this topic, too,” says Thomas Bühler, who is responsible for cybersecurity matters at Grenzebach.

### Summary and outlook

Through this interplay of automation, integrated data pool, AI-powered applications, realistic simulation, and a consistent cybersecurity concept, Grenzebach is demonstrating how existing glass plants can take targeted and cost-efficient approaches to set themselves up for the future. It is not only the individual technology that is crucial – close collaboration between all the elements throughout the entire lifecycle of the plant is also essential. And it is precisely here where the strength of the longstanding partnership with Siemens comes to the fore. This partnership links in-depth process understanding with advanced hardware and software to offer solutions that are already providing glass manufacturers with enhanced efficiency, transparency, availability, and security – and thereby securing their advantage for tomorrow. •



# A modular way to add value



All images: Heinz-Glas

**Developed by Bertram, a new modular machine concept for pushers has completely won over Heinz-Glas – thanks to the benefits it offers in terms of plant availability, output optimization, and uniform operation. End-to-end engineering in the TIA Portal, coupled with Siemens control and drive technology, ensures the plant achieves the overall standard of performance that Heinz-Glas needs. After a fault affecting the product flow, for example, the plant can be switched back to automatic mode more quickly – cutting fault-related reject rates for glass bottles by around 50 percent.**

Heinz-Glas is an international group with headquarters in Kleintettau, in Germany's Bavaria region, and is one of the leading manufacturers of glass packaging for the fragrance and cosmetics industry. Its core business focuses on developing, producing, finishing, and selling high-quality glass bottles, glass jars, and other packaging solutions for fragrances and cosmetic products. For decades, Heinz-Glas has relied on Bertram Elektrotechnik to provide the conveying technology for its glass plants – from conveyor belts and transverse conveyors to rotary tables, separators, and cullet conveyors. Based in Bevern, in Germany's Lower Saxony region, Bertram develops and builds equipment including automation solutions for the container glass industry. More specifically, it plans and creates systems that align, separate, and selectively reject bottles and containers at the cold end of the line. One of its specialist machines is known as a pusher, which comes into play at the point in the

**"We are so happy with the concept and execution that we fully intend to add more pushers to the six new ones that are already in operation."**

Marcel Bock, Cold End Engineering  
R&D Team Leader at Heinz-Glas.

manufacturing process when all the containers are standing in rows on the – often wide – Lehr, ready to be transported to the next destination in the cooling process. At exactly the right moment, the pusher positions itself between two of the rows and pushes the containers, row by row, from the Lehr onto the transverse conveyor so that they can undergo the next processing steps.

Heinz-Glas had pushers in service that were all showing their age, something that was having an increasingly detrimental impact on plant availability, output, and usability. "We took that as an opportunity to work with Bertram, already a reliable partner of ours, on creating a new pusher concept that would help us improve availability, optimize output, and make uniform operation a reality," says Marcel Bock, Cold End Engineering R&D Team Leader at Heinz-Glas. Another advantage was the Siemens Solution Partner status that Bertram has



**“To ensure the project would be a success, end-to-end engineering in the Siemens TIA (Totally Integrated Automation) Portal was a must-have.”**

**Jendrik Bertram, Managing Partner,  
Bertram Elektrotechnik**

held for many years, securing its place as one of the selected system integrators that ensure automation, process, and drive technology solutions that meet the same high standards worldwide.

#### **End-to-end engineering in the TIA Portal lays the groundwork for a new machine concept**

“To ensure the project would be a success, end-to-end engineering in the TIA (Totally Integrated Automation) Portal was a must-have,” recalls Jendrik Bertram, one of the Managing Partners in the family business whose name he shares. Heinz-Glas attests to this. “We really wanted to keep our tools within a single universe, so we were won over by

the end-to-end engineering in the Siemens TIA Portal,” says Bock. “It quickly became clear that programming held the key to the success of the new pusher concept. The axis parameters are automatically adjusted in line with the necessary tooling when pushing takes place, for example. I don’t think any other engineering tool can do that. Any tooling changes are then completed in a matter of minutes, preventing collisions in the lehr and keeping our plant availability high as a result,” he continues. These features allow operators to fine-tune and optimize the process in next to no time – whereas older systems are unable to adopt changes made in this way until the next production cycle.

