

Movicon Pro.Lean[®]



The solution for Production efficiency: OEE, KPI and Downtime



Movicon Pro.Lean[®]

Getting full access to real-time production data will enable you to detect or anticipate the weak spots in your production system and make the right decisions to increase productivity and efficiency





Technology and Solutions for Plant Intelligence



Progea offers Lean Manufacturing and Plant Intelligence software solutions to improve productivity, eliminate waste, reduce costs and increase profits

Every modern company embracing Industry 4.0 requires specific tools that are simple and efficient to use. Tools that can ensure connectivity, data collection, aggregation and transparent analysis with rapid returns on minimum investments (ROI). The production reality in today's increasingly competitive world demands efficiency and quality with continuous and improved processes according to the Lean Manufacturing concept while embracing the Industry 4.0 principles. Automation systems that manage production processes can be optimized only when provided with the right real-time information. The Movicon.NExT Pro. Lean© module is an extremely efficient and effective tool designed to do this and offered by Progea based on over twenty years of experience in industrial automation software. Often production lines are subject to various causes that weaken performance: malfunction, downtime, scrap and rejects reduce production efficiency, causing economical loss to the company who at most times find themselves inadequately equipped to intervene. The automatic real-time knowledge of the performance

indicators (KPI) enables Overall Equipment Effectiveness (OEE) values to be calculated in order to determine the true plant production efficiency rate. On average, a well-established manufacturing company performs up to 60% of its full potential performance capacity. This means that for every 100 goods produced in an ideal situation, only 60 are actually produced. Considering that the 100% value is purely theoretical, an 'excellent' value of a true lean production would be around 85%. It is not hard to imagine how improved production efficiency with an increased OEE value would create a noticeable increase in returns for any company by just investing little. Imagine what this would mean for a mass production manufacturing company that by making a slight improvement to performances will get them a very significant increase in profits, much less waste and reduced costs.

Information flows enterprise-wide from production plant system sensors across to the managerial offices, efficiently managing real-time production process effectively. Pro.Lean® is the solution for improving productivity efficiency, reducing waste and increasing profits.





Pro.Lean[®] is a simple and efficient solution

Pro.Lean[®] will make your factory more efficient by calculating the key indicators to allow you to reduce losses increase profits

The Key Performance Indicators (KPI), the Overall Equipment Effectiveness (OEE) value and the production Downtime analysis calculated by Pro.Lean[®], will enable you to maximize your business by increasing productivity in the three areas relating to the Availability, Performance and Quality parameters.

Increase Efficiency

Improving local and global production efficiency will enable you to improve the productivity of existing machines by reducing rejects and downtimes. As a consequence this will reduce plant running costs to satisfy production plans without needing to rely on overtime work and defer delivery deadlines.

Reduce Machine Downtimes

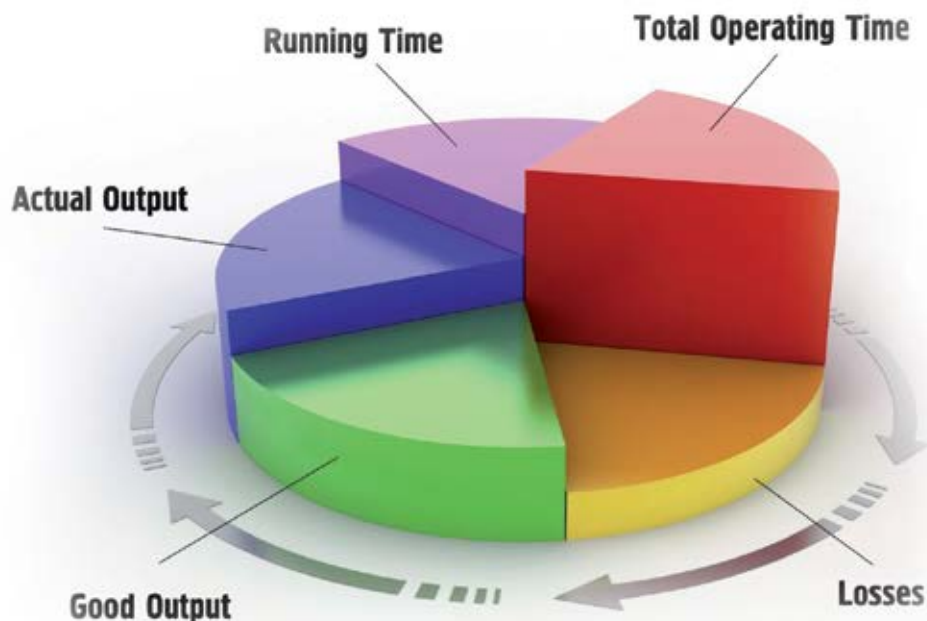
The downtime analysis will enable you to eliminate anticipated and repetitive problems relating to production. Reducing downtimes will allow you to save significantly on costs and re-allocate human resources more efficiently.

