



Transforming food safety with digitalization

Edyta Margas, Global Head of Food Safety, Buhler AG

Food safety and global challenges

1 in 10

people worldwide
become sick from
foodborne illnesses

* WHO

2,250

recall news in 2019

*safefood.ai

10M \$

cost of recall

*GMA

1/3

of global energy
goes into food
production from field
to fork

1/3

of all food produced
is wasted

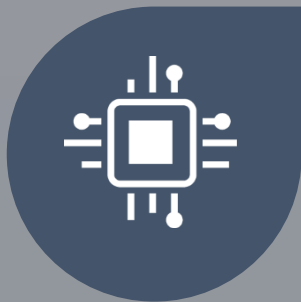
1/3

of production time
is spent on cleaning

2025

75

BILLION
Connected devices



\$10

TRILLION
Revenue Opportunity



18

SECONDS
Average interaction to
connected device



100+

TRILLION
Gb of data



Our Relevance

8 Billion People
Worldwide

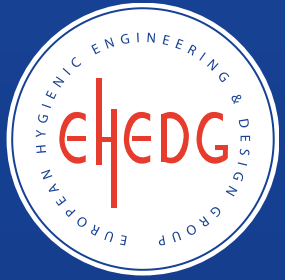
Two billion

people each day enjoy food
produced on Bühler equipment

One billion

people travel in vehicles partly
produced with Bühler machinery

Combining hygienic design with digitalization



Hygienic
design

Digitalization
and
connectivity



Climbing up the Data Science Pyramid



Wisdom

Knowledge

Information

A lot of Data

Data

Data Science, Machine Learning & AI

Reporting & Business Intelligence

Master Data Management & Governance

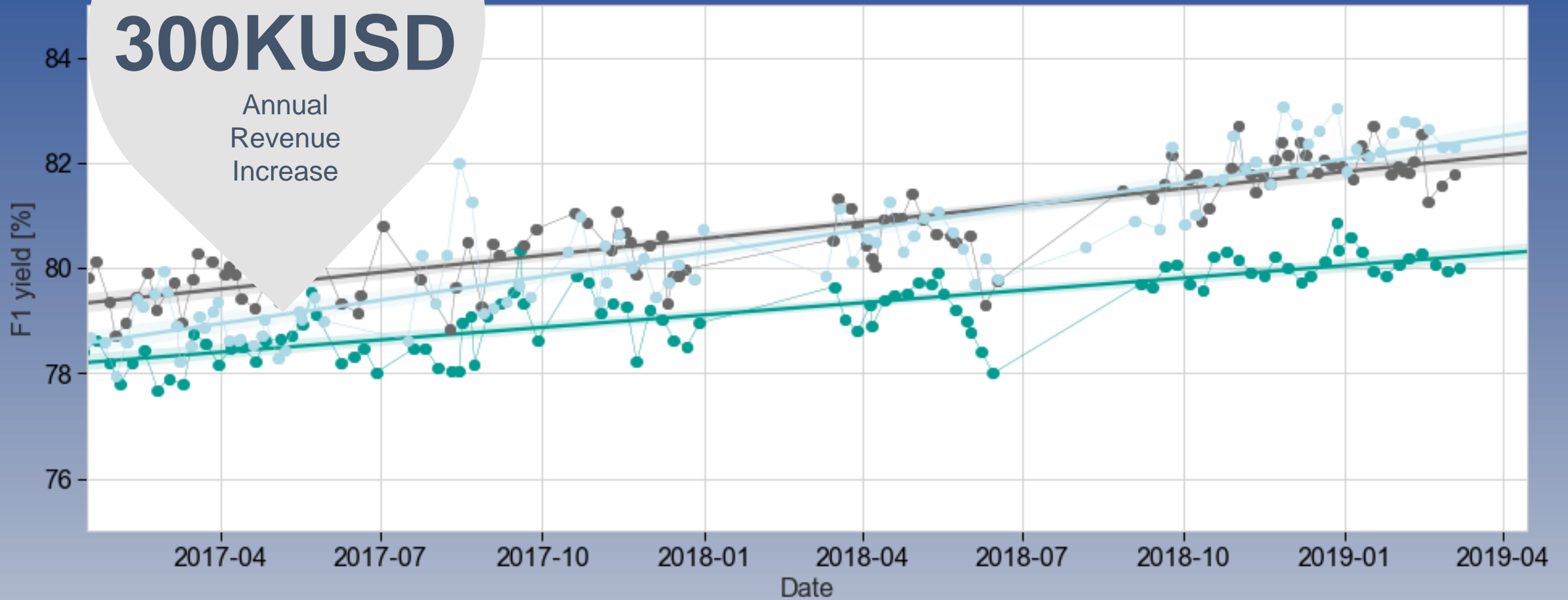
Data Engineering

Data Acquisition

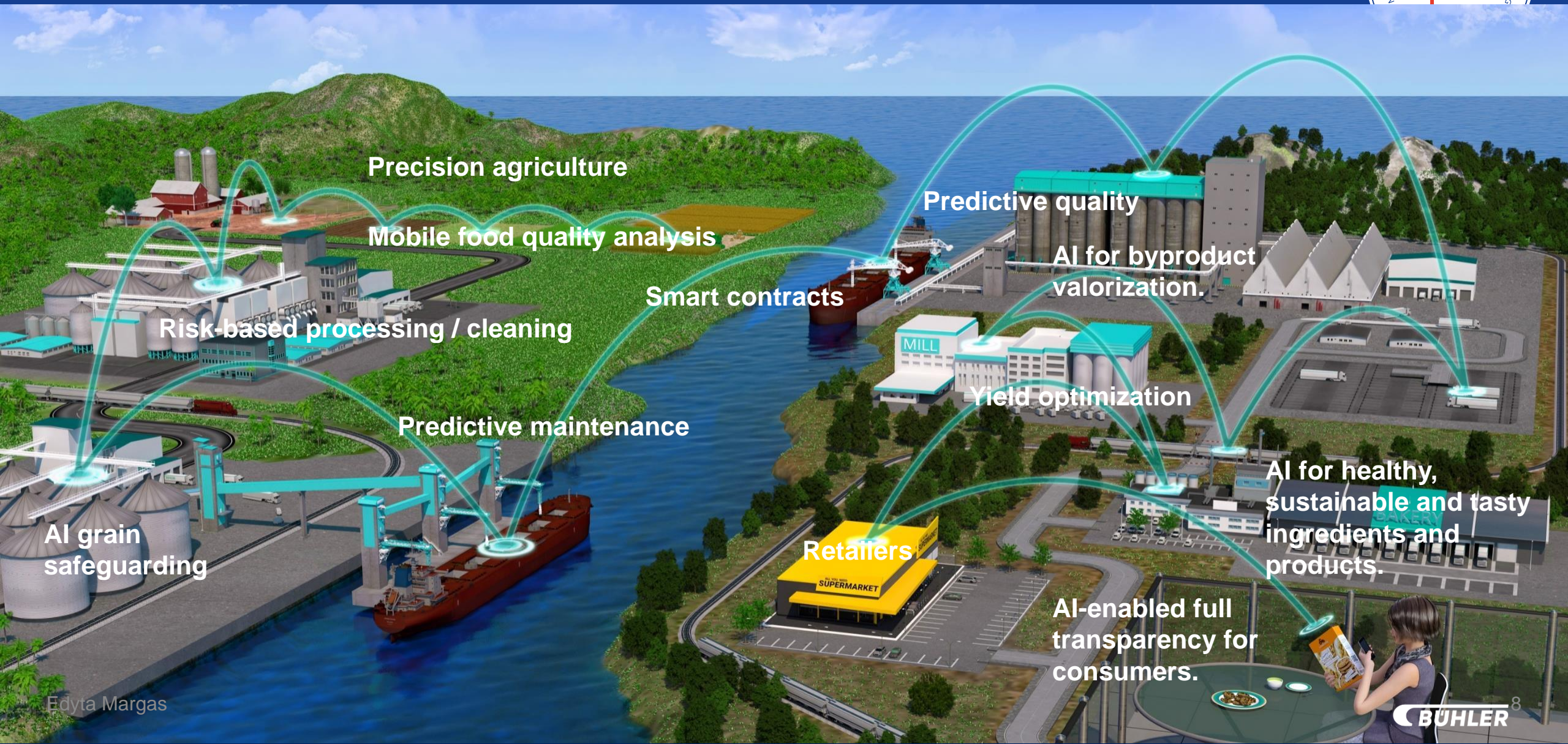
20%

80%

The value of data

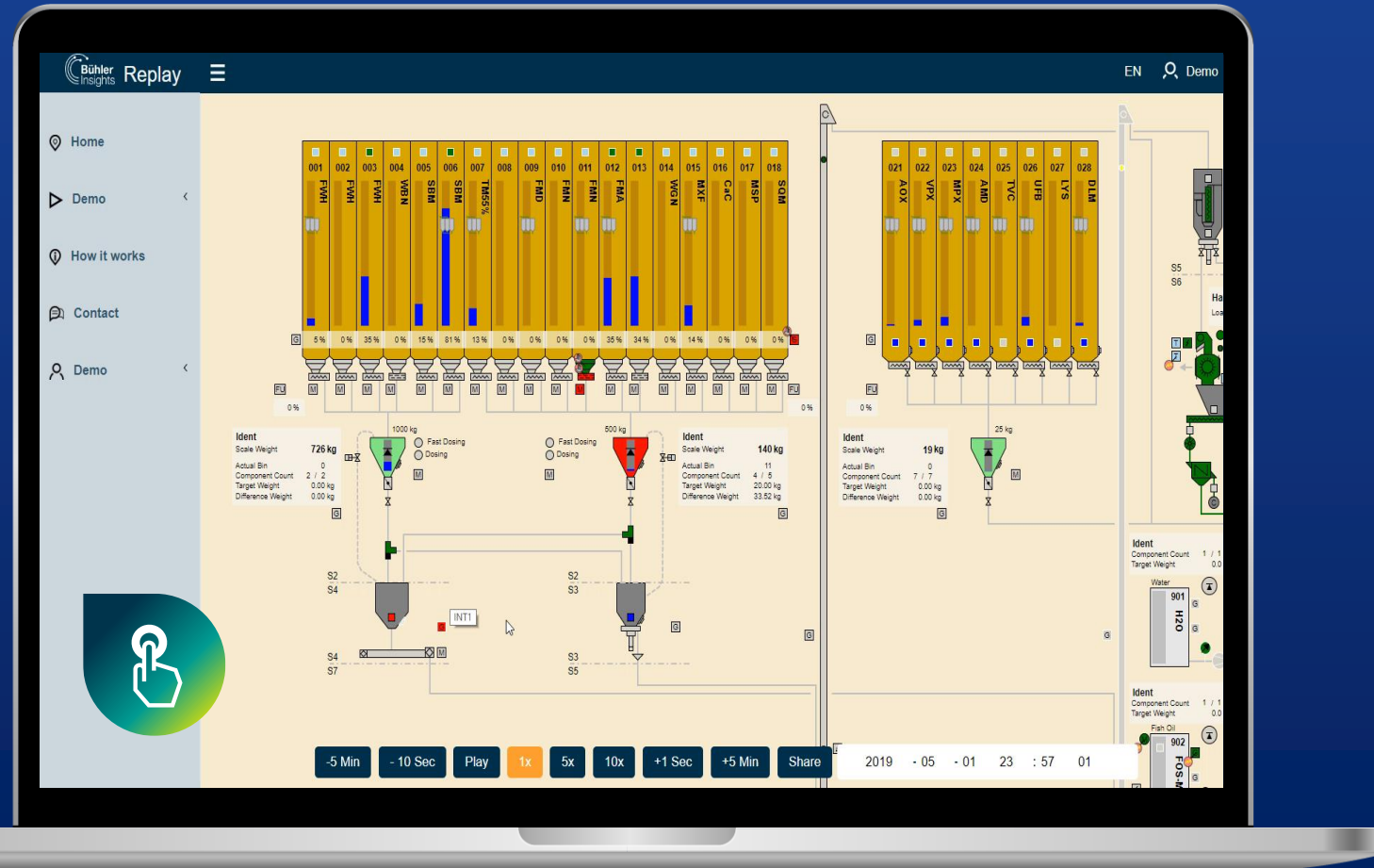
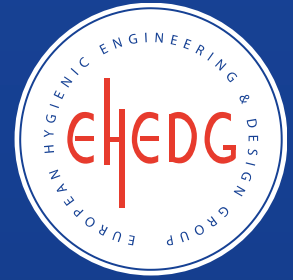