The system demonstrates its programming quality in other ways, too. If the pusher detects an incorrectly positioned bottle, the axes immediately return to the starting position once the error has been acknowledged. This allows the system to proceed straight to pushing the next row, reducing the bottle reject rate by around 50 percent.

#### **Pusher benefits – speed, usability, and flexibility**

Five new pushers have now been installed at the Heinz-Glas Kleintettau site, plus one at its Dzialdowo site in Poland – and all are proving to be faster, more

user-friendly, and more flexible than their predecessors. “The new pushers allow us to run more cycles per minute, so our output across all container sizes has now gone up by 25 percent on average,” says Bock, expressing his delight at the boost in performance.

Now, all the pushers – both new and old – have exactly the same user interface and are all set up in the same way. “Alongside performance, it was precisely this kind of continuity in the operating concept that was one of the most important requirements at Heinz-Glas,” says Heinrich Peper, one of the project managers at Bertram. Many of the drive parameters can be configured directly on the human-machine interface (HMI), another example of how the solution has improved usability. “We can reference all the drives with the user interface, so we don’t need a programming device,” says Bock.

The concept also includes a comprehensive range of diagnostic capabilities such as evaluations in the program, including system messages relating to faults in the Profinet segment, for instance. Another example is axis errors, which can be brought together and displayed directly on the user interface, allowing the operator to analyze faults without the need for an external programming device and identify solutions much more quickly when errors arise.

A second aspect of the operating concept that has proven beneficial for Heinz-Glas is the mobile HMI, which allows operators to move right up to the machine, especially during the setup process. This is particularly useful in large-scale facilities, which can have lehrs up to 3.60 meters wide in some machine types. In the case of machines with transfer functions, for example, products are removed from one transport tube and placed in another. The →

### Project overview



#### Challenge

Aging pushers were limiting availability, output, and ease of operation.



#### Goal

- New modular machine concept for pushers
- End-to-end engineering in the TIA Portal
- Uniform HMI concept
- Use of Mobile HMI
- Drive and control technology from a single source



#### Customer benefit

- Improved availability
- Optimized output
- Uniform operation



Heinz-Glas is one of the leading manufacturers of glass packaging for the fragrance and cosmetics industry.

ability to move close to the process with the mobile HMI is a huge advantage in this situation, as it allows the operator to check, for example, whether the gripper needs to lower itself by an additional tenth of a millimeter before opening to ensure that the products drop reliably into the new transport tubes. “The mobile HMI really comes into its own in combination with the integrated emergency stop

button and the dead-man function. It allows us to work flexibly and stay close to the action without jeopardizing safety,” Bock points out.

#### High-performance drive and control technology from a single source

For the first time, the servomotors selected for the solution – numbering eight per pusher – are

“Together with Bertram, we developed a new pusher concept to improve availability, optimize output, and enable uniform operation.”

Marcel Bock, Cold End Engineering  
R&D Team Leader at Heinz-Glas.

connected using One Cable Connect technology. The Simotics S 1FK2 servomotors from Siemens are compact, permanent-magnet synchronous motors developed for highly dynamic and precise motion control in applications where space is at a premium. At Heinz-Glas, they work in conjunction with Sinamics S210 servo converters, which control and power the motors. The drive and motor are controlled by a Simatic CPU 1514SP TF controller, which executes the motion program. The controller also uses the Simatic ET 200 distributed peripheral system to link sensors and actuators in the machine, providing all the information required for safe and efficient servo drive operation.

In its fully equipped configuration, each plant has a total of 13 servo axes installed (converter and motor). Parameters are loaded and stored using a web server, making the process of swapping out a converter quicker and simpler, as settings can be saved and trans-

**After a fault affecting** the product flow, for example, the plant can be switched back to automatic mode more quickly at Heinz-Glas – cutting fault-related reject rates for glass bottles by around

50%.

**With the new pushers,** output across all container sizes at Heinz-Glas has now gone up by

25% on average.

ferred to a new device with ease. Specialist staff are also able to fine-tune the drive without the need for a dedicated programming device or expensive software additions.

A specialist machine with series-ready attributes “We are so happy with the concept and execution that we fully intend to add more pushers to the six new ones that are already in operation. Although this is a specialist machine, at Heinz-Glas, we’re already thinking of it as series-ready to a certain extent,” says Bock, who is clearly delighted. •

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