Increase Production

By increasing efficiency and decreasing downtime events caused by production inactivity or malfunctioning, users can increase the effective production rate of the plant capacity value.

Quality Improvement

Quality can be improved by analyzing production data and the number of rejects in order to identify the flaws and remove the causes. The reduction in rejects will increase your product quality and reputation with clients.





How can the OEE be increased?

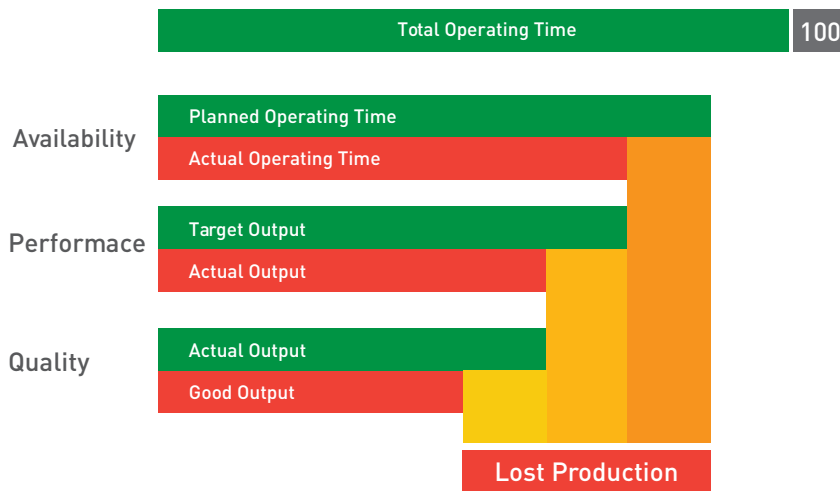
Measure your productivity performances and regain competitiveness using Industry 4.0-ready connectivity and data analysis

The OEE is an essential reference point for analyzing production process efficiency and productivity. It is used to calculate the overall performance of the factory's productivity system and classify the different production losses according to the three following factors:

- Availability
- Efficiency
- Quality

The accuracy of the OEE values depends on consistent and automatic production data collection in real-time without which it would be impossible to identify the inefficiencies and implement corrective interventions to improve productivity efficiency. TPro.Lean© is most simple and cost effective solution designed by Progea to use for this purpose. It aggregates production line information and makes it available to company managers with great clarity and simplicity. It is an essential tool for any company needing to close the gap that is often created between the field production processes, company management and planning. Pro.Lean© is based on Industrial Connectivity and Data Collection technology and has been tried and tested with Movicon for many years by Progea.

