PcVue® *Solutions*

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

HMI SCADA

Solutions for Power

POWER GENERATION - TRANSMISSION - DISTRIBUTION
SUBSTATION AUTOMATION
POWER PLANTS
INDUSTRIAL FACILITIES

www.pcvuesolutions.com

ARC Informatique has been manufacturing and marketing industrial software for 30 years.

ARC Informatique is the *PcVue Solutions* SCADA editor, offering software, hardware and application support as a global service to several markets, especially for energy.

The open scalable software platform *PcVue Solutions* delivers full control and connectivity, implementing a large range of built-in drivers such as IEC 61850 DNV KEMA certified, IEC 61870, DNP3, Modbus® TCP/IP, OPC, a rich graphical interface, an alarms and events logging system and reporting capabilities.

Major players in the power production and distribution have been using *PcVue Solutions* to monitor and control their installations such as *Iberdrola*, the world leader in wind power production.

Both *ISO 9001* and *ISO 14001* certified, the company is establishing an international presence through direct sales offices in the US, Europe, Asia and Latin America and relies on its partner network to guarantee exceptional service, domain expertise and product satisfaction.

PcVue Solutions, your independent global SCADA provider

A global player with a local approach

15 strategic bases
50+ VAR worldwide
200+ of local SI partners
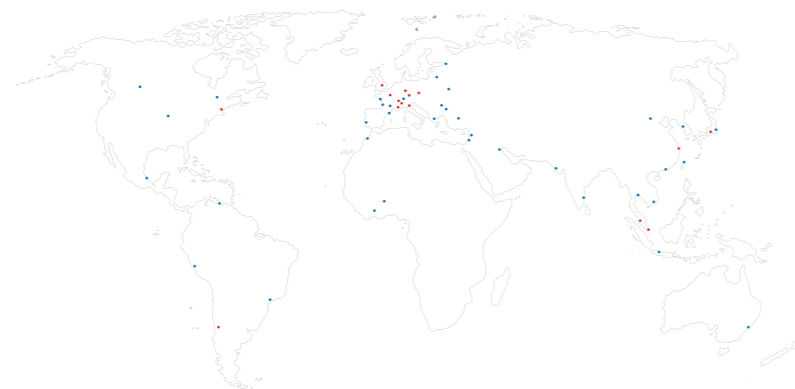
A customer-oriented approach

Listen and answer to our customers
Adapt our solutions via R&D
A responsive technical support

A continuous quality improvement approach

ISO 9001 & ISO 14001 certified
Microsoft® certified partner
OPC® foundation member
IEC 61850 DNV KEMA certified
Member of Think Smartgrids

The flexibility and scalability of the PcVue Solutions products ensure an efficient service for monitoring and control millions of data for any power systems.

