MKT CHEESE PLATFORM

CyberFactory#1 Results Webinar in Finland

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High Metal Oy – MKT Dairy

THE HIGHEST STANDARD OF CHEESE MAKING EQUIPMENT

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High Metal Oy in brief

- Family business founded in 1949
- Turnover 2020 7,5M€
- Personnel 40
- Factory located in Vantaa
- Three business lines:
  - MKT Dairy products (since 2014)
  - Customer solutions (stainless steel)
  - Swimming pool solutions (since 2018)
- R&D, engineering, production, after-sales

HIGH METAL

MKT

Content

- Challenges in Cheese Making
- MKT Cheese Platform concept
- Added Value

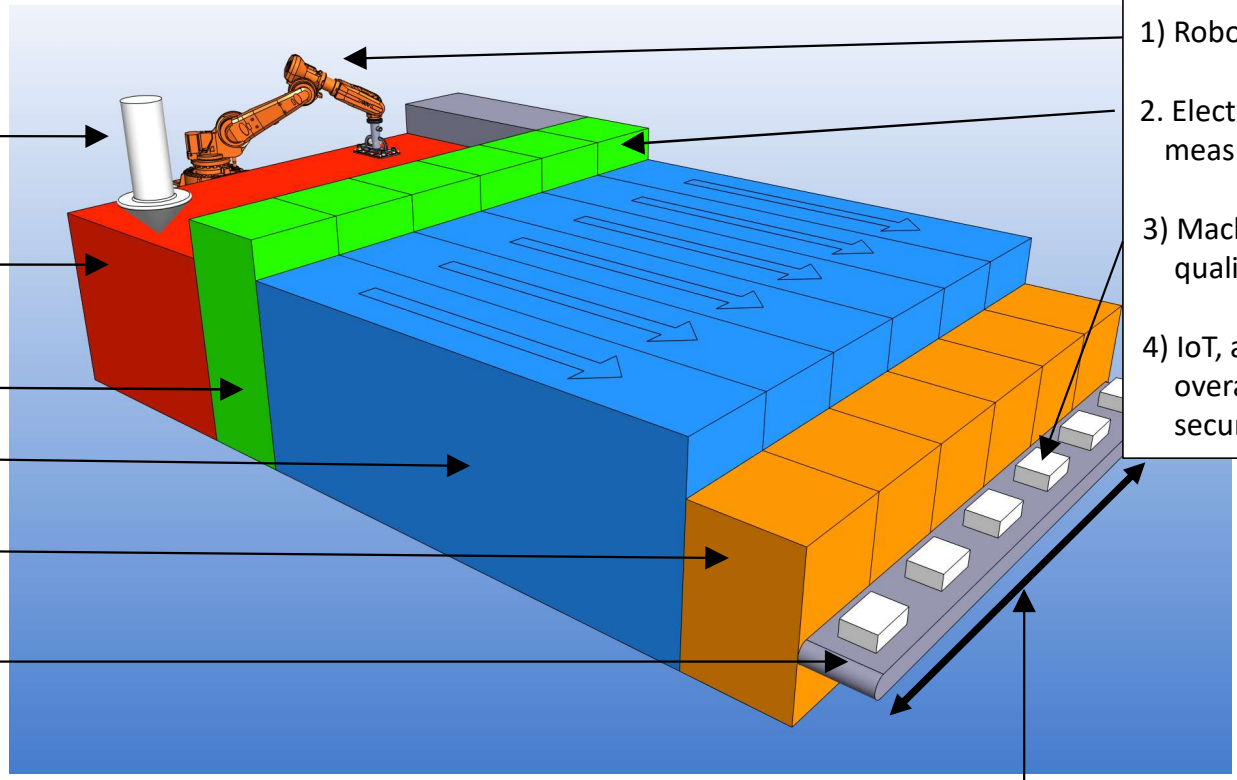
Challenges in industrial cheese making

- Batch process production
- Waste during the product change in production
- Product volume changes
- Cheese size variabilities
- Shattered production Data and utilization
- Equipment life cycle
- Production facility footprint

