



EcoStruxure digital platforms for process and safety systems

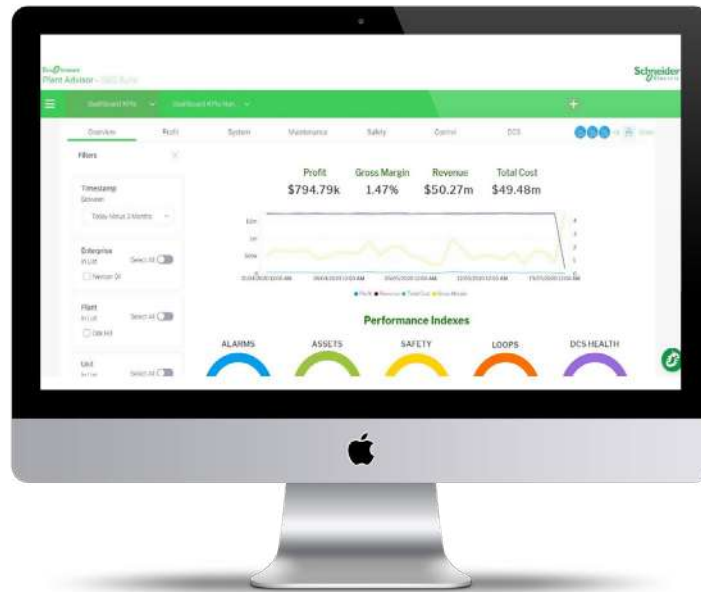
EcoStruxure™ Plant Advisor

se.com/processautomation

Life Is On

Schneider
Electric

Plant Advisor's overview



The Process Automation group within Schneider Electric™ has a wide variety of on-premise and cloud-based 'Advisors' in its portfolio today. These Advisors are designed to support operators, managers, and executives to gather and understand operating, safety, and profit conditions that affect plant or facility operating performance. They are extraordinarily powerful tools that will provide valuable information in easy and intuitive formats with graphical simplicity using easy to follow graphical user experience layouts, workflows, and predictive features. Now with the EcoStruxure Plant Advisor, the power will be even greater as Plant Advisor delivers an outstanding comprehensive to the customer to monitor process performance, system health, and profit sustainability. The new offer consolidates data in order to reduce the visual load on the operations and plant management.

All of this is part of the integration to the larger digital transformation within Process Automation and our customer's organizations. Our goal is to make the client's view of the full plant's operational and safety functions on line and in a digitized format that can be distributed safely across the local and even global enterprise.

In this brochure, we will highlight each advisor and discuss their ability to provide:

- Process and safety centralized monitoring and visualization – Plant Advisor
- Control system performance – Control Advisor
- Remote monitoring and predictive analytics – DCS Advisor
- Condition based maintenance and decision support – Maintenance Advisor
- Profit analysis in real time – Profit Advisor
- Process risk and safety management – Safety Advisor
- System configuration and change management – System Advisor
- Autonomous production advisor – Rod Pump Analytics valuable

Process and safety central monitoring and visualization – EcoStruxure Plant Advisor – Process Performance Console

The powerful tools brought forth by the EcoStruxure™ Process Automation Advisors are made more powerful by the EcoStruxure Plant Advisor - Process Performance Console. The on-premise window to these digitized applications provides an intuitive and cohesive format where all plant stakeholders have a single application that gives them a view into the entire digitized set of advanced process and safety advisors.

Plant Advisor provides the following improvements to the way plants are run:

- Harmonizes and enriches data
- Creates distilled and operable data presentation
- Delivers access across the enterprise in easy formats
- Provides governance across multiple applications and for multiple stakeholders



Plant Advisor leverages data and connectivity between all the Advisors and their unique connections to plant and safety operations. Plant Advisor then provides the customer with critical insights into the health of the system and the process. Our customers have told us some of their issues across the plant can be solved with digitization.

Plant stakeholders need to:

- Extend the operations performance view via easy transition to root cause analysis applications
- Enable a manage by exception operating practice
- Identify improvements and/or responses via “warning indicators”

Plant Advisor delivers on all these challenges by providing all stakeholders the following:

- Dashboards link to root cause analysis Advisor applications
- Single dashboard for access and display of relevant existing and future EcoStruxure Advisors
- Defined metrics for simple decision-making
- Customizable dashboards with warning indicators

Control system performance

Control Advisor is a control loop performance solution to monitor, improve, and maintain your Foxboro control loops in optimal performance. Control Advisor runs as a background service and prioritizes and diagnoses loop improvement opportunities.

