NOBIAN

TrendMiner evolution within our company

Salt | Essential Chemicals | Energy | Storage Caverns

Contents

1 Introduction

Company history – strong European heritage

1918 Start of the Dutch company Koninklijke Nederlandse Zoutindustrie (KNZ).

1931 KNZ adds chemical products to its portfolio.

1963 In the Dutch Twente Region drilling for salt starts at a depth of 325 metres.

1969 KNZ becomes part of the newly formed company Akzo, the 4th biggest company in the Netherlands and the 10th biggest chemicals company in the world.

1919 Dansk Salt (Mariager) established.

1994 Akzo merges with Swedish company Nobel Industries to form AkzoNobel.

2018 AkzoNobel sells its chemical activities, which continues under the name of Nouryon.

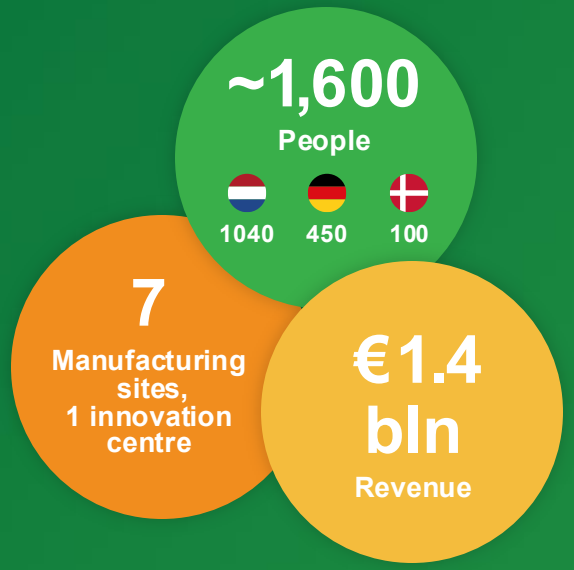
2021 Nouryon splits its activities, Nobian launched as independent company.

