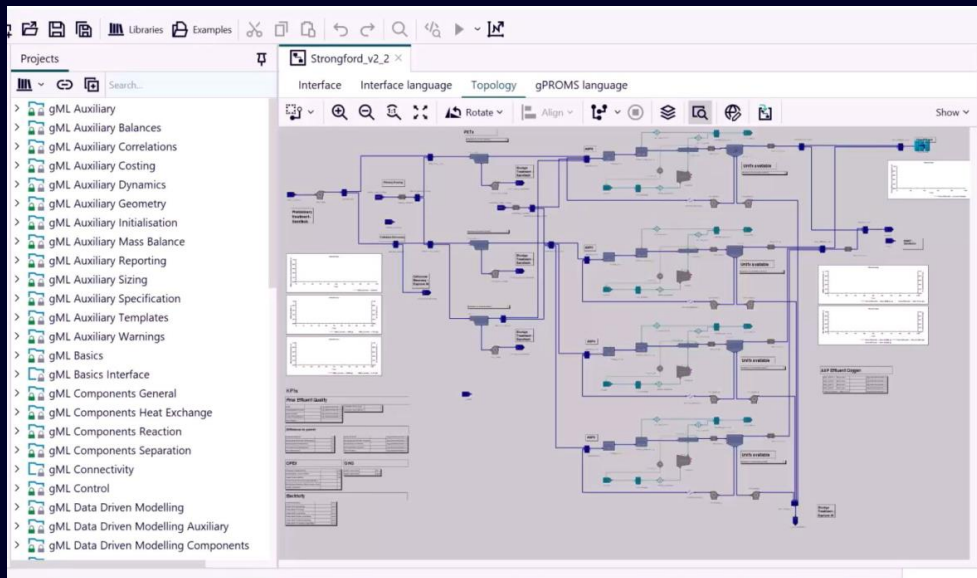


SIWA Treatment Optimizer - Leveraging the Digital Process Twin

An integrated, unified approach to digital design and digital operations

Offline: Build the Process Twin



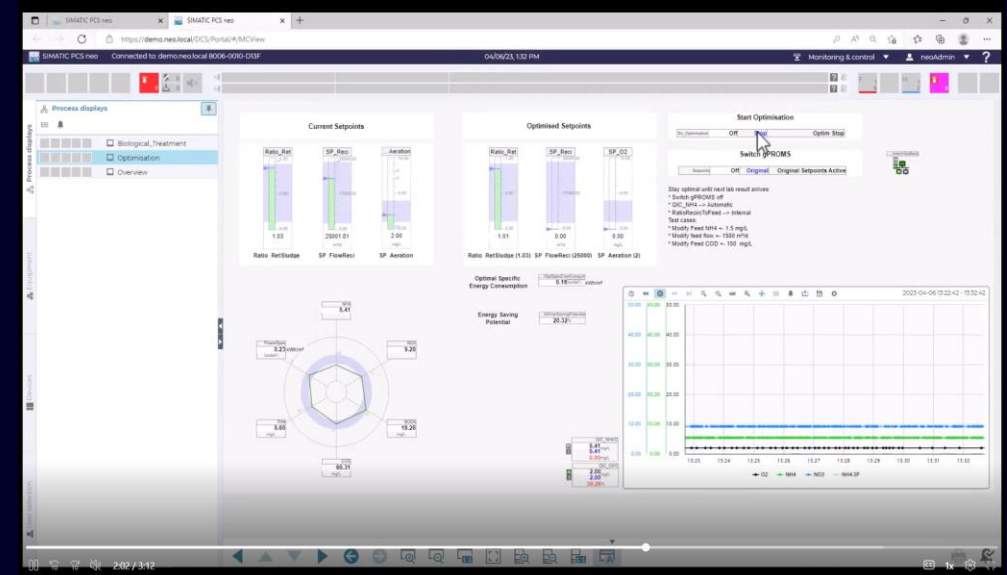
High-fidelity mechanistic modelling

- First principles models (bio, chem and phys) combined with data
- Simulate single units and full systems in one model