Its activities include:

- Identifies the most pressing problems and biggest payback loops
- Isolates control valves that have mechanical issues
- Finds the root cause of oscillations
- Finds the root cause of process upsets
- Recommends improved tuning for improved controller performance

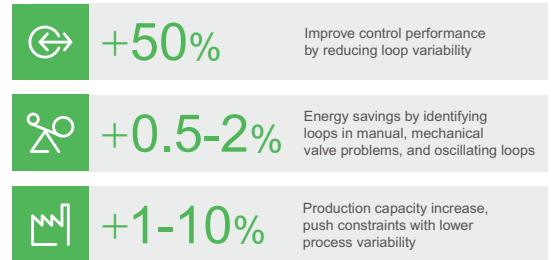
Total solution approach

To fully achieve the benefits of a control loop performance management solution, a combined software and consulting model is recommended. This model is often based on a phased approach, which includes some of the following:

- Plan
- Learn site process
- Establish loop relationships
- Add customizing, such as commercial attributes, plant areas, units, etc.
- Set initial baseline and thresholds
- Work jointly to find improvements
- Provide suggestions for future planning



Fast return on investment



Loop management services

Schneider Electric offers ongoing local and remote services to assess, monitor, prioritize, report, and remediate suboptimal control loop performance.

Using loop management services can help you improve savings and increase profits.

Remote monitoring and predictive analytics

EcoStruxure - DCS Advisor

EcoStruxure DCS Advisor is an advanced local and remote service that monitor the performance of Distributed Control System (DCS) resource servers, located at customer sites which is offered as a part of our Customer FIRST program. A dedicated DCS Advisor server is connected to your plant's automation system network which enables automated monitoring and analysis of configuration and resource utilization.

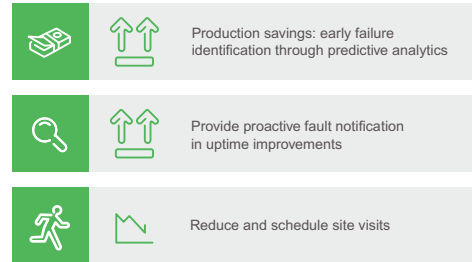


EcoStruxure DCS Advisor – Predictive analytics

The DCS Predictive Analytics module has been developed with customized predictive analytics algorithms designed by Schneider Electric to provide early indications of potential problems with CPs (control processors) and switches. The predictive analytics in the DCS Advisor module is for Maintenance and Operations personnel to extend insight into the health information within CPs and switches. The Schneider Electric engineers at our GCS sites can now instruct our customers regarding immediate remediation of the predicted problem until field service engineers can come to site.

This predictive information will be a quick way to respond to potential vulnerabilities and deliver timely information to our customers before a problem threatens your production.

Fast return on investment



If an unacceptable threshold is reached, an alarm is sent and Schneider Electric engineers at our Global Customer Support (GCS) center and are alerted to the changes before an issue develops.

Schneider Electric technical support experts are provided daily and hourly updates when alarm thresholds are exceeded. These remote engineers analyze the data to determine the root cause and guide corrective activity. This capability facilitates reactive diagnostic analysis to help maximize the operational efficiency of the automation system and minimize downtime.

Platform for condition based maintenance and decision support

EcoStruxure Maintenance Advisor

EcoStruxure Maintenance Advisor enables maintenance supervisors to monitor the condition of automation assets in real time to provide early insight into impending failure enabling maintenance to act on it proactively thus preventing a failure. Embedded workflow and mobility allow easy dissemination of maintenance decisions from anywhere in the plant.

Condition Advisor

Condition Advisor is a vendor neutral condition monitoring platform providing early insight into emerging abnormal asset conditions in real time. Multiple built-in condition monitoring engines are available to monitor the health of various assets automatically.

In the case of intelligent automation assets, condition monitoring is achieved by leveraging predictive context awareness available in intelligent assets.

For non-intelligent automation assets, condition monitoring techniques may vary from a simple to complex rule engines. For stranded assets, condition monitoring is achieved using AVEVA IntelaTrac Mobile Operator Rounds function that enables efficient and consistent execution of field tasks by digitizing paper-based inspection rounds.