2022 Start green hydrogen joint-venture HyCC with Macquarie.

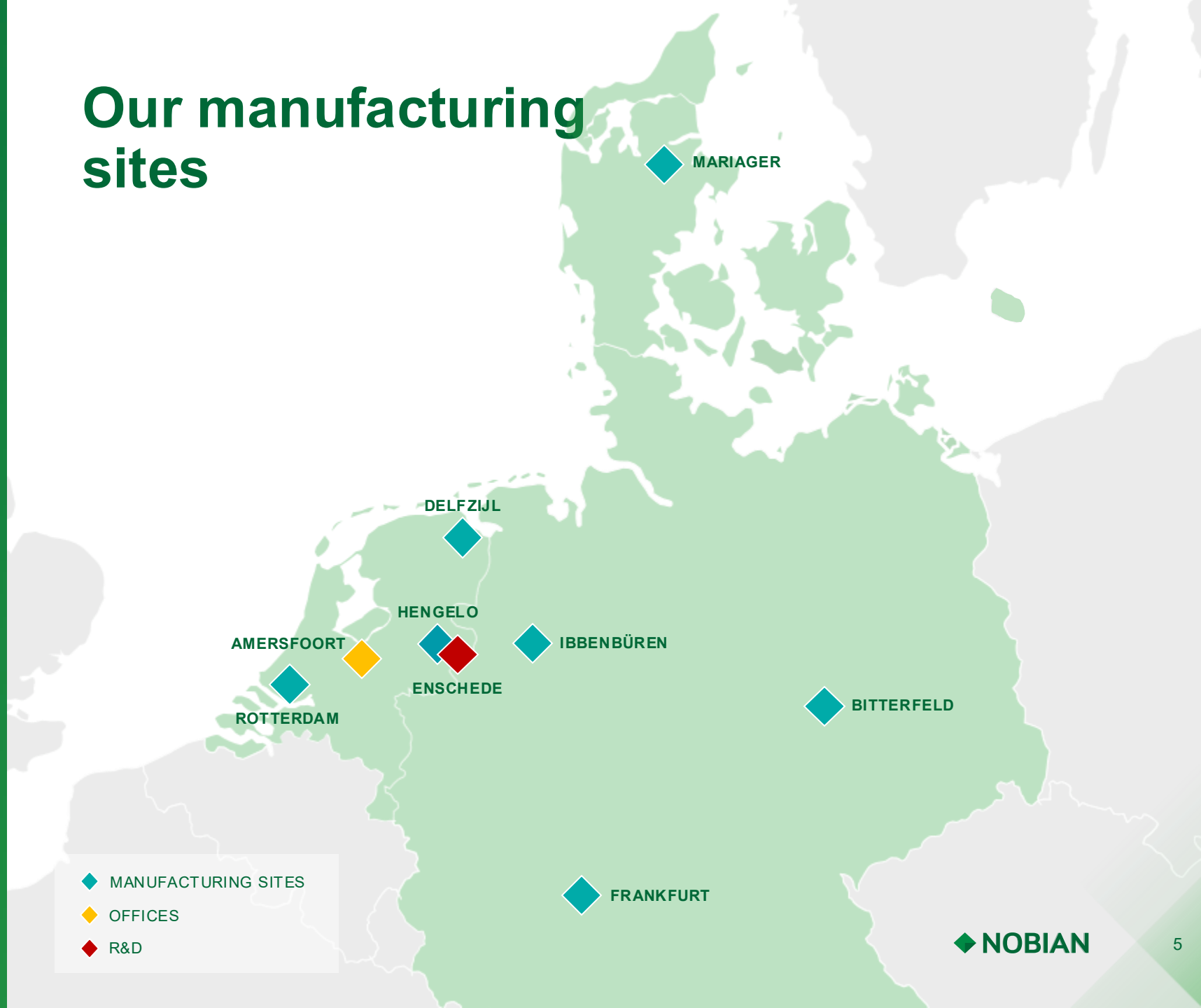
Our company key numbers

Nobian has 3 salt production sites,
5 chlor-alkali plants,
and 1 chloromethanes plant
across 7 locations.

Head office in Amersfoort
and R&D centre in Enschede.



