PcVue Solutions

Success stories

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Customer: CERN

Switzerland

System Integrator: SPIE

Large Hadron Collider at CERN

PcVue solution manages thousands of safety alarms while handling a continuous growth of the application

CERN, the European Organization for Nuclear Research, is one of the world's largest and most respected centers for scientific research. Its business is fundamental physics, finding out what the Universe is made of and how it works. At CERN, the world's largest and most complex scientific instruments are used to study the basic constituents of matter—the fundamental particles. By studying what happens when these particles collide, physicists learn about the laws of nature.

The instruments used at CERN are particle accelerators and detectors. Accelerators boost beams of particles to high energies before they are made to collide with each other or with stationary targets. Detectors observe and record the results of these collisions. Founded in 1954, the CERN Laboratory sits astride the Franco–Swiss border near Geneva. It was one of Europe's first joint ventures and now has 20 European member states.

The project

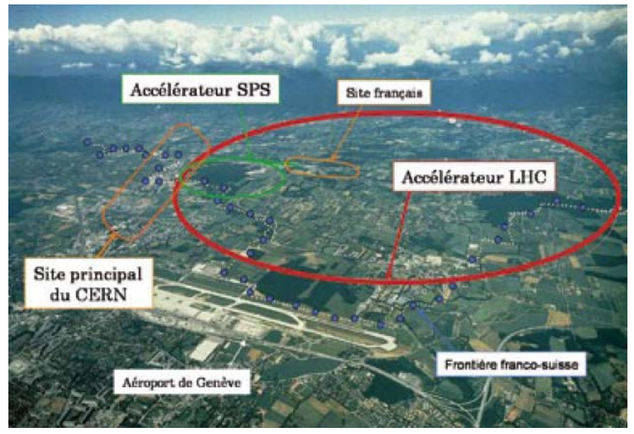
In 1994 CERN approved one of the most ambitious scientific projects of our era: the creation of the greatest and most complex particle accelerator in the world, the Large Hadron Collider (LHC), at a cost of nearly €7M ($9.5M USD). With this tool the researchers are intent on studying the elementary particles that make up matter, but also anti-matter, by recreating the initial conditions of the Big Bang, with the objective of clarifying the mystery of the creation of the universe.

BUSINESS OBJECTIVE

Safe operation of the Large Hadron Collider

The accelerator consists of a ring 27km (17 miles) in circumference at a depth of 100 meters (325 ft.) below the Franco-Swiss border.

In the year 2000 CERN launched a competition for a contract for a higher-performance safety system for the accelerator. Eventually SPIE, a European leader in electrical, mechanical and HVAC engineering, energy and communications systems, chose PcVue, a SCADA software from ARC Informatique for its flexibility to suit the specific requirements at CERN.



Dynamic supervision

The implementation of a supervisory system across such a geographically distributed site is complex and the degree of difficulty is heightened by the need for continuous development. This requires an on-line database to be available to handle an increasing number of data variables.

Thanks to the collaboration between ARC Informatique and SPIE, an innovative solution has been developed for a system able to be updated both dynamically and independently.

The applications extract the required information from a database of around 300,000 variables stored in Oracle.

Scientists working at CERN come from all round the world, hence another aspect that illustrates the dynamic nature of the supervisory system is the use of workstations with multilingual capability.

PcVue was able meet the necessary specifications to reach Safety Integrity Level 2 (SIL2) for the IEC 61508 standard of secure operation.

Keys to success

- ✓ Manage one or several buildings in a centralized and cohesive manner
- ✓ A centralized control room connected to 33 local alarm monitoring centers
- ✓ Manage 300,000 variables for a dynamic list of equipment
- ✓ Manage 21,000 alarms
- ✓ Accommodate multiple languages
- ✓ Achieve 99.98% reliability

Management of the alarms

The LHC project required the implementation of a central control room such that all of the supervisory terminals for CERN's 3 accelerators are in one location and able to monitor all safety related alarms. The alarms, managed by 2 file servers, are arranged in 4 levels of priority. Overall there are around 21,000 alarms that can be sent to the control room.

Management of the alarms results is particular important due to the layout and dimensions of the whole installation so it is seen as vital to implement the most efficient supervisory system possible.

The supervisory system is a fundamental element of the project but the most complex part to implement has been a redundant network for alarm management. This redundant TCP/IP network connects the various LSACs (Local Safety Alarm Controller) for automatic display of alarms in the 33 different safety zones and the SAMC (Safety Alarm Monitoring Center) with its data acquisition file server.

Each of the safety zones has 2 redundant PLCs for acquiring the alarms. These have been installed with touch-screen Panel PCs that act as PcVue clients with the same functionality as the central stations. The alarm management system was already operational before the LHC system was activated.

Everything is measured, published and archived, from curves of gas detection in the buildings to transmission times for the alarms. The criticality of the system further requires no more than 100 minutes of downtime a year. Given the importance of the application, everything has to be flawlessly under control.

Results

The solution with PcVue meets the specification to reach Safety Integrity Level 2 (SIL2)

Customer: Grenoble Alpes University Hospital

France

System Integrator: Adeunis

Grenoble Alpes University Hospital

Adeunis and ARC Informatique join forces to create a building management system solution (BMS) integrating the IoT universe at the Grenoble Alpes University Hospital

Two recognized player in IoT technologies are integrating their solutions to achieve unprecedented IoT equipment integration with an existing Building Management System (BMS) using LoRaWAN technology at the heart. The Grenoble Alpes University Hospital´s technical teams wanted to be able to instrument and control various equipment quickly, inexpensively and without cabling (Ethernet and power). The Grenoble Hospital asked Adeunis and ARC Informatique the question of how to best solve this operational challenge.

In addition, the Hospital expressed the wish to do this with their existing BMS software without adding additional software layers. PcVue supervision published by ARC Informatique, is the BMS in charge of managing two of the Hospital´s sites, the GTB and the GTE site.

The first step, of this project consisted of a LoRaWAN radio coverage study of the site. This study, done by the Adeunis team, who are experts in this field, made it possible to identify the best location of the LoRa antenna, to ensure the zones (floors, buildings, parking, etc.) are correctly covered to allow desired positioning of the Adeunis® IoT sensors.

The LoRaWAN architecture makes it possible to set up a private network, specifically in indoor and deep indoor configurations, while taking advantage of the radio coverage of LoRaWan´s "Long Range" network. Indeed, only one antenna at the top of a building (15th floor) can cover almost all buildings on the site but also reach a second site about 6kms away. The cost of the network infrastructure is therefore very small when compared to a WiFi solution.

After the preparation and installation of the LoRaWAN infrastructure by the Adeunis team, the Adeunis® "PULSE" IoT sensors were installed to measure water meter readings on numerous external locations of the Grenoble University Hospital. Other sensors detect drifts in temperatures in sensitive locations such as drug storage areas.

The integration of the LoRaWan network at the heart of the GTB PcVue solution allows feedback from sensors used with the existing BMS supervision. The "raw" data of the sensor (Temperature, On / Off) is enhanced by the power of PcVue to enrich and treat this data including, creation of threshold, alarms, mimic, curves and archiving.

Integration of IoT equipment maintenance data is also implemented with monitoring of remaining battery life of sensors and sensor position in the building.

This project thus provides the operator with significant savings both in commissioning and in operation of the Hospital facilities. Furthermore, the installation of the LoRaWAN infrastructure allows development of many new services through additional sensors integrated with PcVue´s data treatment features.

In conclusion, these GTB hybrid solutions, allowing both the control of standard automation equipment and simplified instrumentation thanks to the use of Adeunis® IoT technologies, are clearly part of a modern and innovative approach.

This technological partnership between Adeunis and ARC Informatique will solve many use cases in other sectors such as infrastructure, water, environment or the industry of the future, sectors where these two players have already acquired strong expertise.

Customer: Le Louvre des Entreprises

France

System Integrator:
APILOG AUTOMATION

The Louvre building management system (BMS)

Solution with PcVue reaching up to 30% energy savings

The building's owner SFL (Lyon Property Company) recently undertook extensive renovation of the Louvre office space. An efficient BMS was needed to enable the company to monitor and operate the 37,000m² (400,000 ft²) building. The objective is to allow energy consumption to be reduced by 20% to 30%. This building dates from 1852 and is situated opposite the Louvre Museum in Paris. It was built at the direction of French emperor Napoleon III and was initially used for shops. Today, the first two levels of the Antique Dealers' Louvre contains over 250 shops in 10,000 m² (108,000 ft²) including 30 artistic specialty shops with artifacts from Europe, Asia and the Middle East.

Six upper floors are dedicated to the business Center called The Business Louvre (Louvre des Entreprises) which has hosted prestigious tenants since 1990, including the Ministry of Finance, the U.S. Embassy and the Bank of France.

The general contractor selected APILOG AUTOMATION to implement the BMS package. The scope of work includes some equipment for The Business Louvre and some common equipment and supplies shared with the Antique Dealers' Louvre.

The PcVue supervision monitors various equipment including:

- France Energie heat pumps with KARNO OEM regulators; in all, 1,200 heat pumps will be monitored.
- Lighting with ACELIA infrared multi-sensor modules.
- Blinds with ACELIA modules for 230V motors.
- THERMOKON remote controls for centralized control of heat pumps, lighting and blinds.
- Data acquisition from divisional panels on several levels, via Johnson Controls FX15 PLCs.

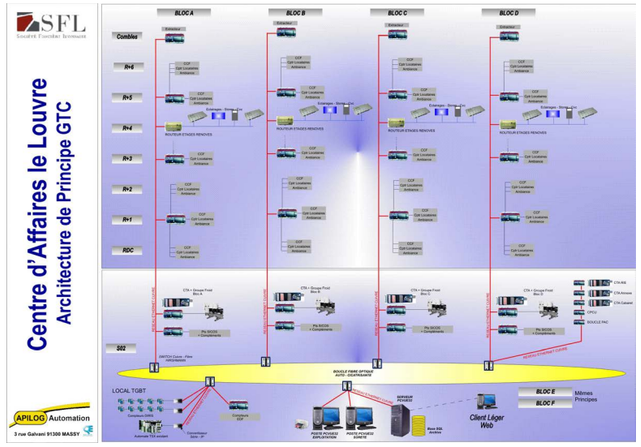
This architecture uses LonWorks® technology and is complemented by:

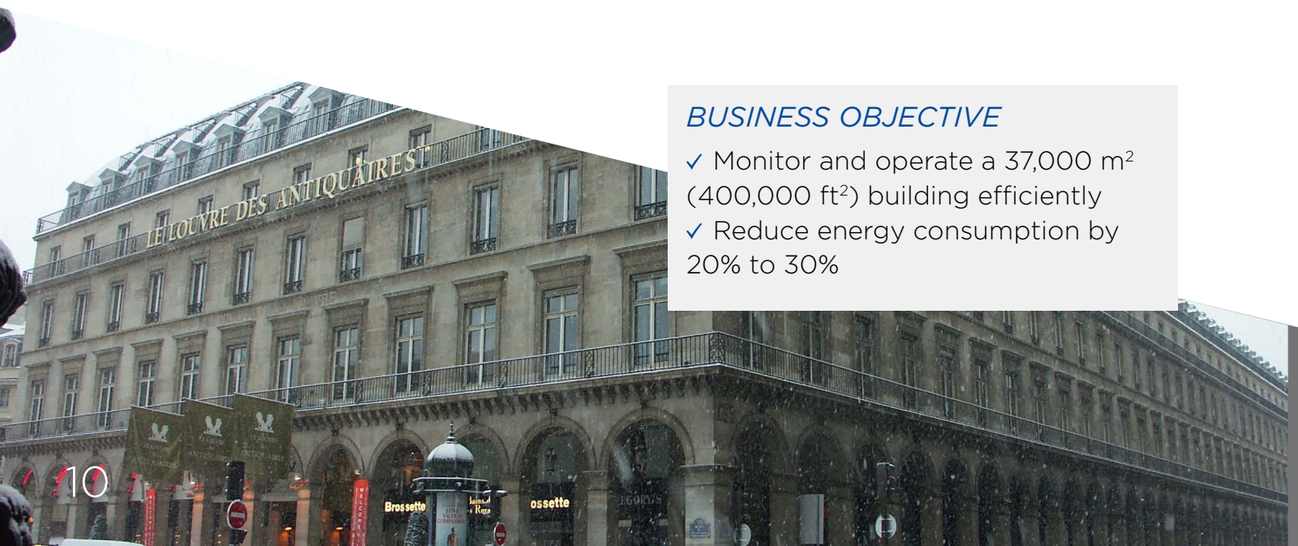
- Supply equipment: air conditioning units and substations for electrical regulation and distribution, controlled via TREND IP devices.
- All of the tenants' meters and the central low-tension boards: PcVue processes and analyzes data from some 250 meters on Modbus.
- A TSX PLC supports management of the backup supply (GE).

The scope of the project will comprise over 2,500 LonWorks® nodes.

The BMS architecture consists of 36 Loytec L-INX servers, 3 PcVue supervisory stations with WebVue thin-client access via Internet/intranet and NL Facilities from Newron System (using the Monitoring and Zoning version for surveillance and subdivision of areas).

Together with PcVue's flexibility and advanced technology, APILOG AUTOMATION was able to achieve open systems integration of the hardware and software. The solution provides for management of all of the





BUSINESS OBJECTIVE

✓ Monitor and operate a 37,000 m² (400,000 ft²) building efficiently

✓ Reduce energy consumption by 20% to 30%

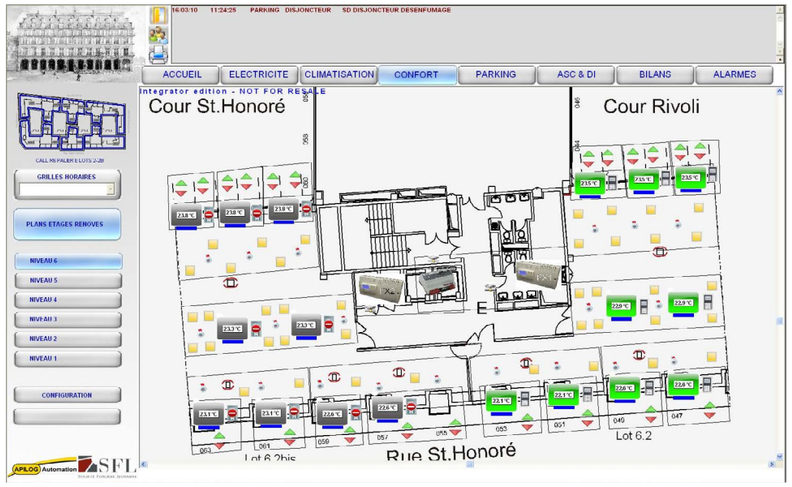
Keys to success

✓ Integration of all building equipment and control panels using a variety of communication protocols including 2,500 LonWorks® nodes

✓ Remote access to graphical screens

building's equipment and quick response times in case of emergency. It exhibits easy-to-use, effective behavior that affords quick control of each area while allowing for dynamic reconfiguration.

This application is outstanding for its management and optimization of energy consumption, meeting expected energy savings in the order of 20% to 30%.



Results

Solution with PcVue results in energy savings up to 30%

PcVue solution allows rapid control and dynamic reconfiguration of each building area enabling quick response to emergencies

Customer: Passivhaus

Luxembourg

System Integrator: GIGA-Automation

Passivhaus Steffen

Optimized energy performance of an ultra-low energy building using PcVue Solutions

This trend-setting building is a clinic for physical therapy. It also houses the offices of the builder, Steffen Holzbau. All of the efficiency systems are monitored from a PcVue BMS system with remote WebVue access linked to BACnet controllers and communication.

As a specialist in design of wooden buildings, Steffen Holzbau planned and built the facility in cooperation with Sanichaufer based in Luxembourg - where the building is situated - and the contractor GIGA-Automation of Saarbrücken in Germany. GIGA-Automation is a PcVue Solutions Certified Partner which provides integrated building management systems (IBMS) in Germany and Luxembourg.

The BACnet network was developed to rigorous specifications: PcVue for the operator workstation and control system, DDCs from SAIA Burgess with native BACnet communication and a Menerga Control System for the swimming pool and therapy controls.

The building conforms to the Passivhaus standard for energy efficiency with minimum ecological footprint. The clinical and administrative areas have been optimized for ultra-low energy usage across several kinds of heating and cooling.

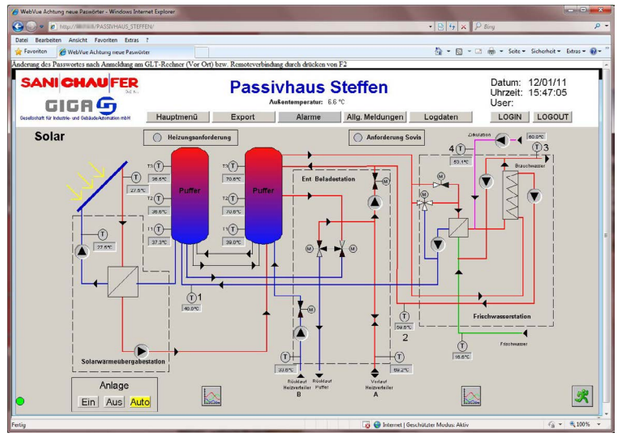
Two central ventilation systems provide sterilized air to both areas. The cooling and heating plant uses special convector systems built into the floors and arranged in front of the window surfaces.

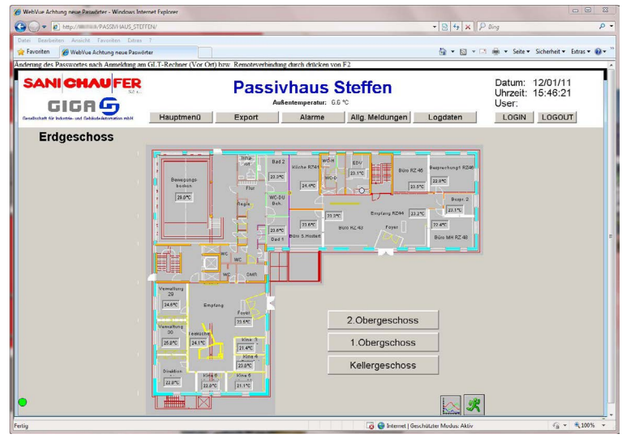
The ventilation is equipped with efficient heat recovery systems and adiabatic cooling. There are approximately 50 m^2 (550 ft^2) of solar panels on the roof for hot water production and heating support. As backup for the solar water heating (140 kW) both the ventilation and the pool heating are assisted by woodchip boilers (100 kW) and an oil-burning system.

The high-grade steel therapy pool has a water treatment plant installed to ensure water quality. The pool is equipped with a countercurrent feature and underwater massage nozzles. Space heating and dehumidifying of the swimming-pool area are achieved with a special air handling unit.

PcVue combines the data from those systems and from 65 sensors at various points in the façade, roof and outer surface of the building to measure temperature and in some cases humidity.

The results are sent to a laboratory for evaluation to assess the influence of external conditions on the internal environment and thus help to optimize the building´s energy performance.





BUSINESS OBJECTIVE

Optimize energy efficiency with minimum ecological footprint

Keys to success

- ✓ Automatically populate PcVue's database using BACnet EDE-File giving access to 2,000 I/O points
- ✓ Include BACnet scheduling for the pool heating cycle
- ✓ Archive monitored points with SQL Server and use SQL Server Reporting Services (SRSS) for data exchange with scientific institutions for energy analysis

For complete control of the clinical and office areas the BACnet EDE-File Import process populates the PcVue database automatically. The BACnet communication gives access to 2,000 BACnet I/O points in total.

The project also includes BACnet Scheduling for the pool heating cycle. Historical data will be archived using Microsoft SQL Server. Reporting is via SQL Server Reporting Services (SRSS) for data exchange with scientific institutions, including spreadsheet export for the energy analysis.

Results

Solution with PcVue optimizes energy usage in an ultra-low energy building

Customer: St. Joseph-Stift hospital

Germany

St. Joseph-Stift hospital

St. Joseph-Stift hospital in Dresden relies on networked solution that secures the building envelope, but also much more

In its efforts to provide more security against unauthorized access and improved monitoring and control, the technical services department of the St. Joseph-Stift hospital in Dresden relies on the proven technology of the BMS manufacturer PcVue and the door and window specialist GEZE. Over time the originally isolated PcVue solution becomes an all-purpose tool.

In the 2019 major hospital rating of the Frankfurter Allgemeine Zeitung (Frankfurt general newspaper, FAZ), the St. Joseph-Stift in Dresden came top six in the category "150 to under 300 beds": The patients surveyed were not only above average satisfied with the medical and nursing care, but the hospital also received top marks for the organization of procedures and service. The hospital, which currently has 250 beds, treats around 35,000 patients a year. In order that the nursing and medical staff can concentrate fully on the patients, the hospital operator also regularly invests in the technical infrastructure. The new comprehensive control technology solution from PcVue and GEZE is an example.

In the origin the visualization and control function of an existing intercom system was used for the building´s door and lock automation. Due to further requirements, especially with regard to scheduling and standardization of the data exchange with a heterogeneous field layer, the need for a comprehensive monitoring and control solution became apparent.

This solution exists in the form of PcVue, which connects doors and locks from different manufacturers via the OPC, ICX and BACnet communication protocols.

That generates a powerful abstraction layer, at instant. A particularly elegant solution is the connection of GEZE door systems via BACnet/IP, as the PcVue software includes a dedicated library with symbols and function blocks for various GEZE module types. Thanks to this simple integration, the connection can be carried out independently by the technicians on site.