Maintenance Response Center

Maintenance Response Center provides a single unified workspace for health of plant-wide assets, acting as a “command center for maintenance”. It offers real time asset health information in an intuitive, easy-to-understand way, with recommended corrective action to enable effective decisions. Context is added to alerts to indicate criticality levels, for example by using standard NAMUR 107, ISA 108 categories. Smart analytics and comparison with historical data for the operational life of an asset help identify failure modes, quality trends, and process issues to reduce time to repair and eliminate unnecessary trips to the field.

Mobility brings the plant to a mobile workforce, empowering users with the capability to access anything anywhere.

Fast return on investment



Workflow

Embedded workflow and ERP integration to support proactive action on decisions from anywhere. The Workflow option provides tools to act on maintenance decisions. It helps to streamline processes and eliminate paperwork by digitizing maintenance activity assignment and tracking to the correct technique.



Profit analysis in real time

EcoStruxure Profit Advisor

EcoStruxure Profit Advisor is a unique, patented solution from Schneider Electric that enables plant personnel and management teams to identify the largest potential areas of improvement in their operations. Profit Advisor is based on the patented Real-time accounting principles unique to Schneider Electric.




Profit Advisor gives your team process improvement assessments and implementations that are measurable in the language of the business. We monetize the benefits and we deliver for all to see!

Profit Advisor gives your team detailed visibility into operations/ cost center performance that provides consensus on operational improvement benefits and bottom-line benefits so that real-time decision making is done with facts that are easily translated into control changes.

Profit Advisor can operate in three distinct modes:

- Historical data: Profit Advisor enables plant personnel to identify true performance-improving initiatives based on recorded data.
- Real-time performance indicators: Profit Advisor can indicate current performance and inform workforce operators when their operating decisions are making the business more profitable.
- Profit planning: Profit Advisor can predict the profitability of the changes your operations workforce is proposing, which will substantially minimize project risk and help to eliminate waste.

Fast return on investment

	+1 - 3+%	Operational profitability: team knows best operational capability through real-time analytics
	-3 - 5%	Reduction in energy and material costs
	+5%	Production values





The Profit Advisor graphic shows how users are presented with data on energy, material, and production values right down to the equipment level that will help drive their operators to make the best choices for the operation of the plant. The data is built from historical data at the plant or from industry standards such as regional energy costs. We have many examples which show how Profit Advisor and Real-time Accounting have saved and generated benefits in refineries, gas processing, water, power, mining, and chemical plants.



Refinery

Energy savings from reduced
congeneration needs \$7.5M/year



Cement plant

Feed rate increase 9.3%
\$200K increase in production value



Natural gas refinery

\$6M reduced maintenance costs
\$58M reduced operating expenses/year

Process risk and safety management

EcoStruxure Process Safety Advisor

EcoStruxure Process Safety Advisor is a mobility ready digital solution that brings process safety to life. It provides users with real time dynamic view of operational risk and safety, both current, past and future, delivering the right information to the right people at the right time to support better decisions, safer operations, and a more profitable business.

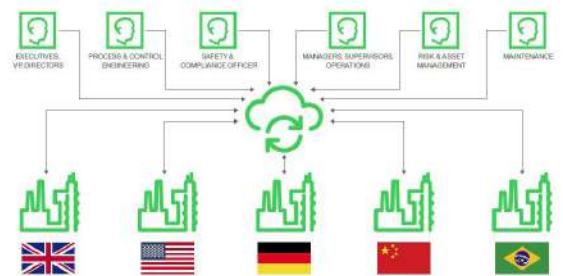
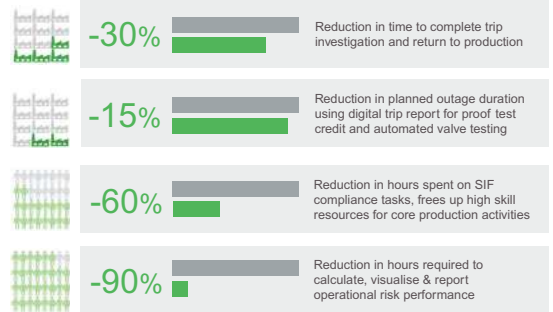
Process Safety Advisor is made up of two parts combining Process Safety Advisor On-Premise (PSA OP) for onsite data collection and Independent Protection Layers (IPL) analytics with Process Safety Advisor Cloud (PSA Cloud) that integrates analytic data from every site into a single globally accessible view of your entire enterprise's operational safety and risk status, performance, and history.