Our manufacturing sites



Essential Chemicals

Our main product groups

1
SALT

2
CHLORINE

3
CAUSTIC SODA
(SODIUM HYDROXIDE)

4
CHLOROMETHANES

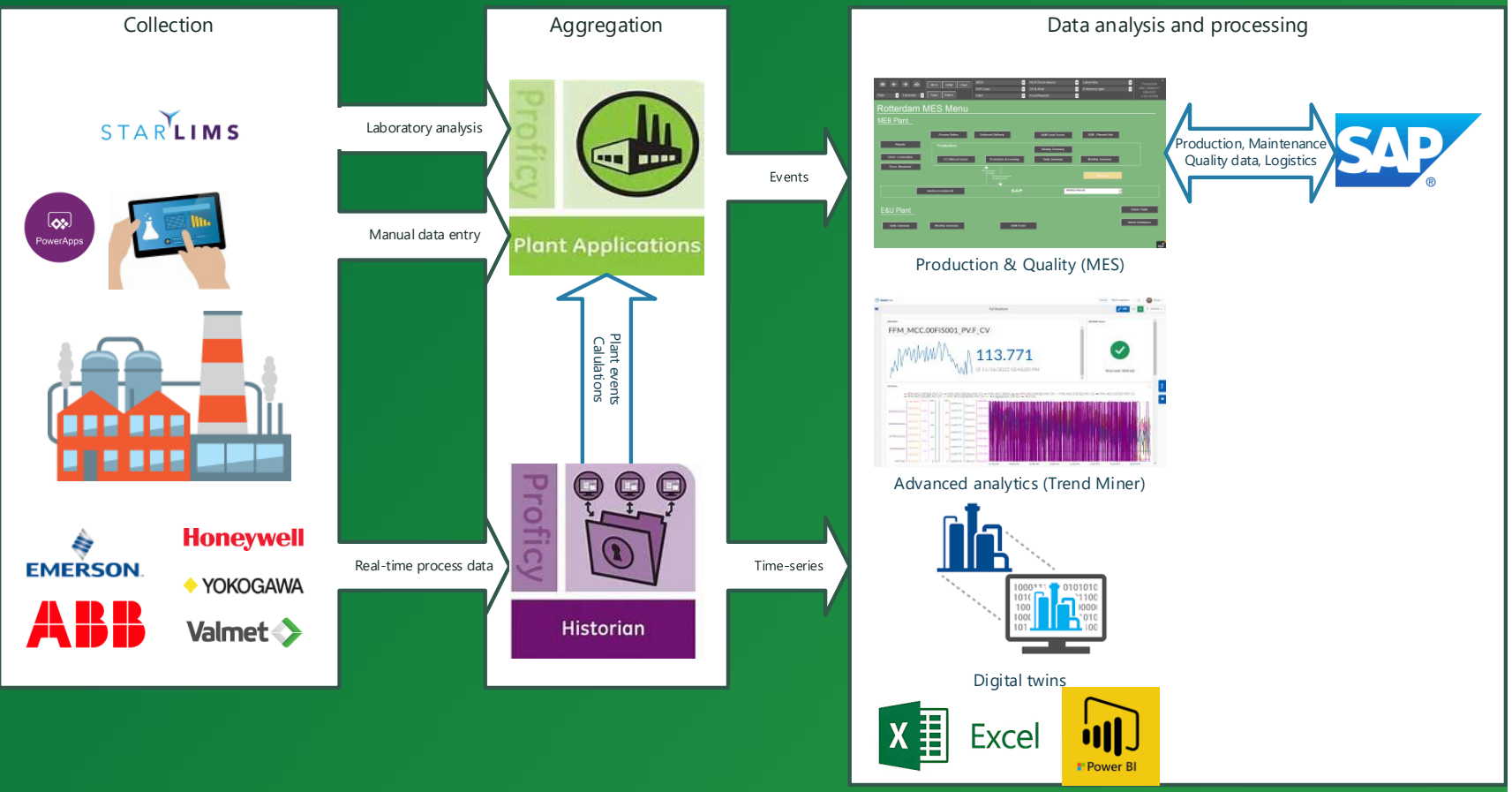
5
HYDROGEN

Ruud Timmermans
MES Architect – Nobian

Ruud Timmermans

- Chemical engineer with affinity for computers
- 25 years in process automation, 7 years in MES
- ISA member and standards advocate
- Fond of field hockey and road cycling
- Joined Nobian in 2022
  - Enterprise plant information (GE Proficy) operations manager
  - OT – IT integration architect
  - Member of Nobian Industry 4.0 team
  - Responsible for TrendMiner

Where does TrendMiner come in?



What is EPI?

Enterprise production information

- Source data
  - Process control systems (DCS)
  - Lab analysis (LIMS)
  - Manual entry (tablet PC)
  - Third parties
- Destinations
  - Analytics: TrendMiner
  - Production & quality: MES/SAP
  - Optimization: Digital twin
  - Improvement: Whiteboard
- Users
  - Process engineers & production
  - Asset owners & maintenance
  - Accounting, planning & commercial

2

What do users do with TrendMiner?

Development of TrendMiner usage

2018 — Introduction of TrendMiner as trending tool.