The Pro.Lean® module provides automatic and intuitive management of the Historian component for collecting and recording data, the Dashboard component for displaying the key indicators KPI, OEE) in real-time and Reports for analyzing data collected and archived by date, shift, operator, machine, product and batch. . Pro.Lean© allows companies to discover the real production capacity of their systems, production lines and machinery. Pro.Lean© facilitates the detection of critical weaknesses and imperfections by providing the information needed to eliminate them and improve overall efficiency. This will give production plants the opportunity to increase their value, improve productivity and increase profits while reducing investment recovery time and sustaining company competitiveness. In today's global economy, manufacturing companies cannot risk becoming inefficient and non-competitive. It is critical to reduce production costs, improve production line and machine use and flexibility to improve not only product quality but services as well. Pro.Lean© offers cost effective tools for collecting real-time information from production flows and analyzing the coefficients of efficiency using tables and graphs in an open and integrated web-enabled architecture with direct connection to the company IT tools (ERP, SAP).





Dashboards

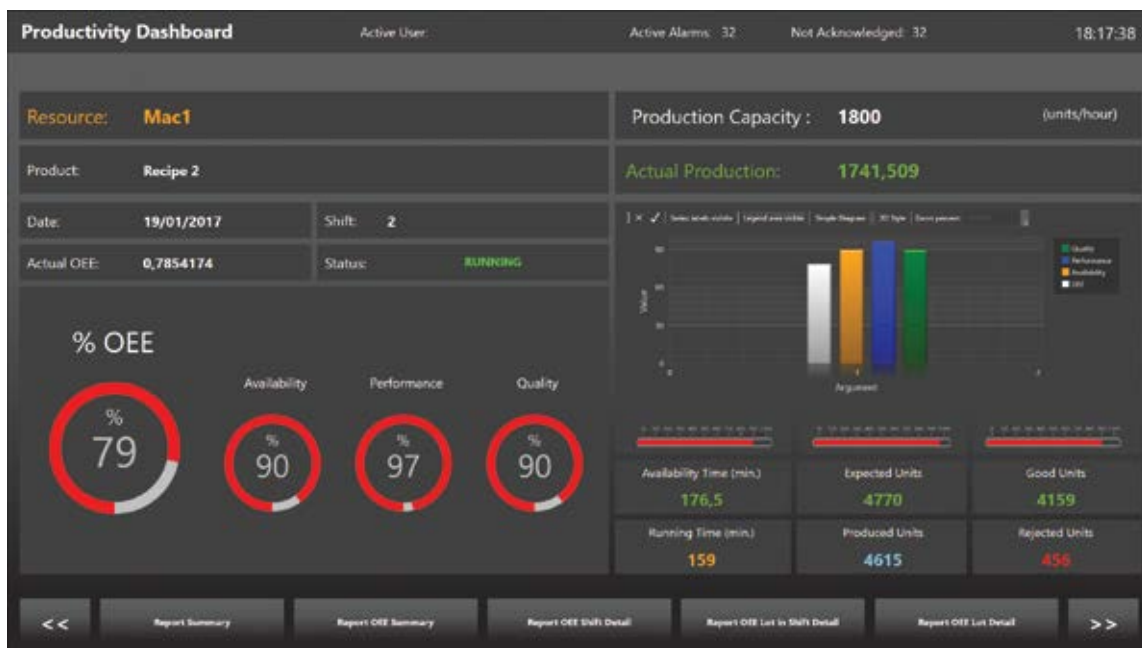


Pro.Lean® offers complete, fast, effective and transparent performance and downtime visualization

Pro.Lean® has been designed to guarantee perfect visualization of all the performance parameters and indicators collected from the production system using the real-time data dashboard displays and analytical reports. These tools are designed to offer transparent and accurate data with all the information needed to reduce production loss and increase business productivity. By using the Movicon technology in combination with the Pro.Lean® module, you will be able to view dashboards of your company's performance indicators on local screen monitors and over the Internet by using a simple browser. By investing little Pro.Lean® will enable you to drastically cut management, maintenance and licensing costs more than any other OEE system on the market.

Dashboards

The collected data is represented by the Pro.Lean® module in real-time using attractive dashboard graphics to display indicators and operating statuses with great clarity. Operators will be able to supervise and control all productivity processes, from anywhere and at anytime, by using the web interface graphics. The dashboard interface has been designed with the latest ergonomic requirements in mind. They can also be customized and integrated with advanced supervision and control features to enable the module to function as a supervisor. This technology is open to all types of additional data visualization and therefore accepts display screens of any type to visualize production plant data as required.





