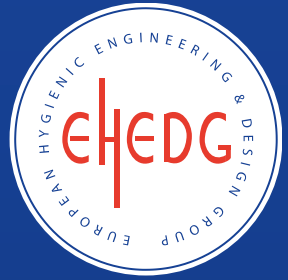




# Sustainable with optimised cleaning processes

Dr. Thilo Berg, Jürgen Lührke GmbH

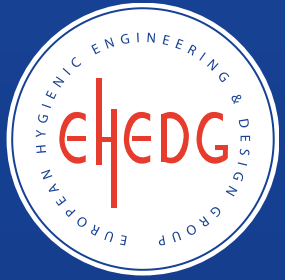
# Sustainable, optimised cleaning | Introduction



- Reducing the use of increasingly valuable resources - to protect the environment and save costs
- Actual discussion of climate change
  - (e. g. declining groundwater levels)
- Strongly increasing energy costs
- Supply chain challenges / restricted availability
- Skills shortage
- More difficult operational planning due to Covid-19
- Automation / Digitalisation



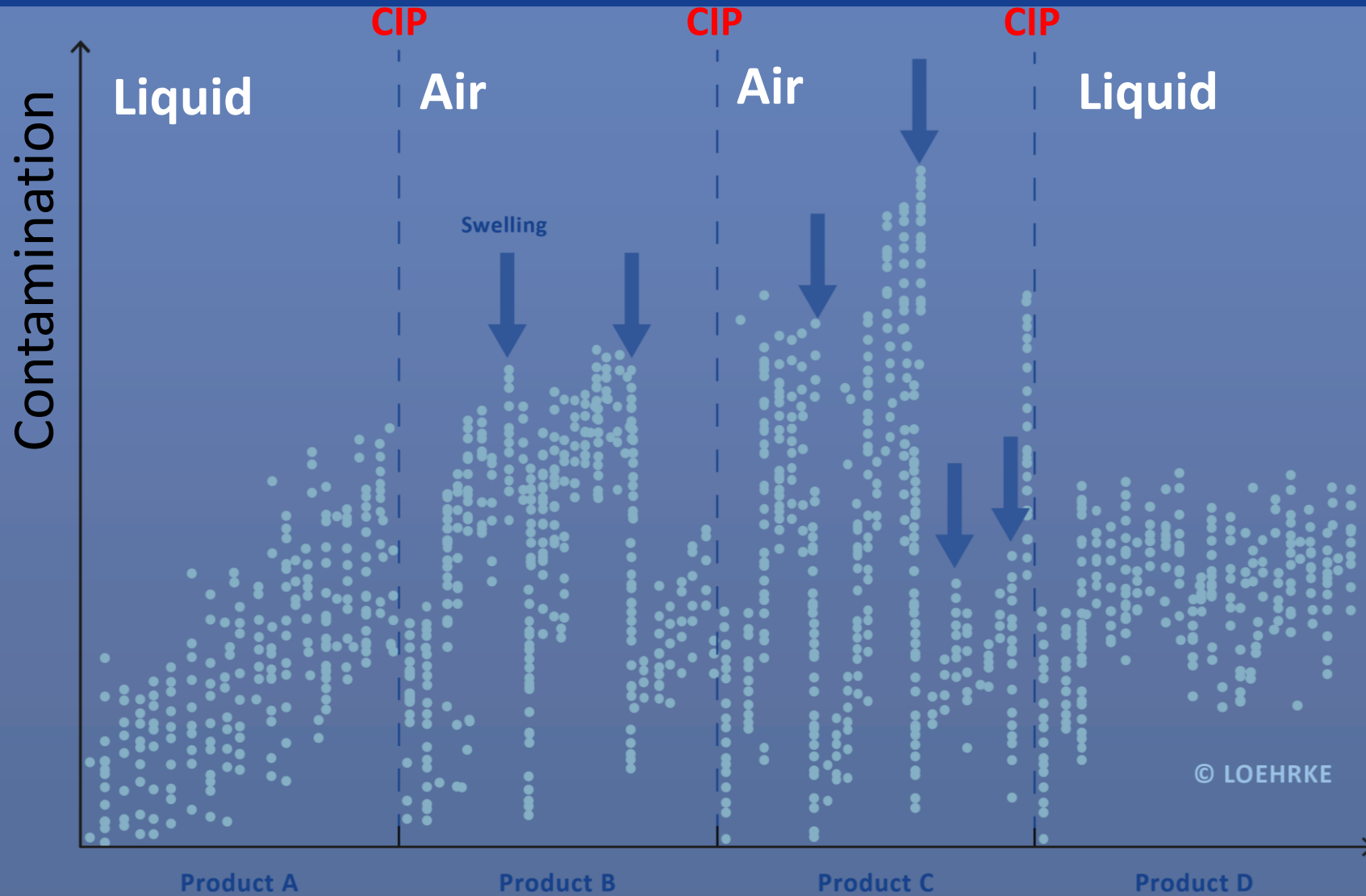
# Sustainable, optimised cleaning | Introduction