PcVue enables the implementation of complex, building-specific logics, which are necessary due to the existing building topology. Sequential control and flexible networking options are of fundamental importance in such scenarios. The same applies to the special purpose emergency switch in the emergency room. In the event of structural changes, it must be possible to convert escape routes at any time. Thanks to the use of a PcVue developer license, as well as the intuitive configuration interface of the PcVue software and the intensive on-site training, it is possible for technical staff to reconfigure the system at any time.

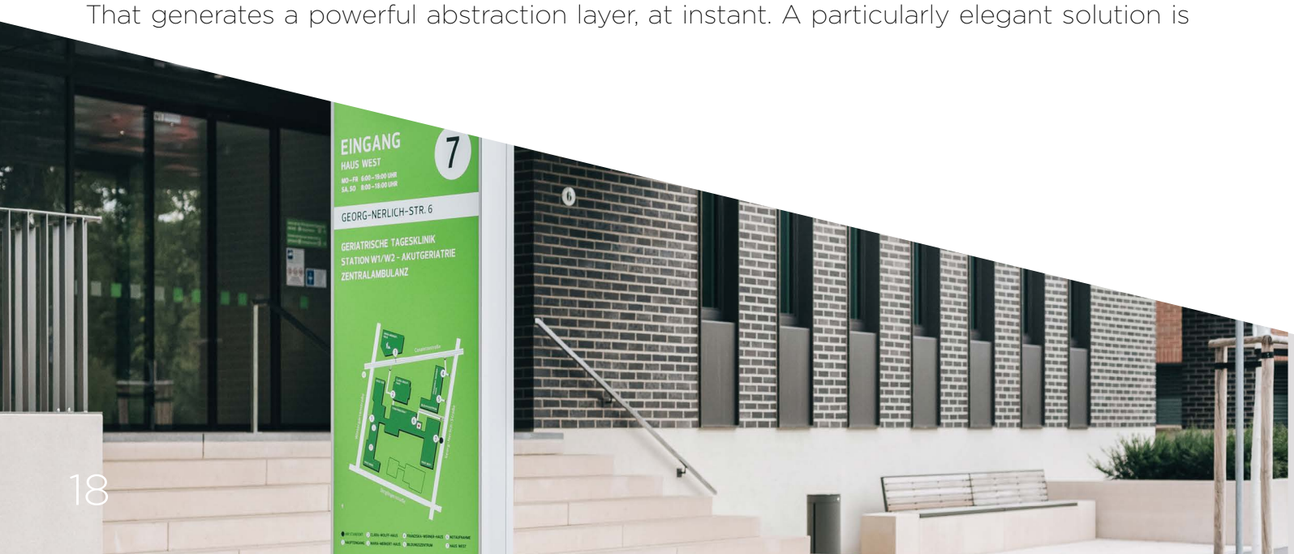
A multitude of benefits for various user roles

Users of the system include medical and administrative staff. Using web-based thin clients on 32" flat screens at the gate and in the emergency room staff can always keep an eye on the status of the building´s lock status. At off-peak times, the medical staff in the emergency room and receptionists are authorized to acknowledge certain alarms autonomously. Torsten Klotzsche, head of the building´s technical services department, describes the requirements for the system as follows, among other things "The aim is to facilitate the daily work of the operating departments". Above all, this could be achieved by relieving certain functional areas.

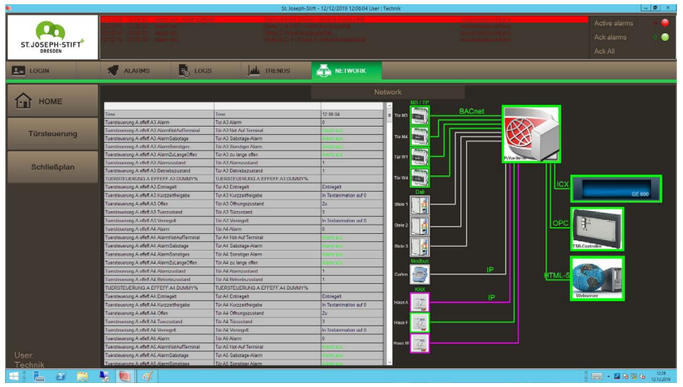
His own department also benefits from the system´s versatile functionality. Thanks to the 100% Wi-Fi coverage within the building area, which has been in place since 2019, technical staff have access to the PcVue web visualization (WebVue) via notebook and tablet anywhere and at any time, which is a decisive advantage for mobile maintenance workers. An additional screen is available in the technical area, which also serves as an alarm monitor for the on-call service.

A uniform architecture and extensive networking possibilities

Torsten Klotzsche´s vision of "achieving intelligent control of neuralgic information and control points with manageable investments" is fulfilled by the solution in that the four main buildings and four annexes of the facility can be supervised with a simple yet flexible,



future-proof architecture. The control system consists of a PcVue server station for up to 65,000 data points, five web clients and a development and test station. All stations are networked with each other, so that new project versions can be created, deployed and distributed at any time. This happens almost in real time, as PcVue projects do not have to be compiled before deployment. Data and control commands are currently exchanged via several different communication protocols, including BACnet, OPC, Modbus, KNX and ICX. Also integrated into the project´s web interface is the WebScheduler, the user interface for managing PcVue´s native schedules and BACnet schedule objects. By now PcVue even monitors status messages from the intercom system by using the ICX protocol.



Connecting the doors brings more transparency, comfort and safety.

Locking the doors in the evening once forgotten is a thing of the past. Thus, for example, unwanted visitors remain outside, which could cause a lot of damage in such a property. Instead, the doors are now automatically locked by the system after a certain time using sophisticated scheduling. The controlled admission of persons is easily possible at any time.

Other functions that have changed as part of the integration are:

- Temporarily putting indoor doors into "permanently open" state; reducing the door cycles (movement of the door)
- Connecting the weather station; enabling the doors to be opened and closed accordingly (e.g. in strong winds) or to switch into automatic mode

The first GEZE doors are now connected to the PcVue system thanks to the simple integration. This creates more transparency, offers more comfort and above all makes the building safer. Thanks to that technology, the conversion measures were changed while the building was still in operation without affecting the regular operation of the building. It was possible for the technical team on site to create an intelligent door control system with manageable investments. In the first stage of the expansion, three door control units, three sluice systems, a revolving door and several other automatic doors were activated.

This also relieves the staff, doors no longer must be locked manually, unexpected visitors have no access and the technician on site has an easier time managing the building. During the next round of door maintenance, a check is made to see which door systems can be connected to the PcVue system with little effort using BACnet. This simplifies to connect the subsystem "doors" step by step.

Further system expansion

After the planned handover of the control system to the IT department of the hospital and the associated virtualization of the system, the connection of further GEZE automatic doors, the integration of blind controls, as well as critical and non-critical power supply lighting over KNX into the system are planned for the near future. The incorporation of remote branch offices via the IOT protocol LoRa, as well as the integration of video surveillance systems in PcVue, also play a role in the considerations of the technical team. Furthermore, a new part of the building is planned, where the entrance door will also be connected via BACnet. All this is easy to implement with the versatile PcVue solution. The technicians on site therefore have now a true all-purpose tool at their disposal.

Customer: TelecityGroup

France

System Integrator: ETDE

TelecityGroup Data Center

Data Center customers receive realtime energy reports from PcVue solution

Systems integrator ETDE has chosen PcVue from ARC Informatique to monitor the electricity distribution and air conditioning systems for the entire range of installations at TelecityGroup´s new Data Center in the Paris region.

The software´s openness and the simple hierarchy used for the communication architecture were determining factors in this choice.

PcVue can, as part of its functions, generate reports on the electricity consumption by each of the servers operated by TelecityGroup´s customers.

TelecityGroup, whose head office is in London, is the European leader in independent data center operators. The company designs, develops and manages high-connectivity secure environments where technical, Web and IT infrastructures can be hosted in total security.

TelecityGroup manages 23 data centers across the main European business hubs.

Its new building, Condorcet, with 3400 m^2 (36,000 ft^2) of floor space available to customers, is the perfect solution for businesses looking to locate their critical infrastructure in a data center. It won the trophy for “Best Data Center in Europe” at the Data Center European awards 2010.

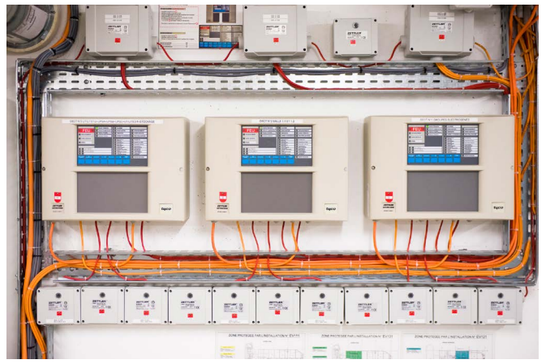
BUSINESS OBJECTIVE

✓ Report Data Center customers’ electrical use of their servers

✓ Monitor the air conditioning to reduce energy consumption

The new site has been designed in accordance with international standard ISO 27001:2005, which governs information security, and ISO 14001:2004, which ensures effective environmental management.

Energy-efficient design principles have been implemented in the construction of the building, along with the use of sophisticated intelligent air conditioning and free cooling technology to reduce energy consumption.



In addition, the multiple connectivity options available on site are enhanced by PANAP and SFINX connectivity, offering customers high-quality national and international peering and Internet connectivity options.

The building includes a monitoring center, an NOC (Network Operations Center), with a video wall comprising twelve 52-inch screens, each dedicated to a different system: 6 screens for security and video surveillance, 1 screen for fire detection, 3 screens for systems operation applications, and two PcVue workstations.

The first workstation is dedicated to the electrical distribution system, and the second manages the air conditioning. Each workstation has three screens: one screen showing a schematic diagram (air conditioning and electrical supply) on the video wall, and two further screens at the operator stations.

One is for a detailed systems display, and one remote screen for PC Security monitoring, and which includes the general schematic.

Keys to success

✓ Conformance to ISO 27001:2005, which governs information security

✓ Conformance to ISO 14001:2004, which ensures effective environmental management

✓ Open, multiprotocol system compatible with standards compatible with building management control systems and PLCs

“We chose PcVue for two main reasons. First, so that we could provide our customer, TelecityGroup, with an open, multi-protocol system capable of keeping up with new standards in the market, and compatible with building management control systems and PLCs.

The second reason was that with PcVue there are only two protocol conversion points. Direct LON or MODBUS communication gateways collect the reading data and then the PLCs are directly accessible via the IP network.

This simple-hierarchy architecture is much more reliable and offers faster data processing. With the other solutions on the market, there can be up to 4 different conversion layers before reaching an SQL type database”, explains Hélène Gaury from ETDE.

On the electrical supply side, PcVue monitors all of the systems, from the transformers to the uninterruptible power supplies, distribution boards and consumption meters for each of the server bays. On the air conditioning side, PcVue includes monitoring of the whole circuit from the cooler units to the pumps, root-top installations and cabinet air conditioners in the server areas.

The Dream Report software - an integral part of ARC Informatique´s PcVue Solutions offer - allows TelecityGroup to generate complete dynamic reports about the systems, and particularly the amount of electricity used by each customer.

Results

PcVue solution tracks and generates electrical use report for each data center customer

PcVue solution monitors the entire air conditioning circuit and computer security

Customer: Iberdrola Ingeniería

Spain

System Integrator: IBERINCO

Iberdrola Renewable Energies Toledo Operation Center

PcVue is the CORE SCADA solution for efficient remote control of wind farms

Iberdrola Renewables is the world leader in electricity production from renewable sources, in particular from wind power. Founded in 1995 by merging several engineering companies, Iberdrola Ingeniería y Construcción is an energy operations center at Toledo, near Madrid, that manages and remotely controls ten wind farms across all the regions of Spain. The firm is responsible for the installations in terms of electrical generation, distribution and control. It ensures services that comprise project management, engineering, supply, construction and operational support. Iberdrola Renewables aim is to provide the service without geographical limits.

In the context of a project for supervision and control of modern wind power systems, Iberdrola Ingeniería has chosen ARC Informatique's PcVue software for its reliability, scalability and high performance in a Client-Server data architecture.

The main objective of the project was to make the information from the wind farms, especially alarms and historical data, available remotely.

The control system at each site samples the main operational data from the generators and the various substations. These systems are connected to the CORE (Iberdrola's Renewable Energies Operation Center) via long-distance communication links.

BUSINESS OBJECTIVE

- ✓ Remote access to wind farm information
- ✓ Ensure efficient service

PcVue Solutions

CORE uses this data to identify and diagnose potential problems and respond with corrective action. Previously each wind farm was monitored from one local SCADA station and the operators sent the data in by telephone. All the required data were saved to disk and then forwarded for manual data recording.

For remote monitoring of the wind farms and so for remote control through a dedicated VSAT network, Iberdrola Renewables has chosen to install in the CORE an OPC based architecture with PcVue SCADA server and FrontVue clients.

PcVue and FrontVue are both Windows-based software packages capable of managing millions of I/O points online from thousands of devices. The PcVue-FrontVue SCADA system in the CORE has been implemented to provide the operators with all the required information regarding alarms from the turbines.

Up to 2.4 million data items are monitored by the FrontVue client stations, which communicate via OPC with the front end over a 1,000 Mbps redundant TCP/IP Ethernet network. Each front end can receive up to 70,000 I/O points.

Currently they are 30 redundant PcVue servers that manage a million real-time variables and the network can be extended without limits or structural changes.

An easy, efficient process

Using the PcVue-FrontVue architecture, the operators can analyze the data from the remote wind farms in detail.

Given the huge volume of data (around 350 points per turbine) and so as to ease maintenance operations, the supervision takes place at two levels:

- The upper level gives a panoramic view of the most significant alarms, data values and counters, as required for monitoring the turbines and to detect faults that require intervention;

Keys to success

- ✓ Reliability of the SCADA software
- ✓ Scalability
- ✓ High Performance
- ✓ Open system to interface to third-party automation technology

- The next level is more detailed to enable better analysis of all the data from the turbines so that the operators can immediately and accurately diagnose problems and take appropriate action.

All of the data received are processed by way of set points, historical data, alarms and trends.

The solution implemented with the PcVue SCADA software has allowed a remarkable reduction in maintenance costs, while centralizing all the information from the remotely controlled plants.

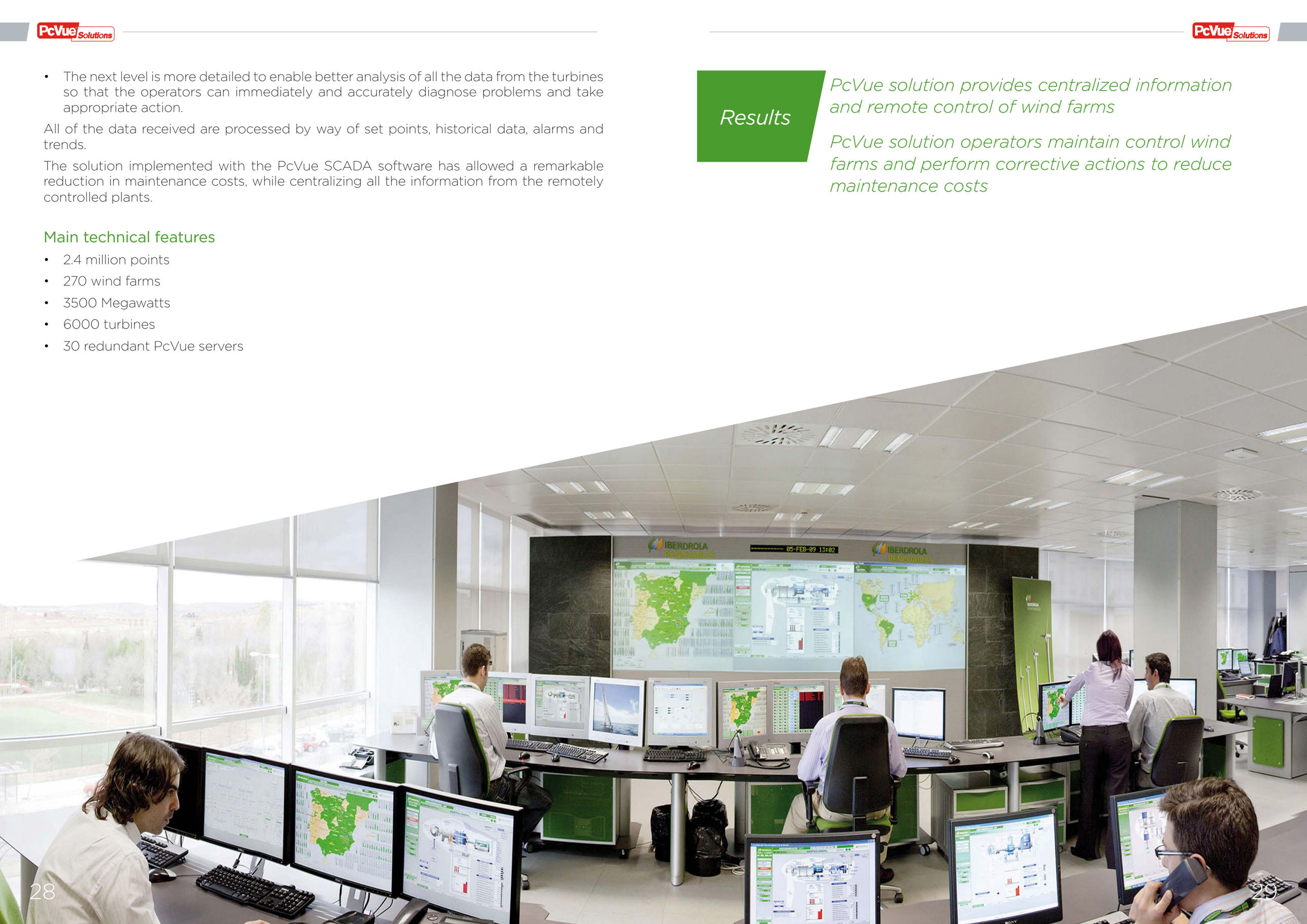
Main technical features

- 2.4 million points
- 270 wind farms
- 3500 Megawatts
- 6000 turbines
- 30 redundant PcVue servers

Results

PcVue solution provides centralized information and remote control of wind farms

PcVue solution operators maintain control wind farms and perform corrective actions to reduce maintenance costs



Customer: Iberdrola Renewables Inc.

USA

System Integrator: IBERINCO

Iberdrola Renewable Energies Portland Operation Center

PcVue is the nerve center of a solution for centralized control of wind farms across the United States

Wind energy is the fastest-growing source of energy in the world and a tremendous source of homegrown power. And Iberdrola Renewables has a nerve center in the wind industry at its National Control Center in Portland, Oregon.

Iberdrola Renewables is the largest provider of wind energy in the world and the second-largest provider in North America, helping utilities to 'green up' their energy portfolios. The Center is professionally staffed 24/7/365 to provide energy management, scheduling and generation dispatch. These capabilities help the customers of Iberdrola Renewables to manage risks and uncertainty in the natural gas and power generation industries while fulfilling energy requirements with clean, sustainable power.

The company began operating in Oregon in 2001 with 12 employees. At that time it was called PPM Energy and was part of Scottish Power. As of 2010, more than 850 workers throughout the United States maintain, develop, build and operate over 3,500 megawatts of wind power and other energy facilities in 20 states. With a goal of adding about 1,000 megawatts of new renewables each year, this exceeds the capacity of any other renewable energy supplier in the U.S.

The latest operation at Iberdrola Renewables is the National Control Center. Located in a room that looks a little like NASA's Mission Control, systems analysts oversee every turbine at every wind farm throughout the country, 24-seven. They monitor the performance and efficiency of every turbine. They keep an eye on approaching storms to warn technicians in the field to get to safety before harsh weather hits. They even help scientists conduct groundbreaking wildlife research at wind farms. And they help the nation's various transmission system operators ensure grid reliability to keep the lights on under any circumstance!

A vital element of this operation is the SCADA system. Each wind turbine has a control box at the top containing a PLC, power converter, control boards and I/O device. Sensors for wind speed, wind direction, shaft rotation speed and numerous other factors collect and transfer data to the PLC. By detecting the direction of the wind, the control system can use a motorized yaw gear to turn the entire turbine in the proper direction for maximum power generation. All turbines are connected to a Local Area Network (LAN), with each wind tower's control box using Ethernet to link to the base of the tower where there is a fiber-based, redundant ring LAN connection. The LAN is connected to a remote control station running a control system that manages and collects data, adjusts turbine settings and provides intelligent alarm, troubleshooting and reporting capabilities via the central facility.

The National Control Center has a powerful SCADA system supplied by PcVue that acts as a 'nerve center' for all of the wind farms. It connects to this central control room the individual turbines, substations, meteorological stations, bird/bat avian radar and other surveillance systems for preserving wildlife. It provides visibility for the operator to supervise the behavior of all the wind turbines in all of the wind farms. By keeping a record of activity on a time-interval basis, the SCADA allows the operator to determine what adjustments and corrective action, if any, need to be taken. It also records energy output, availability and error signals. It offers the capability to implement any compliance requirements and to control (among other matters) the power factor, voltage and reactive power production. This is to manage the wind farms' contributions to network voltage and frequency control. It also enables operators to manage power output based on real-time grid requirements.

BUSINESS OBJECTIVE

- ✓ Monitor and control of wind farms installed across the US, from one location
- ✓ Manage a big data system
- ✓ Scalable at high growth rate

Keys to success

- ✓ Robust and reliable architecture which is easy to extend to new wind farms
- ✓ Scalable to hundreds of thousands of tags accessible from multiple clients 3500 Megawatts
- ✓ Open system allowing easy integration with other automation technology

The SCADA communicates with the turbines via a communications network that uses optical fiber for almost all its links. Iberdrola Renewables uses turbines of various types and each turbine supplier provides their own control/HMI system.