MKT Cheese Platform – concept 1/2

New Platform Cheese Factory Concept

1. Milk in
2. Cheese vat
3. Moulding
4. Pressing
5. Removing cheese from moulds
6. Conveyor to brining



Technologies can be utilized

1) Robot for cheese vat operation

2. Electrical tomography based measurement for curd/whey ratio

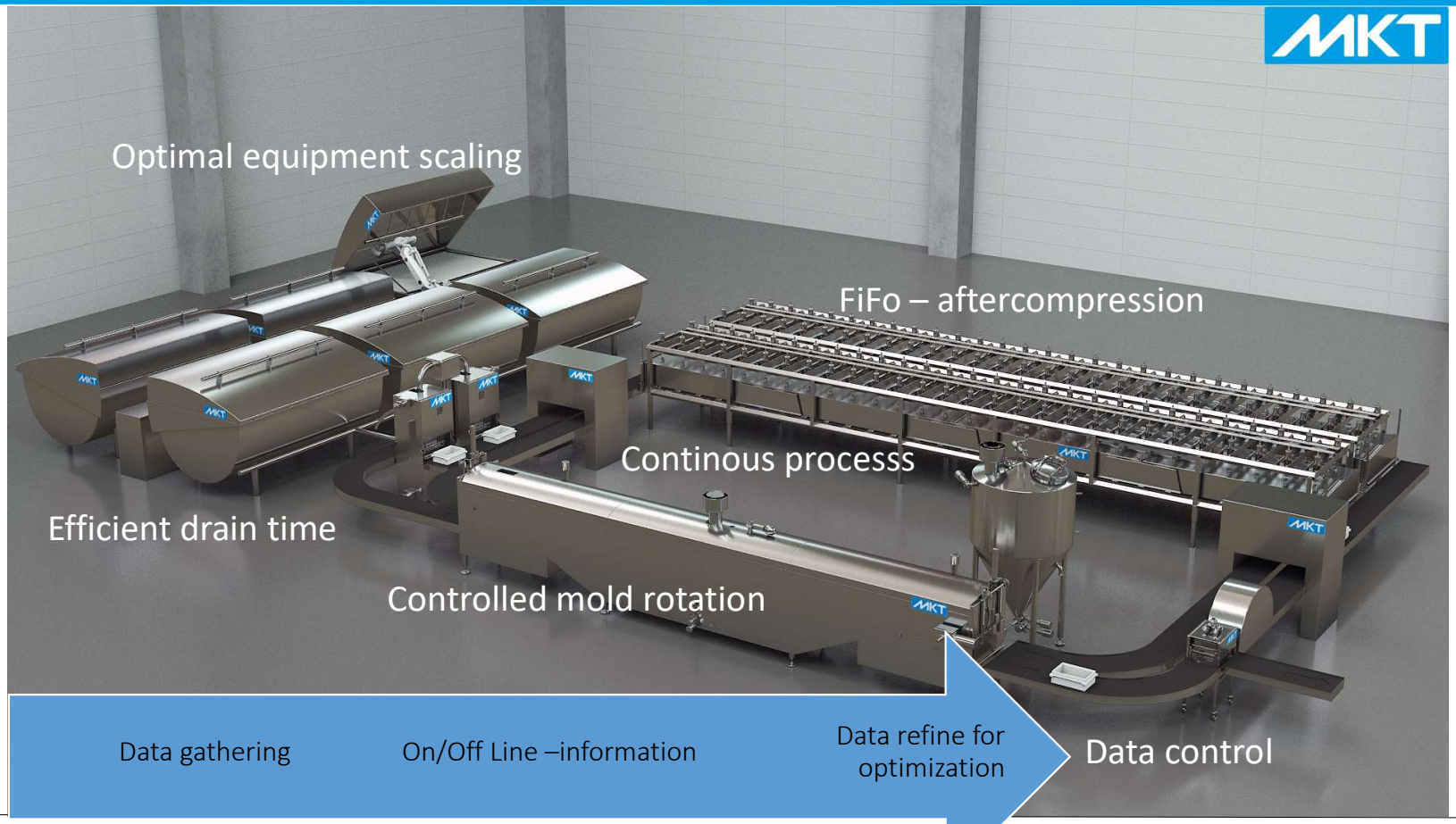
3) Machine vision used for cheese quality verification