Where to play? Value chain full of opportunities



Troubleshooting and process optimization

Data analytics for troubleshooting of food safety incidents.



Features:

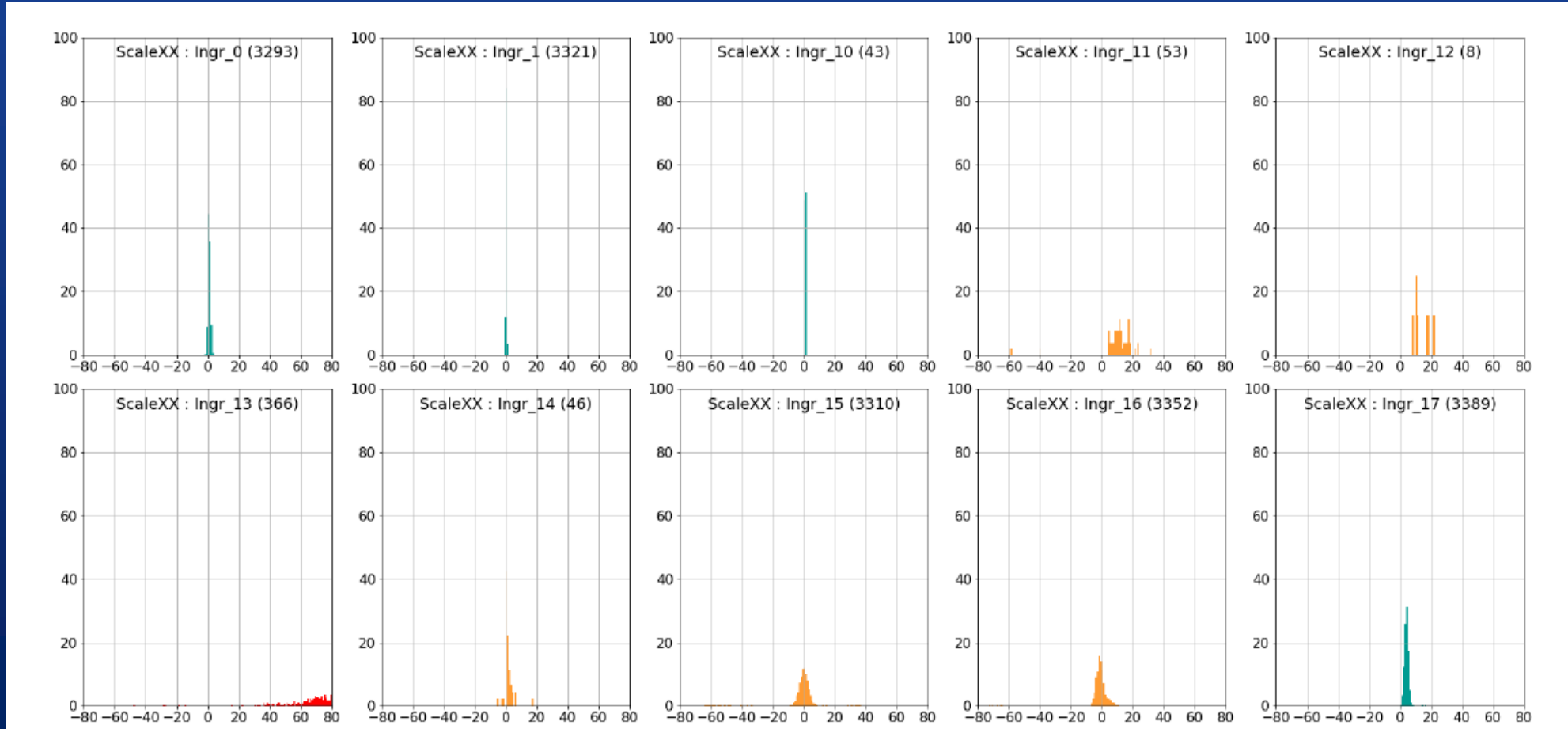
- Replay allows you to visualize the state of production lines at given points in the past
- Easy to monitor the system remotely in case the person responsible is not around
- Data generated from the system is continuously analyzed and reported