The major advantages of using PcVue as the main SCADA system are that it is neutral to turbine suppliers and is not tied to any one PLC vendor so it can be free to provide data reporting and analysis formats irrespective of turbine type.

PcVue is one of the few SCADA providers on the market that is not owned by a PLC provider and is able to invest wholly in its core competency, which is about robust, high performance SCADA systems. This was of particular importance to Iberdrola who have wind farm operators using many turbine types and a myriad of PLC types.

The Iberdrola team also really liked how PcVue is user-friendly and easy to configure. Its ability to iconize animated mimics and use pop-up windows reduced the risk of overlaying crucial information and helped to simplify the SCADA view. Also, the creation of templates for contents and behavior ensures consistency of all animations in mimics. Iberdrola uses multi-level access rights and menus associated with each user to ensure that navigation within the application is tailored to the needs and permissions of each individual. This ensures a layer of security, traceability and control for users' actions.

Iberdrola Renewables has been in the global energy business since 2000. In the past with a small number of wind turbines transmitting energy into the grid, the process of entry to the industry was fairly easy. Currently, congestion has become a large issue with wind energy suppliers balancing energy production with available inputs for transmission. Requirements are quite strict, thus Iberdrola has designed an integrated system using curtailment via set-points to manage the generation profile on a real-time basis. They are working towards a more scalable system to suit the next generation of renewable energy markets.

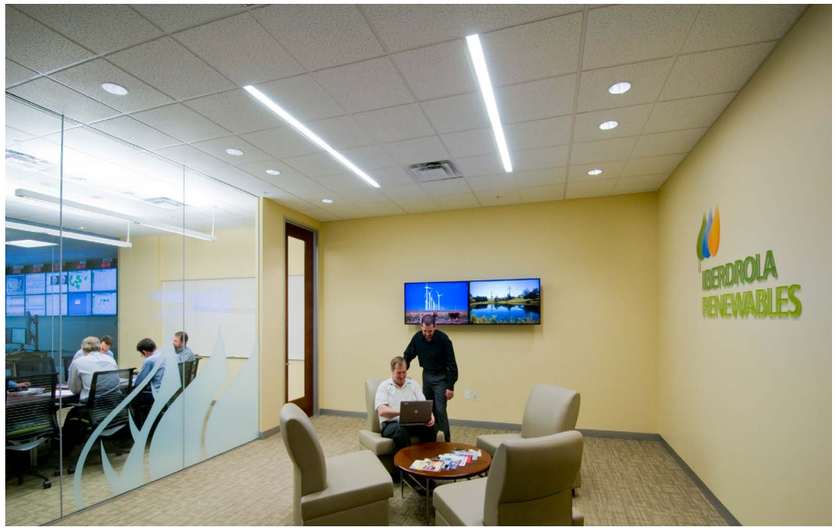
According to the Managing Director, Head of Operations Services – Wind Operations for Iberdrola Renewables in Portland, Oregon, "we are installing wind turbines to operate in harmony with other sources such as nuclear power, solar, hydro and other energy in a netting arrangement to optimize performance. We are on the cutting edge."

To manage their growing business, Iberdrola Renewables has developed fiber optic networks on their wind farms in the U.S. along with the National Control Center that is a state of the art facility located in Portland, Oregon.

PcVue's centralized configuration provides the capabilities for management and traceability of the various application versions and changes. It also supports automatic updating of the stations that make up the supervisory system. At each start-up of a station on the network, PcVue automatically runs consistency checks of the application versions in use. Without geographical limitations, the Operation Center has a global potential to supply energy management services to any owner of such facilities. The facilities in the U.S. are currently producing 3,600 megawatts of wind power across 50 independent power plants. Iberdrola maintains 2,479 wind turbines.

Each wind turbine supplies about 300 to 350 data points, which equates to approximately 700,000 to 850,000 I/O data points on more than 22 servers. To cope with the diverse demands of maintaining Iberdrola's wind farms, the PcVue application's alarms are highly configurable. Alarm messages may be printed, viewed in alarm lists and archived.

Operators configure the behavior of alarms by using groups, filters, sorting, acknowledgement and masking. They also create alarm counters and associate specific actions with any alarm. Alarms can be acknowledged by operators directly from mimics and those actions



can be broadcast automatically to all nodes on the network.

Iberdrola Renewables is using OPC as the communications protocol, along with other protocols, to pull data from the various PLCs. Wind farm applications often use OPC™ and the KEPServerEX™ driver to communicate seamlessly with diverse systems. Iberdrola uses PcVue's OPC Data Access Client and the OPC DA XML Client for exchange of real-time data with communication servers, plus the OPC DA Server to facilitate data exchange with third party applications.

All of the data acquisition that occurs is routed back to the National Control Center. The development team at the National Control Center in Oregon found the PcVue Solution to be reliable, scalable and easy to configure. CORE had been kept up and running very successfully. PcVue provides a single user view that allows an easy visual display and overall management of the myriad systems in place from the PLC, HMI and control system equipped on the turbines.

According to the Managing Director of the Control Center. *"As we monitor avian migration and weather in addition to controlling and managing our turbines, we needed a system that would provide a simple, easy to read GUI so that we can react at a moment's notice."*

The new PcVue SCADA software integrates and connects with the wind turbines via the PcVue-GUI interface acting as a light client to the PcVue application and managing up to 2.5 million data elements. This configuration provides the operator with all required information about the turbine signals.

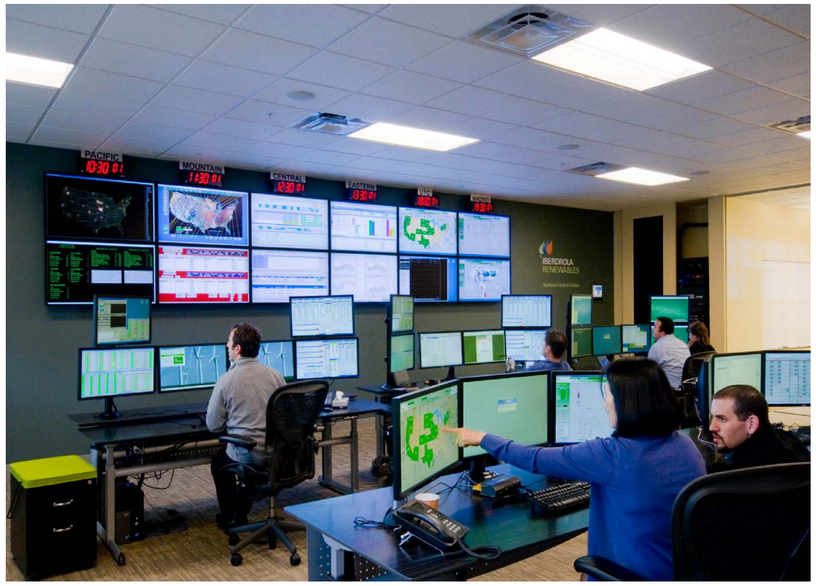
Iberdrola Renewables is utilizing this distributed client-server architecture with a redundancy mechanism to ensure that the design is fault tolerant.

Using PcVue's built-in redundancy features, Iberdrola Renewables is able to ensure continuity of data collection in the event of failure of a system component. PcVue also supports dual networks both for communication with field equipment and among PcVue stations.

Each component and each station in the configuration has a validity status to enable the operators to view the condition of the system in real time. These client stations are communicating via OPC with the redundant communication front ends connected to the 1,000 Mbps TCP/IP Ethernet network. Each front-end is able to receive up to 100,000 I/Os.

Using the PcVue architecture, operators can see in depth details of the data from the remote wind farms in a real-time status display. The supervision is arranged on two levels

to handle the large volume of information (around 350 signals per turbine) and to facilitate operation and maintenance of the facilities.



A first supervisory level provides an overview of the most relevant alarms, values and counters, which is enough to supervise the turbines in a normal situation and to detect failures that need to be corrected. A second, more detailed level of supervision is triggered on request to display selected data from the turbine so that the operators can immediately and precisely diagnose any failures that have occurred and determine remedial operations. The data received can be processed as set points, historical records, alarm management, trending and so forth.

The control system in each installation collects the main operational information from the generators and their associated substation. The control system is connected to the National Control Center through a remote communication channel, which eases maintenance. The Center receives this information and processes it into an organized and simplified structure that enables easy identification and diagnosis of failures. This triggers the appropriate actions for its solution: remote reset or activation of local maintenance teams. As a result, average downtime decreases and availability is increased.

Main technical features

- 1,000,000 I/Os
- 2479 WTGs
- 50 wind farms
- 3600 Megawatts
- 22 redundant PcVue servers

Results

Solution with PcVue is remotely controlling US wind farms from the National Control Center in Portland, Oregon

PcVue solution has decreased average downtime and increased availability

PcVue solution is a complete wind farm model enabling an out-of-the-box expansion for new sites

Customer: STAER SISTEMI

Italy

System Integrator: STAER SISTEMI

Solar Electric Photovoltaic System

Solution for monitoring and control of Solar PV farms down to the string level with PcVue

A performance monitoring system is very important to a solar electric photovoltaic (PV) system. The monitoring system must account for the amount of energy produced in real-time to be sure the system overall conversion efficiency remains intact over time and enable immediate response to any event that degrades the PV system performance.

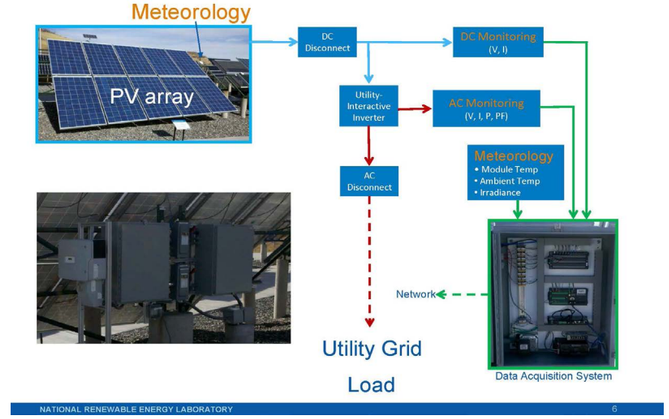
We are all familiar with our residential electric meter used by the utility company to record and bill us monthly the kilowatt-hours consumed. Over the course of a year, these bills can be compared to determine monthly consumption. While this scenario illustrates usage consumption, it is different for monitoring production with PV systems.

A meter is also used to measure the energy produced but, instead of a monthly basis, we are interested in the amount of energy produced during short time intervals – perhaps every hour or every 5 minutes. The recording frequency requires more sophisticated meters than the residential ones called data loggers. Data loggers feed data into a memory system that can be archived for use at a later time. They also have communication interfaces, which allow a computer to connect to it and retrieve the data.

Most electric utilities in the United States have adopted standard criteria and guidelines for interconnection of distributed generation (DG) to their electric distribution systems. Photovoltaic system installations effectively reduce the customer load and, during minimum loading conditions, may export energy back to the utility in a transaction known as “net energy metering” (NEM). A set of guidelines (IEEE P1547.6) were recommended by the Institute of Electrical and Electronic Engineers (IEEE) to PV system integrators to support them designing systems operable in parallel with the utility systems.

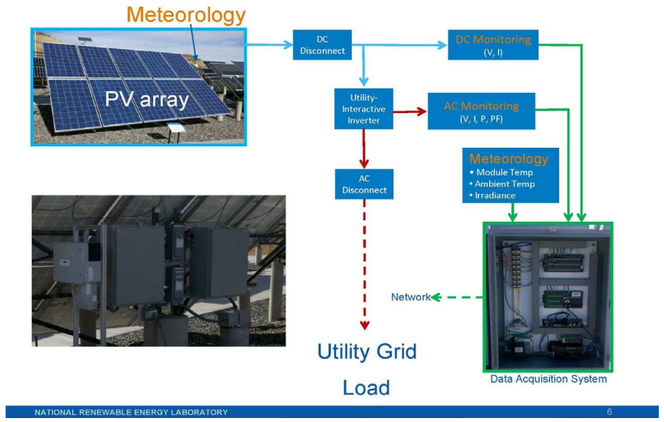
BUSINESS OBJECTIVE

- ✓ Understand Maintain PV system conversion efficiency
- ✓ Respond immediately to any degradation of system performance



Advanced SCADA (Supervisory Control and Data Acquisition) software find ideal application to support the operation of an electric utility. Automation sequences usually managed by means of SCADA system include: fault detection, localization, isolation, and load restoration (FDIR). These sequences will detect a fault, localize it to a segment of feeder, open the switches around the fault, and restore un-faulted sources via the substation and alternative sources as available. SCADA implemented algorithms work to safely minimize the fault duration and extent, significantly improving the SAIDI (system average interruption duration index) and SAIFI (system average interruption frequency index) performance metric for the customers on those feeders. An additional important sequence is the automatic check of equipment loading and thermal limits to determine whether load transfers can safely take place.

Modern SCADAs communicate using standard protocols like IP and secure Ethernet LAN system, which provides significant improvement over a serial system, including supporting peer-to -peer communications, multiple access to tie switches, and simplify remote access by communications and automation maintenance personnel. Benefits to manage distributed generation include: higher efficiency, improved security of supply, improved demand-response capabilities, avoidance of overcapacity,



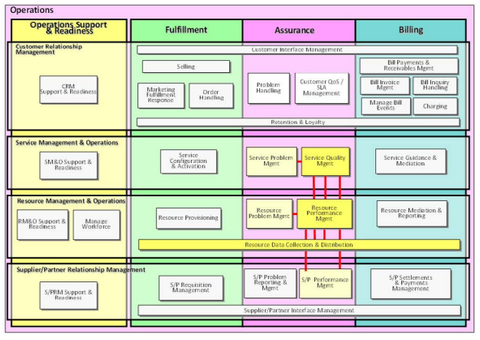
better peak load management, reduction of grid losses, network infrastructure cost deferral, power quality support, improved reliability and environmental monitoring.

SCADA based applications offers extraordinary value because they provides a flexible range of combinations and customizable configurations that provides a balance between cost and reliability.

Distributed generation is considered a more desirable generation asset because it is "closer" to the customer and is more economical than central station generation and its associated transmission infrastructure.

While the disadvantages of distributed generation are in the electric utility perspective awkward remote operation, fuel delivery logistic (for combustion engine based distributed generation), cost of connection, dispatching, and production forecasting (wind and solar related), the SCADA system helps to offset such costs through automation, remote, real time monitoring capabilities.

PV systems monitoring due to the volatility of solar radiation at ground level, which is mainly due to atmospheric turbulence, stress SCADA real time capabilities requiring a fast sampling pace (5 seconds or less) of main physical variables.



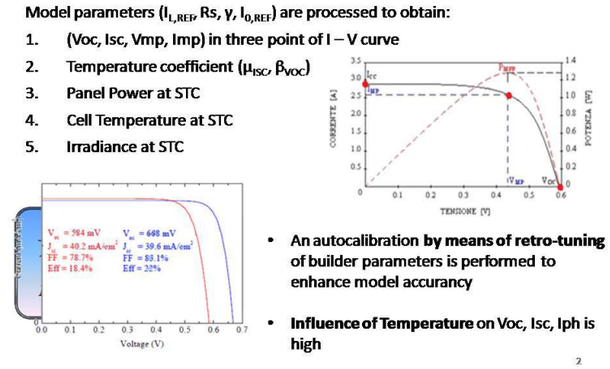
As designer of PV plants monitoring systems Staer Sistemi, conducted tests on many industrial SCADA meeting requirements as fast sampling speeds, flexibility, scalability and ease to use and programming, selecting PcVue of ARC Informatique. This choice allowed designers to be confident to effortless manage data streams in the range of several thousand measures per second and concentrate on the most specific aspects of the application. PcVue capabilities allow monitoring and controlling of all the various plant component and subsystems operations, including trackers, inverters, grid substations and meters.

The PcVue based system logs any problem and triggers alarms so that the engineering staff can fix or change components or fine-tune the process of plant operation.

The automatic comparison between the calculated and the real production figures (supplied by the data logger) provides a precise indication of the plant performance or plant health every minute or less.

Today monitoring and performance analysis of solar PV plants has become extremely critical due to the increasing cost of operation and maintenance as well as reducing yield due to possible performance degradation during the lifecycle of the plant equipment. This means that the use of a monitoring system can become essential to ensure high performance, low downtime and fault detection of a solar PV power plant during the entire lifecycle.

From a technical point of view, it is interesting to understand how the overall data acquisition toward SCADA is performed starting from the DC level. String combiner boxes designed for PV installations have in-built string probe units that measure the values of DC current and voltage and made those available through a serial RS485 port (different methods or wireless can be used) for communication to the SCADA usually via the industry standard ModBus protocol. For that purpose some RTUs (Remote Terminal Units) are installed at the field location connected to the string junction boxes on the RS485 loop by means of multi-drop wiring.



At the AC level, inverters expose RS485, CAN or Ethernet ports to allow a simple connection using the native communication drivers from the SCADA. PcVue support a large collection of standard protocols to manage any kind of inverters.

All data collected are augmented by the SCADA system with a time stamp for real-time processing: alarming and displaying, trend analysis and storage for reporting activities. The SCADA capabilities are further used in monitoring of grid protection relays, energy meters, weather monitoring station/sensors, LT (low tension) and HT (high tension) control panels, DC Switches, transformers and in general any devices capable of affecting

Keys to success

- ✓ Fault detection, localization, isolation and load restoration (FDIR)
- ✓ Minimize fault duration and extent while maintaining safety
- ✓ Improve SAIDI and SAIFI indices for customers on the feeder
- ✓ Monitor equipment loads and thermal limits to enable safe load transfers
- ✓ Scalable to several thousand measures per second with capability to automatically filter to most critical aspects of the system
- ✓ Monitor and control trackers, inverters, grid substations and meters
- ✓ Log operations and provide alarms for maintenance and fine-tuning of plant performance
- ✓ Track real-time production versus predicted production and provide real-time performance metrics

- directly or indirectly- plant production.

Additionally, to make PV management applications as effective as possible, its important take into consideration other aspects of the SCADA applications features in order to support plant operations.

PcVue as an example, provides dynamic configuration, stand-alone and client-server and web configurations architectures, redundancy, historical and real-time trends analysis support as well as advanced alarm management.

Looking further at compliance, the support of such protocols as IEC 61850 and DNP3 enable communications with various electric sub-station devices, which becomes essential when the local electrical utility is engaged in Smart Grid implementation.

User-friendly graphical interface with 2D and 3D displays, scheduler, and an event-driven engine all make the management processes much smoother.

Finally, web access capabilities provide mobility and access to remote devices to make PcVue the SCADA of choice for PV Monitoring.

Results

Conversion efficiency

Security of supply

Power quality

Reliability

Peak load management

Demand response capability

Environmental monitoring capability

Over capacity

Grid losses

Network infrastructure costs

Customer: Toyota, EDF

France

System Integrator: Ecotral, a subsidiary of Electricity of Strasbourg

Tracking of Rechargeable Hybrid Vehicles (RHV)

PcVue solution supervises the world's largest experiment with RHV's

In May 2010 Toyota, EDF and Strasbourg City and Urban Community launched a joint project called "Kléber" for a full-scale demonstration of rechargeable hybrid vehicles (RHV).

This experiment is vital as Toyota is now marketing a plug-in version of its well-known Prius range. The Kléber program is part of a world-wide project rolled out by Toyota, with 600 Prius RHVs also being tested in Japan, the United States, England, Canada and Australia. For EDF it is an opportunity to test the charging facilities in practice.

The Kléber project is the largest experiment of its kind in the world with a fleet of 70 RHVs and 145 charging stations, almost all connected via cellular network. The 145 stations are installed in all the places one might expect: at the roadside (8 stations), in public car parks (18), at the vehicle owners´ homes (44) and in the car parks of the businesses where they work (75).

To manage the remotely metered portion of the charging data from the EDF stations, the sponsors of the Kléber project selected the PcVue SCADA software as it is a proven and reliable industrial tool that is used to supervise numerous devices in many large-scale projects around the world.

The choice was also influenced by its meeting performance requirements and value for money.

BUSINESS OBJECTIVE

- ✓ Understand RHV customer expectations
- ✓ Verify RHV and infrastructure performance
- ✓ Develop methods for evaluating fuel consumption and CO2 emission

The main function of PcVue is to collect data for transfer to other computer systems for analysis.

The acquired data is collected in industry standard databases for processing via analytical software such as spreadsheets.

Data is also processed directly by PcVue for display using pre-defined symbols that are instantiated in the mimics.

The data acquired by the charging stations is transmitted over a cellular network also managed by PcVue.

The database created by PcVue using the collected data is shared with an EDF central server via a web service. This means that the data can be accessed over the Internet or an intranet via secure access.

The PcVue software logs the usage of the charging stations throughout the Strasbourg area. It also provides real-time management of any charging station that malfunctions improving maintenance of the overall system.

One year into the experiment and the EDF and Toyota teams started analyzing the technical data gathered from the charging stations, uploading the data recorded in the RHVs during visits to the dealer, and reviewing user questionnaires and field surveys.

Keys to success

- ✓ Responsiveness of vendor due to very short time frame from concept to implementation

The PHVs involved in the project were intensively used in an urban environment and for longer journeys. PHV users averaged a yearly mileage of 19,000 km (12,500 miles), which is above the 13,000 km (8,000 miles) average for French drivers.The solution implemented with the PcVue SCADA software has allowed a remarkable reduction in maintenance costs, while centralizing all the information from the remotely controlled plants.