4) IoT, analytics and cyber security for overall process control and security (e.g. remote connections)

Scalable solution for production increase

Confidential

MKT Cheese Platform – concept 2/2

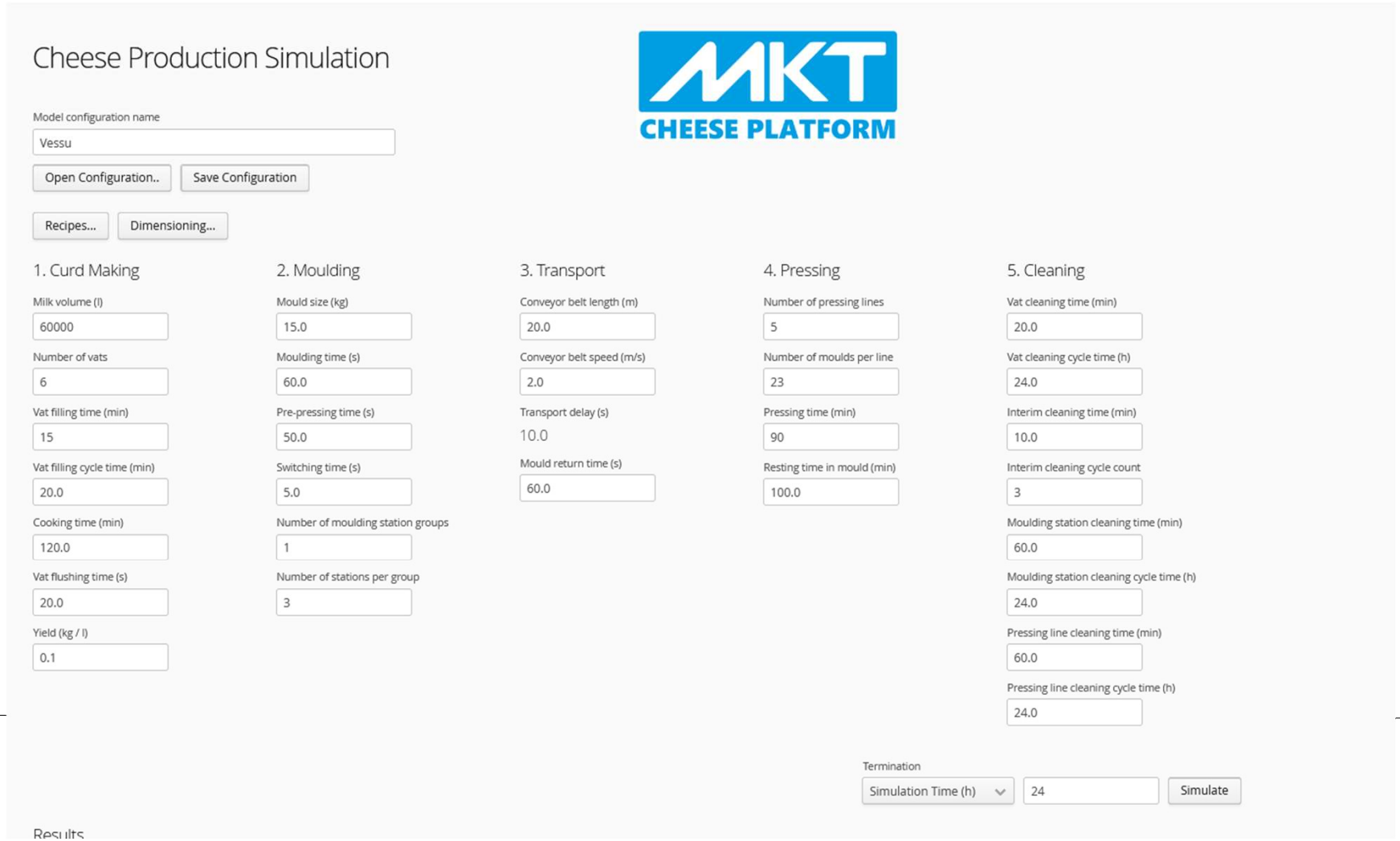


Production simulation