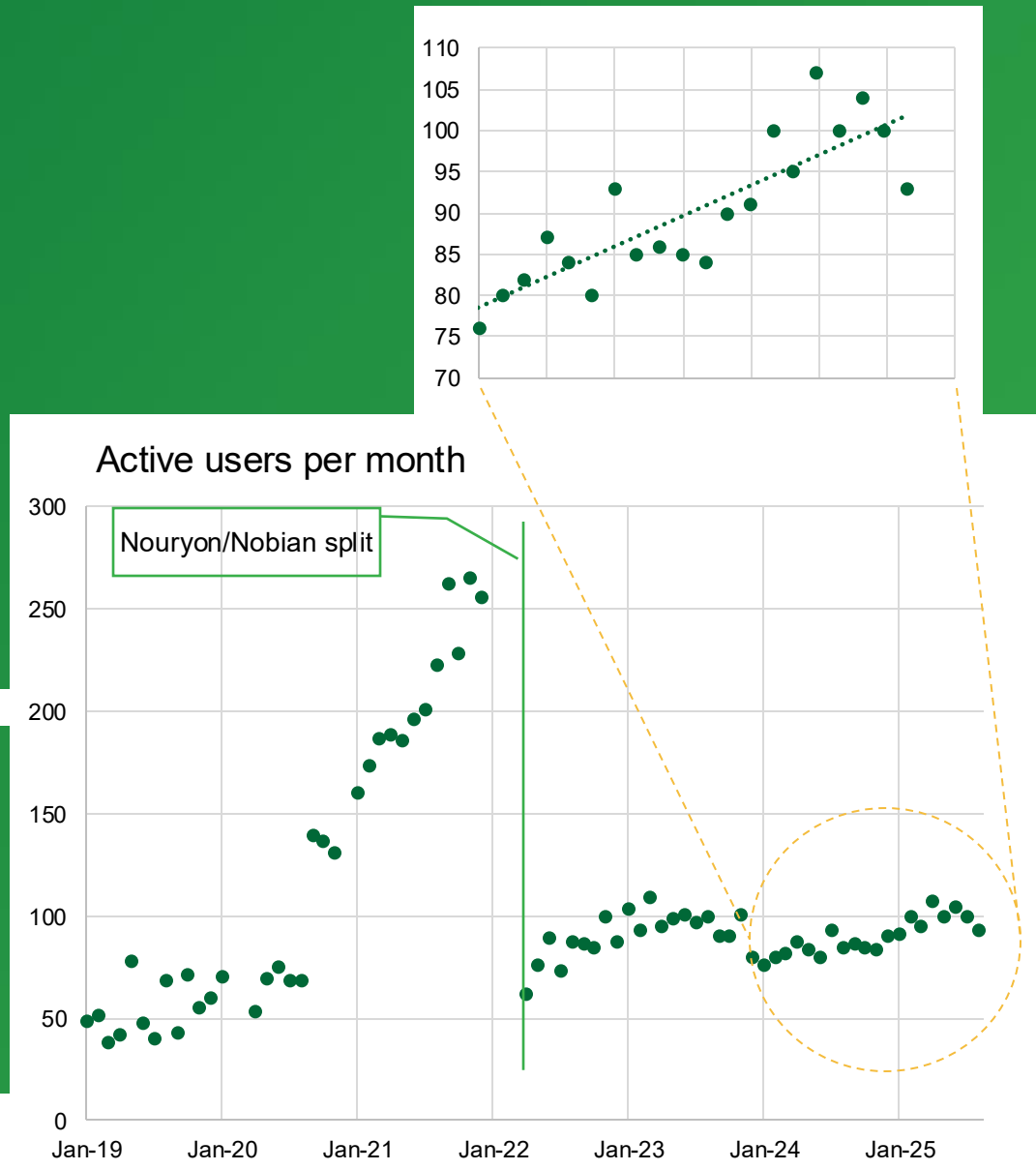
2019 — Unlimited users. All EPI users have access to TrendMiner

2021 — User base grows to 250 active users/month

2022 — Nobian splits from Nouryon

2023 — Reduce to 90 users due to too small license

2024 — New contract: grow from 120 to 250 users.



How do we proliferate TrendMiner?