Results

PcVue solution demonstrated that PHV performance is in-line with customer expectations and meets a significant share of daily commuter needs

Solution using PcVue identified that PHV environmental performance depends on utilization

PcVue Solutions' consultants responsiveness and software tools proved capable of meeting aggressive development schedule

Customer:
Automobile manufacturing company

Germany

System Integrator: Cegelec AT GmbH

Automotive Parts Logistics Center

PcVue based solution unifies parts tracking, material handling and building management systems

The logistics centers of a well-known German automobile manufacturing company controls the worldwide distribution of spare parts for all of its models. They have now introduced a system for visualizing both materials handling processes and building automation across the logistics centers in Germany and other European countries. In this way, a consistent mode of operation and HMI is established for maintenance teams across all locations.

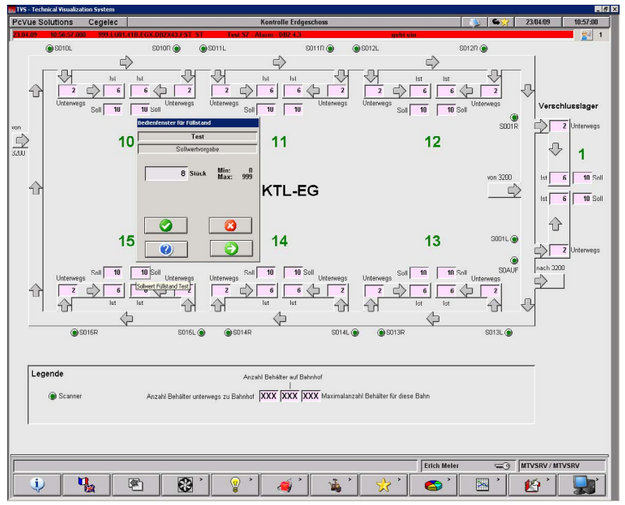
Cegelec AT GmbH & Co. KG Frankfurt/Main worked with the planning department of the central logistics center of the manufacturer. Together they have developed an application using the PcVue SCADA system to serve as the platform for standard implementation across the various sites.

Consistent HMI

The HMI provides the information and functionality to support the operator by displaying all relevant information in the clearest way possible. The innovative screen layout makes it easy to find the information by localizing regions maintaining consistent functionality and appearance.

The active regions of an image are indicated; for example, buttons and controls are displayed in relief under the mouse pointer. All commands have to be confirmed in a separate dialog box before being sent to the process level, so that commands cannot be triggered by accident.

All operator stations are provided with a multilingual capability. Languages including German, French, English and Spanish may be used.

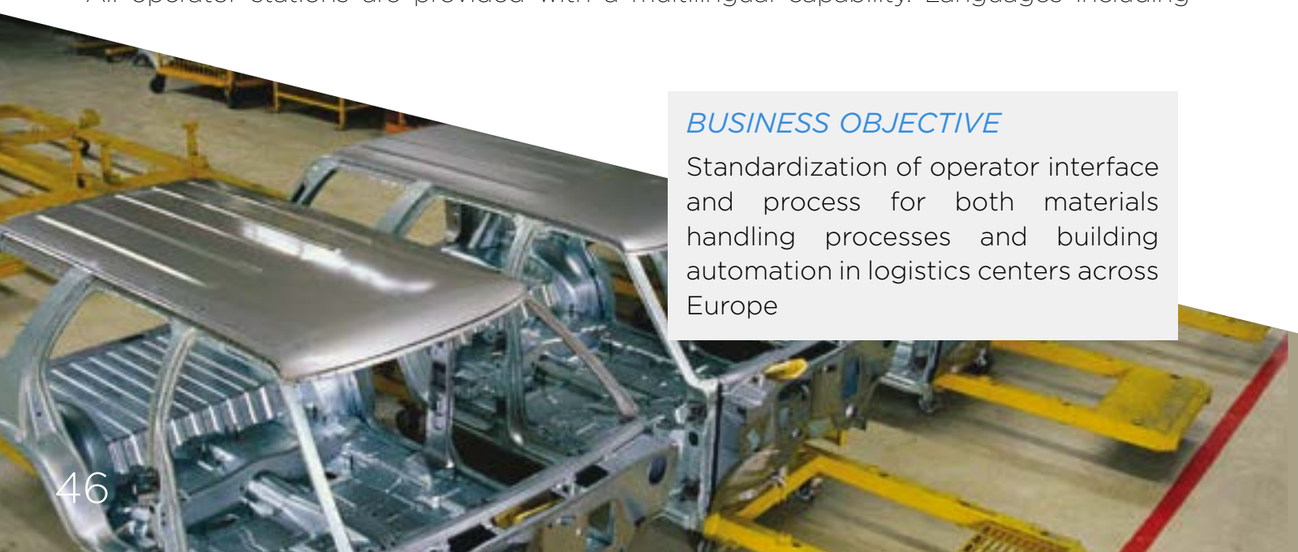


Process events generated in the facility are displayed as a text message and logged. All messages are distinguished by domain and nature. All messages, alerts and alarms are logged and archived. Using standard PcVue functionality, alarm counters are created for domains and natures according to the chosen naming conventions. Operational logs and alarm logs are configured, displayed and archived in a database for further reporting.

The PcVue system supports a client-server architecture, redundancy and the ability to integrate databases for data archiving in addition to the required object orientation. Storing the archived data in a Microsoft SQL Server database enables the personnel to analyze the collected information with common tools such as Microsoft Office.

Conveyances (jobs), scanner readings, efficiency and reading quality are distilled into hourly, daily and monthly values for the past 12 months:

- Scanner readings for the past month
- Trend archive for the past 12 months
- Operations log for the past 12 months
- Alarm log for the past 12 months



BUSINESS OBJECTIVE

Standardization of operator interface and process for both materials handling processes and building automation in logistics centers across Europe

Keys to success

- ✓ Innovative screen layout for intuitive navigation to required information
- ✓ Reusable graphic objects from a common symbol library
- ✓ High availability redundant client-server architecture
- ✓ Integration with a relational database for archiving of data
- ✓ Role based, multilayer security

Functionality

The core functionality is provided with the base application. This functionality is extended with site-specific components. The typical tasks of a SCADA system consist of displaying the status of a facility by visualizing real-time data and displaying recorded warnings and alarms. In addition to those data, the information that is specific to material handling is stored in a structured database.

Job data, including the data captured by barcode readers, is transmitted to the control system, allowing the current position of every box in the system to be determined and the paths of every current or finished job within a facility to be recorded. By linking jobs and boxes to their positions, the distance each box has covered for a particular job is derived.

Some notable statistics of implementing the conveyor technology are:

- approximately 5,000 I/Os from three PLCs
- approximately 300,000 scanner readings per day added to the database
- approximately 20,000 transport jobs per day added to the database

The availability rate of the facilities is calculated according to VDI (the German association of engineers and natural scientists) from the relation between uptime and failure time.

Simple projection

To create mimics for different sites, you use the graphic symbols from a common symbol library that is included. When creating the visualization, these symbols are inserted into the images and animated by assigning a variable name. The symbol library includes symbols and mimics that are created for specified behaviors during development including aggregate types.

The system provides user defined interface functionality for each object, using the definition of variables and objects. 3D mimics are created in the PcVue editor, while 3D models are imported in Microsoft's Direct X format.

PcVue provides the further option of inserting graphics in most common formats, such as .BMP, .JPG, .WMF and .EMF as images.

PcVue stores the whole object model in a comma-separated ASCII file. This allows for automated creation of the object model from an interface provided by the material handling supplier hardware, using familiar methods such as Excel macros.

Future perspectives

The base application was developed to also meet the requirements of the building automation systems. This has unified the operation of facilities at sites where material handling is integrated with building management in a single supervisory application.

Typical site configurations include a server, normally in a redundant server association, connected to PLCs (Siemens S7-400) and the option of connecting a large number of operating stations (clients) in parallel.

To meet the logistics center's requirements, clients are operated as terminal clients (via Remote Terminal Services), using Windows Server as the operating system.

The complete functionality of the application is available to the client operating stations.

There is the option to connect all of the systems on the various sites via the company's network infrastructure. In this configuration, all clients of the servers in this distributed architecture will be available at one centralized site.

A centrally available server can take over the role of the decentralized servers in case of failure.

Operators log onto the servers at fixed operator stations over Windows Terminal Service (Remote Desktop) or over an intranet or the Internet by using PcVue's WebVue client.

Each client, local or via the Internet, will have access to the mimics of all the servers without any modification being required.

Security concept

PcVue's security concept includes the assignment of operators to groups and password protection. Groups of operators are configured in the user management feature according to designated security layers. When the user groups are being defined, the user rights (operational rights) assigned to a group are unlocked. When a user account is created, the user may be assigned to one group or several groups. Each user is assigned all the rights needed to perform his tasks.

Results

PcVue solution provides all information and functionality for operators based on their role, secured by logon profile

PcVue has multilingual capability, a key requirement of the solution

The PcVue solution provides an integrated view of material handling and building management systems with realtime part tracking and history of all jobs in the facility

Customer: Dunn-Edwards Paints

USA

System Integrator: Centris Technologies

Dunn-Edwards Paint

Solution integrates PcVue and ERP to coordinate plant-floor process control and automation

Since 1925, Dunn-Edwards Corporation has been the leading manufacturer and supplier of architectural and industrial coatings in the Southwest, providing a complete line of paints and painting supplies to professionals and quality-conscious consumers.

Dunn-Edwards paints are manufactured exclusively in the Southwest and formulated specifically for the climate of the Southwest. From the hot, arid deserts of Arizona and Nevada, to the cool, moist seacoast of California, Dunn-Edwards paints are uniquely formulated to withstand the elements, and protect and beautify a wide variety of architectural surfaces.

Dunn-Edwards was operating plants in Tempe, AZ and Los Angeles, CA. The Tempe plant was not automated and the Los Angeles plant had only has a small section of its operations automated. Dunn-Edwards commissioned the consolidation of both operations into one large, state of the art manufacturing facility located in Phoenix, AZ, which is has the advantages inherent with automation.

Paint is generally custom-made to fit the needs of various end users. For example, certain industrial users might be especially interested in a fast-drying paint, while another might desire a paint that supplies good coverage over a long lifetime. Paint intended for the consumer can also be custom-made. Paint manufacturers provide such a wide range of colors that it is impossible to effectively keep large quantities of each on hand. To meet a request for “stonish beige,” “whisper white,” or “aloha sunrise,” the manufacturer will select a base that is appropriate for the deepness of color required. The base is developed at Dunn-Edwards using a slurry system and the PcVue SCADA software automates this process. The software is integrated with three PLCs based on ISaGRAF, which are fully compliant with both IEC 61499 and IEC 61131 industrial control standards.

The automated slurry system, currently residing at the Los Angeles facility, frees workers from having to add ingredients by hand into paint mixing tanks. This high-tech paint making method ensures consistent paint quality because it is almost entirely computer automated polling about 1,200 physical I/O points and monitoring approx. 5,000 variables in total. There is one PcVue server communicating with three PcVue client stations running on Ethernet and Profibus devices. Every step in the manufacturing process is controlled by dual computer networks in order to achieve redundancy. PcVue constantly monitors and enables the operator to adjust the exact amount of raw materials needed to make each paint batch perfect. In a few months, these operations will be moved to the new Phoenix facility and expanded upon. Centris Technologies, known for its industrial control and automation expertise, was chartered to develop and integrate all the real-time process control and SCADA development on the plant floor.

The Phoenix plant has been designed to accommodate future growth of the company for years to come. To handle this volume of production, the system architecture for the new plant is completely state of the art, consisting of two PcVue servers set up in a redundant configuration and connected to 10 Centris Technologies Advanced Process Controllers (APCs), each running ISaGRAF over TCP/IP. The servers are connected to 12 PcVue Human Machine Interface (HMI) stations residing in key operator locations, some running WebVue through the facility. WebVue is PcVue’s solution for remote monitoring and

BUSINESS OBJECTIVE

Consolidate two existing plants into a single state-of-the-art manufacturing facility

Keys to success

- ✓ Manage up to 20 batches per shift per operator
- ✓ Manage 75,000 data points
- ✓ Integrate 55,000 data points with the enterprise resource planning system

maintenance through the use an ordinary browser. WebVue enables Dunn-Edwards staff to display and control their paint manufacturing process remotely across the Internet or an intranet network. Through management of user rights and authentication processes, operators are able to access in polling mode the real-time values of PcVue's variables and lists of alarms, events, historical data, etc.

All of Dunn-Edwards production systems are linked to PcVue through standard connections to access both historical and real-time production data. Staff are able to trend, plot, analyze and report on any details workers need to see in order to make better decisions about their batch processes.

Dunn-Edwards utilizes an extensive array of quality control measures. The ingredients and the manufacturing process undergo stringent tests, and the finished product is checked to insure that it is of high quality. Typical inspections for a finished paint include: density, fineness of grind, dispersion, and viscosity. Paint is also applied to a surface and studied for bleed resistance, rate of drying, and texture. There are thousands of data points PcVue collects and manages through the quality control process.

The PcVue SCADA performs data acquisition and collection of approx. 75,000 data points and is integrated with the enterprise resource planning system (ERP) from SAP -- sharing some 55,000 of those I/O points. SAP has embedded a Pico module for I/O connectivity which is communicating to PcVue's SCADA through OPC.

Manufacturing paint is a material intensive process. SAP is handling the accounting, lab, reporting, POS, sales, purchasing, inventory and production and PcVue manages all the process control and automation on the plant floor. Operators manage anywhere between 10 – 20 batches per shift within PcVue.

By investing in automation, Dunn-Edwards has gained deep insight into their batch processes. They have also facilitated information-sharing among their production and supervisory staff so that they are able to better monitor production in their appropriate contexts.

Results

Solution with PcVue provides deep insight to the batch processes by managing all the process control and automation on the plant floor

Solution with PcVue provides operators with remote access and ability to collect and report on data to support improved batch processing

Customer: Home Hardware Canada

System Integrator: Centris Technologies

Beauti-Tone Paint

PcVue provides the edge needed to win against larger North American and global competitors

Home Hardware Stores Limited is Canada's largest independent home improvement retailer. The company is owned by close to 1,100 independent small business operators from every corner of Canada, who operate under one of four banners: Home Hardware, Home Hardware Building Centre, Home Building Centre and Home Furniture.

The company offers over 8,700 exclusively-branded products. Beauti-Tone Paint - produced along with many household products at its plant in Burford, Ontario - is just one well-known Home Hardware private-label success story. These Home Hardware branded products offer customers superior quality with economical pricing.

Competitive Drive

"From a macro perspective, it's all about competitiveness", according to Darrin Noble, Vice President and General Manager of Beauti-Tone Paint and Home Products. *"So many Canadian manufacturers are working on a smaller Canadian scale but we are competing with North American and global manufacturers who are ten, fifty, up to two hundred times our size. These much larger companies are our most direct competitors"*.

In order to track progress, the plant is keeping a close eye on both production rates and yield. Darrin explained, "The objective is to do as much as we can in a labor hour while maintaining high quality. It's not just about beefing up the system and pumping more product out".

BUSINESS OBJECTIVE

Grow Beauti-Tone market share against much larger competitors

Streamlining communications so that the information is available more quickly to plant workers is a key factor in how PcVue helped the plant meet that objective. Eliminating the lag between the collection of data and the availability of that information to inform decision making was the first step.

1 - Home Hardware's Beauti-Tone Paint products

Russell Banks, who is the plant manager, understands the importance of data for managing production and has been the champion of increased data collection. When the plant started collecting more data they found that some assumptions they had from simply viewing the line were incorrect. *"I don't think our impressions are very accurate, as far as what is holding us back and what our bottlenecks are"*, remarked Noble. Knowing where the true bottlenecks are has enabled the plant to focus in the right place.

PcVue's SCADA system is providing the plant with both a real-time and comprehensive view of the filling line which operates across multiple work centers. In the past, the focus of automation and data collection was on specific production equipment. The issue with this approach is that it gave the line workers a limited understanding of how the plant was performing as a whole. Darrin summarized the situation, *"We are focusing on finding those bottlenecks and opening up those freeways as well as the speed of communications to the floor. That way, we have our people wandering around less and knowing more about what is ahead of them, so they can plan for it"*.

The system has also helped improve yield by eliminating some common problems in the handoff of work-in-process from one work center to the next. *"It's helped us improve quality"* noted Russ. *"The system automatically updates the equipment for the order that we're running rather than having the operator do it by hand".* Automation reduces errors in changeover, which happens multiple times a day in their production schedule. Quality checks are also key elements of improved accuracy of the finished goods. For example,

Keys to success

- ✓ Manage up to 20 batches per shift per operator
- ✓ Increase the amount of data collection done on the line
- ✓ Speed data communications to front line workers
- ✓ Automate the changeover process to reduce human error

2 - Russ Banks demonstrating the front line worker interface of the PcVue production system

printing and scanning barcode labels to confirm the correct lot is at the work center before starting to process it.

Fifteen years ago, Beauti-Tone invested in materials handling automation to better manage the batch process for bulk paint manufacturing. At that time, production automation for the filling line was not a priority. The plant has a very stable and experienced work force with the majority of employees having worked in the plant for ten to fifteen years. They made few obvious mistakes in the production process. Darrin commented, *"Maybe we would have got to control systems sooner if we were making a lot more errors."*

The lack of data made it difficult to measure plant performance. Darrin noted, *"When I started here we were looking at sales every month. Now we do what we should do and look at sales every day."* The plant also looked at average gallons produced per labor hour, but did so on an annual basis.

Today, the plant looks at several additional measures and does so much more frequently. With the new production system on the plant floor, performance metrics are visible to everyone. In addition to visibility of the real-time production rate, they are now looking at performance against plan. Most recently, they have started to drill in further and look at performance to schedule and individual line performance as compared to overall plant performance.

Adopting Change

Implementation of the system was done by Centris Technologies of Varennes, Quebec. Centris has experience implementing paint manufacturing control systems and knows that no matter how good the system is, it will fail if there is not buy-in from the operators.

On one hand, some of the older workers at the plant were not really comfortable, even somewhat fearful, that the new technology would make their job more difficult. On the other hand, even those who were comfortable with the technology understood that in order to learn the system, it would require extra work on their part.

To address these issues, Centris put a priority on the design of the human machine interface in order to create a clean, simple, easy to understand layout. Soliciting feedback from the front line operators enabled a deeper understanding and buy-in from them. As an added benefit, familiarity with the purpose and layout of the interface makes training easier.

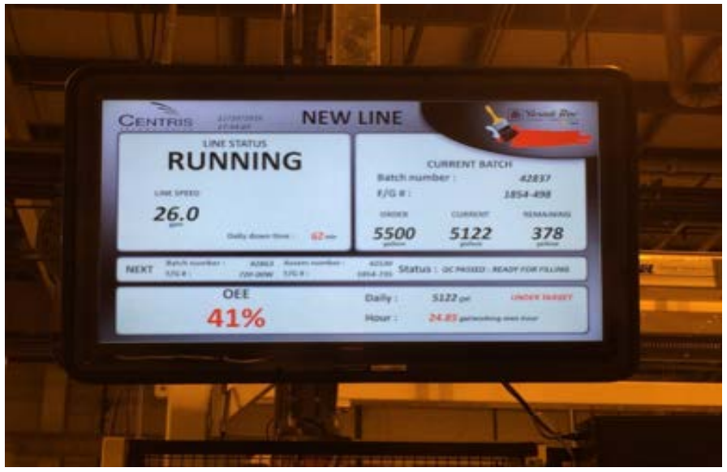
Centris also established a partnership program with a 24 hour/ day hotline for the plant. Anyone, whether front line operators or management, is encouraged to call the hotline with questions or concerns. In new technology deployment, a common factor that turns users away from the system, is frustration. It can be frustration from not understanding how the system is intended to be used. It can also arise when things don't work as they are supposed to as the system is brought on-line. The hotline provides a means to address concerns quickly in order to eliminate these sources of frustration, which if not addressed will slow the adoption of the new system.

Michel Kakos, President of Centris Technologies observed, *"Companies who succeed at putting this kind of system in place, do so because everyone on the various teams involved are speaking the same language"*. This is an iterative process of developing the system on-line, soliciting feedback from the users, and then tweaking the system until everyone is on the same page. The result is a platform for growth and expansion that can be rolled out to the other lines much more easily.

Measuring Success

The first PcVue production system was deployed initially at the end of 2016 with an expectation to complete a second production line in 2017.

Beauti-Tone Paints is now producing twice the volume that they were achieving fifteen years ago without an overall increase in the number of employees. With the increase speed of communication and volume of data collection coming from the new plant control system, Beauti-Tone expects significantly more improvements to come.



3 - Production system board showing real time metrics for line performance

Success of the project is measured from an improvement in gallons per labor hour and also in other metrics such as corrective actions and rework. Most importantly success for Home Hardware is achievement as the #1 top-of-mind retail paint brand, building on their current position as the market share leader by volume in the Canadian DIY market.

Internally, success is measured by the extent to which the users feel the production system makes them better able to perform effectively. "We know we have success when we hear the frontline assembly workers telling us that the system is helping them do their job and recommending that we expand it to other lines and areas of the plant", according to Darrin.

The PcVue Solution is also intended as a platform for continuous improvement. Plans for enhancements include incorporating training documents and videos so that operators can easily reference standard work instructions. Russ added, *"At the end of the day, the fact that we get more information to more people is a huge benefit to us down the road"*.

