Optimisation of production and procurement of technical gases

**Situation**

Networks for H2 and CO in Dormagen and Leverkusen managed by Covestro.

**Use Case**

- Internal Producers
- External Producers
- Consumer

**Challenges**

- Most of the gas is procured from different external suppliers.
- Gases can be procured within the boundaries given by multi-tiered and coupled contracts with take-or-pay/take-and-pay constraints.
- Continuous coverage of the demand for the gases is difficult to organize due to several load changes per day.
- Additional boundaries (e.g. flaring)
- Pressure control by the suppliers
- Manual follow-up order creation

“The task is difficult when everything else is also difficult and easy when everything goes well!”

**Goal**

Assist operators in the complex decision making processes via a flexible and easily maintainable solution.

**Usability**

Requirements for operator acceptance:
- Cover more than 90% of the scenarios
- Integration into existing workflow

**Solution**

- Option for manual solution
- Automatic generation of order documents
- Easily accessible documentation of circumstances
- Consistency checks to avoid slip-ups
- Mobile frontend for increased flexibility (wip)

**Maintainability**

- Adaptation of the optimization problem including the contract structure without accessing the code

**Additional benefits**

- Separation of contractual data and operator interface
- Archive with orders and circumstance documentation
- “What if” analysis

**Implementation**

- Division into frontend, contracts, and backend for optimisation for increased reusability
- Open source backend
- Stand-alone version

**Workflow for operators with the tool**

- Automatic Get data
- Select availability
- Optimise
- Evaluate
- Add to schedule
- Create order

**Benefits**

- Savings through optimized purchasing in a broader range of scenarios
- Reduced stress of the operators
- Knowledge conservation and transfer such that non-expert users can perform the tasks
- Software foundation for further projects

**Covestro**

- Tool for coordination of supply and demand
- Optimal reaction to changing market and operating conditions
- Increased competitiveness of European process industries

**CoPro**

- Reduction of fossil energy use
- Reduction of the consumption of non-renewable resources
- Decrease of CO2 emissions

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