Chief technology officer

Business owner: digital team lead

Architect / delivery manager

Power users

Support team

Site users maintenance & production

Planners & office users

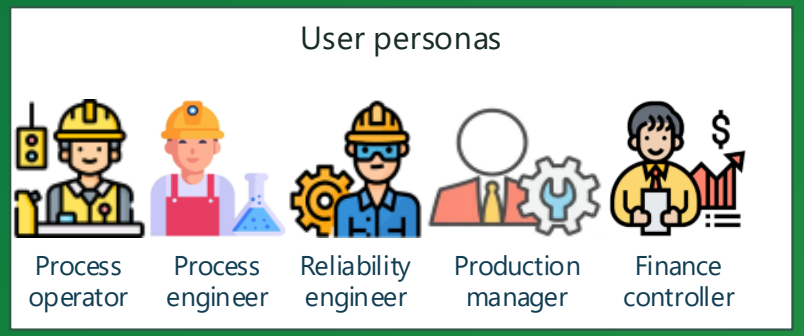
@TrendMiner

- Customer success meetings
  - TrendMiner usage
  - Support issues
  - Events & Roadmaps
- Occasional review meetings with account manager

Many (easy) use cases

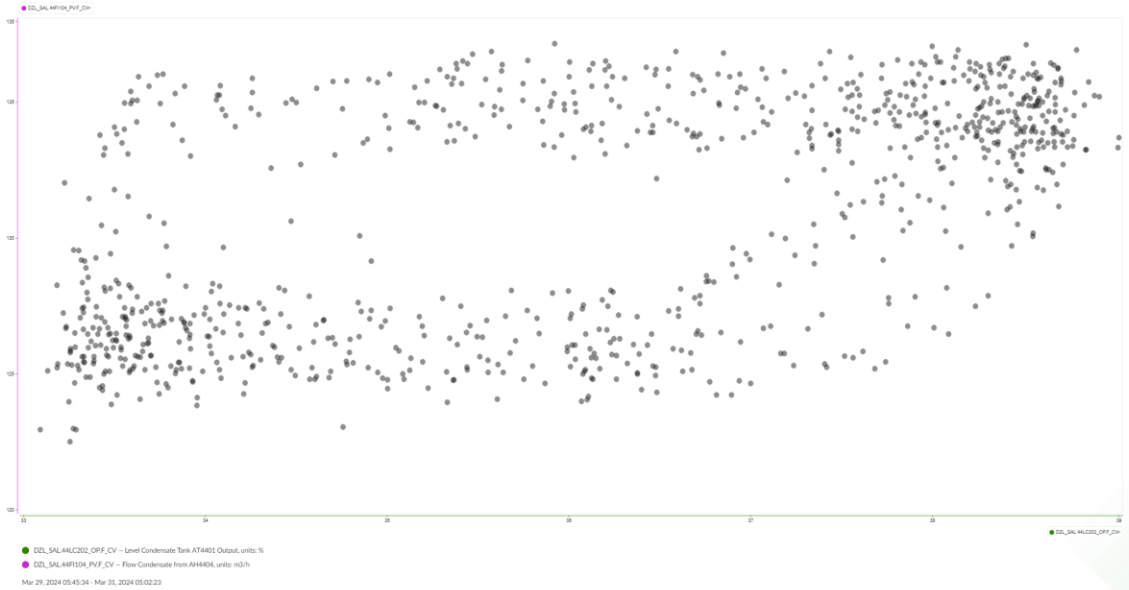
Quick (ad hoc) analysis for process/maintenance engineers

- Unit start/stop improvements
- Brine leakage reduction
- Valve hysteresis detection
- Root cause analysis for equipment failure
- Optimization of wood chip cleaning program
- Analyze effects of throughput up/down
- Optimize steam consumption
- Valve hysteresis
- Data validation for month-end closure



