Smart and Green Manufacturing Summit

Collaboration - The challenge to reduce emissions during a period of growth

C. Jones
Environmental Solutions Business Development Manager
Edwards Vacuum, Burgess Hill, United Kingdom

Abstract
A credible reduction in both direct and indirect, specifically energy-related, greenhouse gas emissions is needed to meet the global warming goals outlined by the Paris Agreement. This is one of the many environmental sustainability challenges the semiconductor industry must face. This reduction must be achieved during a period of substantial growth for our industry and must be met by innovation and unprecedented collaboration.
We will describe the scale of the challenge, the specific issues that need to be overcome, and outline some approaches to halve our emissions on a decadal basis, whilst the industry expects to double in size by 2030. We all must understand the magnitude of the challenge.

Biography
Christopher Jones is a PhD-qualified chemist with more than 30 years of experience in the environmental protection arena. He has designed and implemented processes to manage wastes generated by the semiconductor, nuclear, military, and pharmaceutical industries and developed analytical methods for air and water quality monitoring. He is the Environmental Solutions Business Development Manager at Edwards. He aims to help owners of fabs better understand the local and broader environmental sustainability implications associated with the operation of their facilities.

Treading lightly: How a pandemic pivot to remote integrations helped reduce our carbon footprint

D. Suerich
Product Evangelist
PEER Group, Kitchener, Canada

Abstract
When the pandemic hit its disruptive peak in 2020-21, the airline industry took a record-breaking tumble as countries restricted travel to limit the spread of COVID-19. For PEER Group, a company that supplies automation software to semiconductor OEMs and factories around the world and relies on onsite discovery, integration, and inspection to deliver and maintain its products, the limitation on international travel forced an immediate pivot to alternative ways of performing these critical functions.
As the business world moved to remote work and virtual communication platforms to stay connected with colleagues and customers, so too did PEER Group's integration and services team to ensure clients and partners continued to receive the same high level of service they were accustomed to pre-pandemic.
In this presentation, we'll share lessons learned from two years of performing remote discoveries, integrations, and inspections and how, in some instances, these lessons have become best practices for our customers going forward. We'll show how pivoting specific functions to remote platforms has decreased our reliance on air travel, reducing PEER Group's carbon footprint during the pandemic and, as we continue to improve and develop our remote capabilities, into the future.

Biography
Doug Suerich, Director of Marketing & Product Evangelist, PEER Group
Doug combines more than 20 years of experience creating manufacturing software with a deep desire to help customers find the best solutions to solve their biggest challenges. A passionate advocate for smart manufacturing, Doug is an active member of the SEMI SMART Manufacturing Technology Community, Americas Chapter, and co-chairs the Advanced Process Control Smart Manufacturing Conference.

The environmental footprint of Si chip manufacturing

C. Rolin
Program Manager
Imec, Compute and Memory Technologies,
Leuven, Belgium

Abstract
The climate crisis calls for urgent actions towards sustainability as an integral component of businesses and regulations. With its large and growing environmental footprint, the Information and Communication Technology sector is arguably a large part of the problem, but also a part of the solution. Fabrication of integrated circuits is an energy and resource intensive process and the drive towards higher performance and increased functionality increases the process complexity dramatically from node to node. Traditionally, the improvement between technology nodes is evaluated using Power, Performance, Area and Cost (PPAC) metrics in a Design Technology Co-Optimization (DTCO) completely neglecting sustainability. However, this established framework provides an opportunity to do early sustainability assessments of future technologies all the way from material sourcing and fabrication to end of life. To demonstrate this approach, we evaluate the environmental impact, more specifically the energy, ultra-pure water (UPW) and mineral consumption as well as the greenhouse gas (GHG) emissions from manufacturing logic, DRAM and NAND technologies from past to future nodes. Our analysis of logic scaling reveals how the environmental metrics normalized per transistor evolve along with improvements in performance and reduction in cell area.

Biography
Cédric Rolin is Manager for the Sustainable Semiconductor Technologies and Systems (SSTS) Program at imec. He received his M.S. degree and his PhD degree in materials science from the Université Catholique de Louvain in 2004 and 2009 respectively. During the first 13 years of his career (including 2 years postdoc at University of Michigan), Cedric grew his expertise in the thin film growth and manufacturing of devices based on organic semiconductors. Then, from 2018 to 2021, he led a R&D team developing solutions to move flexible thin film circuit and display technologies from the Lab to the Fab. Part of this effort focused on the upscaling of the nanoimprint lithography patterning technology to a 300mm Fab tool. Since November 2021, Cédric has joined the sustainability effort of imec as Program Manager, focusing on the assessment and improvement of the environmental footprint of the semiconductor manufacturing industry.

Green ICT

R. Wieland
Project Manager
Fraunhofer Research Institution for Modular Solid State Technologies EMFT, Dresden, Germany

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Biography
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Green AI

J. Kelleher
Professor
TU Dublin, Dublin, Ireland

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Biography
John’s core research expertise is in the areas machine/deep learning and natural language processing. He is the TU Dublin lead in the ADAPT centre and the scientific lead for the Digital Content Transformation Strand. Within the ADAPT centre he leads research projects on language modelling, lexical semantics, machine translation, novelty detection, image captioning, dialog systems, and making AI more environmentally sustainable. John has been the academic lead on numerous industry projects across a range of topics and domains, including: anomaly detection, transfer learning, customer segmentation and propensity modelling, dialog systems and chat bots, and information retrieval and natural language processing.

Green ICT

N. Nissen
Head of Department
Fraunhofer Institute for Reliability and
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Biography
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Sustainability Improvements in Semiconductor Manufacturing Using Smart Manufacturing Technologies

A. Neuber
Director Environmental Services
Applied Materials, Dresden, Germany

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Biography
Andreas Neuber, Ph.D. has been a Senior Director at Applied Materials since 2008. He has published 80+ papers related to semiconductor fab and facility design, sustainable design and energy savings, water management and recycling, contamination control, and industrial engineering.
Prior to joining Applied Materials, Andreas Neuber was Vice President for M+W Zander. During his 18 years at M+W Zander, was involved in semiconductor fab construction and operation/optimization in many locations.
Andreas Neuber received a PhD degree in Chemical Engineering from University of Technology Dresden. He is co-chair of the SEMI ESEC task force and the IRDS EHS/S Energy and water reduction roadmap.