Future Fabs

Plan Virtual, Build Sustainable: Combining the Real and the Digital World

K. Westrich
Siemens AG, Munich, Germany

Abstract
As global semiconductor demand accelerates, the industry faces a dual challenge: scaling rapidly while scaling sustainably. Greenfield fabs offer a unique opportunity to embed net-zero principles from the outset—but the transformation must also extend to brownfield sites through modernization and retrofitting.
What if every decision in fab planning and operations could be validated virtually—before a single foundation is laid, a system installed, or a solution deployed?
At Siemens, we are making this vision a reality. By applying digital twins across the entire fab lifecycle—from conceptual design through construction and operations—we enable sustainability to be engineered in from day one. Our approach integrates: Deep domain expertise, AI-powered analytics, IT/OT convergence and real-time simulation.
The result? Smarter, faster decisions that optimize energy use, reduce emissions, and minimize downtime. With Siemens, the fab of the future isn't just more cost-effective—it's inherently more sustainable.

Biography
Katharina heads Siemens' global activities for Electronics & Semiconductor and Simulation, leading a team dedicated to unlocking the potential of resilient, smart, and sustainable semiconductor manufacturing across the entire value chain. As an elected member of the Semiconductor Climate Consortium (SCC) Governing Council, Katharina reinforces her commitment to drive positive change within the semiconductor ecosystem. Her dynamic leadership places her at the forefront of digitalization and sustainability solutions – transforming the everyday through innovative technologies.
Previously, Katharina held various strategic positions within Siemens, including heading the Research & Pre-Development department. She championed sustainable practices and contributed to the development of next-generation Siemens products.
She holds a Master of Science degree from the Catholic University Eichstaett-Ingolstadt.

References

Closing Europe’s Greentech Talent Gaps

R. Barberis
ManpowerGroup, Dieman, North Holland, The Netherlands

Abstract
Despite recent geopolitical changes, nearly half (47%) of employers worldwide plan to increase green business transformation investment and most (91%) do not have the talent they need to achieve their sustainability goals. The role of the semiconductor industry in Europe will become increasingly important to sustaining green innovation and energy security as geopolitical uncertainty continues to disrupt global supply chains. The challenge will grow as most employers (74%) report difficulty finding skilled talent today and aging populations continue to decrease the size of the total workforce.

This presentation will leverage data from nearly 40,000 employers and 14,000 workers to explore the challenges and opportunities this poses for the semiconductor industry.
Current tech talent shortages
Tech worker sentiment
Tech skills gaps
Employer best practices
Regional partnership opportunities

ManpowerGroup Employment Outlook Survey
The ManpowerGroup Employment Outlook Survey is the most comprehensive, forward-looking employment survey of its kind, used globally as a key labor market indicator. The Net Employment Outlook (NEO) is derived by taking the percentage of employers anticipating an increase in hiring activity and subtracting from this the percentage of employers expecting a decrease in hiring activity.

ManpowerGroup Global Talent Barometer
The ManpowerGroup Global Talent Barometer measures worker well-being, job satisfaction, and confidence. around the world. The Talent Barometer leverages independent survey best-practices and statistically significant samples to create a powerful tool to better understand what workers want globally. The research aims to improve the future of work through deeper understanding of key drivers of workforce sentiment today.

Biography
Riccardo Barberis was appointed Regional President, Northern Europe in May 2021, and in January 2025 expanded his responsibilities to include France, ManpowerGroup's largest market in the region. In this role, Barberis oversees all of ManpowerGroup's brands and offerings across the region – Manpower, Experis, and Talent Solutions. Barberis will lay the path to further accelerate ManpowerGroup's diversification, digitization, and innovation plans, creating even more value for clients and candidates and strengthening our performance in the region.

Riccardo joined ManpowerGroup in 1998 and has held numerous leadership positions in Europe and Latin America, most recently as country manager for ManpowerGroup Italy. With more than 25 years of experience including many international roles his deep industry knowledge and passion for a client-first, candidate-centric approach consistently delivers superior results.
An accomplished executive, Riccardo holds an Executive MBA from Bocconi University (Milan), has completed management programs at INSEAD and speaks five languages. Currently serving as Board Member of Junior Achievement Europe, he has previously held positions as Vice President of the Italian Industry Association (Assolavaro) and President of ManpowerGroup's Human Age Institute. Riccardo lives with his family in Paris.

References

Optimizing water usage footprint: Direct water recycling from abatements

P. Osten
DAS Environmental Expert GmbH, Dresden,
Germany

Abstract
As semiconductor manufacturing advances, exhaust gas treatment systems—particularly point-of-use (POU) abatement units—play a vital role in maintaining safe and stable operation. These systems often rely on water to manage byproducts generated during gas treatment. By rethinking how this water is managed and treated, new opportunities arise to reduce overall water consumption without compromising process integrity. This presentation explores how aligning gas and water treatment at the POU level enables significant water recycling, with fresh water savings of over 90% achievable through targeted strategies.
Our work focuses on enhancing water reuse by introducing a tailormade particle removal system installed directly after the abatement POU. This system is designed to address process-specific particle loads, which can otherwise limit recirculation potential. By removing these particles efficiently, the treated water becomes suitable for reuse within the same abatement units—creating a closed-loop solution tailored to the demands of the gas treatment process.
This approach builds on field observations across multiple fabs and process types, where we observed that particle characteristics in abatement wastewater are closely linked to the upstream semiconductor processes. Recognizing this dependency, we have developed a flexible particle separation solution that can be adapted to different tool sets and chemistries. Early application of this system has shown that water quality can be stabilized sufficiently to support continuous reuse, while maintaining abatement performance and reliability.
In addition, we address the issue of salt accumulation, a common challenge in high-recycle environments, through conductivity-based monitoring and control strategies. This ensures long-term operational stability even as recycling rates increase.
This presentation highlights the potential of integrating gas and water treatment strategies in a purposeful way. Rather than viewing abatement systems as isolated water consumers, they can be transformed into platforms for water efficiency through the application of process-informed treatment technologies. A key takeaway is the importance of considering wastewater characteristics early in fab planning and collaborating with treatment technology providers to enable point-of-use or semi-centralized recycling concepts.

Biography
Pascal Osten is a German engineer currently serving as Technical Director for Global Water Treatment at DAS Environmental Experts GmbH.
Born in Berlin, he studied physics and water management in Dresden, earning a degree in engineering.
He began his professional career at wks Technik GmbH, working as a project engineer in environmental engineering for water and wastewater treatment facilities. During his time there, he contributed to several research and development efforts, some of which resulted in patent applications.
Over the years, he took on increasing responsibilities, including leading a team in process engineering. In this role, he supported the successful implementation of a variety of customer projects, focusing on practical, reliable solutions.
Today, at DAS Environmental Experts GmbH, Pascal draws on his hands-on experience in water treatment to support the development and execution of sustainable solutions for the semiconductor industry and

beyond. He remains committed to advancing technologies that balance performance with environmental responsibility.

References