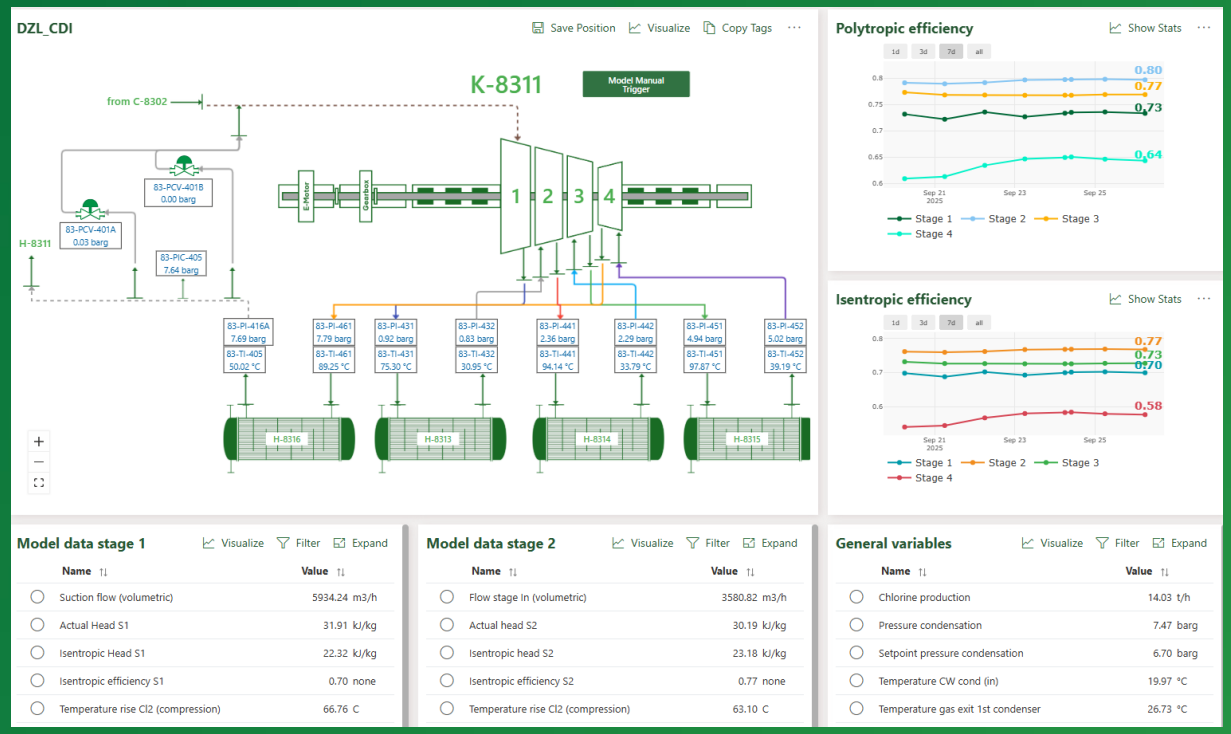
Typical Functions

- Basic (80% of the cases)
  - Normal trends & X-Y trending
  - Monitors
- Analytics (20 % of the cases)
  - User-defined calculations (first principle)