The PcVue Solutions Difference

PcVue was chosen for this project for two specific reasons. First, as an independent global software supplier, PcVue is not attached to any hardware manufacturer or affiliated with any brand of PLC or controller. This makes it a good choice in a typical plant environment with a mixture of hardware in use. Second, PcVue offered the optimum balance of features, complexity and flexibility needed for the project now and supports future expansions.

According to Michel Kakos, *"There are a lot of alternatives on the market. We prefer PcVue because it has the right balance between features and ability to customize. It is a generic platform for developing SCADA and HMI applications. We have worked with very complex and expensive platforms that require extensive training to use and we have worked with very simple platforms which were very difficult to customize. PcVue Solutions are the right balance for most customers."*

The project has been recognized by the High Tech News, 2016 Kinetic Process Innovation Award for Advanced HMI/SCADA Software Solutions. In addition to the business objectives and results described above, the integration with the plant Enterprise Resource Planning system to PcVue on this project was one of the elements of the Advanced SCADA that stood out for the judges.

4 - Ed Nugent, COO of PcVue Inc. presents the Process Innovation Award to Russ Banks and Darrin Noble of Beauti-Tone Paints and Michel Kakos of Centris Technology

Results

Increased production rates

Lower production costs

Reduced corrective actions and rework

Customer: Veuve Clicquot

France

System Integrator: SF2I

Veuve Clicquot Champagne

World renowned champagne producer adopts a solution with PcVue to supervise its fermentation process

Veuve Clicquot is a French champagne house known the world over. Founded in 1772, this prestigious house is now a subsidiary of LVMH. Its reputation is obviously no accident. The house does not compromise on quality and its motto is 'Only one quality – the finest'. In order to ensure that it always makes the finest champagne, it also needs to be able to closely supervise its production systems.

That is why, in late 2012, Veuve Clicquot revamped its fermentation cellar supervision system. The fermentation cellars are where the house makes its wine from harvested and pressed grapes. Supervising the tanks in which alcoholic and malolactic fermentation take place is crucial.

However, the software being used by Veuve Clicquot was at the end of its life and the publisher was no longer supporting it. It was therefore necessary that the house replace its 10-year-old supervision system by a more recent and better performing solution.

"We needed to replace it by a lasting solution that would be supported for many years to come," says Franck Berruyer, sales engineer at Arc Informatique, the company behind the PcVue supervision system installed at Veuve Clicquot.

"In addition to various technical factors, we chose the PcVue software suite because of the relationship of trust we have maintained with Arc Informatique and because the cost of the licenses is economically suited to Veuve Clicquot's needs," says Stéphane Fournier, manager of SF2I, the company that developed and integrated the supervision software.

Another advantage of PcVue is that it has the same HMI as the previous software, meaning that the operators were able to use PcVue immediately.

Furthermore, Guy Jendryka, manager of the electricity, automation and industrial computing department at Veuve Clicquot, stresses that one of PcVue's strengths is that it is easy to adjust and program. *"With the previous system, you really had to be an IT specialist to be able to upgrade the software. PcVue is much easier to modify as needed."*

The development architecture is based on PcVue objects and greatly facilitated the supervision software's design. Because Veuve Clicquot's fermentation cellars contain 400 tanks of various types and volumes up to 60,000 liters (16,000 gallons), the developers had to be able to use models to reduce programming, and maintenance times.

Depending on their type, the tanks are fitted with up to three temperature-control sensors and manual or automatic valves. The application manages some 40 variables per tank for a total of 16,000.

"The object development architecture saves time and simplifies operations. Once the model was made for the dozen existing tank models, it was simply a matter of instantiating the objects and automatically generating the communication variables," says Mr Fournier.

With its virtual architecture, PcVue runs on a server that is installed in a secure, air-

BUSINESS OBJECTIVE

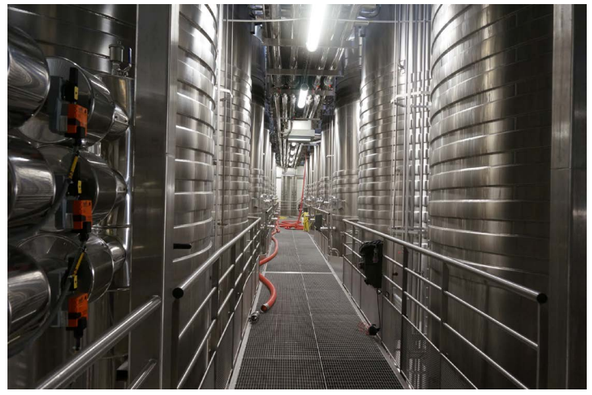
✓ Realize the company motto 'Only one quality – the finest'

✓ Closely supervise the fermentation cellars' 400 tanks of various types and volumes distributed in various towns across the Champagne vineyard at distances of 30 to 200 km (18 to 125 miles) from the main cellar

Keys to success

- ✓ Relationship of trust between customer and ARC Informatique Group
- ✓ A solution that will last for many years
- ✓ A system that is easy to modify and maintain
- ✓ An integrated system linking distributed locations across the champagne region
- ✓ A system capable of running on virtualized servers
- ✓ A system which is fully accessible by supervisors from their personal computer
- ✓ A system which can be monitored and controlled via a 42" touch screen with a graphical interface attractive to visitors who will see it in the lobby

conditioned and filtered room protected from the damp. The application's maintainability and portability on new physical machines is thus simplified.



The fact that, in such a virtualized environment, the software is decoupled from the hardware means that reinstallation and commissioning times in the event of failure are considerably reduced. Five web-based clients allow the cellar managers to view the supervision system and select its set points via their personal computers. Operators can also monitor and control the software via a 42" touch screen that is installed in the lobby and within view of all visitors.

The software communicates with the programmable logic controllers (PLCs) over a Modbus TCP/IP network while a VPN (virtual private network) link is used to collect information from the tanks in the house's other fermentation cellars. Fourteen fermentation modules are housed in the main cellar in Reims and four others are located in various towns across the Champagne vineyard at distances of 30 to 200 km (18 to 125 miles) from the main cellar. The VPN saves a tremendous amount of time.

"Being able to supervise all our fermentation cellars from one place eliminates the need to drive to each cellar. The supervision system issues an alert if a serious temperature control issue crops up," says Stéphane Fournier.

Mr Jendryka can now monitor all his tanks from his desktop PC. *"PcVue supervisor has made our fermentation cellars smart. We can monitor every aspect of temperature control from just one place."*

Encouraged by this positive experience, Veuve Clicquot's technical teams quickly realized how PcVue could be used elsewhere. Not only does it supervise the fermentation of wine in the tanks, it also monitors the production of cold during cold stabilization after final blending.

PcVue does not control these operations; it is used simply to view their settings and archive, log and track temperatures, faults and other data.

It is also used for effluent monitoring purposes at the two treatment plants – it manages acid and sodium-hydroxide levels, tracks pH and flow-rate values (weekly dashboard report for Dreal, the regional directorate for the environment, land-use planning and housing) – and to e-mail resupply alerts to the managers when levels become low.

PcVue is now being deployed to other areas of Veuve Clicquot's operations.

By the end of 2014 it will be running on the wrapping line (placement of foil capsules and labels on bottles prior to shipment). *"We are going to use it in particular to retrieve production orders from SAP and provide the laser ID to be affixed onto the glass and back-label,"* says Mr Jendryka.

Results

PcVue solution has made the fermentation cellars smart by managing 16,000 tank temperatures and diagnostic points

PcVue solution also monitors effluent at two treatment plants

Solution with PcVue incorporates weekly dashboard reports

PcVue solution automatically sends resupply alert e-mail to managers

Customer: ANAS

Italy

System Integrator: GEMMO S.p.A.

Lombardy Region Tunnel Management

PcVue solution monitors and controls systems critical to comfort and safety of approximately 100 tunnels

Due to its mountainous topography, Italy is a country rich in road tunnels. In the Lombardy region, a new supervision and remote control system has been designed and implemented by Gemmo S.p.A. Based on the PcVue SCADA system from ARC Informatique, it ensures the comfort and safety of users along over 140 km (87 miles) of tunnels.

The wide alpine arc that surrounds and contains Italian territory is crossed by roads which include many tunnels. The tunnels are of different ages and the control system used inside them is mixed, due to differing implementation dates and technologies adopted. Thanks to a new wide-ranging project, the tunnel system of the road network is now managed by a new supervision and control system that is unique due to its size and complexity.

€140M ($190M USD) on project financing

The application falls within a national project for safety management and technology update of approximately 100 tunnels on state roads managed by ANAS S.p.A in Lombardy.

The wide scope includes the review and qualification of the technology of the tunnels and standardization or renovation of power, lighting, ventilation, video-safety and data transmission plants. The single or dual 'pipe' tunnels have lengths ranging from 250m to 5km (1/10th of a mile to more than 3 miles).

BUSINESS OBJECTIVE

- ✓ Safety management and technology update of approximately 100 tunnels on Lombardy roads
- ✓ Ensure the comfort and safety of users along over 140 km (87 miles) of tunnels
- ✓ Standardize tunnel safety technology and renovate power, lighting, ventilation, video safety and communications

50% of the project is financed by ANAS and 50% by the private sector. Tunnel Gest (a company whose majority shareholding is held by Gemmo S.p.A.) is responsible for the management of the realized project for 17 years, starting in June 2013 when the 3-year construction and requalification period will be complete.

This time frame, which was defined in the financial plan at the start of the project, will allow the company make a return through the provision of services such as plant maintenance. The road management will remain ANAS's responsibility.

"The first stage, nearing completion, scheduled the technological requalification of the tunnels according to ANAS guidelines, which adopt the main European standards in terms of tunnel safety," says Ciro Ascione PE, Systems Business Unit Manager at Gemmo S.p.A. *"Depending on their length, the tunnels are provided with plant of different complexity: from simple lighting, to equipment for ventilation, pollution analysis, heat detection, video-surveillance and image analysis, SOS management, audio for emergency situations, variable-message display panels and radio communication to support rescue organizations".*

Each tunnel is provided with its own PLC-based automation system and is connected for supervision and control to the ANAS operations Center, located in Bellano (Lecco), through a communication network (WAN) using both fibre optic and microwave technology. For the integration of local systems with the WAN the Modbus TCP/IP protocol has been widely used because it allows direct and reliable control of peripherals and relevant data.

Supervision and remote control

The supervision and remote control system configured by Gemmo S.p.A., a certified OEM partner of ARC Informatique, is based on a customized application of PcVue SCADA. Approximately 50,000 data points, 800 network nodes and over 500 graphical pages are managed.

Keys to success

- ✓ Communication networks tie all automation components together
- ✓ Simple navigation from alarm notification to the equipment affected
- ✓ Manual override for remote control of systems in the tunnel
- ✓ Balance fan operation to synchronize maintenance
- ✓ Integrate smart video for surveillance and image analysis
- ✓ Support graphic changes on-line and the ability to make programmatic changes to graphic screens
- ✓ Ability to develop with teams working concurrently on application

From the main page which offers a system overview, it is possible to access the various tunnel subpages listed on the display. When a subpage is accessed an information window opens which aids navigation within the subpage.

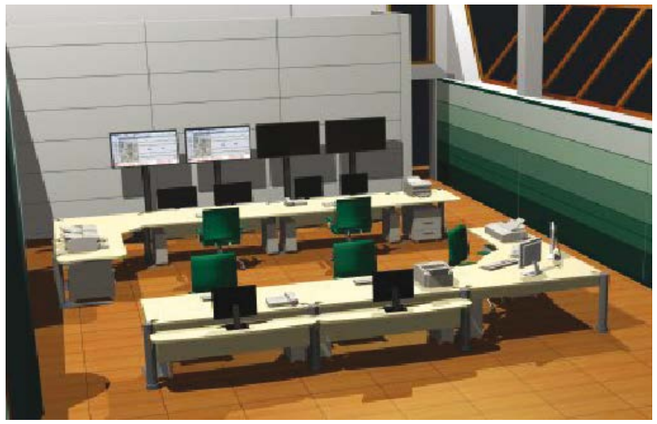


Fig.1 - View of the ANAS operations centre, located in Bellano (Lecco)

At the same time, when a particular system is selected (the lighting system for instance) it is possible to visualize its status in any or all of the tunnels. Finally, by opening the information window of a particular piece of equipment it is possible to visualize several aspects of its operational status, set alarm limits, visualize alarm notifications and by-pass the local control logic to remotely control the equipment.

In fact, all represented objects can operate in either automated or manual mode. In the case of a problem (like fire risk or high pollution) the relevant automated procedures take over, but the operator can manually intervene for better management of the situation.

For instance, when an alarm procedure due to an excessive pollution in a tunnel is started automatically, the operator can watch the situation through the video system (composed of approx. 1500 cameras) and override fan settings and variable-message display panels to facilitate the outflow of the vehicles from the tunnel before the tunnel access is inhibited.

The hardware includes two servers in a hot backup configuration with a further server devoted to database management, two clients for ANAS, two clients for Tunnel Gest and one client for the Traffic Police. Two maintenance clients are used by the Gemmo team. Each workstation at the control Center has two 42" monitors side-by-side which can be used independently.

This allows, for instance, management of the SOS system in a tunnel and simultaneous monitoring of the complete system. *"We centralized all the tunnel plant monitoring at the ANAS operating Center of Bellano,"* Ascione explains. *"The SCADA shows the operator a series of video graphic maps that supply the status of all equipment in real time."* Thanks to the network connection, it is possible to connect through the web to the individual controllers.

Locally, using a portable PC, it is also possible to connect as a PcVue client and query a controller, or to navigate with a browser to the network server. Starting from the graphical pages displayed by the supervision system the operator can instantly know where an alarm was triggered or if a user is calling from inside a tunnel.

Maximum safety

The whole system is characterized by several safety levels. In every tunnel there is a redundant LAN connected to the general WAN, to which all automation peripherals and subsystems refer. The automation system of every tunnel is independent of the Operations Center and therefore all the subsystems interact through the tunnel LAN.

"When an SOS is triggered from any tunnel, a general alarm procedure is activated," says Ascione. *"From the main page, with a maximum of two steps, the operator is always guided to the point indicated by the alarm."*

Tunnels have mainly axial ventilation, but some also have cross or half-cross ventilation. In case of over-pollution the ventilation is activated and increases in volume as a function of the detected pollution level, to attempt to avoid the potential closure of the tunnel.

Fig.2 - The supervision and telecontrol system, designed and implemented by Gemmo S.p.A. and based on PcVue SCADA from ARC Informatique

At the same time, user warnings are shown on the variable message display panels and in some cases, the audio system is activated, directing the users to abandon vehicles.

All this information is monitored by the SCADA system, giving the operator the opportunity of overriding the automatic system to directly interact with the involved systems by remote control.

Fig.3 - Main page with alarms and info window for the SS36 road

In the SCADA main page the most important information is collected: the ventilation level, the status of the sign system and the pollution with different settable thresholds. Moreover, the status of every object is shown.

Using the simulation mode running special algorithms, it is possible to change the alarm thresholds.

For instance, in the ventilation system, it is possible to cycle fan operation so that all fans simultaneously reach the number of hours scheduled for periodic maintenance, minimizing the possibility of emergency maintenance in which the tunnel must be closed.

In case of fire detection, the ventilation system is driven not only by opacity and CO sensors, but also by the image analysis and thermometric system. The Operations Center can intervene with messages that directly reach drivers through the FM radio system.

The fire-fighting system is based on one or more pumping and pressurization units that guarantee the water supply. The storage tanks provide flow rates from 21 cfm for tunnels with length greater than 1000m (1/2 mile), or a flow rate of 17.8 cmh (10.5 cfm) for shorter tunnels. Special fire hoses are located in SOS containers arranged every 150m (0.1 mile) within the tunnels.

The containers are also provided with VOIP phone communication equipment that is integrated within the network.

The integrated video system allows not only video surveillance, but also image analysis. It can operate on-demand, on operator request, or on event. Through image analysis, for instance, it is possible to detect a stationary vehicle due to accident or fault, a vehicle driving against the traffic, the presence of smoke, the presence of pedestrians on the roadway, or other alarm situations.

The video system is independent but integrated. *"We developed interfaces on PcVue to be able to access special images and we also created an interface to the video system dedicated to the Traffic Police, who have operational headquarters in Bellano Center,"* says Ascione.

Fig.4 - Main page with alarms and info window for the Regoledo tunnel

A fully open system

"We selected ARC Informatique's PcVue because we appreciated that the system is really open," says Ascione. *"The openness is fundamental in our work as system integrators, because we can get inside the product to customize it and better use its capabilities, while exploiting the 50 years of experience that we acquired in the road industry. With PcVue we combined our specific know-how with the most advanced SCADA technology to reach a double target: on one hand, to be able to constantly monitor all the operations by presenting an interface that is relatively user-friendly while providing all the relevant information; on the other hand, to be able to collect the details that the technicians require to keep the operations efficient."*

Gemmo S.p.A. has therefore used a single tool, serving different purposes.

A manager needs to use the graphical pages tool to better monitor the events on the road. On the other hand, the technician uses the tool with such detail that they can make a diagnosis and therefore prevent a malfunction. *"This is the purpose of the concessionary company,"* Ascione emphasizes. *"By keeping the plant operating efficiently through adequate remote control, we are able to prevent faults and to guarantee ANAS that they can perform their job, with the ultimate target of improved safety for the users."*

Fig.5 - Sub-page of Poggi tunnel, along the Strada Statale della Valsassina road

"We understood the graphical editor of PcVue, because it was also used by FactoryLink®, a product that we knew in depth. This was another plus of the ARC Informatique solution and another reason why we selected it. We have been able to carry on to this platform all the know-how and the solutions that we developed with FactoryLink®," adds Ascione.

Energy management

A future expansion of the system will concern the energy management system. This will allow ANAS to monitor consumption and to save energy by switching the lights off when the traffic in a tunnel is moderate and by regulating the fans as a function of the pollution level reached inside a tunnel.

Results

Solution with PcVue provides detailed monitoring to improve safety and prevent malfunctions that disrupt traffic

PcVue solution manages 50,000 data points over 800 network nodes and 500 graphical displays

PcVue solution incorporates tunnel safety standards with several safety levels included

Customer: United States Navy

USA

System Integrator: Triton Marine Construction Corporation

Pearl Harbor Naval Shipyard

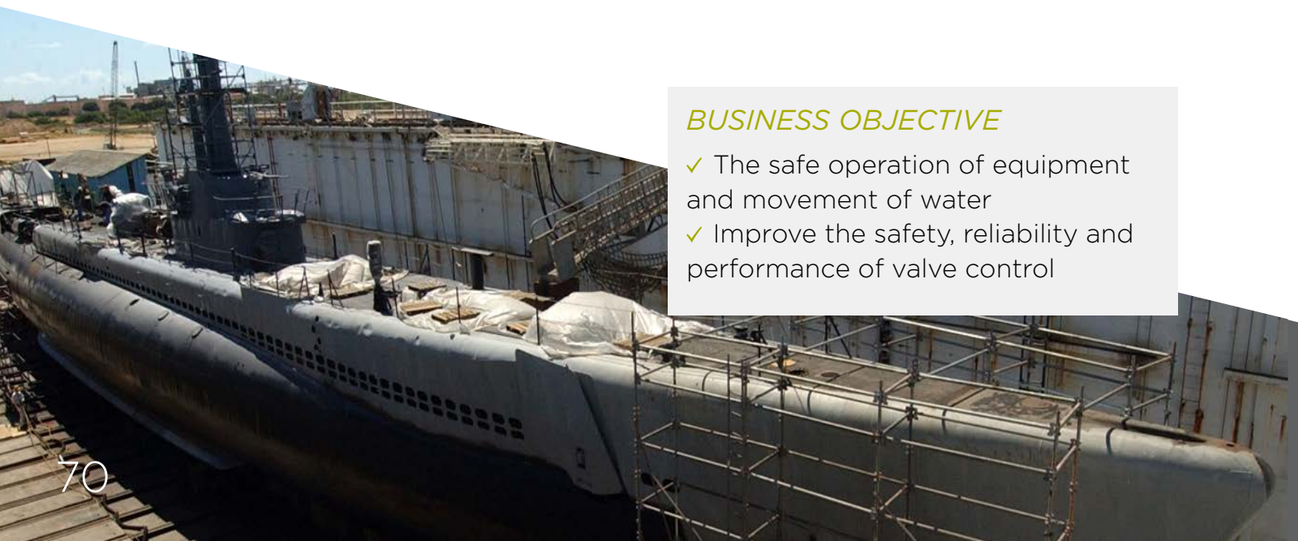
PcVue solution controls flooding and de-watering of dry docks with increased safety

Pearl Harbor Naval Station and Hickam Air Force Base have grown up together around the historic port, known as Wai'Momi to the native Hawaiians, adjacent to Honolulu on Oahu's south shore. Pearl Harbor Naval Shipyard (PHNSY), located at Joint Base Pearl Harbor-Hickam, is a one-stop regional maintenance center for the Navy's surface ships and submarines. It is the only intermediate maintenance facility for submarines in the Middle Pacific.

Of the four dry docks at Pearl Harbor, dry dock numbers 1, 2 and 3 are located in the Controlled Industrial Area (CIA) and are primarily used for repairing and maintaining nuclear submarines.

These are graving style dry docks comprised of a narrow basin with access to deep water through a floating caisson gateway. Dry dock no. 1 measures 1,001 feet (305 m) from the head side of the caisson, with a width of 114 feet (35m) at the bottom and 138 feet (42m) at the top, and a depth of 32 feet 6 inches (10m) from the mean high water mark to the keel blocks.