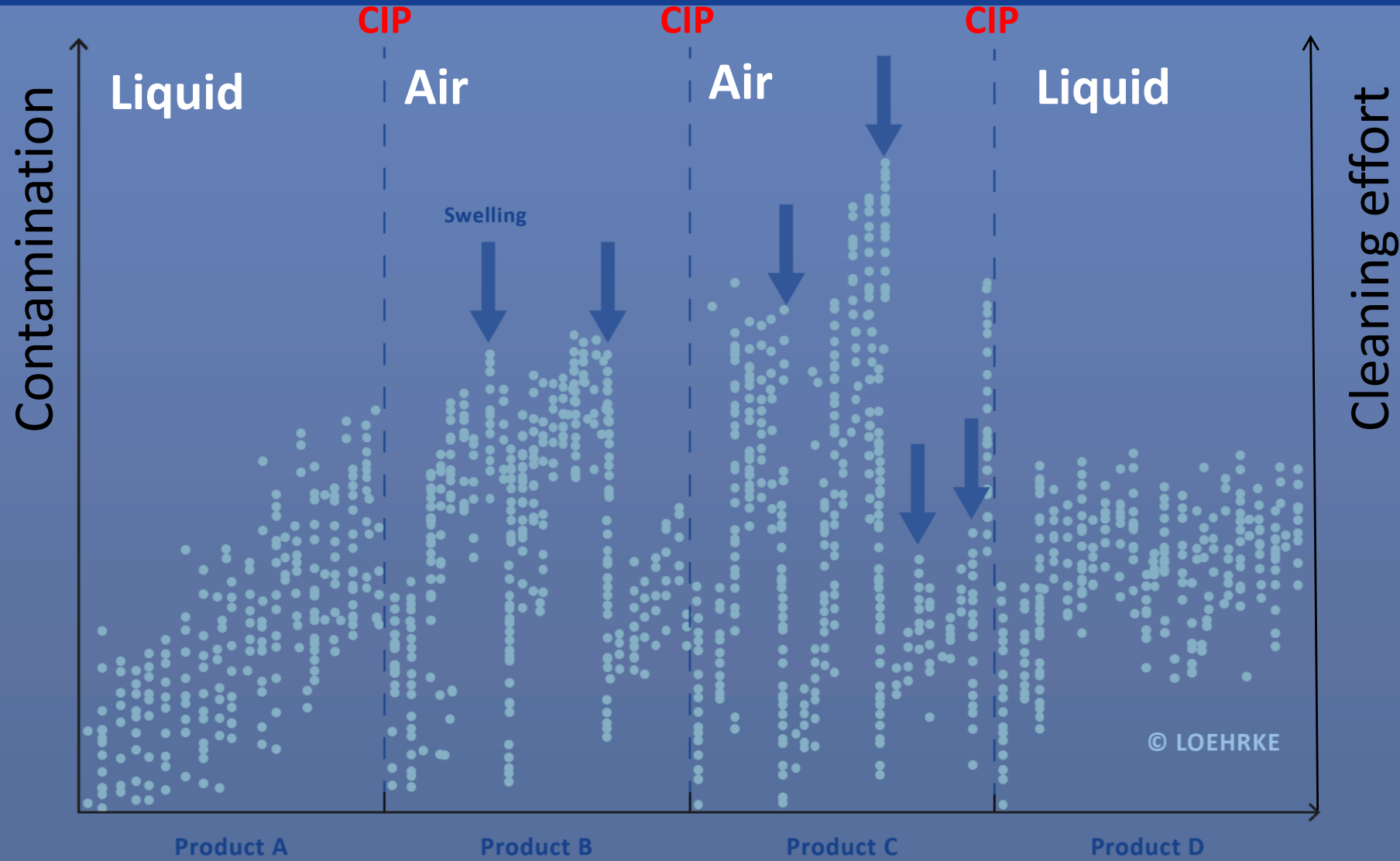
- Cleaning intensity based on the contamination of the system
- Variable parameter control
- Sinners Circle:
  - Concentration of chemicals
  - Time
  - Temperature
  - Mechanical impact
- But how to define the need of cleaning?