Predict performance and validate plant design

- Dynamic modelling of system behavior
- Risk analysis studies, design space exploration, optimization

Online: Deploy for Digital Operations



Deliver optimized asset performance

- Implement optimal production schedules to meet targets
- Respond to uncertainty with confidence and clarity

Simple implementation for Operations

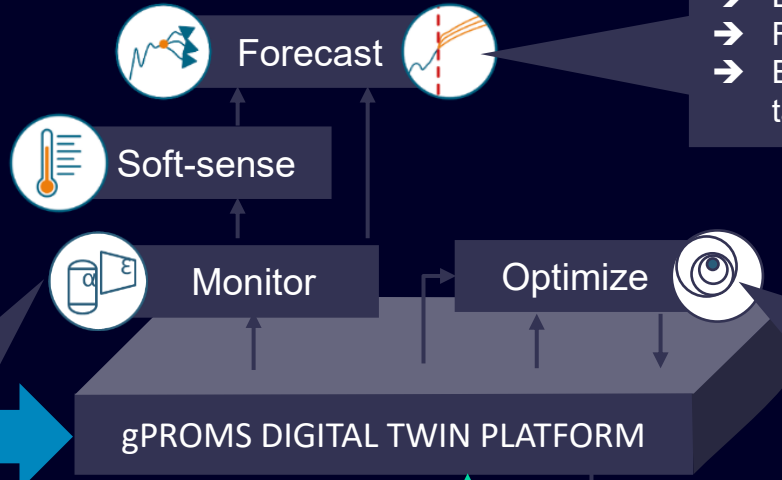
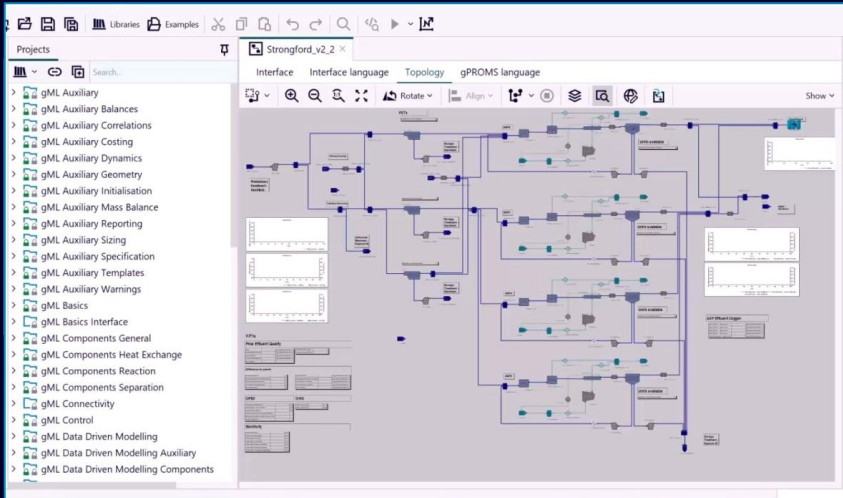
- Integrate into the control room to empower operations teams
- Easy-to-use interfaces provide process status in real-time

Digital Twin Platform augmented with wastewater specific libraries

Integrates with control systems via OPC UA to provide Real-Time Optimization

Utilize the model validated offline

The Digital Twin platform has been deployed & validated in O&G and Pharma - now integrated with Activated Sludge Model and wastewater specific model libraries.