Complete and efficient production data analysis

Pro.Lean[®] offers integrated and ready-to-use analysis tools based on production and downtime data reports, charts and tables

The OEE indicators (Overall Equipment Effectiveness) are recognized as the most effective key indicators for measuring overall plant system efficiency. The OEE is aimed at assisting enterprises with maximizing market output by increasing productivity in the three key areas: availability, performances and quality.

Real-time data acquisition combined with the OEE analysis will allow managers to get a better understanding of the production performances of each of their assets and identify the factors restricting opportunities to improve efficiency. This is done by providing an overall vision covering the productive and functional aspects, production rate and quality using common metrics to provide unique calculated performance measurements.

The OEE calculations take three factors into account:

$$\text{OEE} = \text{Availability} * \text{Performance} * \text{Quality}$$

Where:

- 1. Availability:** takes into account Down Time loss and is calculated on the percentage of effective operating time in respect to planned production time.
- 2. Performances:** takes into account Speed Loss and is calculated on the percentage of pieces effectively produced in respect to programmed target total and ideal runtime.
- 3. Quality:** takes into account quality loss and is calculated on good pieces produced and total number of pieces produced.

These indicators are applicable using Time Range, Production Line, Machine, Shift, Batch and Operator filters.

All collected and recorded data are calculated and displayed in integrated Reports that are created by the Wizard automatically. These reports provide efficient production data analysis in full detail. Those areas experiencing inefficiencies are highlighted giving details on where and when production downtime occurred and the causes. These integrated reports can be completely customized with the Report Designer to integrate any other production data type needed analysing. They can also be cross-referenced with the production data of other company assets. All reports are Web-enabled thanks to the Movicon.NEXt HTML5 Web Client technology.



OEE Summary Table

Production line	Shift	Date	Production data						OEE analysis		
			Prod. pieces	Defect pieces	Total prod. pieces	Quality	Performance	Availability	Overall OEE	Losses	OEE loss
Line 1	Day	2014-06-01	1000	50	1050	95%	90%	85%	76%	24%	
Line 1	Night	2014-06-01	800	40	840	95%	88%	80%	71%	29%	
Line 2	Day	2014-06-01	1200	60	1260	95%	92%	88%	81%	19%	
Line 2	Night	2014-06-01	900	45	945	95%	89%	82%	74%	26%	
Line 3	Day	2014-06-01	1100	55	1155	95%	91%	86%	78%	22%	
Line 3	Night	2014-06-01	850	42	892	95%	87%	80%	72%	28%	
Line 4	Day	2014-06-01	1300	65	1365	95%	93%	89%	83%	17%	
Line 4	Night	2014-06-01	1000	50	1050	95%	90%	84%	76%	24%	
Line 5	Day	2014-06-01	950	47	997	95%	88%	83%	75%	25%	
Line 5	Night	2014-06-01	700	35	735	95%	85%	78%	70%	30%	



