

Italian petrochemical company

Optimizes system and process performance with ABB Ability™ Advanced Digital Services



ABB provides the systems, solutions and services needed to operate petrochemical plants safely, productively and profitably.

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01 Italy excels in its efforts to reduce greenhouse gas (GHG) emissions placing their petrochemical industries several years ahead of the European Union's 2020 targets; which call for a 20 percent reduction in greenhouse gas emissions from 1990 levels. ABB helps petrochemical plants worldwide ensure that these critical system processes meet or exceed industry best practices.

Sardinian Petrochemical Operations

What does a petrochemical producer do when its most skilled workers have retired and its infrastructure is more than 60 years old?

In 2015, the inefficiencies resulting from these two factors led an Italian management team to consider shutting their facility down. Company executives wondered whether they should invest their money in emerging countries/markets, or whether they should attempt to make their aging plant productive again.

Adding to these complex decisions were the challenges faced by all petrochemical operations, which are held to strict safety and emissions guidelines. Since chemicals can be problematic or even hazardous if not used as intended, it is essential that they are correctly processed. The necessity for production efficiencies, the requirement for fiscally responsible capital expenditures, and the concerns for safety and emissions combined to provide significant incentives to identify the best solution.

Upgrading the control system to ensure high production availability

Large industrial facilities such as this petrochemical plant are comprised of a multitude of components and sub-processes that all work together to drive optimal production processes. This is made possible with hundreds, sometimes thousands of control loops, which run the plant the way the producer intends. The plant can only run optimally if all control loops are perfectly aligned with each other; however, each modification and each upgrade require constant re-optimizing. For that reason, almost all plants operate at a sub-optimal level.

Sub-optimal system settings and conditions can result in:

- System overload, causing slow response rates
- Gradual system performance degradation
- Sporadic issues arising which are difficult to diagnose
- Hardware devices gliding slowly towards obsolescence
- Redundancy problems creating single points of failure
- System efficiency losses

This producer was dealing with the cumulative effects of manual data collection and analysis from their functionally siloed systems, which had resulted in data inaccuracy and inconsistencies. Over time, this had led to decisions based on incorrect, missing, or obsolete information. During a series of meetings held to discuss their options, the plant's manager suggested focusing on improving process control by optimizing their control system to ensure high production availability. Rather than attempting to upgrade the sub-optimal facility with new technology such as expensive new distillation columns, furnaces or other substantial infrastructure investments, the manager suggested migrating from a focus on reactive maintenance to a predictive maintenance strategy. He recommended using automated intelligent devices to achieve accuracy, high productivity and cost savings.

Predictive maintenance for process control

The plant had an existing ABB MOD 300 distributed control system (DCS), as well as ABB's System 800xA. System 800xA is built for collaboration in a fully redundant, reliable environment. It provides connectivity to all ABB DCS systems, as well as other ABB and third-party plant systems and applications.

To maximize their capital expenditure and identify the sources of the issues that were inhibiting peak performance in their equipment and processes, plant managers decided to invest in ABB Ability™ Advanced Digital Services. Advanced Digital Services use a secure, remote-enabled service delivery platform that maximizes the use of limited resources onsite. It provides daily assessments of equipment and process performance by identifying, categorizing and priori-

tizing Key Performance Indicators (KPIs). Then, ABB experts can help customers find and mitigate productivity variables, ensure maximum performance of their equipment and processes, and achieve higher operational efficiency.

Challenges

Modern plant control systems integrate tightly with industrial equipment. As a result, a control system includes far more elements than ever before. Control loops are designed to improve quality, performance and production, but 75% of process automation is not properly utilized. Because control is either out of range, manual or actually inducing problems into the process. To monitor their complex petrochemical operations, this producer selected ABB Ability™ Performance Optimization for control loops to identify and provide 24/7 monitoring of control loop performance issues.

Results

The producer had known that they had some control problems but had not known the entirety of the problem. Once Performance Optimization for control loops service was commissioned and the first data collection report completed, results showed that more than 40 percent of loops were operating in manual mode and numerous loops were having control problems.

ABB's Performance Optimization for control loops service helped plant managers ensure optimum results from their control system investment. The producers decided that they had received so much value from their investment in ABB Advanced Digital Services, they asked ABB to help them improve petrochemical production at a second location, in Sicily.



