



Environmental Responsibility & EHS Strategies at GlobalFoundries

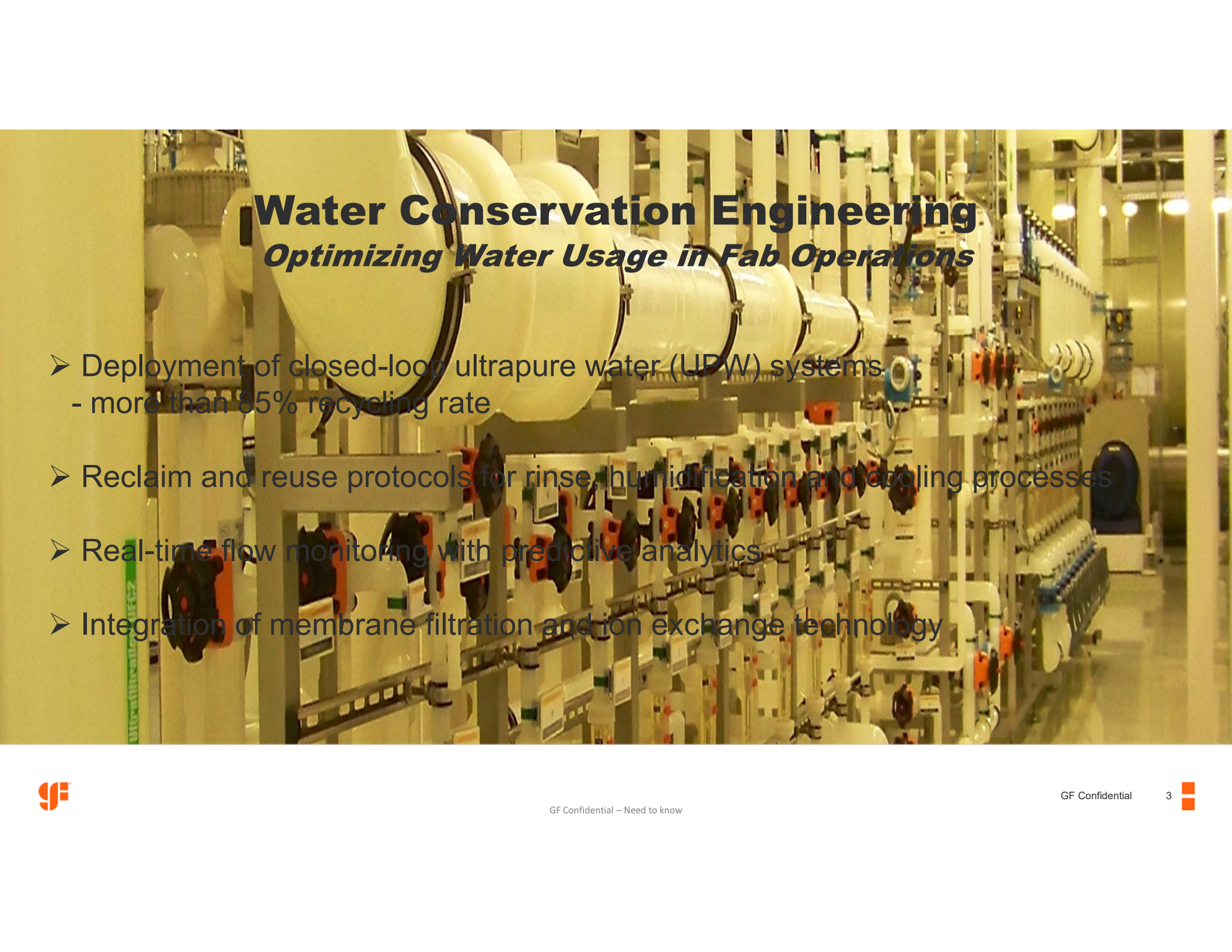
Engineering Sustainable Operations & Safety Excellence

GlobalFoundries Dresden
Tom Clarius, Dir. EHS&S

GF Dresden im Überblick



- Toll manufacturer for the global chip industry since 1996/2009
- Driving engine for the Silicon Saxony-Cluster
- Approx. 3.000 employees with 50 nationalities
- about 60.000m² clean room space
- Production and R&D for a strong technology portfolio
- Chips for automotive, industry and smart consumer goods
- Trustworthy chips für A&D, passports, encryptions, banking



Water Conservation Engineering

Optimizing Water Usage in Fab Operations

- Deployment of closed-loop ultrapure water (UPW) systems
 - more than 85% recycling rate
- Reclaim and reuse protocols for rinse, humidification and cooling processes
- Real-time flow monitoring with predictive analytics
- Integration of membrane filtration and ion exchange technology