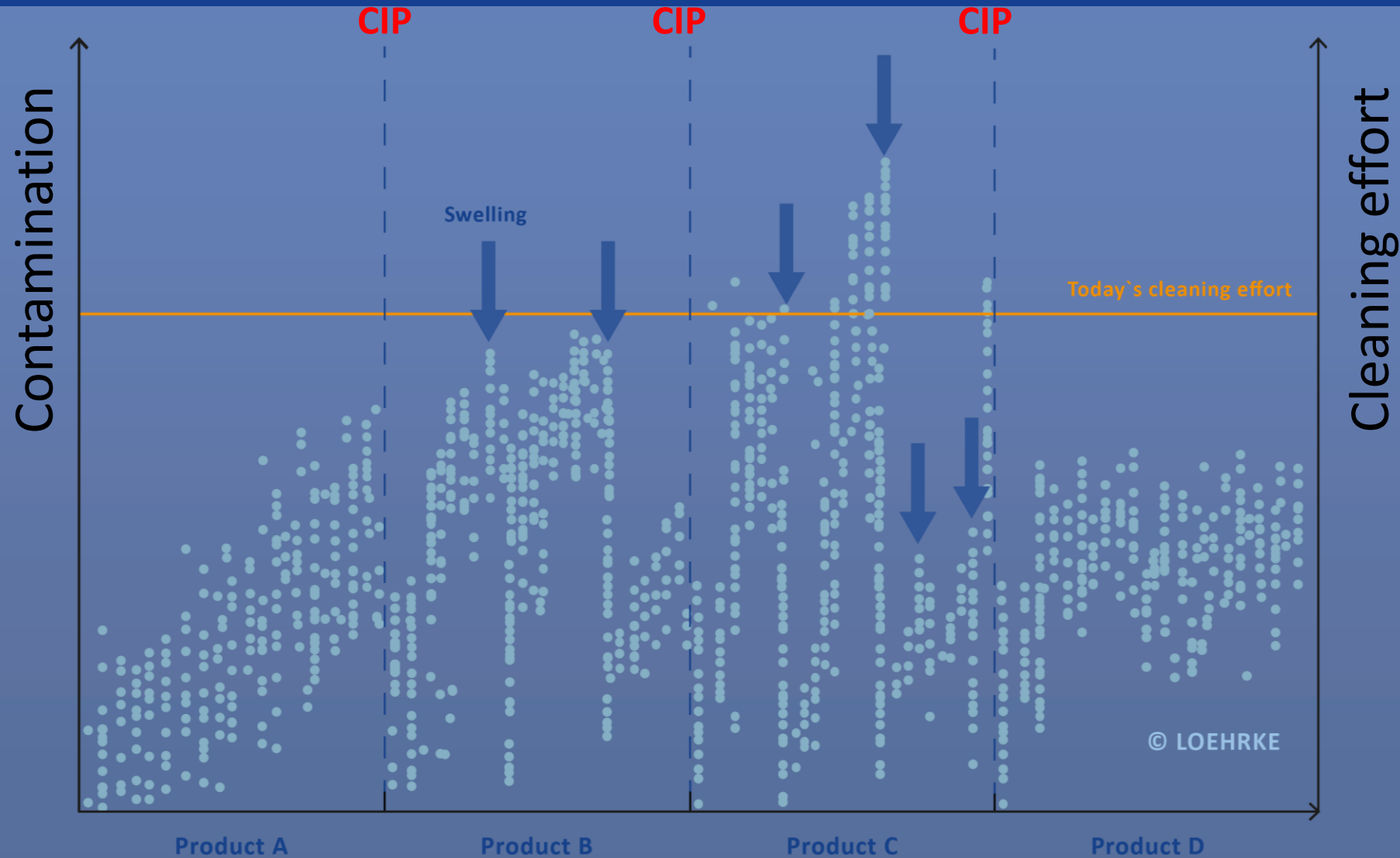
# Cleaning requirement of a plant



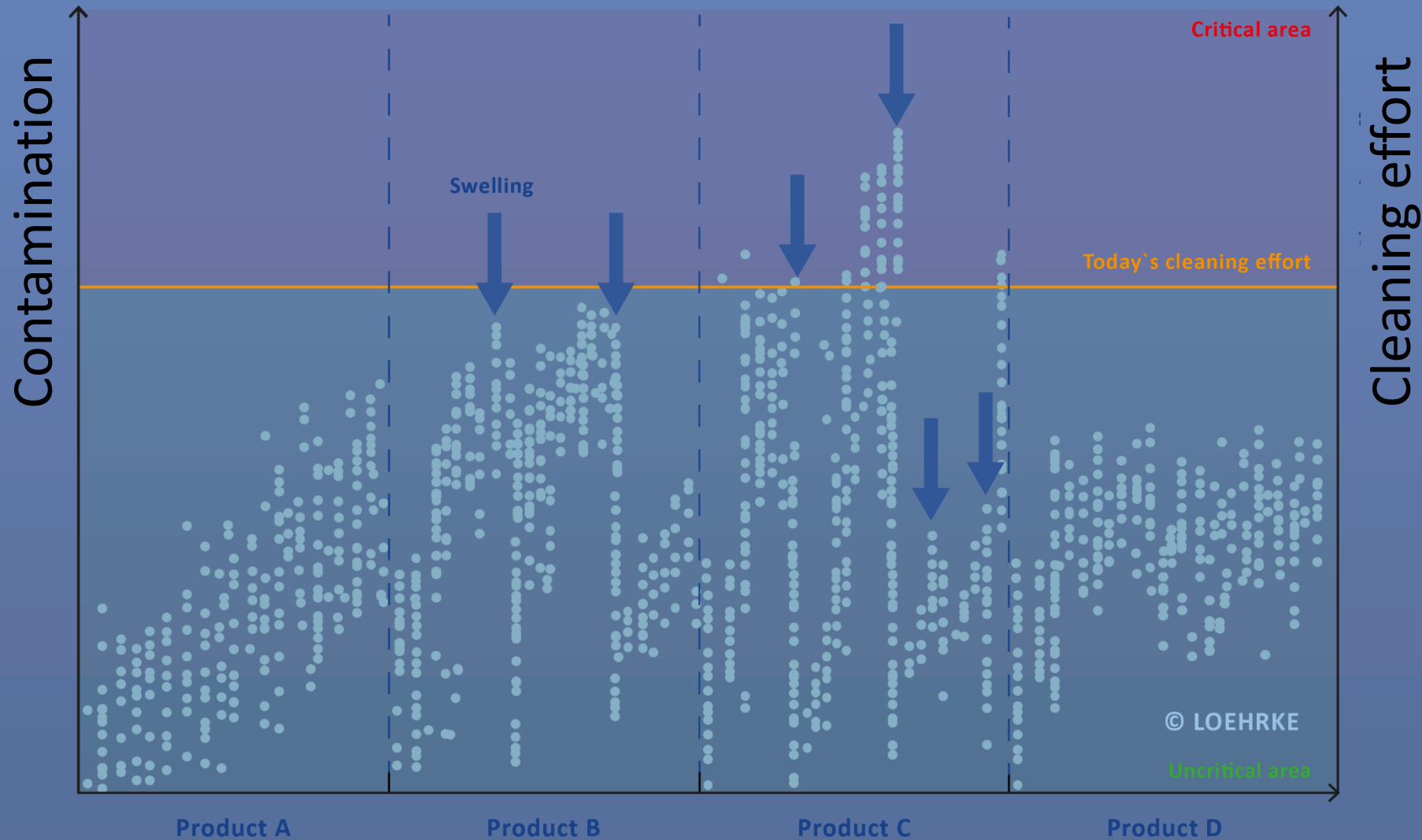
# Cleaning requirement of a plant



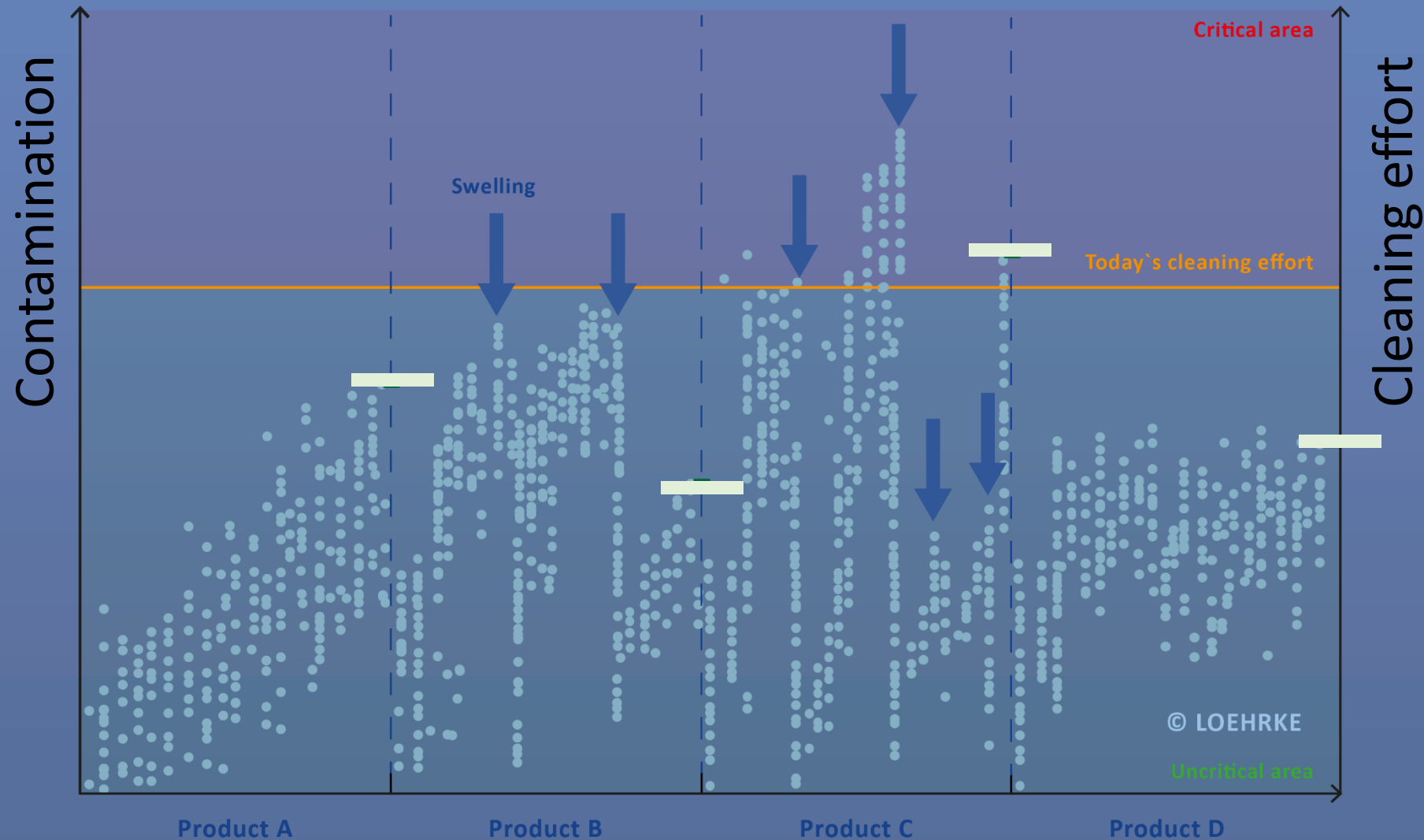
# Cleaning requirement of a plant



# Cleaning requirement of a plant



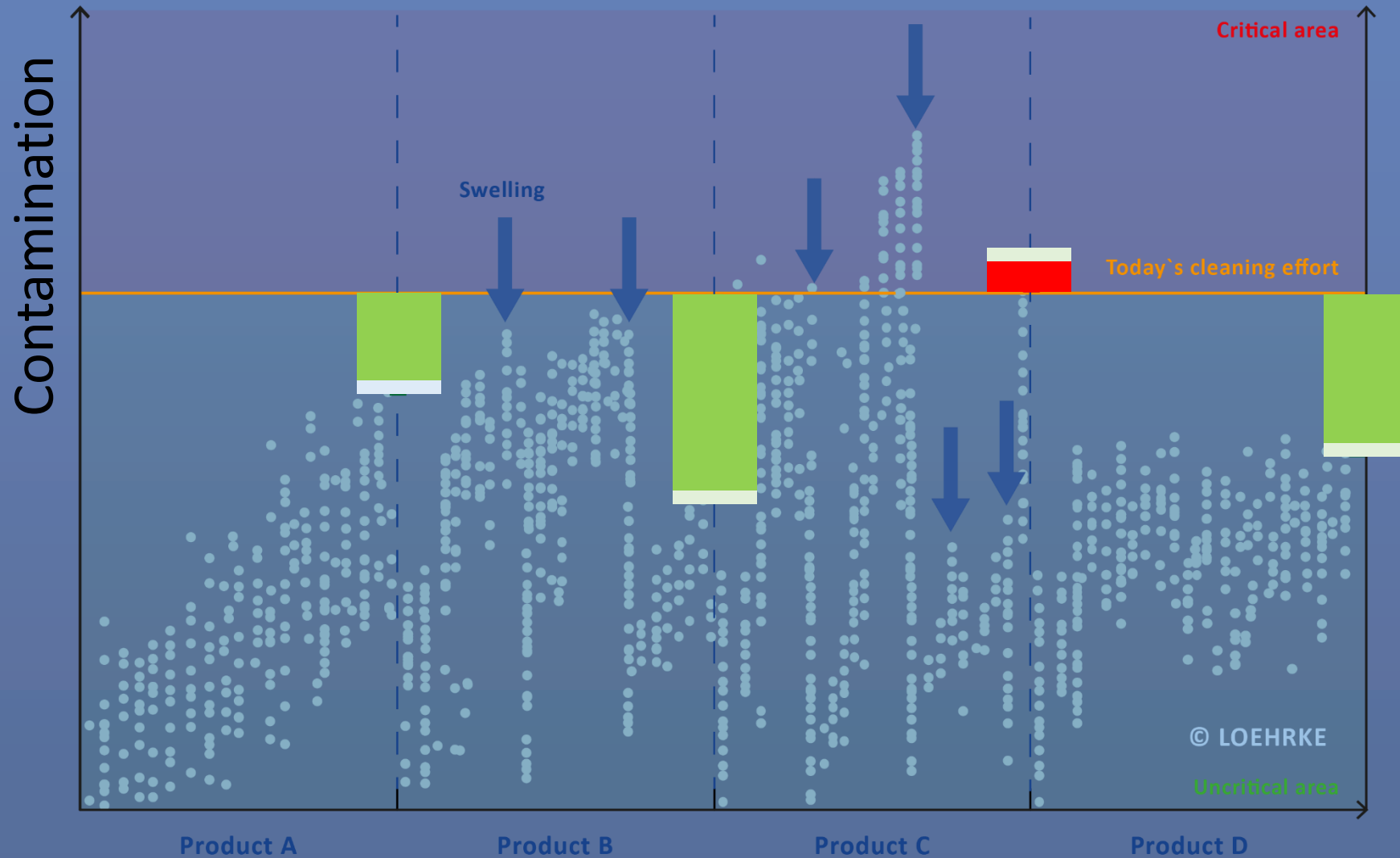
# Cleaning requirement of a plant



Actual cleaning demand



# Cleaning requirement of a plant



Hygiene risk

