Sustainability, Climate and EHS

Welcome remarks for the day

C. Frieling
Director Advocacy and Public Policy
SEMI Europe, Brussels, Belgium

Abstract
Opening remarks for the day at the TechArena

Biography
Christopher Frieling is Director for Advocacy and Public Policy and Head of office at the SEMI Europe Brussels Office. He has a background in EU affairs, innovation, and tech policy. Mr. Frieling has 15+ years of experience in Brussels and leads SEMI's team for advocay and oversees all of SEMI's engagemen in European projects. Prior to SEMI he worked at the Brussels office of Fraunhofer in several roles including most recently as Senior Advisor. Mr. Frieling holds an MSc in Economics of Science and Innovation and a Bachelor of Business Administration.

References

Opening remarks by session chair

E. Michalopoulou
Program Manager, Sustainability and Innovation
SEMI, Berlin, Germany

Abstract
Aligning climate ambition, regulatory readiness and industry performance

This session explores how sustainability, climate priorities, and EHS considerations are increasingly shaping semiconductor manufacturing and operations across Europe. Industry experts will share practical approaches and collaborative initiatives that support regulatory compliance, reduce environmental impact, and strengthen the resilience of the semiconductor ecosystem.

Climate Strategy and Decarbonisation Pathways

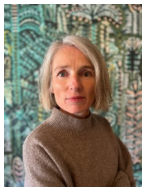
EHS and Regulatory Readiness

Circularity and Resource Efficiency

Biography
Eleni Michalopoulou is a Program Manager for Sustainability Innovation at SEMI Europe, working to strengthen Europe's semiconductor ecosystem through collaborative innovation, sustainability initiatives, and strategic EU projects. She brings together industry, research, and policy stakeholders to address challenges related to climate, circularity, skills, and technological competitiveness.

References

Coming Soon



C. Stevenson
Global Lead for Sustainability Engagement
Edwards Vacuum, Berlin, Germany

Abstract
Coming Soon

Biography
Coming Soon

References

PFAS Whitepaper

J. Bierwagen
Teamleiter Forward Material Compliance for Semiconductors
Robert Bosch GmbH, Reutlingen, Germany

Abstract
The semiconductor industry is facing increasing regulatory attention on PFAS while simultaneously enabling many of the technologies that support Europe's digital and green transition. This presentation provides an overview of the PFAS White Paper developed by the European Semiconductor Alliance, outlining the role of PFAS in semiconductor manufacturing, ongoing innovation efforts to reduce dependency where technically feasible, and the potential implications of future regulatory measures.
The presentation will discuss how the semiconductor value chain is addressing PFAS-related challenges, the importance of maintaining technological feasibility and supply chain resilience, and the need for science-based, risk-driven regulatory approaches. It will also highlight key messages and recommendations from the White Paper, intended to support a constructive dialogue between industry, policymakers, and other stakeholders on the future of PFAS regulation in Europe.

Biography
Dr. Jakob Bierwagen is a semiconductor environmental and regulatory compliance expert at Robert Bosch GmbH in Reutlingen, Germany. He specializes in material compliance, environmental regulations, and sustainable semiconductor manufacturing. He currently serves as Chair of the Environmental, Health and Safety (EHS) Working Group of the European Semiconductor Industry Association (ESIA) and represents industry interests in discussions on environmental and chemical regulation affecting the semiconductor sector.
Dr. Bierwagen works closely with the European Commission, Member State authorities, and industry stakeholders on the development of appropriate environmental requirements for semiconductor manufacturing, including the ongoing STM-BREF (Semiconductor BREF) process under the Industrial Emissions Directive. His work focuses on balancing environmental objectives with technological feasibility, innovation, and the global competitiveness of the European semiconductor industry.
In addition, he is a member of the PFAS Working Group of the European Semiconductor Alliance, contributing to the development of the Alliance’s PFAS White Paper. He has also provided semiconductor industry input on behalf of Bosch to the GENESIS Consortium in support of discussions on PFAS and future regulatory approaches.
For today's topic, Dr. Bierwagen brings both an industry and policy perspective, combining practical semiconductor manufacturing experience with active engagement in European regulatory and sustainability initiatives.

References

Sustainable Microelectronics and the GENESIS project

J. Osten
Research Manager
Fraunhofer IPMS, Dresden, Germany

Abstract
Sustainable microelectronics requires resource-efficient semiconductor manufacturing and circular process concepts. The goal of the Chips-JU project GENESIS is to develop new solutions for implementing such measures in European semiconductor factories. Activities by the consortium include reducing material consumption in wet processing and lithography, replacing critical materials, lowering process emissions, improving equipment energy efficiency, and developing greener manufacturing technologies. Recent results obtained by Fraunhofer IPMS together with other project partners include PFAS removal from wastewater, recycling of CMP slurries to reduce fresh material consumption, and recovery of high-purity solvents for reuse in semiconductor production. Together, these approaches support a more sustainable and resilient European semiconductor industry.

Biography
Julia Osten is a research manager working in Business Development at Fraunhofer IPMS in Dresden. She has been with the Fraunhofer-Gesellschaft since 2018, after previously working at HZDR. She has a PhD in Physics. Her work combines research management, strategic development and collaboration, with activities spanning topics such as microelectronics and resource-efficient technologies. In the Genesis Project she coordinates one work package.

References

Innovative Primary Substitution and Secondary Valorisation Routes for Europe's Silicon and Silicon Carbide Semiconductor Raw Material Value Chains

N. Somi Ganesan
Research Scientist
SINTEF AS, Sustainable Energy Technology,
Trondheim, Norway

Abstract

Silicon (Si) and silicon carbide (SiC) are foundational to modern electronics. Si powers logic, memory, and photovoltaic technologies, while SiC is critical for high-efficiency power electronics in electric vehicles, renewable energy systems, defense and aerospace applications. They drive digital and green transitions, holding complementary and non-substitutable roles in the global semiconductor value chain. Both materials start from the same source: quartz. Quartz is transformed through thermal and chemical processes into EG-Si (Electronic grade), achieving purity levels of 9-12N, and then drawn into Czochralski (CZ) or Float-zone (FZ) ingots for wafer production. SiC is produced by carbothermic synthesis, mixing quartz with carbon at temperatures up to 2500°C to form boules and wafers for high-power applications.

High-quality quartz comes in two distinct grades. High-purity quartz (HPQ, >5N SiO_2) is indispensable for manufacturing quartz crucibles used in the CZ pulling of Si-ingots. Metallurgical-garde quartz (MGQ, 2N-3N) with precise granulometry and morphology is a critical bottleneck for Europe's metallurgical grade (MG-Si) and SiC production, directly impacting the security of supply for semiconductor-grade SiC and poly-Si, amongst other strategic industrial outputs.

ReSiLient, an EU-funded project, aims to strengthen Europe's strategic capabilities in Si and SiC production by developing and upscaling integrated, sustainable process routes. The project will demonstrate the production of high-purity silica utilizing domestic minerals such as olivine and aplite, as well as industrial by-products such as Si slurry, quartz, and graphite residues. The high-purity silica produced will be utilized for the production of Si ingots and SiC boules, supporting a more resilient and circular European semiconductor raw material value chain.

Biography

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References