Digital Transformation in Oil and Gas: 
Asset Excellence

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We address both lifecycles in the markets we address through the key elements of our platform.
Asset Performance Management
Solutions for maximum return on industrial assets
Schneider Electric offers the most comprehensive APM solution - optimizing asset availability and reliability to safeguard business continuity.
Connect the Asset Strategy to Corporate Objectives
Manage Risk to Safeguard Business Continuity

Corporate Objectives
Business Imperatives

Asset Strategy
Manage Risk, Cost, Performance

APM Framework
People, Process and Systems

Creating a high degree of confidence / decision support
Three Easy Ways to Start Your Digital Transformation

Improve operator safety, increase reliability of assets and maximize profitability

1. Digital Transformation of Work Processes
   - Supports daily activity for operator rounds, work tasks and maintenance activities
   - Saving +500K in unplanned downtime
   - Increase workforce efficiency by 20%
   - Improve data accuracy by 10-20%

2. AR/MT for Operations and Maintenance
   - Augments the user experience with added context and support
   - Increase workforce efficiency
   - Improve data accuracy
   - Transfer knowledge

3. Predictive Asset Analytics
   - Provide early warning notification of potential equipment failure
   - $17M+ saved in a single catch
   - 25% reduction in unplanned downtime
   - 20% increase in asset availability
Digitally Transform Operator Tasks
Closing the Business Loop to Improve Workforce Efficiency
Empower the Workforce with AR/VR/MR Technology

Immersive Training

Enhanced Operator

TRAINING

OPERATIONS

+ Product Marketing

+ Next Generation HCR
  Holographic Control Room
Intelligent Analysis to Optimize Asset Performance
Apply the Right Analytics Mix to Maximize Results
Intelligent Analysis to Optimize Asset Performance
Apply the Right Analytics Mix to Maximize Return on Assets

- Business Intelligence
- Condition-based
- Machine Learning
- Prognostics
Total Selects Schneider Electric for Predictive Asset Analytics

**Client:**
Total

**Location:**
France

**Closing the Loop:**
Our competitor has significant installation of their software for many years for the upstream side of TOTAL’s business. We convinced them our predictive asset analytics technology was best in class and were selected for the downstream business.

**4th largest**
international oil and gas major

**More than 98,000**
Employees globally

**2.5 million**
barrels of oil per day

**Results:**
We’re Closing the Loop to help Total:

- Enable predictive maintenance to reduce unscheduled downtime, improve asset reliability, availability and performance
- Integrate to their data lake and through a phased approach to deployment migrate everything to the cloud.
The Total Sales Engagement & Project

The Project

- Early detections of anomalies
- Focus on Rotating Equipment

<table>
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<tr>
<th>Centrifugal compressor</th>
<th>Turbines</th>
<th>Expanders</th>
<th>Reciprocating compressors</th>
<th>Pumps</th>
<th>Motors</th>
<th>Gears</th>
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- Deployment in all refineries operated by TOTAL:
  - In Europe and North America
  - 7 refineries + 2 integrated platforms (refinery + petrochemicals)
- 6-month expected for full deployment
  - SE provide licenses, install/config, mapping services
  - TOTAL develop, tune and run the models and analyze results
BASF Partners with Schneider Electric for Industrie 4.0 Initiative

**Client:**
BASF

**Location:**
Global

**Closing the Loop:**
BASF started an Industrie 4.0 initiative in 2005 covering their entire value chain with multiple work streams including predictive maintenance and augmented reality. For the first initiative, BASF selected PRiSM Predictive Asset Analytics and for the second initiative they selected IntelaTrac Mobile Operator Rounds with integrated workflow for mobile and augmented reality.

**Results:**
We’re Closing the Loop to help BASF:

- Enable predictive maintenance to reduce unscheduled downtime, improve asset reliability, availability and performance
- Achieve mobile operator driven reliability with increased access to information through a phased approach to leading to more applications, more coverage and more functionalities in particular AR.

**World’s Leading Chemical Company**

More than **112,000** Employees globally

Augmented Reality Rollout on **400+ Plants**
With 1,000+ End Users
BASF 4.0 – Smart Manufacturing

Predictive Maintenance
Target & Approach

- Reliability
- Unexpected Shutdowns
- Transparency

Augmented Reality
Target & Approach

- Workforce Efficiency
- Potential Errors
- Know-how Transfer

Big Data  
Advanced Analytics  
Process Know-how
Air Liquide uses predictive asset analytics to detect compressor problems & avoid forced outages

Client:
Air Liquide

Location:
Global

Closing the Loop:
Schneider Electric helps Air Liquide use a scheduled opportunity outage to repair a damaged turbine engine. Prior to the scheduled outage, the plant notified the M&D center indicating a vibration sensor anomaly Air Liquide was able to use a planned outage to investigate the compressor and found a cracked impeller.

Results:
We’re Closing the Loop to help Air Liquide:
• Detect equipment failures before they occur
• Prevent unscheduled system downtime
• Harness real-time information that brings plant operators and engineering experts together to collaborate

Saving
$+500K
Preventing reactive maintenance and unplanned downtime

Predicting a Compressor Failure
Using Real-time Data To detect unforeseen events
The Air Liquide Sales Engagement & Project

Where are we today

Deployment Contract signed in February 2017 for a 4-year term

• Scope: Large Industries
• Current status: 82 sites deployed in 30 countries
• 150 people trained

Great event today in Kuala Lumpur for Air Liquide South-East Asia Remote Operation Control Center inauguration.

Remote plant operation, data-driven optimization, predictive maintenance, all powered by ALIZENT solutions and technologies from OSIsoft and Schneider Electric.
Questions?