Forecast

Use up-to-date model with “what-if” to anticipate future events

- Effect of operating changes
- Rain events
- Ensure compliance with effluent quality targets

Optimize

Hour-by-hour optimization

- Minimize energy consumption
- Emission management (energy recovery from CH₄ / minimize greenhouse gases)
- ... subject to plant constraints

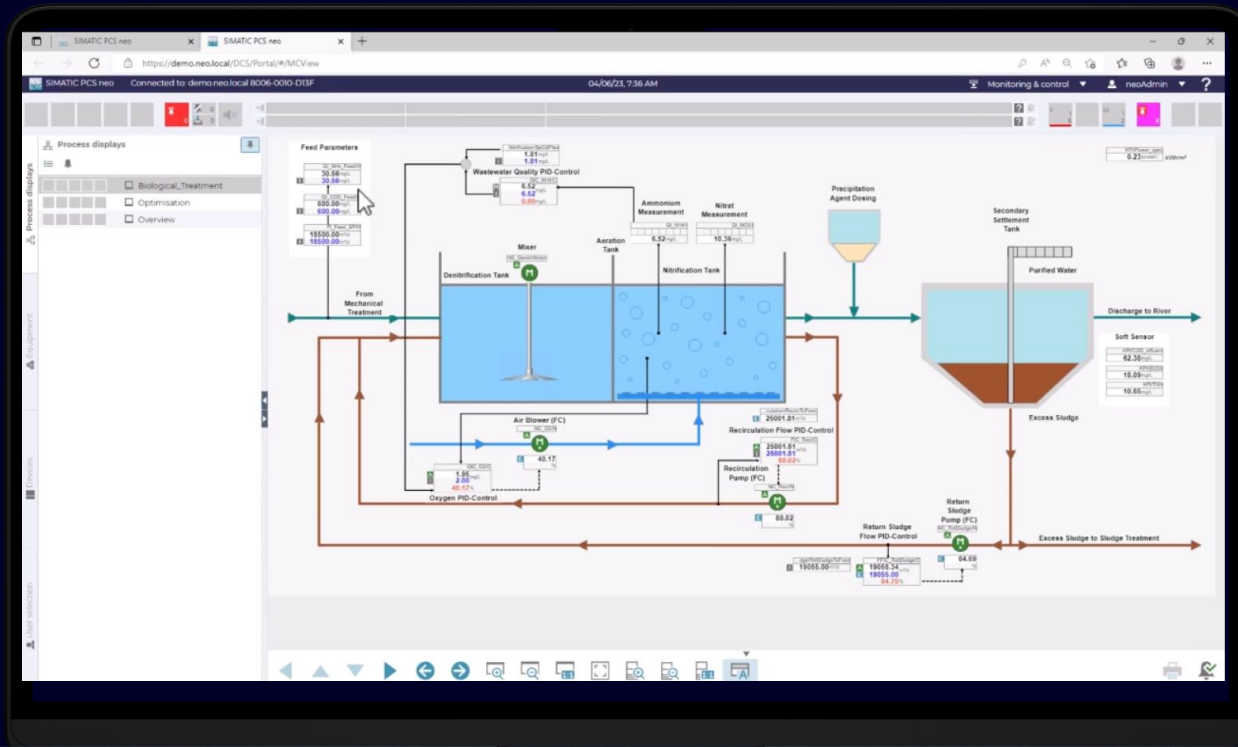
Monitor

Monitor process parameter changes continually

- “Single source of truth” on plant state
- Information to operators / early warning
- Maximize plant uptime
- Transparent emissions (greenhouse gases)

Open-loop optimization recommends optimal set points

User defined optimization goals for energy, emissions or quality



STO Model outputs appear in DCS/SCADA Faceplate
Show soft sensors and modelled energy outputs

Recommend optimal set points

- Uses the same validated mechanistic model of your plant → Securely integrate on-premise with the plant's control system via **OPC UA**
- The optimization respects physical limits of plant assets and the least risk route to the optimization goals (i.e. won't expect a pump to exceed its max flow)
- Interface can be via a new/existing faceplate in the DCS or SCADA system (supplied by Siemens or a third party)



Operator

SIEMENS

Your benefits



Target zero non-compliance
Reduced risk of breaching water quality permits



10-25% reduction in energy
Real-time site-wide energy management



Up to 20% reduction in N2O
Accurate carbon emission monitoring



Secure and Open implementation
Digital Twin proven in multiple sectors around the world

SIWA Treatment Optimizer's **real-time optimization** securely **reduces OPEX by 10-25%** while reducing risk and improving operational transparency