Downtime Analysis



Accurate Analysis is essential for productivity improvement

Downtime Analysis

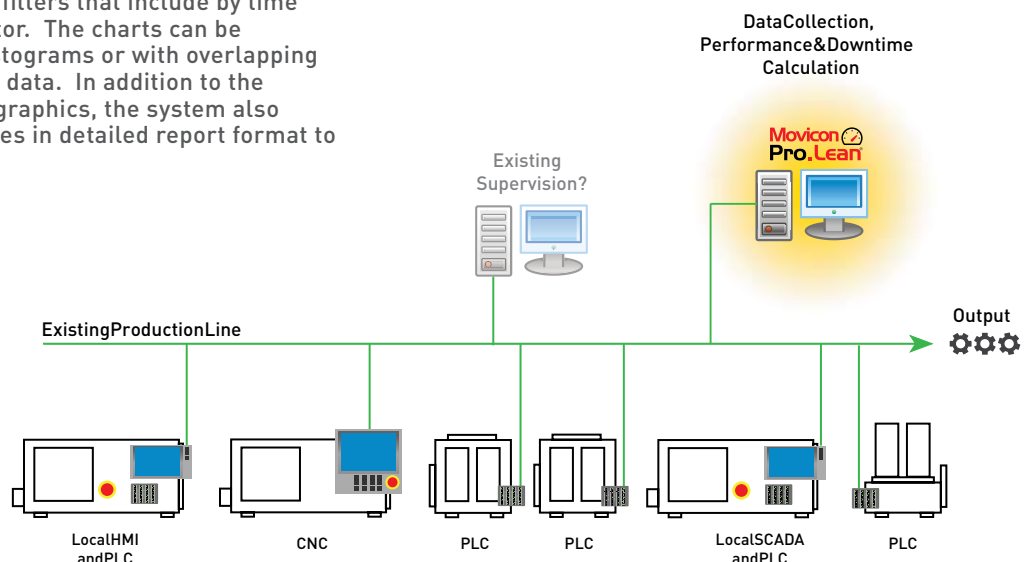
The performance indicators alone are not enough to detect the causes of inefficiencies. Data collection systems need to be evaluated for their capacity to provide the right information that enables detection of the macro causes that drive productivity loss and diminish performance. This information is essential to ascertain what and where the causes of inefficiency are in order to remove them. This requires the full cooperation of all operators to not only control alarm events, that are automatically triggered by the system, but to establish the reasons why production downtime events occur in the machinery being used (e.g. format change, setup, raw material shortage, scheduled maintenance, meetings and work breaks).

Pro.Lean® includes analysis modules for DownTime event causes that generate a statistical analysis of the downtime causes based on a selection of various configurable reasons. Production managers can refer to this analysis to obtain the vital information they need to recover efficiency and improve production management by implementing the most appropriate corrective interventions.

Statistical Analysis

The DownTime Analysis Module is used for visualizing statistical data relating to production downtimes. This is done by graphically representing data in classification of date order, total duration or event frequency. The values displayed in these classifications are extracted from historicals and then represented in charts offering a selection of different data filters that include by time range, batch, shift or operator. The charts can be displayed and printed as histograms or with overlapping curves to present statistical data. In addition to the statistical calculations and graphics, the system also provides data summary tables in detailed report format to represent all filtered data.

The information managed by Pro.Lean is essential for any production manager to improve the productivity performance of their assets by making machines more efficient, optimizing production time and reducing waste. A calculated low OEE value will inevitably cause the company an increase in production costs and hence a reduction in profits and opportunities. This would mean that a production line running 24/7 would lose 4% of its productivity potential for every hour lost in a production downtime event. By analyzing production data to detect the bottlenecks and downtime causes, the company will be able to take immediate action to prevent any further loss. For instance, by recovering 2% of production loss will gain 3.5 hours of productivity time a week. On an annual basis this will mean an additional 168 hours of productivity a year. Therefore a simple 2% production recovery translates into a significant increase in profits. Today, based on a theoretical OEE value of 100%, the most efficient companies operating with a high productivity rate can generally reach 80-85% of this value. Unfortunately this is not the case for many companies who only operate at an average of 60% of their estimated OEE value potential because they do not implement the necessary control procedures that would increase their market share. These companies would greatly benefit if they considered the opportunities offered by using the OEE indicators to reduce loss and increase profit as a consequence.





Connectivity and IIoT

Open data collection for total connectivity

Pro.Lean® is based on open architecture that integrates with any machine and production line control and management device. In fact a true integrated system should be capable of collecting any type of value from the field, whether deriving from PLCs, CNCs, PACs, Inverters, fieldbus or I/O instrumentation and this is what Pro.Lean® does.