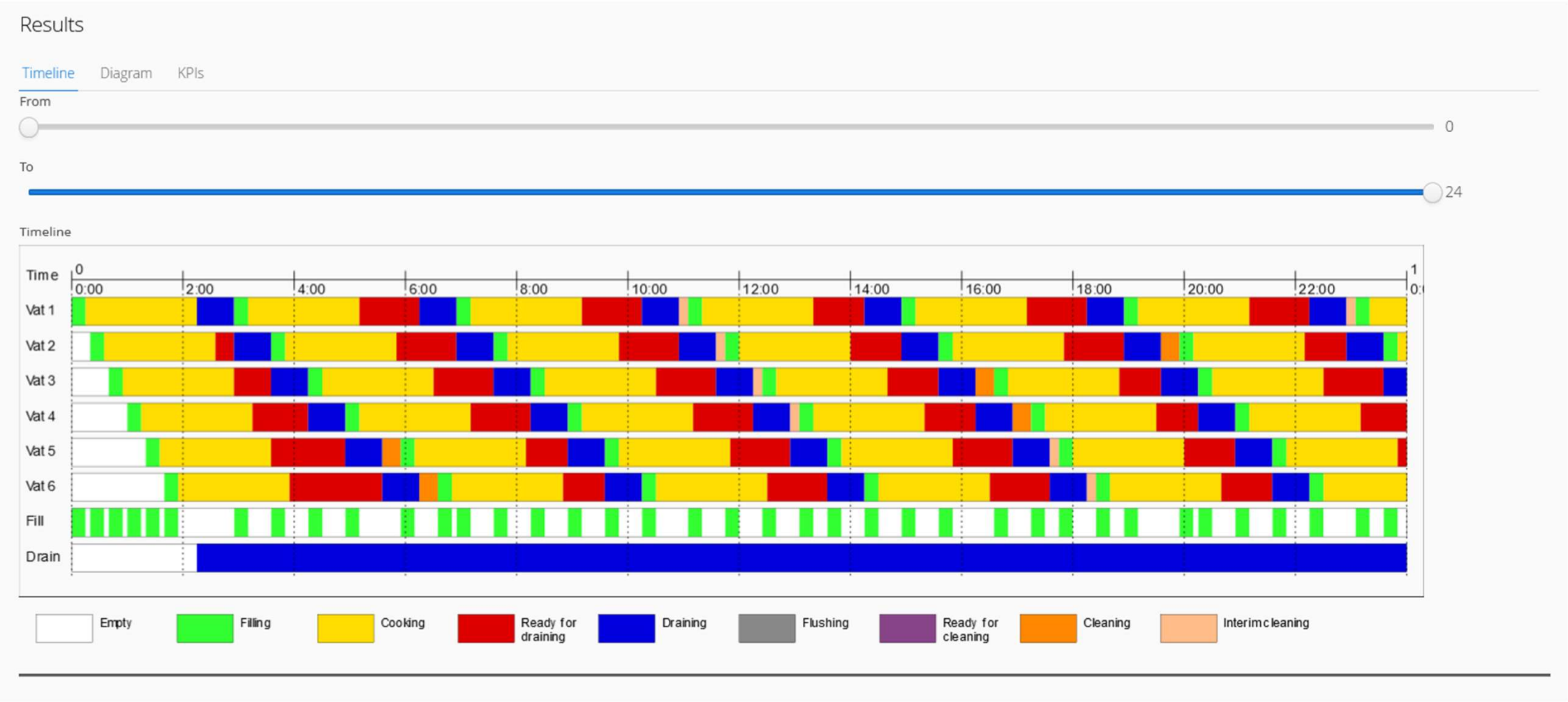
MKT simulation benefits:

1. Optimum equipment size
2. Modelling continuous cheese making production
3. Verify KPI in advance
4. Equipment life cycle optimisation and prolonging equipment age
5. Step toDigital production modelling (digital twin)