Saving potential time,  
resources

Actual cleaning demand

# Cleaning requirement of a plant



Hygiene risk

Saving potential time,  
resources

Actual cleaning demand

# Cleaning requirement of a plant

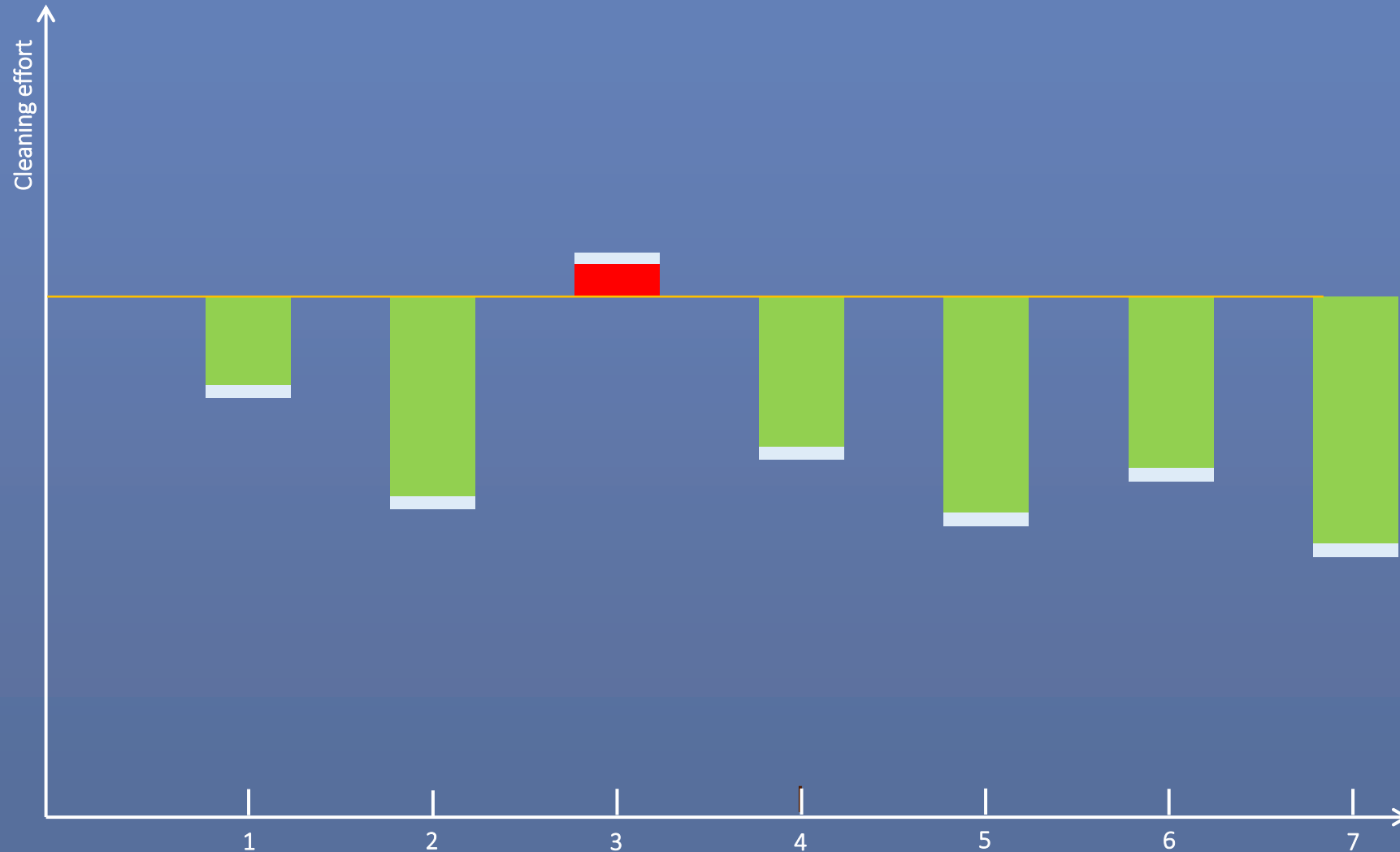


Hygiene risk

Saving potential time,  
resources

Actual cleaning demand

# Cleaning requirement of a plant

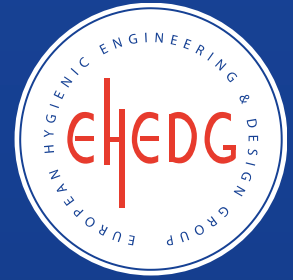