Benefits:

- Fast troubleshooting of food safety incidents
- Process and food safety measures optimization with data analytics
- Prevention of contamination

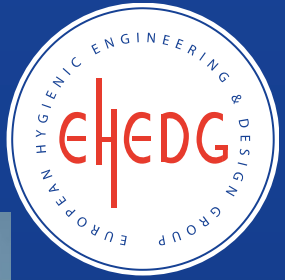
Monitoring of Dosing Accuracy

Frequency of occurrence (%)



Deviation from target weight (%)

Digitally-enabled process improvement



Example: Animal Nutrition Plant

- + 5% OEE Mixing Line
- - 60% Overdosing ingredients



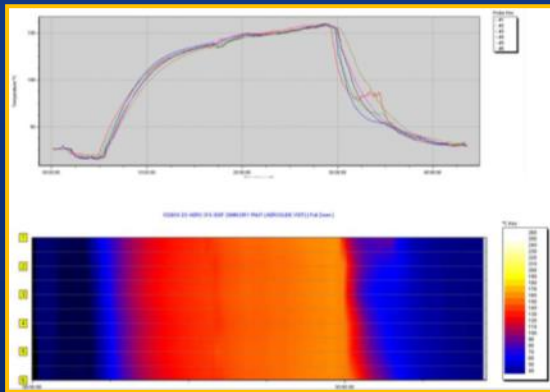
Process monitoring

Upgrading nut roasters into trusted bacteria kill steps



Process monitoring

1



compliant