02 ABB Advanced Services provide Key Performance Indicators for a number of assets, processes and risks by identifying issues, categorizing them, and prioritizing them in order of severity and criticality. KPIs are visualized using a Pareto format to highlight which issues need attention first.

Sicilian Petrochemical Operations

Maintenance Cost Optimization

The petrochemical producer based in Sicily met with the ABB team and reviewed the excellent results demonstrated from the Performance optimization for control loops service in Sardinia. The Sicilian management team had been wanting to employ a predictive maintenance approach to proactively address equipment issues. Their goals were to avoid lost production, manage life cycle costs, and ensure continuous process optimization.

During the meetings, the Sicilian producer evaluated all the ABB Advanced Digital Service offerings. As a result of these discussions, ABB assembled a sitewide package for the Sicilian producer which included a renewal of their ABB Automation Sentinel agreement, as well as Performance Optimization for control systems – 800xA and Cyber Security Analytics Services. As a pilot, they also added one Performance Optimization for control loops service for 25 loops. The plant's installed base consisted of ABB MOD 300 DCS, as well as ABB's System 800xA with AC 800M controllers.

This plant's control systems now have the capability to monitor and report on critical system settings and parameters to ensure that they are configured according to established industry best practices.

ABB's Advanced Digital Services Benefits

- Performance trends continuously gathered and assessed
- Higher confidence in system and process performance, cyber security defenses, and control system

health through quick identification of system optimization opportunities

- Increased convenience by reducing time and cost of manual identification of issues
- More predictable maintenance costs

Challenges

Plant managers at both locations wanted to ensure the maintenance costs were predictable. The plant's management teams wanted to know where their investment would be most likely to be translated into higher productivity and manufacturing cost savings. This producer invested in ABB's Advanced Digital Services at both locations and are open to future opportunities to improve performance and control costs.

Results

In Sardinia, ABB helped the management team optimize their production by using ABB's Advanced Digital Services to manage their process operating conditions. Now, they are able to use predictive analysis to know when modification is needed for their process control and PID tuning parameters.

ABB's service solutions for the Sicilian operations involved helping them to optimize their maintenance costs using a site wide Advanced Digital Services solution. The Sicilian management team is now able to comprehensively monitor their system for cyber security vulnerabilities using ABB's Advanced Digital Services.

ABB Ability™ Advanced Digital Services



ABB Ability™ Performance Optimization for control systems – 800xA

Performance Optimization for control systems – 800xA uses data collected during scheduled and on-demand analyses for comparison against best practices and standards to detect performance irregularities. This comparison quickly pinpoints issues, helping to improve system reliability, availability and performance.

Benefits

- Minimizes risk of system upsets
- Decreases the cost of identifying issues
- Ensures smooth maintenance, expansions, and changes
- Reduces response time and travel expenses



ABB Ability™ Cyber Security Analytics

Cyber security is an important factor in all phases of system life cycle. Today's process automation systems are more networked than ever, creating new risks that threaten control system availability and security.

ABB addresses cyber security at each process stage; from design and development to operations and maintenance. No single solution can keep increasingly interconnected systems secure, so ABB works with customers to create a defense-in-depth approach where multiple security layers detect and deter threats – if, where and when they may arise. Even an oversight in loading a software security patch, or the retention of old software versions, can make a system more vulnerable.

The Cyber Security Analytics Service collects system data for comparison against industry best practices and standards to detect weaknesses. This pinpoints areas that require action to help protect the control system by ensuring it has multiple layers of security. The Cyber Security Analytics Service is non-invasive, and can be applied to any control system. It provides continuous, remote monitoring, and periodic or regularly scheduled security reviews.



ABB Ability™ Performance Optimization for control loops

Performance Optimization for control loops piloted for this producer presents a complete report of process deviation in control loops, giving plant managers the opportunity to make corrections. Now plant personnel can identify troublesome loops through data collection, model identification, feedback tuning, feedforward tuning and controller simulation. ABB's Performance Optimization for control loops service is a platform-independent, non-invasive service that can be applied to any automated process or control system to diagnose issues, implement improvement actions and sustain performance.