I/O Drivers

The I/O Driver library contains a vast selection of native and integrated I/O Drivers for communicating with control system communication protocols (e.g. Modbus, Siemens, Schneider, Rockwell, Omron, Saia, Mitsubishi, Profibus, Profinet, EtherCAT and other).

OPC

Native and integrated OPC UA technology as Client and Server.

Networking and DB

Vast network connectivity with Networking applications based on database table sharing among distributed station networks, consisting of both HMI panels and third party managerial systems, that connect to any managerial system (ERP) or company SAP system. Movicon Pro.Energy® is the best connectivity system to use for monitoring and control at both field and managerial levels where energy consumption and production data intersect for cross referencing.

Industrial IoT

Communication Drivers for IoT system integration (e.g. reading tools on public networks). Includes PubNub, OPC UA Azure, MQTT and many other protocols.

Data Archivation on relational SQL Server™ database

All process data collected by Movicon Pro.Lean® are recorded and archived for subsequent analysis using the Data Logger objects that are automatically created by the Pro.Lean® Wizard.

The important job of the Wizard to aggregate data and define the recording and archiving modes is done with simplicity, reliability and openness. Pro.Lean® does not need to have a Microsoft SQL Server™ license in order to function in the simplest of architectures. Data tables are structured automatically and the calculation database provides dashboard viewers and analytical reports with all the information required for rapid and efficient analysis. The Pro.Lean® is a functional module of the Movicon. NEXt platform designed with a simple object-oriented configuration that allows users to customize how they want to manage, display and record real-time data.

Data Collection Openness

Collecting measures, operation statuses and alarms, that are not already available as digital information from the PLC, requires the production unit to be installed with a local HMI interface. The Pro.Lean® architecture is ideal for this because it can connect any data display screen whether local HMI, network or Web-based. It has been specifically designed with integrated features to directly manage a vast range of distributed data collection or visualization points for those systems requiring it. It is a future-proof solution designed to safeguard your investment and cost-effective because it does not require the installation or deployment of any additional software that would otherwise incur additional costs as well as time spent on invasive interventions.

Data Redundancy

Movicon Pro.Lean® provides the option to use a data Redundancy function that automatically synchronizes historical data in PC systems with redundant hardware and communications. This option makes it possible to deploy the Pro.Lean application in "Mission Critical" data collection systems.





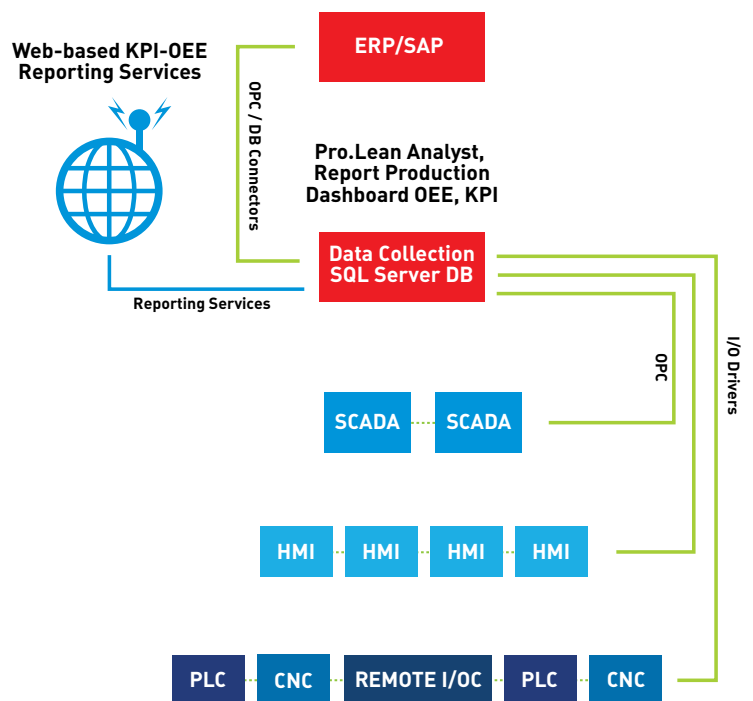
Rapid and safe investment

By investing little Pro.Lean[®] can be applied anywhere, in any production context, including those already with automation infrastructures, with a minimum level of invasiveness