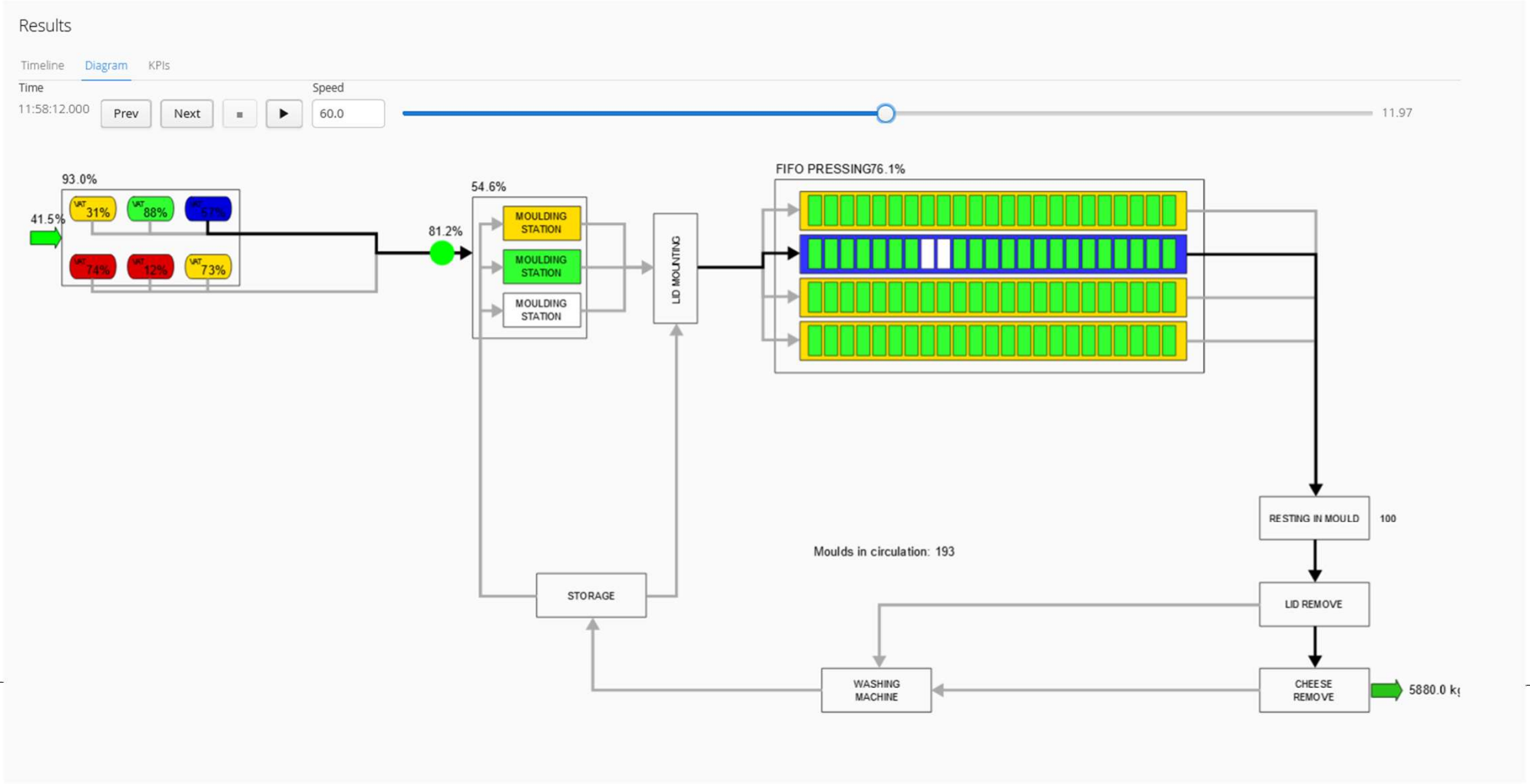
MKT –simulator 1/4



MKT –simulator 2/4



MKT –simulator 3/4



MKT –simulator 4/4

Results

Timeline | Diagram | KPIs

1. Utilization rates

Filling utilization rate
39.6%

Vat utilization rate
76.6%

Draining utilization rate
100.0%

Moulding station utilization rate
67.0%

Press utilization rate
100.0%

2. Quantities

Total production (pcs)
1114

Total production quantity
16710.0 kg

Hourly production rate
900.81 kg/h

Daily production rate
21619.4 kg/d

Yearly production rate
7134.4 t/a

3. Time values

Average vat draining time (min)
38.4

In-mould time (min), min / avg / max
192.0 / 192.0 / 192.0

In-vat time (min), min / avg / max
120.0 / 196.5 / 259.0

Total time (min), min / avg / max
312.0 / 388.8 / 451.0

4. Equipment

Number of vats
6

Vat capacity (l)
6000.0

Number of moulding stations
3

Number of pressing lines
4

Number of moulds per pressing line
23

Filling pump rate (l/min)
400.0

Draining pump rate (l/min)
150.0

Maximum moulds in circulation
194