Hygiene risk

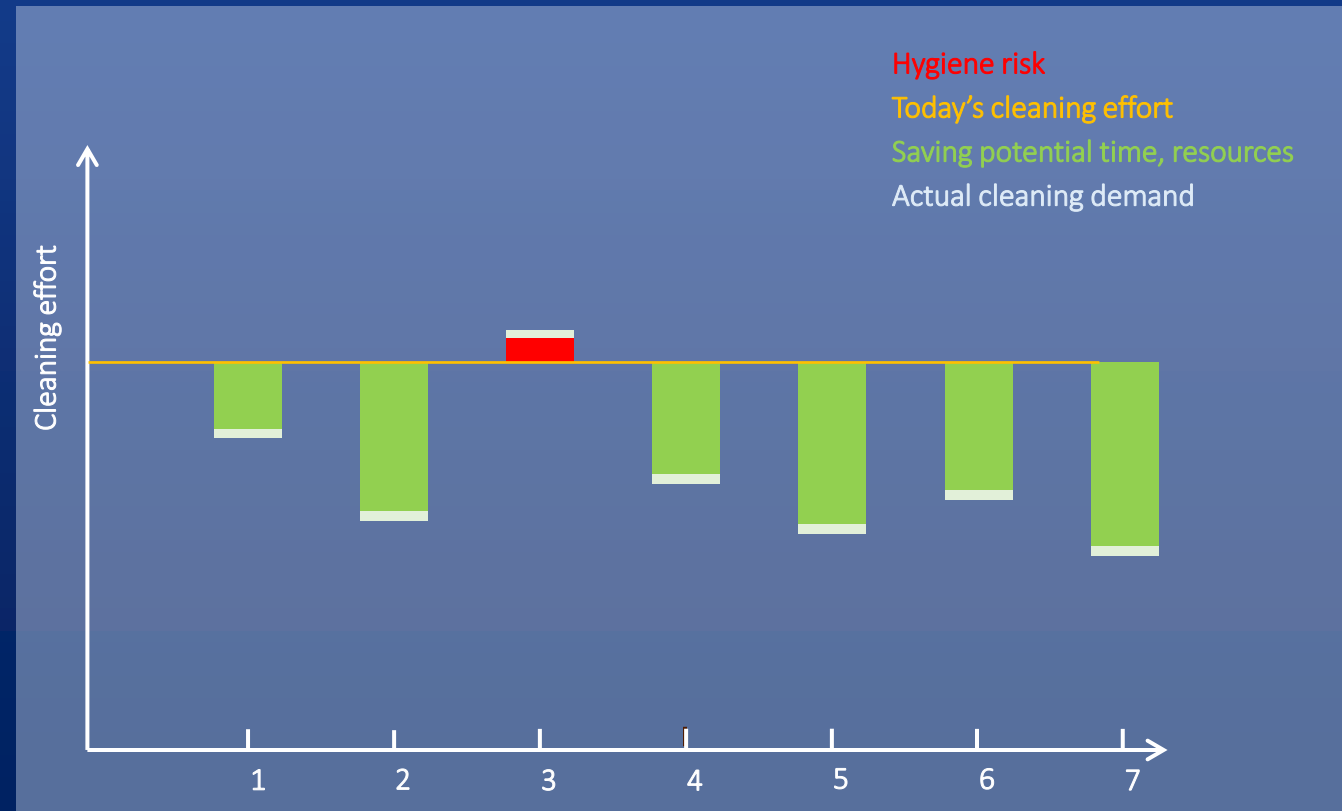
Saving potential time,  
resources

Actual cleaning demand

# Cleaning requirement of a plant

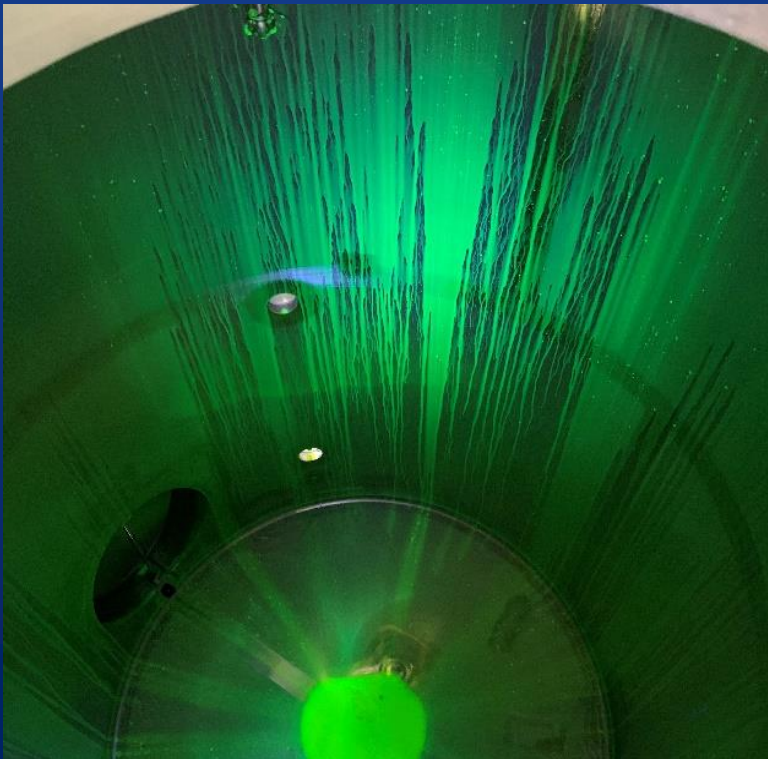


- Contamination level must be known to adapt the cleaning requirement to the contamination
  - Product residues
  - Microbiology
- Knowledge of the composition and layer is helpful
  - Adjust cleaning media
  - Adjust cleaning time



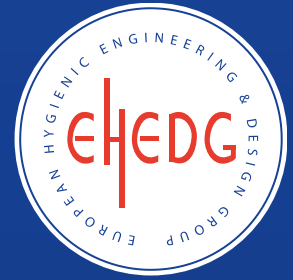
# Challenge

Determination of the hygienic status of a plant before each cleaning



- Microbiological sampling
  - Results only after incubation
  - In-time-controlling of the hygiene level of a plant only after Inline-measuring possible
- Optical methods (camera systems, fluorescence analysis)
- Sensor technologies