To access the dry dock, a ship is floated into the basin, the caisson is positioned at the seaward side and the dock basin is dewatered with large vertical turbine pumps. As the basin empties the pressure of the sea against the caisson creates a watertight seal and allows the ship to come to rest on a dry platform.



BUSINESS OBJECTIVE

- ✓ The safe operation of equipment and movement of water
- ✓ Improve the safety, reliability and performance of valve control

Dry dock operators manage this process, known as evolution, with a staff of engineers, electricians and operators responsible for the safe movement of equipment and water in order to ready the dry dock for ship maintenance and repair.

The CIA dry dock operation has been automated using supervisory and data acquisition systems (SCADA) from PcVue, Inc. The SCADA is primarily controlling a network of Limitorque actuators. The actuators are assembled on large gate valves and the assemblies are known as a Motor Operated Valves (MOVs).

The SCADA communicates with the MOVs using redundant Modbus IP networks connected to a redundant MasterStation gateway.

A Modbus serial 485 loop connects the actuators with the MasterStation. Each dry dock is controlled by 19 MOVs with 16 I/O points being monitored and controlled per actuator. This fault tolerant system opens and closes valves to precise percentages and adheres to specific dry dock operational valve position protocols for safe control of water flow.

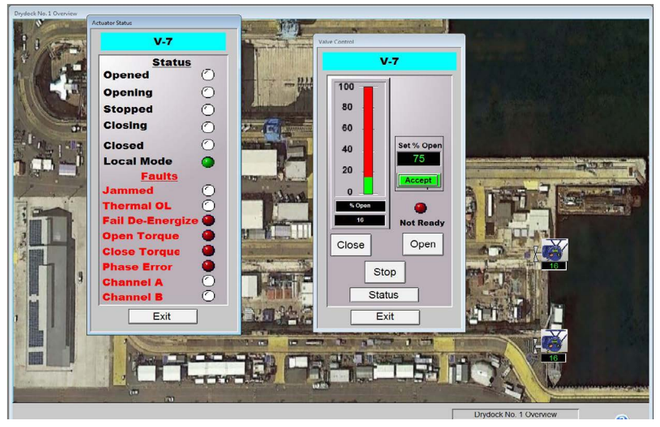
The dry dock operators are prohibited by the SCADA from performing valve movement until receiving the Ready for Operation indicator. This indicator is a synthesized status derived from monitoring multiple alarm points including power off, over-temperature, over-torque, jammed valve, and other actuator alarm conditions. PcVue's event historian keeps an ongoing log of the control actions as an audit trail.

Triton Marine Construction Corp. (TMCC) is a Waterfront Multiple Award Construction

Keys to success

- ✓ Prohibit operation of valves until safe
- ✓ Prohibit operation of valves when equipment is in alarm condition
- ✓ Adhere to existing US Navy procedure for operation of dry dock valves
- ✓ Provide fault tolerant system
- ✓ Develop common objects for standard interface across dry docks
- ✓ Minimize graphic screens for ease of maintenance

Contractor (WMACC) for Naval Facilities (NAVFAC). TMCC was awarded a task order for improvements to dry dock no. 1 including upgrading the actuators and installing a valve control system. PcVue was commissioned for this purpose in 2012. Dry dock no. 1 was the last of the three CIA dry docks to have a valve control SCADA installed. Previously, a system based on a different SCADA platform had been in operation for dry dock no. 2 and 3. Dry Dock Operations had not been satisfied with the safety, reliability and performance of their existing control system. These concerns prompted the discontinuation of that system and had forced the dry dock operations personnel to go back to more labor-intensive manual operations.



Upon completion of the dry dock no. 1 project and after firsthand experience with PcVue, the Navy was able to confirm that the reliability and performance issues were mitigated. Most importantly, the PcVue system had eliminated the safety concern. While safety is important in any process, at the dry dock the large amount of water flowing through chambers puts dry dock personnel and shipyard workers in harm's way if not carefully controlled.

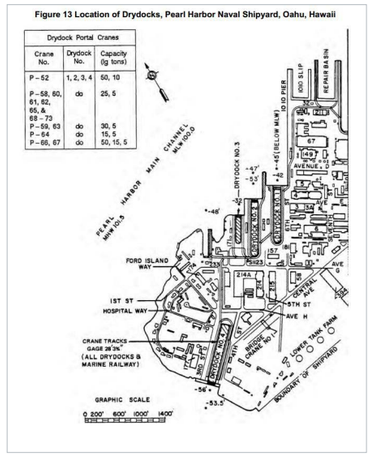


Figure 13 Location of Drydocks, Pearl Harbor Naval Shipyard, Oahu, Hawaii

Drydock Portal Cranes		
Crane No.	Drydock No.	Capacity (lg tons)
P – 52	1, 2, 3, 4	60, 10
P – 58, 60, 61, 62, 65, & 68 – 73	do	25, 5
P – 59, 63	do	30, 5
P – 64	do	15, 5
P – 66, 67	do	50, 15, 5

Subsequently, the shipyard elected to retrofit the SCADA in dry dock nos. 2 and 3. An RFP (request for proposal) was issued for the troubleshooting and upgrading of the control system. The system integrator replaced the SCADA and was able to leverage the object-oriented reusability features of PcVue and minimize the bid cost by using common objects developed for dry dock no 1.

The retrofit for dry dock nos. 2 and 3 was completed in a matter of a few weeks in 2013 Russell Risch, a PHNSY lead electrician for Dry Dock Operations, whose team operates the dry docks, had PcVue configured to be identical to the previous dry dock no. 2 control system. It was important that they shouldn't have to change the operational processes to accommodate the new system but rather be able to illustrate their processes in the way that the operators are certified. *"Our graphical display reflected exactly how our operations work, so that minimal operator training was required,"* said Russell, *"It can be expensive and time consuming when processes change to accommodate new equipment and systems, particularly when technicians have to be re-trained and re-certified."*

Jeff Hutchings, who was responsible for integration, said, *"The architecture of PcVue was ideal for this application. We had multiple MOVs to control and by utilizing the Application Architect feature with symbols and branching, we were able to minimize both the configuration time and the possible points of human error on configuration."*

His team that configured the application also benefited from PcVue's objected oriented project methodology. They developed objects to PHNSY standards including animated graphical objects known in PcVue as symbols and mimic templates, which provided a consistent graphic and navigation look and feel. Jeff noted *"We took advantage of the branching concept in PcVue to minimize the number of mimics required by invoking the graphics and all the variables and tags that are tied to it in the context of the MOV to be controlled. This work really paid off when we were also able to reuse and apply the same configuration objects that we developed for dry dock No. 1, when we bid dry dock nos. 2 and 3, – saving both us and the Navy lots of time and money."*

Jeff continued, *"Everyone is quite happy with the results of the MOV control system upgrades. There was a commitment to not only meet the specification of the projects, but also in working closely with the dry dock personnel to really satisfy their operational needs. For instance, the PcVue application was very flexible and was able to be adapted quickly to the dry dock personnel's requests. Each time that an improvement was mentioned it would be reflected in PcVue in a very short time."*

Steve Yuhl, General Manager of Triton Marine Construction in Hawaii noted, *"We work hard to maintain excellent relations with Shipyard Operations. We had an outstanding and dedicated team collaborating with the shipyard engineers and operators on the delivery of the control system. We had nothing but positive feedback from our customer on the project. The Navy is quite rigorous in their commissioning but with PcVue the controls buyoff went very smoothly."*

Results

PcVue solution resolved safety, reliability and performance concerns

Operator interface in PcVue solution mimics previous system to eliminate need for recertification of operators

PcVue solution was commended for conformance to Dry Dock Operations requirements

Customer: CNRL

Canada

System Integrator: CTH Systems

Canadian Natural Resources Oil and Gas production

PcVue solution supplies production reports and validates data for regulatory audits

Canadian Natural Resources Limited (CNRL), founded in 1989 and headquartered in Calgary, Canada, possesses a diversified combination of assets in North America, the North Sea and Offshore Africa and today is the largest independent crude oil and natural gas producer in the Canada. Delivering a balanced mix of natural gas, light oil, heavy oil, in situ oil sands production, oil sands mining and associated upgrading facilities, CNRL engages in the exploration and development of geographic areas for the production of natural gas and crude oil. The company operates its business through three primary reportable segments: Horizon oil sands production, thermal heavy oil, and conventional oil and gas.

CNRL invested in a large scale automation project that primarily impacts the conventional oil and gas business that deals with the exploration, development, production and marketing of crude oil, natural gas liquids and natural gas.

Scalable SCADA automation

Canadian Natural Resources needed a better way to manage the process control and monitoring of its 300 gathering stations, 800 compressor stations, and 150 gas processing facilities. CNRL's SCADA Specialist, Kurtis Jackson, spearheaded the company's automation project to replace its FactoryLink SCADA systems with the PcVue's SCADA and FrontVue solutions. CNRL has numerous independent automation systems of various brands and Jackson wanted to centralize and achieve consistency by integrating as many of these automation systems as possible on PcVue. In addition, CNRL wanted to leverage PcVue's ability to support multi-station architectures for networking and communicating Modbus Roc, Roc Talk, and BSAP.

The replacement process started when CNRL began migration of their FactoryLink SCADA to PcVue using the Smart Generator. This PcVue tool easily and automatically converts a very high proportion of existing applications to PcVue, while ensuring maximum compatibility and security.

"For most of our SCADA applications we were upgrading, between 60-80% of our FactoryLink applications converted to PcVue with ease. This saved us a tremendous amount of time with not having to reconfigure the entire applications and it meant that we did not have to retrain our users. It also says that we are investing in our future with SCADA automation, PcVue regularly enhances its SCADA with version updates and new features," said Jackson.

CNRL is measuring millions of tags and an approximate 800,000 I/O points within its primary operations. GE and Allen-Bradley PLCs, Fisher and Bristol Babcock RTUs are the

BUSINESS OBJECTIVE

Improve monitoring and control of 300 gathering stations, 800 compressor stations, and 150 gas processing facilities

Keys to success

- ✓ Manage 800,000 points
- ✓ Support multi-station architecture with various RTU communications
- ✓ Communicate over single radio channel to various brands of RTUs
- ✓ Automatically convert existing unsupported SCADA to new technology

major brands used throughout production. The PcVue SCADA is monitoring and providing pertinent data used by some 2,500 employees who need to access the information in some shape or form – i.e., monitoring, reviewing, or maintaining data in real-time.

"We run daily our production reports and utilize real-time and historical trending to give us the data needed to make sure we have met our production goals and will meet our sales contracts, such as to a pipeline company for example," said Jackson. Currently, Kurtis has already implemented eight PcVue servers with remote client access and expects to deploy approximately 40 PcVue SCADA systems within the next two years.

Oil and Gas systems support and advanced communication integration

CTH Systems Inc., a value-added reseller of PcVue, helped to configure and facilitate the migration to PcVue. Using Smart Generator, the engineers were able to convert all of the graphical elements (mimics, symbols and templates), local and shared libraries (symbols, pictures), all sets of variables for the application (including variable tables, alarm configurations and histories) and the database without any rework. It also converts the TCP/IP communication objects and their links.

"We were really happy with how easy it was to transfer all of our applications to PcVue in a very easy, straightforward manner," said Jackson.

In addition, CNRL uses TinBox Energy Software's IM-SCADA™, a multi-protocol measurement and communication software. It allows the wells that are equipped with different automation devices, such as RTUs (remote terminal units) or pump on/off controllers, to talk over a single radio channel in order to bring the data back to PcVue SCADA.

CTH Systems supported CNRL with implementing automatic and remote readings of gas compositions from the well, the upload of the corrected gas compositions to each well, and the elimination of variances between the well meter and the IM-SCADA™ database.

"We couldn't be happier with how robust and effective IM-SCADA works for us. It helps maximize operational efficiency," said Jackson. It minimizes the need to physically go to the well sites to download or upload the gas compositions.

Having 178 host servers along with 600 remote clients, CNRL is monitoring about 5,000 – 6,000 data points per host. Of these there are eight PcVue stations that are supervising anywhere from 50-400 wells and one to three facilities per host, depending on location or region.

"This translates to thousands of tags and alarm parameters that are being monitored and acknowledged daily," said Jackson. As the oil flows out of the well, it passes through a pipe arrangement, which is connected to flow lines that bring the oil and gas to gathering stations where sediment, gas, salt water and oil are separated. PcVue is also monitoring the gathering stations.

The PcVue SCADA collects such I/Os from PLCs and RTUS used in production fields and gathering stations such as gas/oil pressures, (ESD), pump start/stop, remote/local pump control, pump speed, pump run/stop, motor operated valves and motor operated valve shut down, choke set points /positions, temperature, emergency shutdown and fire alarms etc.

"One of the most important factors in our industry is safety. At every stage of the process, PcVue monitors our mission critical operations and maintains all of our safety measures to prevent fires, explosions, and ecological disasters," said Jackson.

Meeting compliance and managing data validation

Characterized by remote and widespread operations, CNRL wanted to have each automated activity whether in drilling/production, distribution, transportation or refining supervised from several of its control centers.

A solid and securely designed SCADA system must be able to control such critical factors as: flooding, leakage, fire, ESD, oil and gas flow rate and accumulated flow, line pressure, wellhead pressure, pump status, tank level, and gathering station equipment status, among others. Due to the nature of the product, which must be transported from the

well to final consumer, and the potential adverse environmental effects of oil/petroleum accidents, SCADA systems are a necessity. *"We wanted to leverage SCADA features and benefits that give us the ability to reliably gather more data and achieve more control,"* said Jackson.

Frank Tarbox, President of CTH Systems aim is collaborate with Jackson and his team to provide an effective way to validate and correct the well data for gas measurement optimize it and then move the corrected data throughout the organization while still complying with Directive 17 and 76 standards. *"Through our expertise in this area, we've really become extremely proficient at managing the measurement requirements for oil and gas operations,"* continued Tarbox. The Energy Resources Conservation Board (ERCB/ Board) had mandated Directive 17, which constitutes the measurement requirements for oil and gas operations. CNRL achieves ERCB compliance and they use the data collected from PcVue for not only daily production reporting but for running audits and assuring compliance.

CNRL is looking forward to reaping the benefits of upgrading its automation systems and is really happy thus far with how well it has been working optimize their processes. *"We are really glad we chose PcVue and IM-SCADA for our SCADA solution and that the configuration process has been very straightforward to implement, especially in consideration that most of our applications are mission critical and work around the clock,"* said Jackson.

Results

PcVue Solution monitors and reacts to critical factors such as flooding, leakage, fire, critical pressures (line and wellhead), emergency shutdown and equipment failures while monitoring and controlling oil and gas flow and recording accumulated flow

Solution with PcVue maximizes operational efficiency by eliminating the need to travel to the wellhead to upload and download gas composition to the flow computer on-site

PcVue solution maintains safety measures to prevent fires, explosions, and ecological disasters

Solution achieved Energy Resources Conservation Board compliance

PcVue solution validates data for regulatory audits

Customer: City of Jena

Germany

System Integrator:
Actemium Automation

Monitoring the charging stations of the e-bus fleet of the city of Jena

How Jena's public transport system monitors its charging columns for the e-bus fleet and uses advanced diagnostic features to increase availability and optimize maintenance activities.

In the city of Jena, electromobility has been present in the form of a tramway in service for 120 years. Supplemented by a fleet of diesel-powered buses, an efficient public transport system has been created over time. Last year saw the introduction of e-mobility in the operation of city buses as well. Three first vehicles started regular service in 2020 to contribute to CO^2 savings (53,000kg per bus and year), but also to reduce particulate matter and noise emissions in the urban area.

The attractiveness of public transport is essentially promoted and maintained by smooth and punctual operation. In this context, operations of tramways in particular require a reliable and uninterrupted power supply, which is the responsibility of the power supply department at Jenaer Nahverkehr, operator of the city's public transport. Nevertheless, malfunctions of the system technology can occur in rare cases. In order to minimize the effects of malfunctions on the operational process as well as on the passengers, it is necessary to keep downtimes as low as possible. This is supported by a reliable control and telecontrol system implemented on the basis of the PcVue SCADA software.

BUSINESS OBJECTIVE

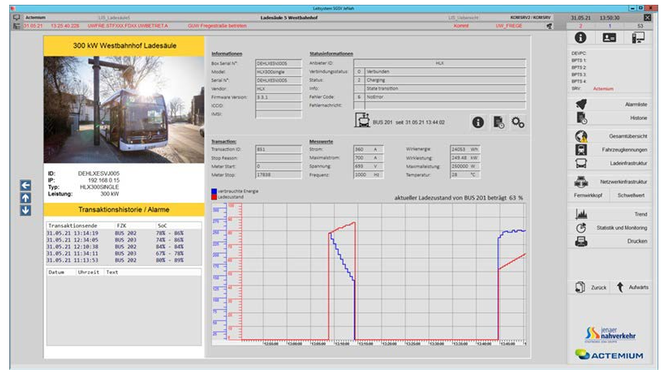
The primary goal of this expansion is remote monitoring of the charging infrastructure by the power supply department so that any faults that occur can be detected and eliminated as quickly as possible

For many years, Actemium Germany's Automation Frankfurt business unit has been the partner of Jena's public transport system for the implementation and further development of the control and telecontrol technology for the power supply, but also for the monitoring of signaling and safety systems.

Maintenance of the newly introduced charging infrastructure for the electric buses fell under the responsibility of the Power Supply department, and the desire arose to integrate the chargers into the control system. Actemium Automation Frankfurt was commissioned to do this.

The primary goal of this expansion is remote monitoring of the charging infrastructure by the power supply department so that any faults that occur can be detected and eliminated as quickly as possible. And to do so while reducing travel times for service personnel as much as possible, especially in a city that, due to its topography and its location within the Saale Valley, has a high traffic density on a small number of routes.

With the existing control system, the possibility of processing the data for visualization, archiving and data exchange with external systems via various industrial communication protocols, as well as remote alarming, is already provided as standard.



©Jenaer Nahverkehr GmbH

OCPP- Driver for communication with charging stations

Typically, the open standard protocol OCPP (Open Charge Point Protocol) is used for monitoring e-charging stations, which ensures the interoperability of products from different manufacturers.

With its latest PcVue version, the manufacturer ARC Informatique provides a communication driver for the OCPP protocol that supports the current protocol versions 1.6-J and 2.0.1 as well as the security profiles 1 and 2. The software also overcomes a typical OCPP problem, which is that a charging station can only communicate with one Charging Station Management System (CSMS). Using a proxy function, the charger's OCPP messages can also be passed on to third-party systems. This represents a typical feature of the open PcVue system, which inherently has a wide range of data exchange options.

Integrated operating functionality

A newly added entry point into the user interface that is seamlessly integrated with the existing system, is a map display that shows the charging stations distributed throughout the city area as symbol markers. The newly added part of the visualization benefits from a very short learning curve for users who have been familiar with the existing functions and operating philosophy of the control system for years, and which is also reflected in the charging station monitoring area.

Data analysis and monitoring

The central function of the implementation by Actemium is alarm and log data management, which allows precise fault analysis in live operation as well as in the evaluation of historical data. The alarm system enables the on-call service to diagnose the fault in advance via the secure remote access of the public utility company and then to rectify it or initiate appropriate measures.

In addition, the traffic control center benefits from the connection to the charging infrastructure. The dispatcher workstation there shows the whereabouts of a bus at the corresponding charging points in real time and points out faults that affect operation. This means that adjustments can be made quickly in vehicle deployment planning to avoid cancellations or delays in the route schedule. Afterwards, the maintenance personnel can determine the actual cause.

Alarms of particularly high priority are sent as remote messages to the mobile terminals of the on-call service.

The users of the system can monitor active charging processes via a trend data display, whereby all measured values, such as currents, voltages and power values of a transaction, can be visually compared. Likewise, already completed charging processes can be called up from the transaction history and viewed in retrospect, as well as compared with each other. The respective vehicle is identified and its current state of charge is documented.

The transaction history is exported at the push of a button or automatically and stored as a weekly and monthly report. Of particular interest is the respective energy consumption per vehicle and charging process, but also the number of incorrect transactions.

The implemented user interface of the system further enables:

- An access management system for charging stations
- Lock or unlock charging stations for use
- Remotely activate or cancel charging processes
- Store and retrieve charging station-specific documents.

Practical benefits proven after just a few weeks

Christian Zeh, a testing and maintenance engineer at Jena's public transportation system, is enthusiastic about the solution:

"By integrating the monitoring and control system for e-charging stations, all operating states are now visible in the control system, which opens up immediate intervention options for us. The charging infrastructure is thus fully integrated into the operational workflows of the power supply department. The usefulness of the system was proven after just a few weeks in daily operation, especially with regard to controlling temperature fluctuations in the charging stations."

With the implementation of the charging infrastructure in its control and telecontrol system, the power supply team is thus well prepared for the already planned increase in the electric bus fleet and the associated expansion of the charging infrastructure.

Customer: Russian Railways

Russia

System Integrator:
SPC MICROTECH LLC

Control Systems of the Main Computer Center of Russian Railways

SPC MICROTECH LLC is an experienced system integrator specialized in industrial automation. The company has worked worldwide with recognized partners such as ARC Informatique and Schneider Electric. This article covers one of the projects implemented by the company i.e. the dispatching of the Main Computing Center of the Russian Railways (MCC RR). Fully owned by the Russian Federation, Russian Railways is Russia´s leading railway company and one of the largest companies in the global transport sector.