Energy Efficiency in Semiconductor Manufacturing

Reducing kWh per Wafer Through Smart Systems

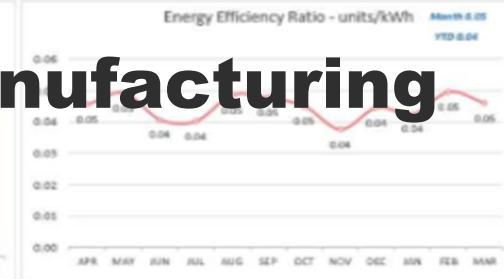
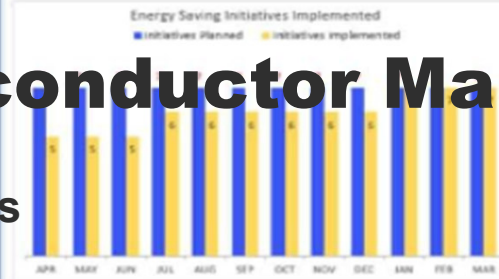
- Retrofitting HVAC with VFDs and smart controls

- LED lighting with occupancy sensors across cleanrooms

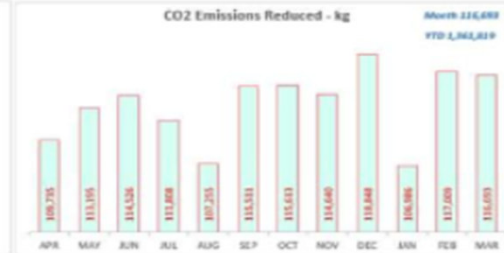
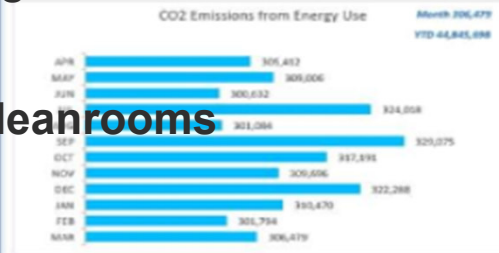
- Load balancing via SCADA integration

- On-site solar and future procurement of green power

Efficiency and Conservation Metrics:



Emission Reduction Metrics:



Cost and Budgeting Metrics:



Waste Stream Engineering

Target to achieving 100% Waste Recycling and Zero Landfill

- Automated segregation of hazardous vs. non-hazardous waste for process materials
- Chemical waste neutralization and recovery systems
- E-waste disassembly and material recovery and re-use
- Vendor audits for closed-loop recycling compliance



Holzabfälle



Metallabfälle



Alu-Folie



Kunststoffabfälle



Pappe/Papier



PE-Folien

Engineering a Safety Culture



Let's direct our efforts to
align safety with the
business agenda

Engageing those around us
to *contribute and*
collaborate

The results will be to move
closer from *Accidents to*
Zero

Behavior-Based Safety (BBS)

Culture is a common set of belief and perceptions, or
The way we do things around here

- Key to the success of implementing any safety measures is *employee* engagement, input and feedback (speaking in their language)
- *Culture is strong when people work with eachother, for eachother.*
A culture is weak when people work against eachother for themselves (Simon Sinek)
- The Activator – Behavior – Consequence (ABC) Model of influence explains the „lead-in“ and „follow-up“ elements of behavior.
What motivates us to undertake a particular behavior and what specific consequence emanates from it to realize specific actions?
Over which aspect do we truly have control?
- Use a holistic approach in the work environment to address attitudes, beliefs, rituals and language

Quality Principles in EHS

Deming's 14 principles for management. They ring true for EHS & S still today



- FMEA and fault tree analysis for EHS risks
- CAPA workflows for incident response
- Safety embedded in SPC and process control charts



Risk Management Framework

Types of risks: Operational, Strategic, Compliance

- Risk = Probability x Severity x Exposure

Addressing risk: **Recognize – Evaluate – Control**

Evaluate risk for human, environment, assets and reputation

Build this approach into a harmonized Enterprise Risk Management where all risks are viewed together in a single coordinated framework.

Engineering Toward Zero

**Don't count the days,
make the days count
(Muhammed Ali)**



- The discourse around zero is disruptive. The problem with zero is that it's an absolute: you either make it, or you don't.
Zero is thus in sharp contrast to the notion of continuous improvement
- A myopic focus on zero as a *goal* can be very risky, because it:
 - focuses on failure
 - builds a culture of intolerance which further increases a fear of failure
 - drives reporting underground
 - shifts us from effective risk management to pedantic risk elimination
 - promotes penalty and punishment
- Taking a cultural approach to safety is a much **more inclusive, positive and proactive** process => learning, coaching leading, empowering towards being **excellent in safety**



Conclusion & Engineering Call to Action

Let's Engineer a Safer, Greener Future

- Sustainability and safety as design constraints
- Cross-functional collaboration for EHS innovation
- Every employee and engineer is a safety leader and contributes to a sustainable future





Thank you

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