# Actual Sensor Technologies

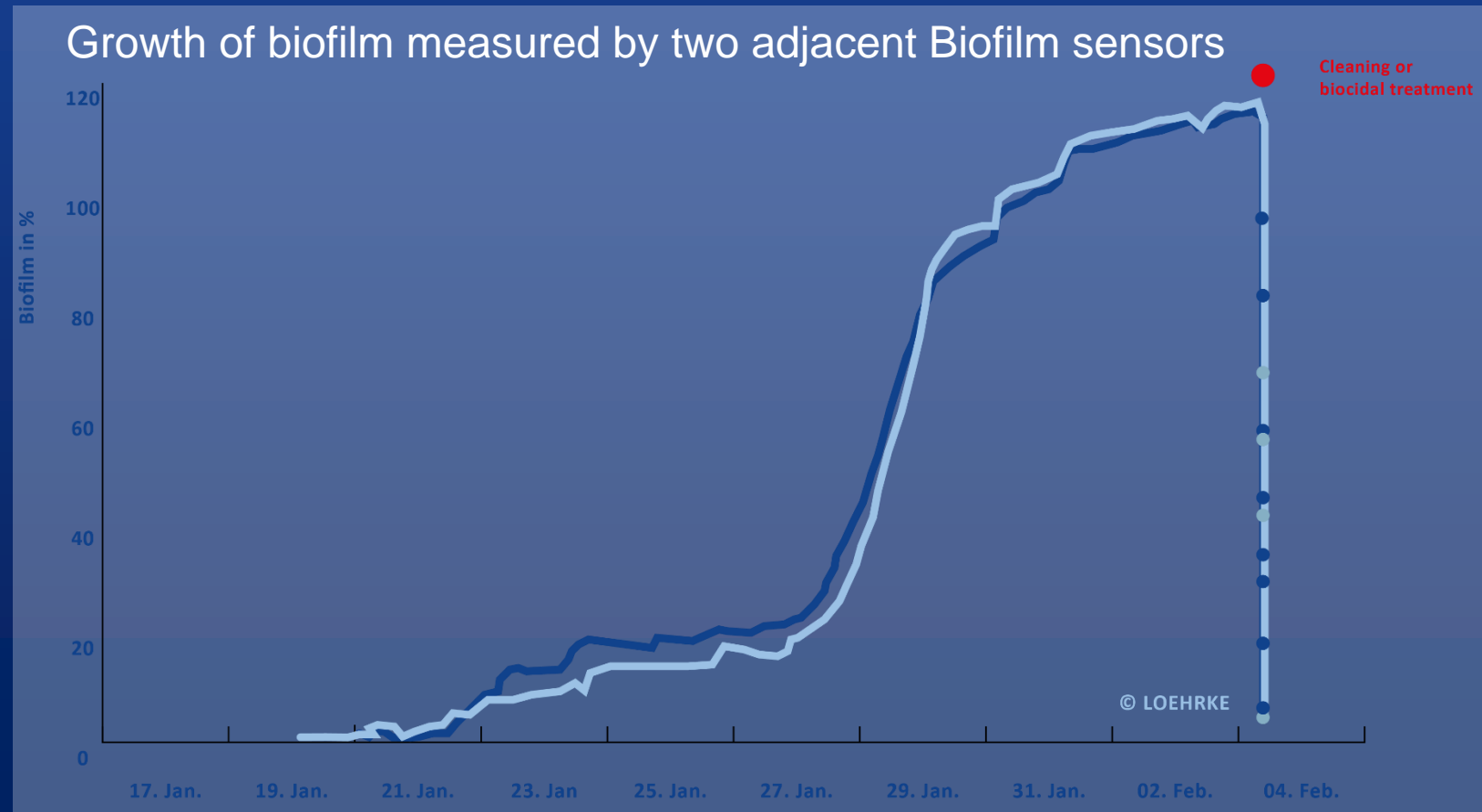


- Already standardised Monitoring parameters

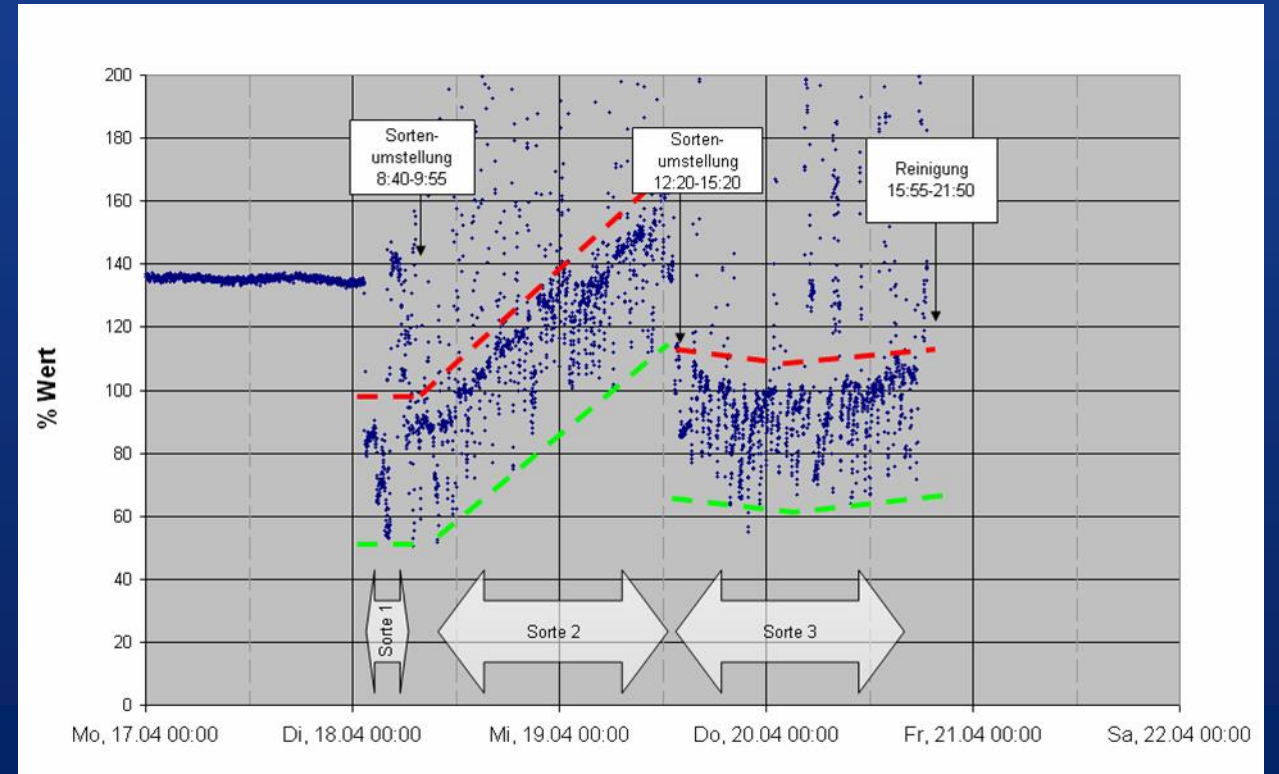
- Temperature
- Flow rate
- Conductivity
- Turbidity
- Pressure
- (pH)
- (Redox)
- ...