data storage

Temperature monitoring
of critical limits

Real time log reduction

2

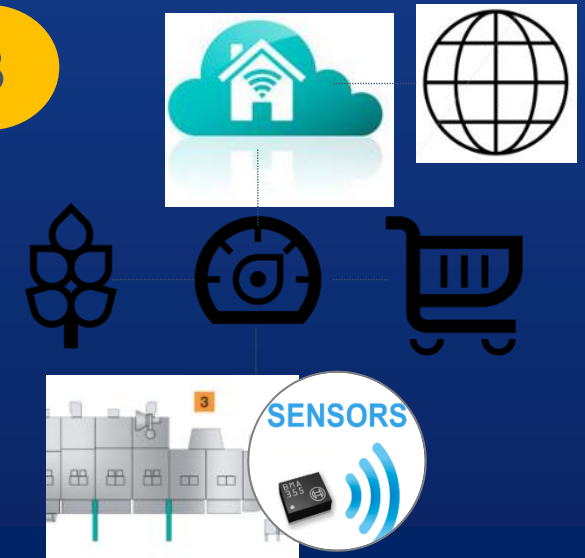


compliant
data storage

Calculation of log
reduction for validation

Processing intelligence

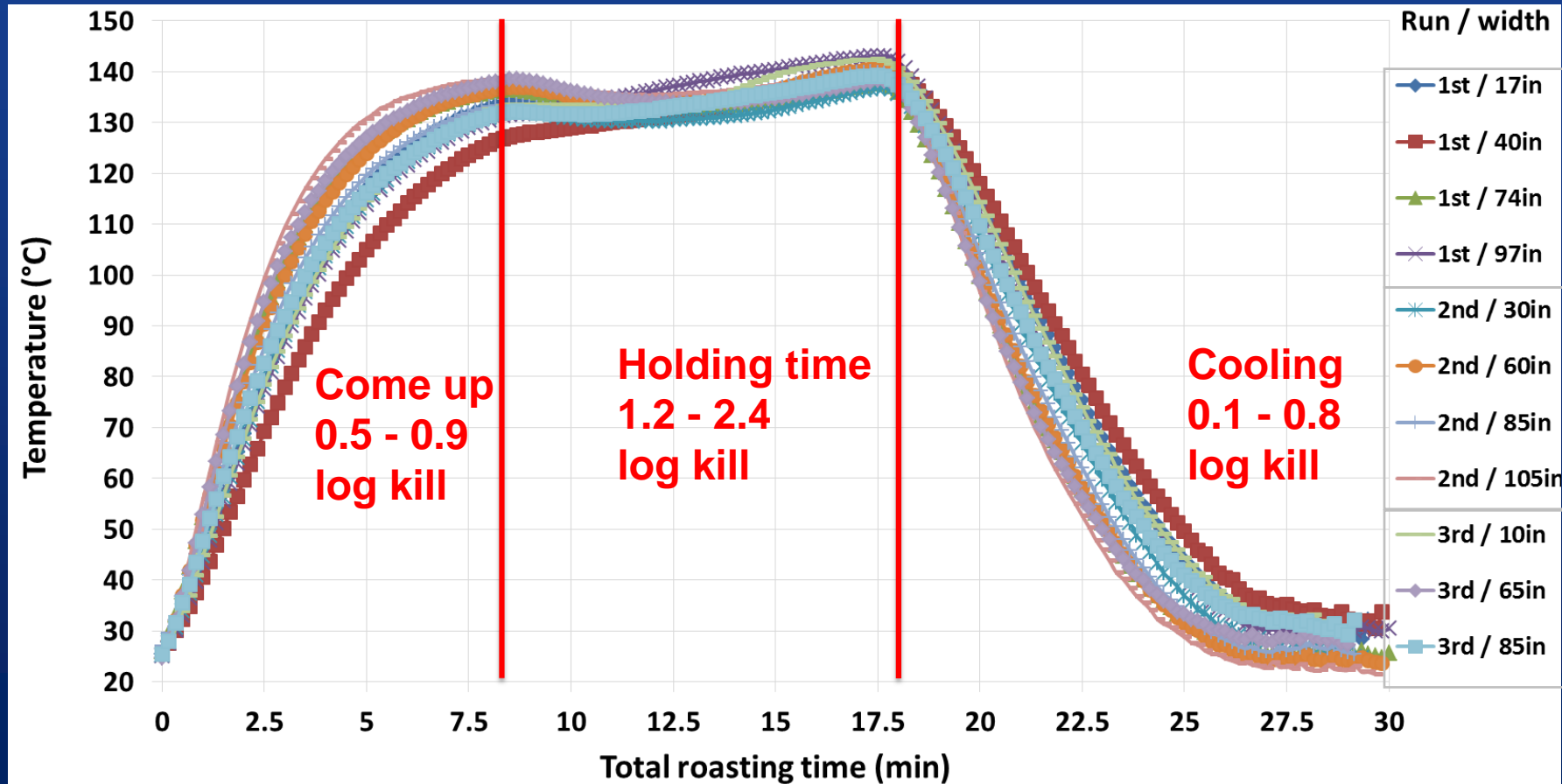
3



Big data analytics for
machine learning &
value chain intelligence

Temperature profiles & inactivation

Calculated log reduction
D (137 °C) 5.7 min

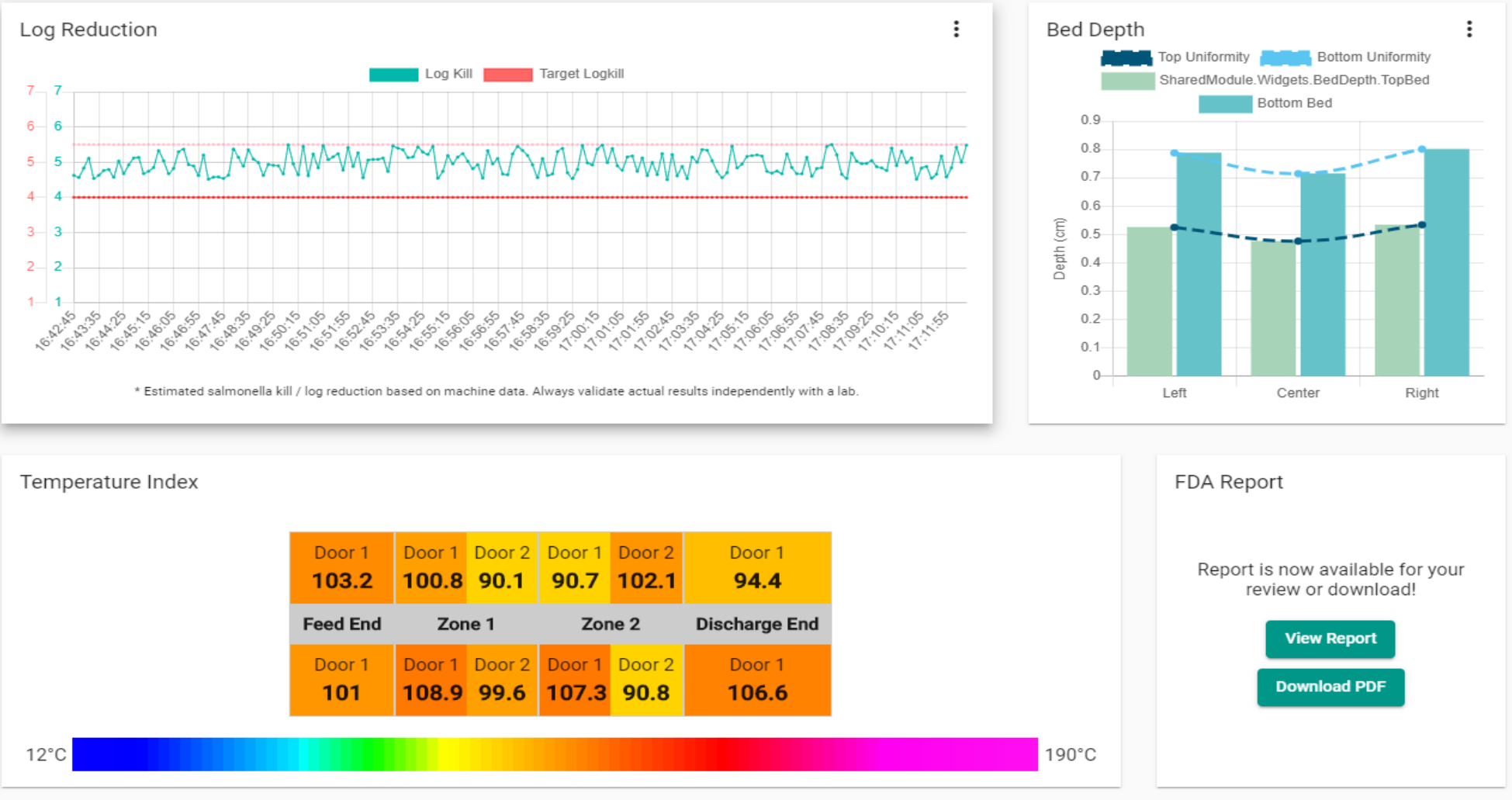
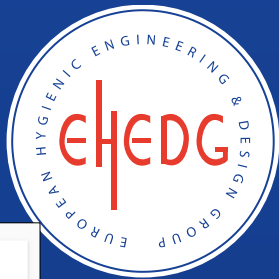


2.6 ($R^* 0.3$)

+ 38 %
real log reduction
with surrogate

3.6 ($R^* 0.6$)

