Real-Time Production Optimization

Improving production through state-of-the-art IOT and optimization technology
What if you could increase production without new investments in equipment and minimal impact on your staff?

Overview

Siemens has leveraged the trends of low-cost computing, IoT and state-of-the-art optimization software to develop Real-Time Production Optimization. RTPO enables complete oilfield modeling from the sand face to sales within a single unified optimization model. Now upstream companies can maximize oil production while minimizing gas lift, flare, energy consumption or other constraints.

Typical improvements in production are in the 2-8% range.

In addition, RTPO runs fast. This allows quick re-calculation of oilfield setpoints to maximize production in the event of field equipment failure.

Benefits

- Increase production without investment in equipment and minimal impact on staff
- Minimize production losses during field upsets
- Ability to do "what if" scenarios
- Re-optimize at the push of a button
- Incorporates all aspects of the field from sandface to export in a single model
- Optimization model reflects today’s operation of the field, not a theoretical model or an AI-trained black-box model
- Simple operator interface allows field staff to make the best decision based on latest information
- Real-Time Production Optimization as a Service means your staff do not need to learn and maintain yet another system
Architecture

The Real-Time Production Optimization architecture is straightforward and comprises three components. First is the gPROMS optimization engine, second is real-time field data integration and third is the user interface.

**gPROMS optimization engine.**
At the heart of Real-Time Production Optimization is the gPROMS optimization engine from Siemens Process Systems Enterprise (PSE). This is a state-of-the-art equation-based optimizer that will converge on optimum set points within minutes versus hours compared to other optimization approaches.

Some of the key features of gPROMS are:
- Fully equation oriented
- Fast, efficient calculations
- Handles inherent non-linearity of oil & gas production systems
- Simultaneous optimization of discrete and continuous control decisions (Mixed Integer NLP)
- Well status (on/off); well & pipeline routing combinations
- Continuous variables – pressure, flow

**Integrated asset optimization**

**Real-Time Data Integration.**
For the optimization to be relevant, current field conditions must be inputs to the optimization engine. Also, in the event of a field upset such as a separator failing, real-time data must be input into the model so that new field setpoints can be determined to maximize production until the field upset condition is fixed. Siemens works with the customer’s IT staff to develop a real-time data integration approach to bring data together from SCADA, well test software, economic models and other relevant sources. Siemens then combines this data either in the cloud or on premise for input into the optimization engine.

**User Interface.**
Siemens works with the customer to provide the appropriate operations decision support displays for integration into the customer’s operations center. Our approach is to keep the displays simple, concise and to incorporate the look and feel of the existing operations center displays.

Business Model

Our business model is simple, prove results and then scale. We provide Real-Time Production Optimization as a subscription service.

**Our Challenge**
If you say that you are content with your current level of production performance, you do not need us. If you believe there is opportunity for improvement, you should be talking to us.

**Optimization model parameters:**
- Well data
- Gathering system
- Separators
- Plants

**Real-Time Data Integration:**
- Continuous - flow, pressure, energy
- Discrete - on/ off, open/ closed
- Well Test
- Economic

**Field Operations Decision Support Displays**