- New / less established sensor technologies

- Biofilm sensor
- Contamination sensor

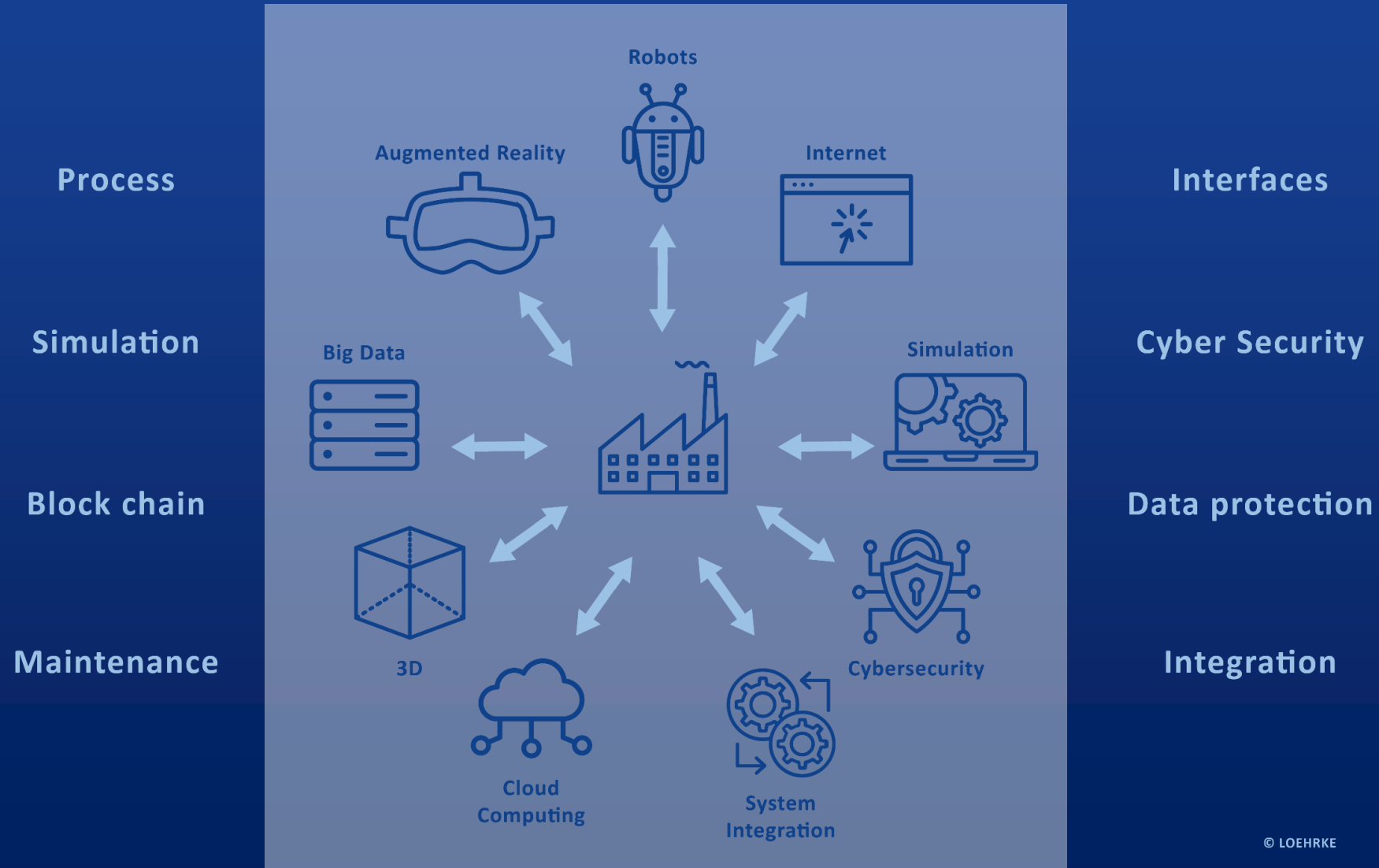


# Biofilmsensor | available sensor technologies





# Technical realisation | challenge



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# From Hygiene-Monitoring to Hygiene Controlling

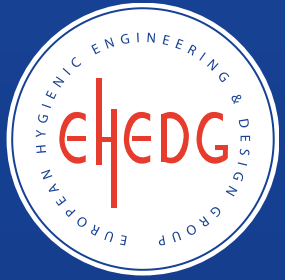
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- Using the possibilities of new sensor technologies
- Detection of microbiological contamination
- Detection of mineral deposits („lime“)
- Differentiation product residues / deposits / contamination
- Integration of the sensor into an adapted carrier system (reproducible measurements)
- Condition based cleaning / disinfection of hygiene critical plant areas

# Condition Based Cleaning | differentiated cleaning

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- Different cleaning of critical and less critical plant areas
  - Cleaning cycles (frequency)
  - Recipe (chemical products, concentration, temperature, duration, ...)
- Contamination – oriented cleaning
  - Use of raw chemical concepts
  - Supplemented by suitable cleaning boosters
  - Combination of chemical and physical processes
  - Use of various foams

# Clean-In-Place | dirt oriented cleaning



Another example of dirt oriented cleaning:

## LOEHRKE CIP + O&R | Override

Developed to clean burnt-in residues from heat plate exchangers or (downdraft) evaporators in the dairy industry.

**Target:** the residue-free removal of protein stains and a flawless microbiological result.

More Information on our poster



Thank you