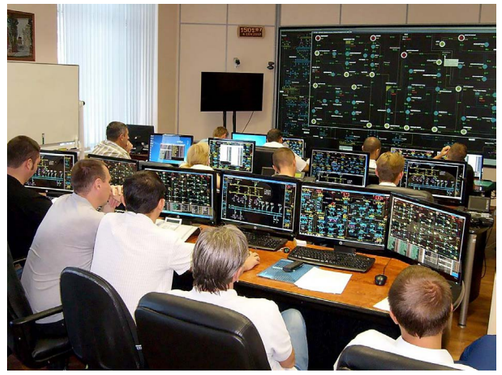
The purpose of the MCC RR is to manage the operation of railway information systems and to ensure the uninterrupted operation and development of the railway transport system.

The responsibility of the MCC places the highest demands on reliability and safety. The equipment that ensures this level of requirement includes ventilation and air conditioning control systems, guaranteed power supply and lighting systems, an individual heating station, a cooling station, and a fire extinguishing station. The integrated building management system manages centralized dispatching and control of all systems.

The principles of building a dispatching system

- Lower level - sensors with normalized signal and actuators, as well as devices for measuring electrical parameters and local automation devices (small controllers).
- The intermediate level - data acquisition system based on several Modicon M340 PLC series manufactured by Schneider Electric.
- The upper level is represented by several PcVue servers and Client stations edited by ARC Informatique.

Communication between the upper and middle levels is carried out via the local Ethernet network, between the logic controllers and data acquisition devices - via Modbus, between the middle and lower levels - via direct I/O channels via digital and analog modules of controllers.



Main functions of the dispatching system

The dispatching of control systems for the MCC RR building was created to retrieve information on operating equipment, to manage all systems and maintain archives of events with access to the analytical data, namely:

- dispatching of power supply systems, including 10 KV relay protection devices and diesel generators.
- dispatching of uninterruptible power supplies.
- possibility to work in real time and/or with analysis of archive data.
- emergency prevention.
- documentation and archiving of information: archives of system parameters, operator actions, alarms.
- monitoring and control of ventilation, air conditioning and cooling systems.

BUSINESS OBJECTIVE

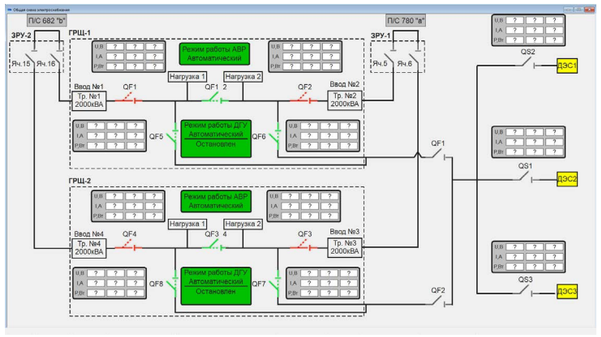
✓ Maximum ease of operation
✓ Increase reliability, safety and quality of equipment operation
✓ Remote control and management of work
✓ Maintenance of automated accounting operations

Keys to success

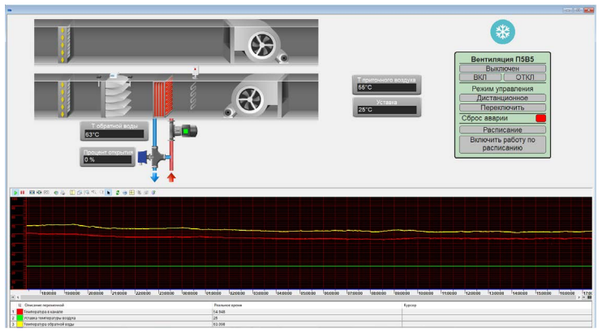
✓ Reduction of downtime and repair costs through rapid response and accident prevention
✓ Analysis of information and optimization of control on the data collected
✓ Improvement of work quality for the personnel through better control with a user-friendly interface
✓ Full and continuous control of all building management system processes
✓ Display of reliable and complete mimics for monitoring
✓ Ability to make faster decisions on system management according to emerging issues

- diagnostics of the current state of engineering equipment and control system.
- implementation of control automation features.
- implementation of safety automation features.
- diagnostics and analysis of emergency situations.
- remote configuration and programming of the controllers from the operator and engineering stations.

System operation has shown a high degree of accuracy and stability throughout the annual range of outside temperatures. As a result, the control and management of the life support system has been improved.



An additional benefit was the ability to detect faults on operator station and thus quickly rectify problems that had previously led to the shutdown of various systems. The stability of the monitored parameters, achieved after the application of intelligent controllers, allowed a new look at the system created according to Building regulation standards in Russia.



The control room with two large screens (in addition to the conventional 27-inch monitors) displaying the status of all systems, including power supply, as well as server rack cooling, reduced the resources of maintenance personnel and simplified the operators' task list.

The control and dispatching system implemented for the building's systems demonstrated the clear advantages of Schneider Electric equipment and an effective dispatching system based on PcVue SCADA.

Results

The high reliability and availability of PcVue Scada allow the control of the most complex and critical systems, at the direction of MCC RR

Customer: Toulouse Tramway

France

System Integrator: Roiret Transport

Toulouse Tramway

PcVue solution integrates centralized maintenance, signaling, automatic vehicle location system and closed circuit TV into a unified system

The railway systems integrator Roiret Transport, subsidiary of the Vinci Group, has selected the PcVue software solution from publisher Arc Informatique to supervise the centralized technical management (CTM) of the new Toulouse tramway.

After the Lyon tramway and the Singapore and Santiago (Chile) undergrounds, it is the thirtieth urban system to opt for this solution. Every day PcVue manages the information necessary for the transportation of more than 10 million passengers around the world.

PcVue is a centralized supervision (SCADA) software with an installed base of more than 38,000 licenses around the world.

In its railway version it is used to supervise the CTM (centralized technical management) equipment, i.e. the trackside equipment of the network.

This equipment includes electricity substations, stations (ticketing, traveler information terminals, etc.), intercom, CCTV, and sometimes even the track signaling systems.

In practical terms, if a ticket machine is faulty, for example, the software sends an alarm to the operator in the central control room so that the most appropriate corrective action can be taken.

In the case of the Toulouse tramway, PcVue will interface with some thirty controllers (including one for each of the 18 stations).

BUSINESS OBJECTIVE

Safe Supervise the Centralized Technical Management (CTM) of trackside equipment for the new Toulouse tramway

The software manages 15,000 to 20,000 information items in real time. It can also run applications handling larger volumes, with up to several hundred thousand managed variables.

"We first appreciated the ability of Arc Informatique to develop specific protocols, particularly for the CCTV. This enables us to interface with the network supervision PCs that have ´business´ protocols and thus ensure the continuity of the installation. Next, PcVue provides a ´VCR´ function which records the events. For example, if an incident occurs at a junction, the entire scenario leading up to the incident can be played back. Lastly, the IntraVue module enables PcVue to supervise and integrate equipment such as the CCTV cameras directly on a TCP/IP network. It is no longer necessary to use a dedicated PC for each type of equipment." said Mr. Clarenne, Business Manager at Roiret Transport.

In a central control room there is usually a computer work station for the signaling, another

Keys to success

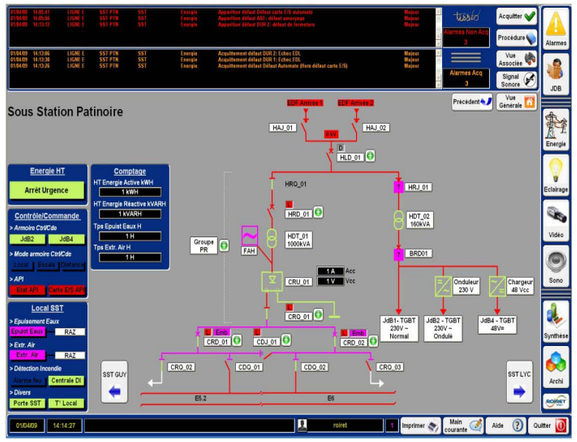
- ✓ Manage Interface with some thirty controllers and manage 15,000 to 20,000 information items in real time
- ✓ Integrate signaling functions on the CTM screen
- ✓ Interface with the network supervision PCs that have "business" protocols and thus ensure continuity
- ✓ Native management of multi-screen displays and video walls
- ✓ Animated graphics managing the combinations required for object coloring are supplied in the form of libraries (track circuits, switches, signals, etc.)
- ✓ Development kits are available as standard for interfacing with third-party applications (train tracking, space-time plots, etc.)

for the CTM, and yet another for the AVLS (automatic vehicle location system).

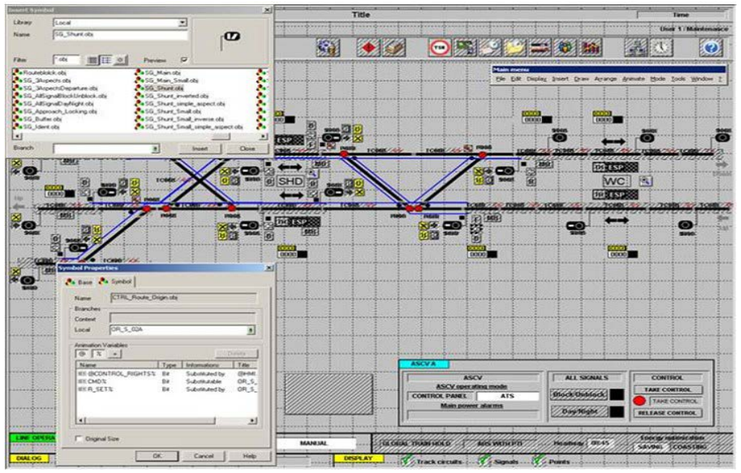
The standout feature of PcVue is that it can integrate everything. Signaling functions can be included on the CTM screen. In this case, with only two screens, the operator supervises the CCTV, the intercom with the trains or the stations, etc.

PcVue also provides native management of multi-screen displays and video walls.

Animated graphics managing the combinations required for object coloring are supplied in the form of libraries (track circuits, switches, signals, etc.).



Development kits are available as standard for interfacing with third-party applications (train tracking, space-time plots, etc.).



Results

PcVue solution provides integrated CTM and CCTV supervision

PcVue solution's VCR function records the events in the system

PcVue solution manages the industrial TCP/IP network for reliability and performance

Customer: JENA PUBLIC TRANSPORT

Germany

System Integrator:

Actemium Cegelec GmbH

City of Jena Tram System

Solution with PcVue helps relieve Jena's suburban traffic congestion

The attraction of urban public transport depends on faultless operation and punctuality. The traffic layout and topography of the city of Jena in the Saale valley are such that a large part of the intra-urban traffic is concentrated on a few commuter corridors. It is important to ensure regular operation and high availability on this main corridor. Outages at technical and railway facilities can cause failures in electrical supply, in control points and switchgear or to signals and security of passageways.

History

In 1992, the Jena city public transport company installed the first supervisory control of the electrical supply. Until 1996, all voltage rectifier units, security units and signaling units were connected to a single Unix-based system. The maximum capacity of the system was soon reached. In 2008 the system was ten years old and order to continue to ensure reliable operation it became necessary to renovate the system.

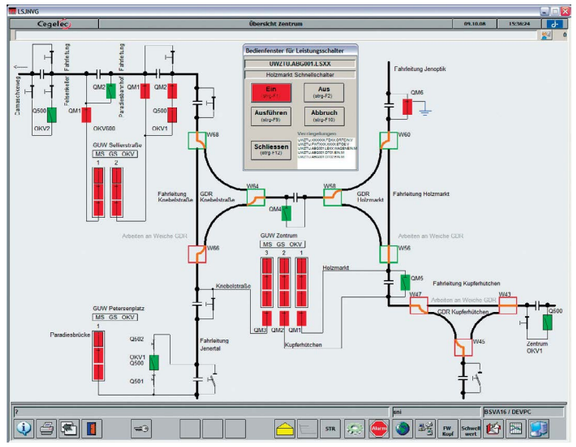
Implementation with PcVue Solutions

The new supervisory control system was implemented by Cegelec using PcVue SCADA software running on a Microsoft Windows client server architecture. It consists of a communication server, a database server and four fixed workstations. There is an option of using any computer or laptop as a remote station. In addition, a development station is available for maintenance.

BUSINESS OBJECTIVE

- ✓ Migrate obsolete SCADA to new scalable architecture capable of further expansion
- ✓ Improve efficiency and reduce overtime
- ✓ Improve reliability to reduce traffic congestion, both in trams and vehicular traffic

The servers act both as domain servers, provide user administration, wireless clock and data backup. The communication server is dedicated to the link to the PLCs via the ABB RP571 protocol. The handling of user actions, messages, alarms and variables take place on the database server running Microsoft SQL Server.



The graphical interface includes object-oriented diagrams that display the current state of the system, alarms, reports, real-time trends and historical trends, as well as running the customer's algorithms for tram operation.

PcVue's native capabilities, such as redundancy and automated project version management, made it was possible to have the project shared from the communication server. In this architecture, changes for any station in the network are only applied in one place.

PcVue allows a client to run as a Windows Terminal Server (now called Remote Desktop Session). In this way, authorized users can access the server of any workstation via remote terminal access, display existing information and – after their passwords have been verified – control the system.

Routers are used to provide a TCP/IP link from the telephone network to the local area network of the supervisory control system; no other software is needed.

To minimize the impacts of failures, it is important to reduce the length of breakdowns. The repair staff has significant travel due to the decentralized nature of the tram system.

Keys to success

- ✓ Ease and speed of conversion from the previous SCADA application
- ✓ Changes are applied in one place as the whole project resides on the communication server
- ✓ Concurrent running of the previous and new systems throughout the transition
- ✓ Remote access from any workstation for both monitoring and control
- ✓ Standard native interfaces such as Modbus/TCP, Profibus and S7 via TCP and IEC 870-5-104

Travel to site plays a large part in the duration of the disruptions.

With PcVue, it is possible to visualize and control the electrical supply stations, points and switchgear; plus control and management of signaling alarms from a central location. Some predefined alarms are sent by SMS to the service technician's cellphone, via the alarm management function of PcVue. In the same way, it is possible to deliver voice alarms by telephone, so the technician on duty can get more information and more quickly resolve the problem.

PcVue offers many native interfaces as standard, such as Modbus/TCP, Profibus and S7 via TCP, and it can be used as an OPC DA server, OPC client or OPC DA XML client. That was vital for modernizing the system, making frequent adaptation of hardware components a thing of the past, even when suitable spare parts could not be obtained.

Future communication between the different devices will be of the Ethernet type, preferably IEC 870-5-104.

Easier handling

The choice of PcVue was also in part, based on ease and speed of conversion from the Unix based SCADA. Design of the data model is accomplished by a set of menus, while changes during the project are integrated on the fly.

A major attraction of PcVue for Cegelec is the ability to view the whole data model or configuration definition as ordinary text files. Using standard tools they can configure variables in bulk with the filtering, copying, insertion and search and replace functions.

To make best use of this facility, and also for improving clarity and maintenance, the most meaningful naming structure possible was set up. The name of a variable indicates the collection, site and components as well as an individual explanation and the nature of the data.

The PcVue development tool represents the variable naming in a tree-structured manner which is also used to filter the data definition selection by site, collection and component type.

Images are easily converted into PcVue via an import tool. The installer can develop and maintain the application by dragging & dropping a preconfigured object as a referenced symbol. Production of the display pictures (mimics) uses a WYSIWYG technique (what you see is what you get).

Start-up

During the start-up of the new system, it was imperative to ensure interruptions to the old system be minimized. This was possible by concurrently running both systems during the transition, such that there was only a short bump during switch-over. To achieve that required two measures, first by coupling the data via an OPC link to the old system, then after disconnection of the link, retrieving data directly from the PLCs.

Results

PcVue solution eliminates the need to travel to site to perform electrical disconnects

PcVue solution enables emergency shutdown of the entire system in case of danger

Solution with PcVue enables swift response to issues resulting in less traffic congestion

PcVue solution provides early warning of potential problems enabling breakdowns to be avoided

Solution with PcVue improves reliability via remote reconfiguring of substation feeds

Customer: Lake Como Waterworks

Italy

System Integrator: T.S.A.

Industrial Aqueduct of Lake Como

PcVue solution incorporates pump energy profile management to minimize costs

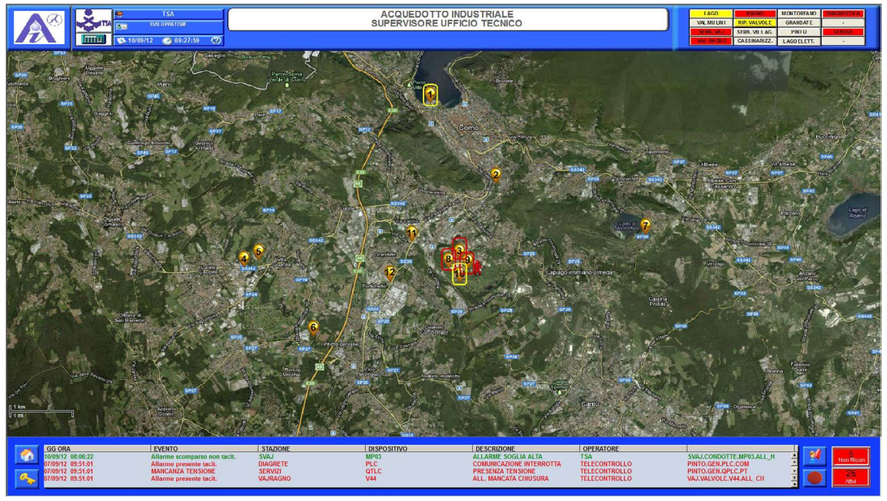
Lake Como, located in northern Italy, is served by nearly 60 KM (40 miles) of aqueducts. The aqueduct draws its water directly from the lake into storage tanks. The water flows from the storage tanks via aqueducts serving businesses around the lake. The waterworks reliability is paramount, as water disruption leads to lost production for manufacturers of Como. After 30 years of service, the SCADA system was in need of modernization.

Energy costs in the region have risen significantly during the last 30 years. The geography of the lake, set in mountainous terrain, is particularly challenging to water management. The modernization of the SCADA created the opportunity to not only take advantage of technology advances, but also to review concepts of water management and to introduce the concept of energy profile management.

Pumping represents the greatest percentage of energy costs. Energy profile management involves analyzing daily water consumption and comparing to lake levels. This analysis provides a projection of the storage required for the upcoming day. The set-points for the pumps are managed such that the tanks are filled at night when electricity is less expensive. Operating the pumps during the day is possible, but minimized to reduce costs.

The SCADA collects other relevant operational data of the system including continuous recording of pressure, level, flow rates and volumetric meter readings. In the future, further optimization of energy costs may be possible.

Telecommunications was evaluated in the early phases of the project. The decision was made to move from a field bus to an Ethernet network. Existing telephone land-lines interconnect the PLCs and the SCADA host. HDSL technology provides the Ethernet network over the telephone system. The Ethernet network provides multiple advantages to a field bus architecture including the potential for future revenue sources. For example, other Lake Como utilities may lease bandwidth for their own industrial protocols or other applications such as surveillance and telephony may be hosted.

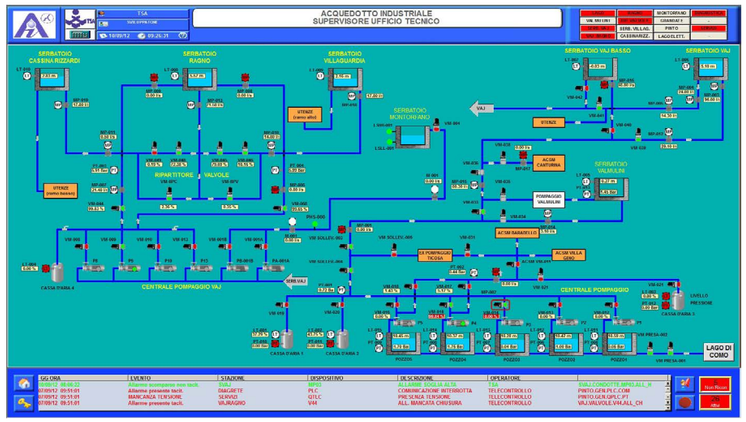


BUSINESS OBJECTIVE

- ✓ Modernize 30 year old SCADA system which had become obsolete
- ✓ Make telecommunications independent of PLC and SCADA vendors
- ✓ Optimize energy use
- ✓ Bring new SCADA on-line with minimal disruption to operations

Keys to success

- ✓ Versatility and ease of maintenance
- ✓ Minimize the number of screens to be developed
- ✓ Integration with various enterprise systems
- ✓ Any modification for the project can be made on the server and copied to the clients
- ✓ High priority alarms are sent to the operator via SMS text messages
- ✓ System operators can reach the PLC directly using mobile devices in the case of a failure of the land-line network



The design also made the telecommunications independent of PLC and SCADA vendors for the project.

Two critical aspects of the communication reliability that had to be addressed were network security and availability.

Standard IT practices for security are used. Firewalls and VPN's ensure that the appropriate policy is deployed, allowing only access to recognized users of the system. Secondly, cellular modems are connected to each PLC. In the case of a failure of the land-line network, system operators can reach the PLC directly using mobile devices.

A client-server architecture was chosen for the SCADA. The simplified design is based on commercially available hardware with a modular open architecture for maintainability.

PcVue Solutions, from ARC Informatique, was chosen for versatility and ease of maintenance. The graphics provides a very lean display, thanks to modern symbols for visualization and animation.