PSA OP is completely scalable both by size of deployment and by functionality. You can start with just "Trip Analyzer" (for trip detection, qualification and analysis), then grow to "SIF Manager" for detailed and powerful Safety Instrumented Function (SIF) analytics, then upgrade to a complete "IPL Manager" to integrate both SIF and non-SIF protection layer performance analytics. Starting at just 50 loops and expandable to over 10,000 loops, the system hardware and software infrastructure is the same so there is never any regret starting small and growing is a natural progression.

With the data aggregated from PSA OP, PSA Cloud provides additional analytics that connect the health, status and performance of each sites IPL's to the actual operating risk profile of each hazardous event (HE) being mitigated by those IPL's, for every site and every asset.

The system will use PSA OP data on each site to provide insight into "past" plant trip performance, "present" operational risk posture as well as providing a risk performance model for performing "what if" analysis on risk impact of "future" operational decisions.

Fast return on investment



System configuration and change management

EcoStruxure System Advisor

System Advisor is a knowledge management application that centralizes the electronic documentation and day-to-day management of Foxboro process automation systems. System Auditor improves engineering productivity, efficiency, and effectiveness.

The System Advisor for Process Control (Foxboro) software provides configuration and system auditing, as well as, provides back documentation, system health monitoring, I/O management, change management, and tracking. The software also provides for improved cybersecurity and lifecycle planning and reduce risks in project execution and expansion.

The System Advisor for Process Safety (SAPC) is also available which allows for proper configuration management for Triconex based Safety Systems. The System Advisor for Process Safety acts to complement the local safety control documentation and provide the basis for ensured safety and regulatory compliance.

System Advisor for Process Control software also provides alarm management and can serve as the basis for alarm rationalization. The Alarm shelving capability temporarily disables alarms or alters priority to improve operator efficiency by helping them avoid nuisance alarms during particular modes of operation in the plant.

A powerful feature of System Advisor for Process Control is the ability to perform integrity checks and send emails when conditions occur. The main categories of checks include:

- Missing native and 3rd party references
- Inactive blocks and blocks in manual/local
- Alarm integrity Issues
- Database integrity issues
- Peer-to-peer connections and read/writes

Managing changes in the process control system are critical to integrity and lifecycle costs and management. System Advisor for Process Control provides significant Change Management functions:

- I/O Management automatically documents when I/O channels have been used
- System Health Monitoring for network and controllers
- Change Tracking for all changes to system with auditing and documentation
- Alarm Management for chattering, flooding, acknowledgement time, and more

SAPC Alarm Management

This feature of the System Advisor maintains peak alarm performance for process safety. System Advisor serves as the Master Alarm Database and rationalization tool of choice, focusing initially on Foxboro DCS, but will expand to accept input data from other systems.

This aspect of System Advisor offering provides the following advanced features:

- Benchmarking to EMUUA standards
- Manually or Dynamically Shelve Alarms or Groups of Alarms via an advanced Alarm Shelving Unit (ASU) capability
- Enforces alarm strategy
- Complete Audit Trail of changes
- Reports of ASU shelved Alarms and Alarms shelved outside of ASU



Wellhead optimization

Autonomous Production Advisor – Rod Pump Analytics

Underperforming wells can significantly impact the bottom line of the oil producer. Rod pump technology is used in nearly 40% of oil production systems around the world. Many of the world's wellheads are unmanned which means that modelling of the wells for abnormal conditions like excessive rod vibration, air locks inside the plunger, closing delays of inlet valves, and broken rods among others are critical to identify and act upon.

The EcoStruxure Autonomous Production Advisor Platform enables users to build, validate, manage, and deploy intelligent applications alongside legacy automation systems. The objective of the platform is to not only collect data for analytics, but also safely control and optimize these systems.

Autonomous Production Advisor – Gateway 101

The EcoStruxure Autonomous Production Advisor Gateway is a device that enables Edge Analytics and Machine Learning Model deployment close to industrial assets.

The gateway is fully managed by the EcoStruxure Autonomous Production Advisor (APA) Platform, where users can control application deployment and hardware provisioning tasks to manage a fleet of Edge Gateways.

The Gateways are delivered with the Ubuntu 18.04 LTS operating system and a preconfigured software environment that allows for the deployment of applications through the APA platform.



Fast return on investment

50 barrels per day @ \$55/barrel

Production optimization

+3% yields \$27K per well

Operators can identify "optimal" pump speeds from models

Pump failure prediction

+4-5 days yields \$100K savings

Advanced notifications means improved scheduling

Improving downtime

+2% yields \$19K per well

Abnormal pump pattern recognition raises events status prior to automatic shutdown



To learn more, visit our website.

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