Dashboard view

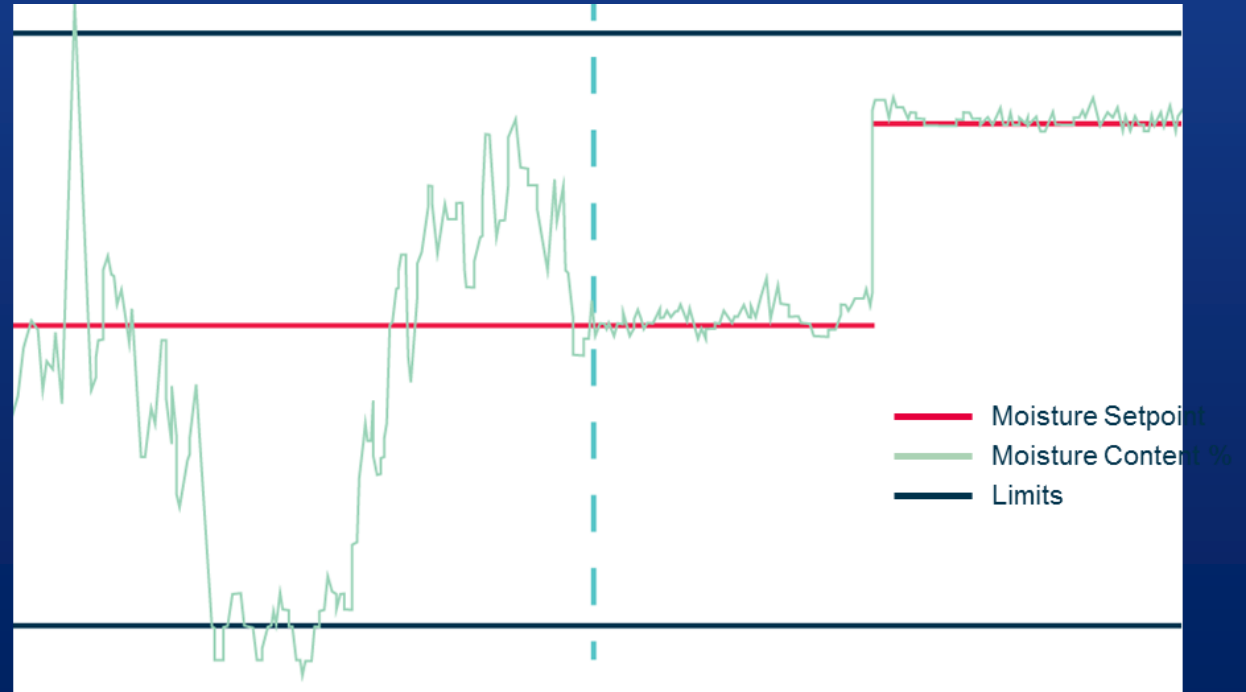


Moisture Control

Increasing dryer yield and reduce energy



- 1 Microwave sensor technology, coupled with algorithms built on decades of pet food drying experience.
- 2 The resulting comprehensive closed loop system delivers automated control of the dryer.
- 3 Advanced analytics in the Bühler Insights IoT Platform to continuously improve control algorithms resulting in adaptive control.



ProcessPro

Monitoring your process with real time log kill calculations



Roasting Process



Monitor

Critical process parameters are monitored continuously and precisely



Adjust

Make adjustments to roasting process or equipment quickly



Report

Generate reports to identify trends, make improvements or complete audits



Alert

Receive alerts when parameters are not being met or are trending towards failure



Store

Store production data automatically in a secure cloud location



Visualize

View real time production data on any web connected device

Safe Food



Management of food safety activities

The next step in sanitation and maintenance



Management of Food safety at Plant level




ADVACTORY

- Organized cleaning and maintenance planning
 - Instant availability of instructions and SOPs
 - Recording and checks of undertaken procedures
 - Logging of failures and invested expenses
 - History of all 'outside production' activities for Audits (IFS & BRC Certification)
 - Data analytics
-
- Benefits:
 - Reduction of incidents
 - Troubleshooting and predictions of incidents
 - Increased plant availability
 - Process optimization


Advactory — Operator view

Tasks

Monthly Filter Manometer Check


2

9 hours

Monthly Management Production...


24

9 hours

Weekly Deep Cleaning


3

9 hours

Wheat throuput

3


9 hours

CM - Others

Office Building

⚙️


☰

CM - Pest

Office Building

⚙️


▶

CM - Taste

Office Building

⚙️

▶

CM - Toxic Matter

Office Building

⚙️

⚠️

Tasks

Notifications

Dashboard

Sensors


Profile

Monthly Glas and Hard Plastic Check

▶▶

ℹ️


🗖️

...Y > LOCATION C > WAREHOUSE

9 hours


▶▶

✅

Check Weigher Display

✅


❌

...C > MILL BUILDING > 2ND FLOOR

9 hours

▶▶

✅

Sight Glasses Mill Pn...

✅

❌

⚙️

... BREAK ROLLERMILL I / II > SIDE 1

9 hours

▶▶

✅

⚙️

Display

✅

❌

⚙️

Handwheel left

✅

❌

⚙️

Handwheel right

✅

❌

⚙️

Inlet Sight Glas

✅

❌

1/3 - Plansifter Cleaning

▶▶


ℹ️

🗖️

Safety Warning

⚠️

Machine secured against automatic restart?