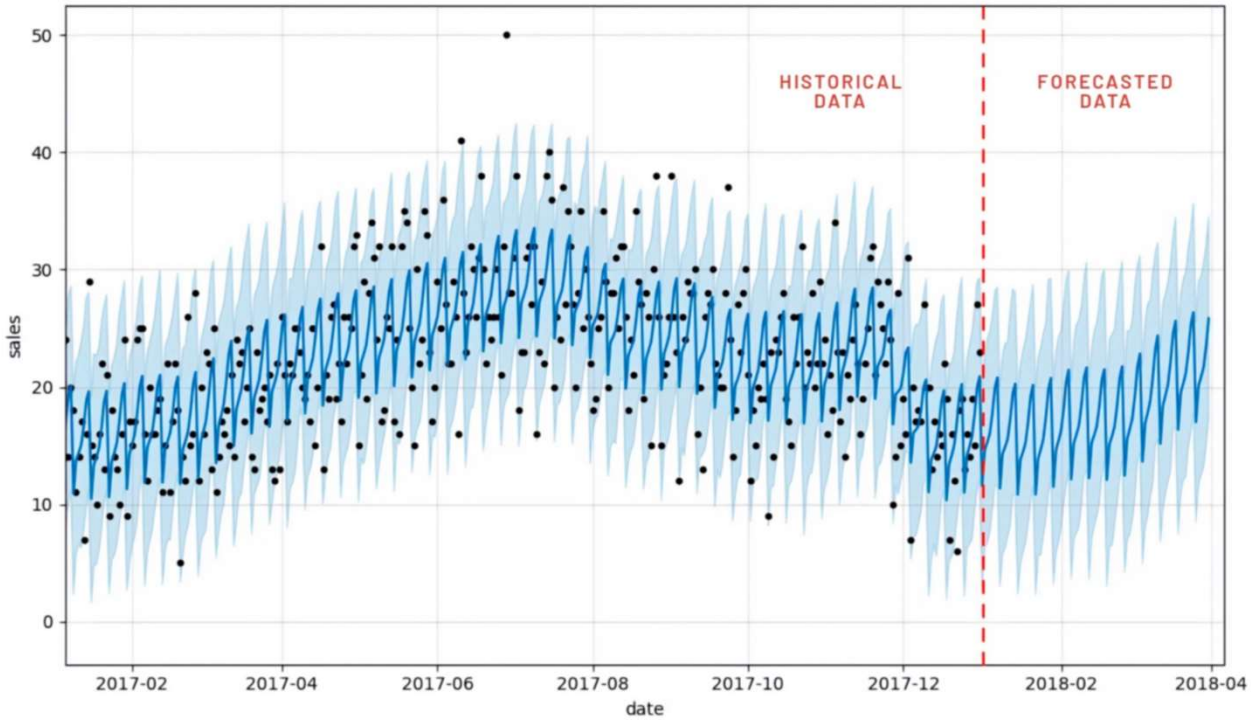
Reporting

Generate Excel Report

Machine learning

Using machine learning we can:

- Predict coming events using data
- Optimize performance and recipe
- We can predict possible production interference to product quality
- Enable predective maintenance



MKT –technology added value

- Correct capacity size design is a key for flexible production
  - Optimize investment and efficiency (ROI)
- Minimize product losses (Batch / continuous process management)
  - Product change losses during the batch change 0-1 cheese block , > annual savings xxx kg/€
- Machine learning maximize quality and yield up to 1-2% (basic data, steering data, results) . Find the most efficience output.
  - Daily time saving about 2 h with help of new moulding technology innovation.

    Time *€ (40min->20 min/ batch handling time)
- Real equal production quality using curd one time cutting , weight control & FIFo pressing principle

THANK YOU

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