Pro.Lean[®] is a “standard” solution that can be used in any production data and analysis application. It can be applied as a module onboard the machine or as a production line supervisory module combined with Movicon SCADA/HMI supervision projects, or in independent or stand-alone architectures applied in already existing systems. Pro.Lean[®] can connect to existing PLCs or SCADA/HMI by collecting production information in its databases. Existing PCs can be used by the local machine operator to track downtime event entries by using a simple web browser, without modifying the local application, if the PC is connected to a network or simple operator panels that are connectable to Pro.Lean[®]. Pro.Lean[®] also offers a solution for those without a main supervisor, whereby screens displaying data can be integrated to manage all production line information. Pro.Lean[®] has been entirely designed to use the best technology available for collecting, managing and analyzing production data. It has also been designed with the purpose to keep investments reduced to a minimum without the need to modify existing circumstances unless absolutely required.

Much more than just an Efficient Production Analysis system.

Thanks to Movicon.NExT, integrating all the functions needed to create true and powerful supervision architecture is very simple. Control Logic can be integrated to manage operation commands, parameter or recipe settings. Maintenance schedulers can also be used to manage and control alarm thresholds with subsequent diagnostics, signalling, on call duty personnel notification and statistics. Dynamic geographical maps can also be implemented to represent a series of systems distributed over different geographical areas, each one integrated with a corresponding data display window. Furthermore, any other information can also be added in relation to the context with which the Supervision and HMI system is being used.





The Key Features



Openness

Pro.Energy® is a Movicon functional module and therefore inherits the platform's .NET, XAML, SQL Server™ and HTML5 technology.

Simplicity and Wizards

The Pro.Energy® configuration wizard simplifies the task of selecting field variables and creates data collection databases automatically. Real-time Dashboards, calculation databases and analytical reports are created automatically within a few clicks. Applications are easy to create within minutes.

Standards

Pro.Energy® is completely based on standard technologies to safeguard your investment.

Performance.

Pro.Energy® ensures real-time data management and offers a structured data analysis of databases containing Big Data.

Powerful Historian

Collected data are recorded by the Historian objects and archived in SQL Server tables with automatic data recycling.

Connectivity.

Pro.Energy® offers a library containing a vast range of communication drivers ready to connect to any measuring and meter device (Modbus, Bacnet, Konnex, LON, Siemens, Schneider, Rockwell, Profibus, Profinet, Ethernet/IP and many others). The drivers include functionalities such as automatic Tag import, remote telemetry system and IIoT connectivity. Total connectivity via OPC UA as Client and Server is also provided.

Ready-to-use and Custom Reports

Pro.Energy® offers integrated, ready-to-use and Web-enabled Analysis Reports based on historical data. This solution also offers the option to integrate and customize your own reports using the Report Designer

HTML5 Web architecture

Pro.Energy® offers local and web-enabled dashboards with real-time measurements and reports. Data can be accessed on the Server using Internet browsers. Reductions in costs and maintenance are ensured with the high performance of Pro.Energy® and the security of the HTML5 standard.

Open and customizable OEE, KPI and Downtime Analysis Modules

The OEE, KPI and Downtime Analysis Modules offer simple and effective solutions to obtain and display all production data measures in a fast and transparent way. Ready-to-use Reports, Tables and Charts for complete production analysis with the option to print and export the represented data. All data are manageable in customizable architectures.

Integrated Connectivity with Movicon™

In addition to interfacing with any supervisor system, Pro.Energy® also offers integration and connectivity with the Movicon.NEXt SCADA/HMI systems.



Progea is at your full disposal to help and support you with your every analysis, Supervision or Consumption Monitoring project need. Please contact us for a demo or any further information:

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