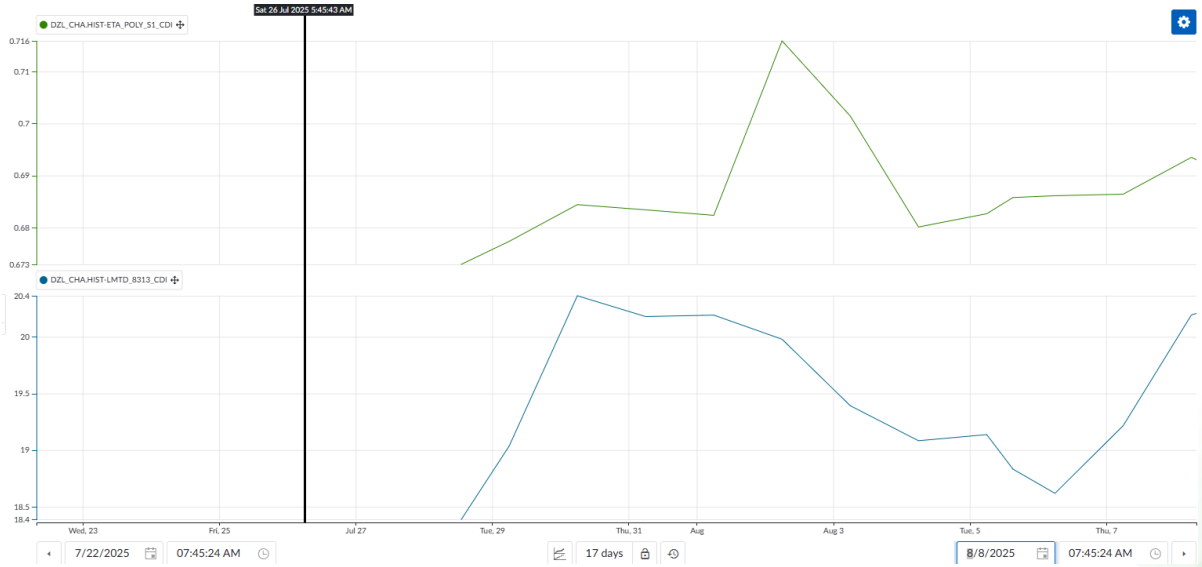
Use case digital twin

- We want to predict failure of our chlorine compressors
- We only measure the temperature and pressure per stage
- Polytropic and isentropic efficiency are “telltales”
- These are calculated in a Python model
- Visualization is done in another tool



How TrendMiner helps

- Check automatic model calculation
  - The model is calculated every morning at 6:00
  - You can see a change in the trend every morning at 6:00
  - This “proves” that the calculation works
- Model improvements by chemical engineers
  - Ad-hoc calculations
  - Easy to export data to Excel



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How do we keep TrendMiner current?

Apr22 — Created new appliance (QA and PRD)

May22 — Upgrade connector

Jul22 — Hand-over from business to IT department

Oct22 — Upgrade to 2022.R1.1

Nov22 — Changed company-wide access

Dec22 — License renewal

Jan23 — Activated mail for monitors

Jan24 — External content tile upload via SharePoint

2024 — Monthly recurring user control

Jun24 — Upgrade to 2024.R1

Today — Move to Azure cloud + upgrade to 2025.R2

Dec25 — Single sign-on

2026 — Connect Influx DB

2027 — New data sources? ML Hub??

3 Future and recommendations

Grow greener together

Current
- Ecovadis platinum rating
- Energy flexibility
- Automatic CSRD reporting
- Green electricity

Climate neutral in 2030
- Electrify brine evaporation
- E-boilers

Support the energy transition
- H2 caverns
- New battery materials

TrendMiner use cases

Save costs and energy
- Optimize process control
- Validate digital twins
- Spot “performance killers”
- Predict failures and waste

Get data ready for new apps
- Validate reporting
  - Month end closure
  - CSRD
  - OAM Portal
- Remove low-quality data

Recommendations - users

1) Grow the user base
- Roll out new features one by one, start simple
- Awareness training for new joiners and refreshers
- Use standard trainings to greatest extent
- Encourage users to join the TrendMiner community

2) Make good tools stronger in the company
- Give improvements exposure
- Rethink possibilities regularly (at least once per year)
- Replace (obsolete) software by TrendMiner

3) Identify new personas (users)
- IT department for testing purposes
- Let users show their dashboards to other departments

Technical and commercial

4) Consider TrendMiner SaaS

- No solid business case (yet)
- Private cloud and public cloud are coming closer together
- Data ownership is always a discussion point

5) Long-term fit-for-purpose agreement
- Enables growing the user base without hassle
- Create commitment from both Nobian and TrendMiner
- Less time for negotiation, more time for improving

6) Keep the system current

- Good support is key (TrendMiner responds fast)
- Take time to identify improvements in new software
- Plan sufficient downtime window

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Want to share ideas with our Industry 4.0 team? Contact me today!

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