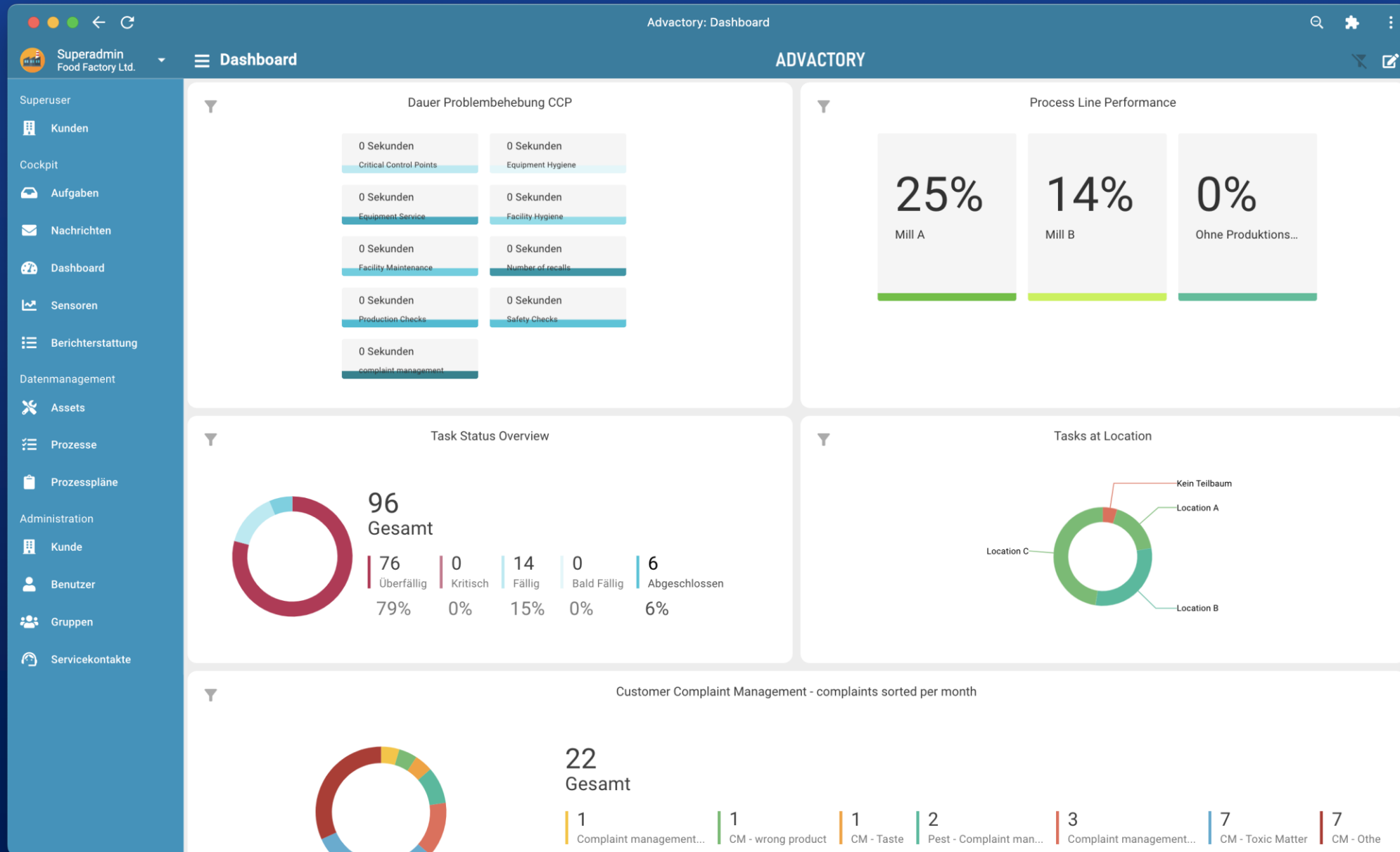


▶▶

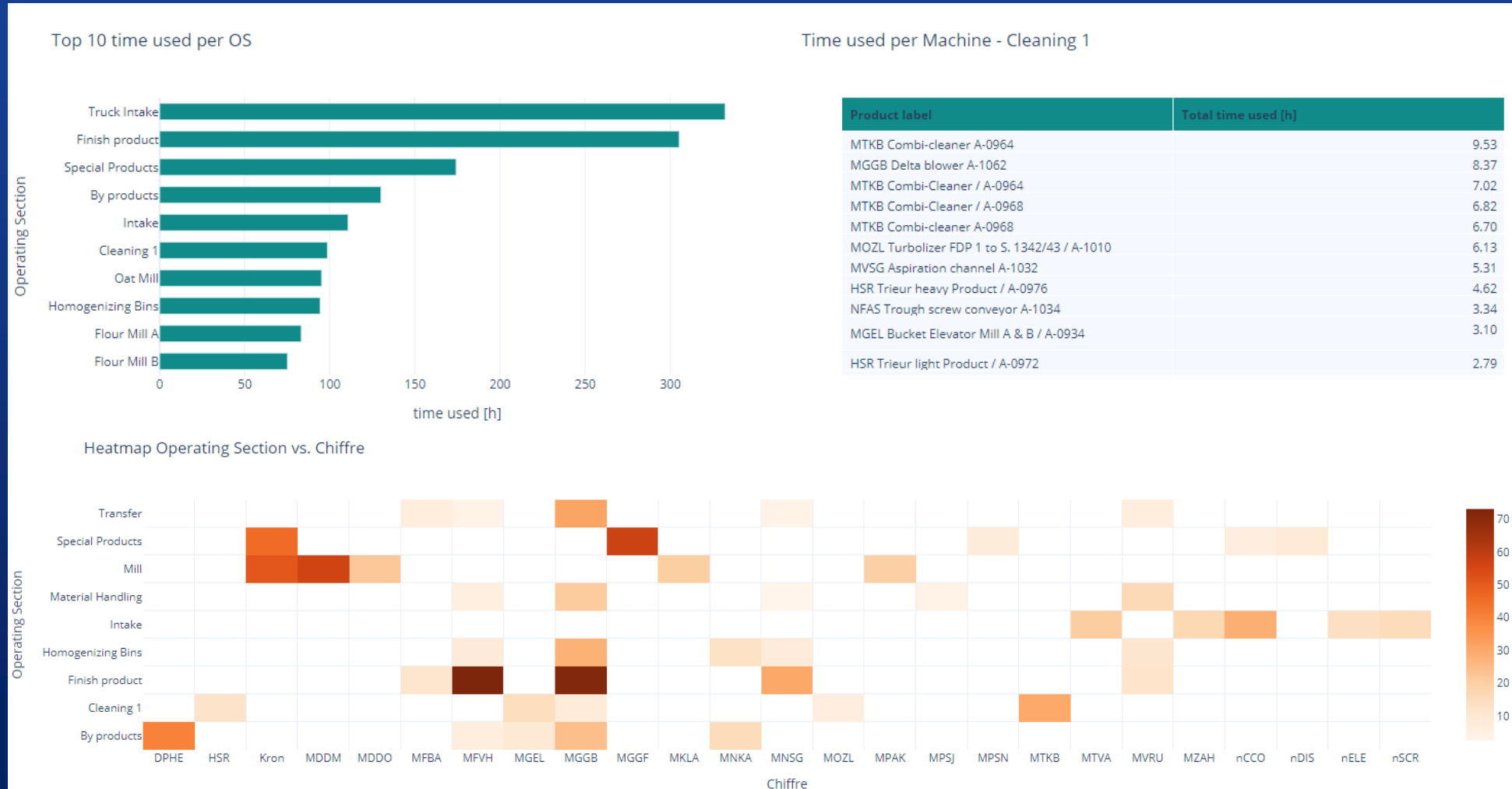
NEXT STEP

Quality status overview

ADVACTORY



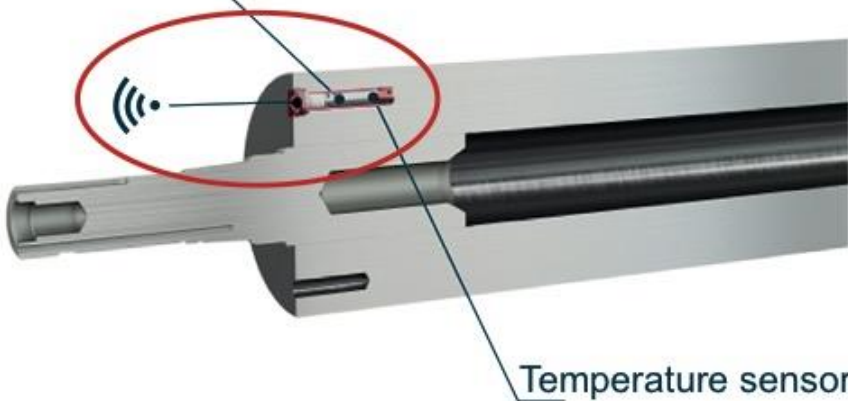
KPI Dashboard – process optimization



Condition based maintenance - IoT technologies applied in mills

Increased quality and yield

Vibration sensor



Predictive
maintenance

Auto-
calibration

Automation

Conclusions



Group Strategy - Value Chain Transparency Program



Agriculture



Storage



Transportation



Mill



Food processor



Retailer



Consumer

1

EQUIPMENT along value chain

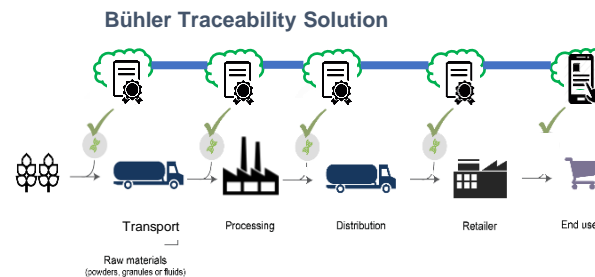
Connected machines with verification of function/calibration



2

PRODUCT along value chain

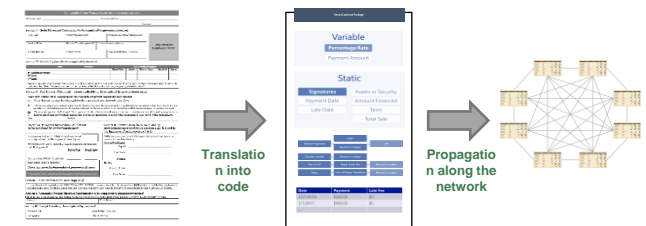
Traceability and authentication of goods, linking physical to digital



3

TRANSACTIONS along value chain

Digital backbone providing transparent, secure, immutable audits



Digital food safety solutions



Summary:

- Start digitalize records and connect data – the benefits will follow!
- Digital solutions are most valuable when go across processes and value chains
- Data analytics must be often customized
- Collaborations and partnerships are a key
- Fixing food safety issues helps to optimize the processes
- The main benefits of digital solutions:

Increased
efficiency

Proof of
effectiveness of
food safety
measures

Prevention of food
safety incidents

Lower recall &
contamination risk

Saved water,
energy & waste



Thank you for your attention



Edyta Margas

*Global Head of Food Safety
Principal scientist*

Buhler AG

Switzerland

Edyta.margas@buhlergroup.com