The variables (tags) in PcVue, using a branching structure, minimize the number of screens to be developed. The client stations deployment is essentially automatic. Clients are enabled by simply sharing the project file. Any modification for the project can be made on the server and copied to the clients.

The system has about a thousand alarms, which are divided into priority levels. All of the alarms are stored and are available in both textual forms and with graphic animations.

When alarms are raised, the SCADA uses contextual logic to determine the appropriate course of action. For high priority alarms, SMS text messages are sent to the operator. This is based on the concept that the operator can connect to the network and acknowledge the alarm.

If the operator does not respond within a designated time, the system will resend the SMS message until the alarm is acknowledged.

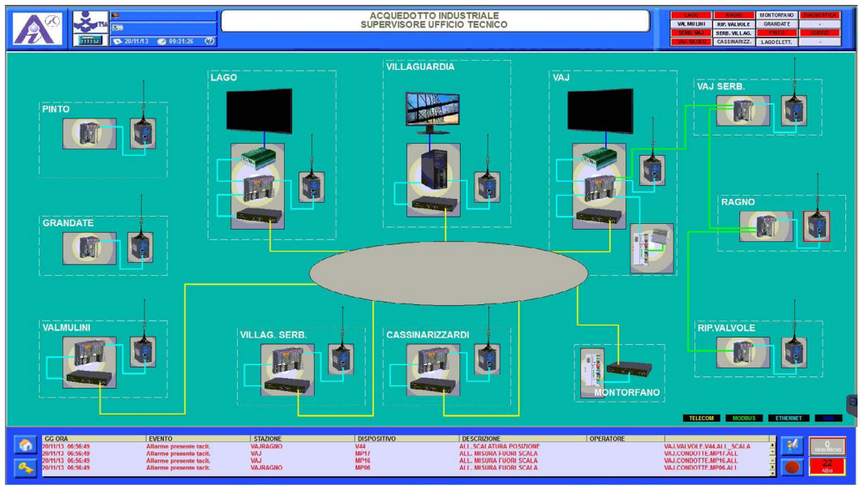
Even the choice of the contractor was strategic. Only qualified system integrators capable of design and implementation of the entire system with full autonomy on the project were considered.

A critical aspect was coming on-line with minimal disruption. Due to the level of automation incorporated in the original SCADA, it was not easy to manually operate the system and then only possible for short times during emergencies.

To replace the SCADA, a total halt of the waterworks was required. Well organized and coordinated teams worked simultaneously on all sites, such that installation and commissioning was minimized.

The selected system integrator, T.S.A., provided a careful analysis of the state of the art in existing similar systems. T.S.A, formed a partnership with Borghi, who had previously been responsible for the design and installation of new electrical switchgear and control.

The synergy between the two partners (T.S.A.-Borghi) allowed for a competitive proposal with a substantial savings in cost. More importantly, the team had all the necessary areas of expertise to be able to execute all stages from design to commissioning without depending on third party subcontractors.



Results

PcVue solution provides clean graphic interface using modern symbols and animation

PcVue solution uses Ethernet network providing vendor independence and allowing future expansion

PcVue solution incorporates energy profile management to minimize pumping costs

PcVue development tools supports solution teams working in parallel so that installation and commissioning is minimized

Customer: Northern Rockies

Canada

System Integrator: CTH Systems

Northern Rockies Regional Municipality Water and Wastewater Treatment

Solution with PcVue enables operations team to improve their productivity

The Northern Rockies Region of northeastern British Columbia is blessed with a significant wealth and diversity of natural resources, heritage and cultural attributes. Over the last four decades, the region has experienced up and down cycles due to the growth and decline of numerous resources and development activities. There have been interesting development proposals such as the Horn River Shale Gas Development, a working partnership that would link the Northern Rockies Regional Municipality, Fort Nelson, and First Nation communities with the oil and gas industry and provincial government agencies.

Configuration of the water treatment system

The Northern Rockies Regional Municipality water and wastewater treatment facilities - comprising of a network of pump houses and other facilities - produces the treated water needed to run operations for the oil & gas patch and forest & mining activities, in addition to serving its population of about 5,000 residents. They have a bulk water station that furnishes water for those who are not on municipal water and to the trucks that transport water to operations in the oil/gas patch, such as for fracking.

"Fort Nelson has a fully automated bulk water station, which delivers an average of 400 m3 (14,000 ft3) of treated water for residential and industrial usage daily. This station is fully integrated into the municipalities' SCADA system, which facilitates monitoring of flow totalization, alarming of heat trace and boiler systems, as well as trending chlorine residual levels in the water being dispensed, etc.," said Michael Ferguson, Electrical and Automation Specialist for the Northern Rockies Regional Municipality.

According to Ferguson, the municipality recently moved from FactoryLink, to PcVue for use with their SCADA system. Fort Nelson's SCADA system includes 22 Motorola ACE RTUs at various pump and lift stations, which communicate over a 900 MHz IP Radio network.

"We have two Motorola IP Gateways (of the ACE3600 platform), which are primary and redundantly configured. The IP Gateways are the interposing link between the network of field RTUs and the managing Servers (also redundantly configured). Our servers are located at the Municipalities Water Treatment Plant."

Through the help of their value-added reseller (VAR), CTH Systems, they chose the hardware independent PcVue SCADA Solution that integrates seamlessly with CTH Systems' IM-SCADA™, an advanced multiprotocol measurement and communication software.

"CTH Systems provided the key component (the IM-SCADA™ Driver Software) that allowed for a quick transition to PcVue," said Ferguson.

CTH Systems used PcVue's SCADA application builder tool, called Smart Generator, to port Northern Rockies applications to a more secure and robust SCADA architecture. PcVue and CTH's IM-SCADA™ software sit on these servers as well as the historical databases.

BUSINESS OBJECTIVE

Automate and reduce repetitive tasks and improve staff productivity

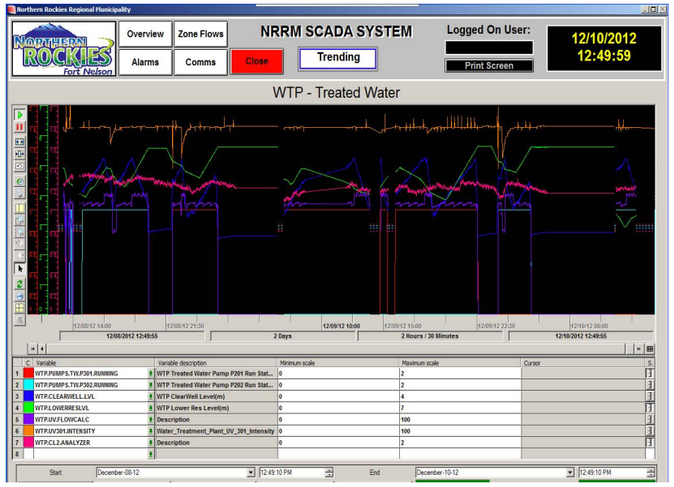
Keys to success

Tight integration between the Remote Terminal Units and the SCADA host for quick resolution of issues

First and only resource municipality

The Fort Nelson facility also happens to be British Columbia's first and only "Resource Municipality" to service the industry, local residents, and businesses. It covers more than 10% of the Province and includes the majority of the vast Horn River Shale Gas Development. Ferguson manages the electrical systems, process control, automation and communication component of the municipalities' water and wastewater infrastructure.

Currently Fort Nelson's SCADA system manages about 8,000 tags. With ongoing capital projects such as a new UV disinfection station to treat wastewater effluent, the system is poised for growth.



Fort Nelson's water treatment process begins by drawing raw water from the Muskwa River, downstream of the Alaska Highway bridge crossing. There are several critical processes involved in filling the municipalities' raw water reservoirs. The initial pumping of the raw water from the Muskwa River requires multi-stage pumping with PID control to overcome tremendous head pressure and control the variable flow rates.

"The process of treating water is not a static process for us. Process variables such as turbidity, color, and organics are influenced from things such as weather events. For instance, we once experienced a mudslide where the river we pump raw water from was impacted," said Ferguson.

Report and trend generation for preventative maintenance

CTH has provided engineering support to allow the municipality to export data in the form of text files (CSV format) to a report and trend generation service called 'FlowWorks.' FlowWorks conditions incoming data with various algorithms such as time-weighted averaging, allowing for the municipalities' non-operations personnel to view trends and generate reports. Additionally CTH has provided real-time and historical trending as an inherent feature of the IM-SCADA™ driver. This feature presents the data needed to make decisions on how to best optimize operations.

As Ferguson further works to develop the potential of Fort Nelson's water and wastewater SCADA system, he plans to integrate PcVue with other management applications such as their work order system.

"The goal of our responsible management and preventative maintenance philosophy is to 'bundle' systems like SCADA, PDAs, and work order application software together. To responsibly operate and maintain a productive multi-million dollar infrastructure such as ours, it requires that we combine the use of technologies, the efforts of personnel, and a forward thinking approach," says Ferguson.

Currently Ferguson is working to have automatically generated work orders based on pump run-times and pressure changes that indicate wearing seals, etc. In addition, he would like to have the ability to view system data such as alarms, pressure, and levels from a mobile device such as an iPhone, which is now possible with the use of the latest version of the IM- SCADA™ driver.

"Having the freedom to access real-time system data from a mobile phone is a welcomed feature, which will get a lot of use from operators at NRRM," adds Ferguson.

PcVue is configured to have one mimic per site along with configured pop-up windows so that if additional details are needed on a pump house or certain critical values, an operator can just simply click on the icon to open a pop up window to give the information needed. "

We have multiple mimics built in PcVue that facilitate the various exchanges between the operator and host. Graphically the mimics are the same as what would have been in FactoryLink," continued Ferguson.

PcVue contributes to Fort Nelson's effort to reduce reactionary repairs, and unexpected equipment replacement. This is achievable by tailoring alarm and reporting functionality to expose issues at their incipient stage. The use of a fully automated SCADA system is essential in downtime prevention in water and wastewater services provided by this growing municipality.

Results

Solution with PcVue allows operations to be more efficient in their work

Customer: Veolia Water France

System Integrator: Veolia

Super Rimiez Water Treatment Plant

Solution with PcVue manages water treatment process, pumping stations and secondary processing equipment

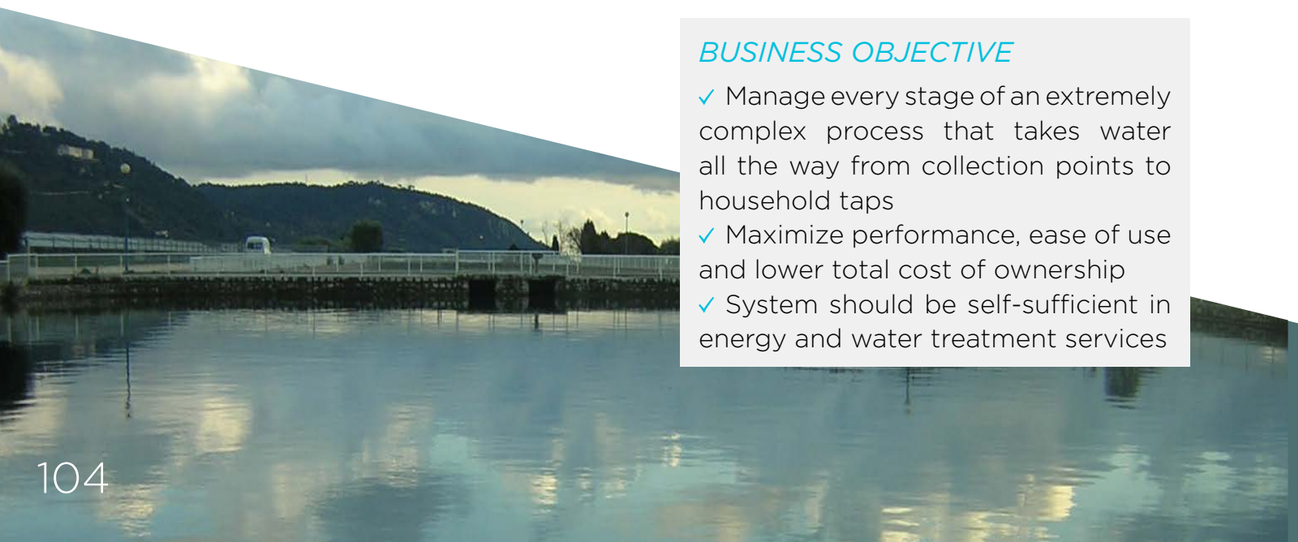
The global water industry leader Veolia selected ARC Informatique PcVue Scada software as their solution to monitor and control services and operations at its Super Rimiez water treatment plant near Nice (South of France) – recognized as the one of the largest drinking water supply sites in Europe.

Performance, ease of use and lower total cost of ownership provided by ARC Informatique solutions were key factors in Veolia selecting the PcVue solution. Additionally, the 20 year relationship and trust between the two companies made the decision easier for Veolia.

The Veolia Super Rimiez water treatment plant is a cutting edge example of global water treatment technology. Constructed in 1972, the plant has seen a number of adaptations, including a total overhaul in 1998 and a systems update in 2007.

The Alpes Maritimes Secteur Nice facility covers twelve drinking water production sites with a total capacity of 460,000 m^3 (122 million gallons) per day (and 3,400 km (over 2,000 miles) hydraulic network for the distribution of drinking water to 64 cities and towns with a total population of over 950,000 people.

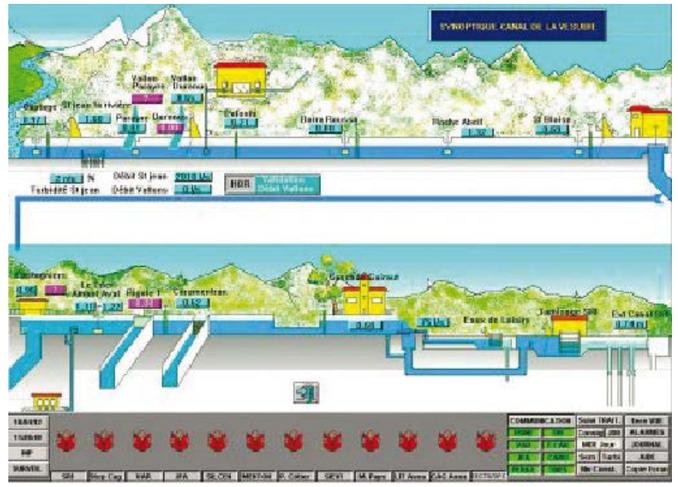
Super Rimiez supplies the City of Nice (population of around 350,000) and surrounding area. Water is distributed to the population by a 1,200 km (745 mile) hydraulic network fitted with multiple valves, pumps and regulating equipment.



BUSINESS OBJECTIVE

- ✓ Manage every stage of an extremely complex process that takes water all the way from collection points to household taps
- ✓ Maximize performance, ease of use and lower total cost of ownership
- ✓ System should be self-sufficient in energy and water treatment services

The Super Rimiez plant manages every stage of an extremely complex process that takes water all the way from collection points to household taps. Apart from the collection and distribution of water, Super Rimiez is also responsible for treating and storing the water in reservoirs located at elevated locations. This includes managing processes at the site itself, as well as all of the remote command and control functions for pumping stations and secondary processing installations located up and downstream, including 20 treatment works and the 90 telemetry stations forming part of the overall system.



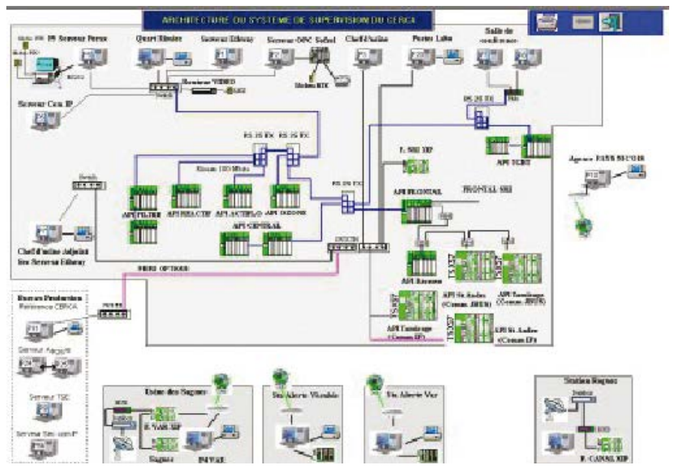
Mimic panel representing a drinking water pipeline feeding into the Super Rimiez plant

To ensure the effective monitoring and smooth operation of such a complex infrastructure, Veolia uses a Supervisory Control and Data Acquisition (SCADA) system. For this, Veolia has chosen the ARC Informatique PcVue SCADA monitoring software package. The monitoring software gathers data, stores it in a central IT system and then the data is processed. PcVue directly processes the data and displays it as animations (called mimic panels) using symbols that can be instantiated (known as objects).

The information gathered is converted into standard PcVue objects and then stored in databases for subsequent use in associated spread sheet tools.

Keys to success

- ✓ Efficiently manage 26 SCADA stations, 50,000 variables from 400 PLC's and RTU's
- ✓ Ultra-high performance system with user-friendly graphic interface
- ✓ Effective development tools that minimize costs and application roll-out times
- ✓ Long history of trust between Veolia and ARC Informatique Group allowing for close collaboration



Mimic panel of the monitoring and control architecture

At Super Rimiez, the software controls and monitors processes not just at the main site, but also at secondary sites. The remote control and monitoring service installed comprises no fewer than 26 SCADA terminals, which acquire around 50,000 variables from some 400 industrial PLCs (programmable logic controllers) and remote terminals. To achieve this, the team of engineers at Super Rimiez configured 1,800 mimic panels and 600 objects.

"In addition to ultra-high performance, a major benefit of the ARC Informatique PcVue solution is the user-friendly graphic interface, which enabled our team of development engineers to configure mimic panels and objects much more quickly than with a traditional SCADA solution. This helps to reduce costs and application roll-out times significantly", explains Marc Pons, Veolia Water engineer and Head of the Control-Command department at the Côte d'Azur operational Center.

With regard to the data transmission network, the TCP/IP communication protocol is used throughout the plant, and at the 26 SCADA terminals.

The system is based on a virtual private network on ADSL lines and the GPRS network, with a satellite link for the main connections and RTC, GSM and SMS packet transmissions for time-stamped data stored by a secure archiving server.

The network serves around 450 monitoring sites and is capable of issuing an average of 8,000 remote commands and acknowledging and supervising 7,000 alerts every month.

"The performance, ease of use and application roll-out cost reduction associated with using the PcVue software were certainly key deciding factors in Veolia opting for this solution. But it is also very important for us to have total confidence in the companies we work with, and this has been the case between Veolia and ARC Informatique for nearly twenty years now", explains Marc Pons of Veolia.

The authorities of the urban communities of Nice intend to be self-sufficient in energy and water treatment services. They are producing electricity from the potential energy generated by a cascade of water. In order to reduce greenhouse gas emissions, the City of Nice is installing 4 micro-turbines in the water supply system for converting potential energy into useable electric power.

Untreated water coming down from the mountains is channeled to Super Rimiez above the city and 280m (900 ft) above sea level. The head pressure achieved in this way, which can be up to 17 bars (nearly 250 psi), is converted into electric power by the micro-turbines.

This solution for producing renewable energy makes it possible to generate over 12 GWh of electric power per year – the equivalent of the average electricity consumption of over 3,000 households.

Results

PcVue solution manages 4 micro-turbines in the water supply and the solution produces 12 GWh of electric power per year

PcVue solution manages the treatment plant processes as well as remote control of pumping stations and secondary treatment facilities

PcVue Solutions
by ARC Informatique

Software platform for IoT, SCADA, BMS & real-time data analytics

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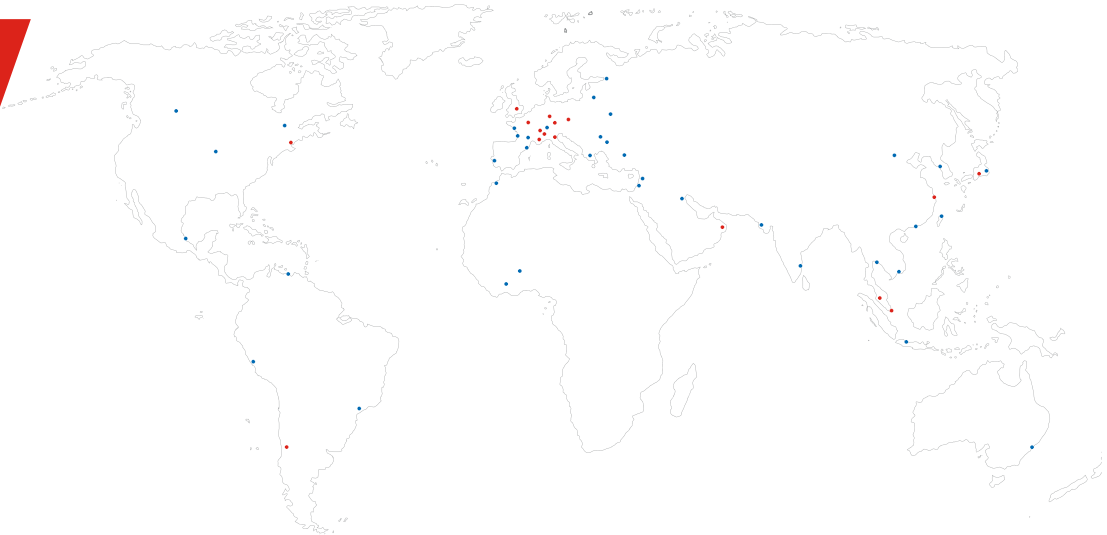

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