Benefits

✓ Monitor and control any kind of power systems
✓ Connect heterogeneous and distributed assets
✓ Centralize data for post-mortem analysis, dispatching and reporting
✓ Save time and cost with a flexible and scalable open platform that adapts to system changes
✓ Take advantage of the latest mobile technologies
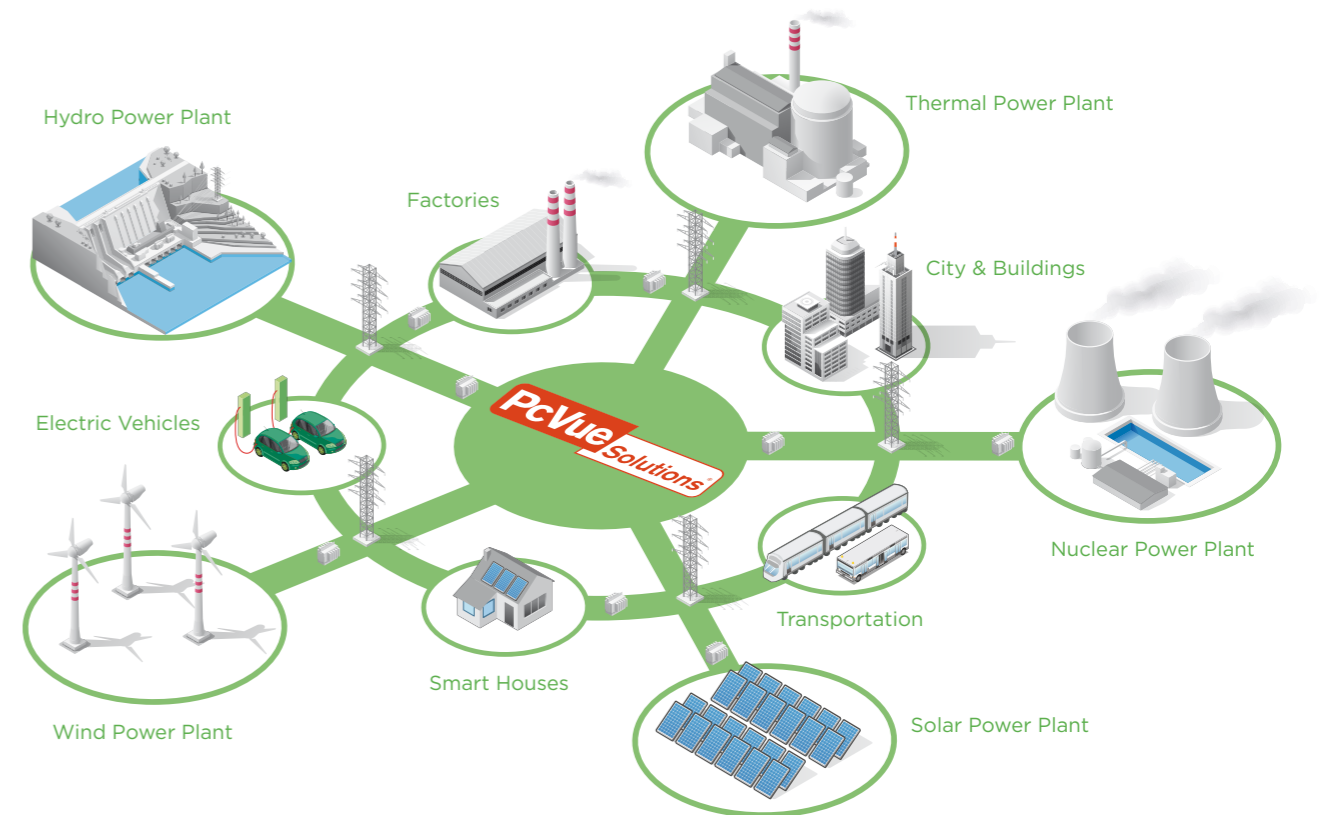
With a rich HMI, protocols IEC 61850, IEC 60870, IEC 61400-25 and DNP3, versatile architectures and full reporting capabilities, PcVue offers a unique platform to meet the power systems automation constraints.

Features

✓ A single platform to develop your application
✓ Built-in support for IEC 61850 DNV KEMA certified, IEC 60870, IEC 61400-25 and DNP3
✓ Deployment solutions from stand-alone station to high availability distributed systems
✓ Ready-to-use animated symbols for power systems
✓ Dynamic busbar coloring
✓ On-line/Off-line simulation
✓ Events and alarms management
✓ KPI and generic dashboard reporting tools

Why PcVue is worth a look?

PcVue is a fully-featured product that represents the latest advances in SCADA software for multi-station monitoring and control.

The new PcVue range has been designed using recommendations from integrators, OEMs and end-users, and based on ARC Informatique's experience in the industrial automation sector. PcVue features modern ergonomics and tools based on object technology to minimize the time for application development, including the latest tools from Microsoft user interface standards and the security features of

Windows® platforms.

PcVue provides a flexible solution for supervising power systems. It meets energy standards of reliability and performance while maintaining the user-friendliness of an office application. It spans requirements from single-user applications to complex client-server applications with redundancy.

A single configuration platform that reduces development costs

✓ Advanced configuration environment
  - Intuitive and unique interface using wizards
  - Configuration and diagnosis tool
  - Object-based approach, modelization tools,
  - Suite of import tools for mass configuration from third-party platforms

✓ Open platform for integrating future components

✓ Multi-language HMI platform designed to handle several languages in projects both in design and run-time

✓ Full backward compatibility
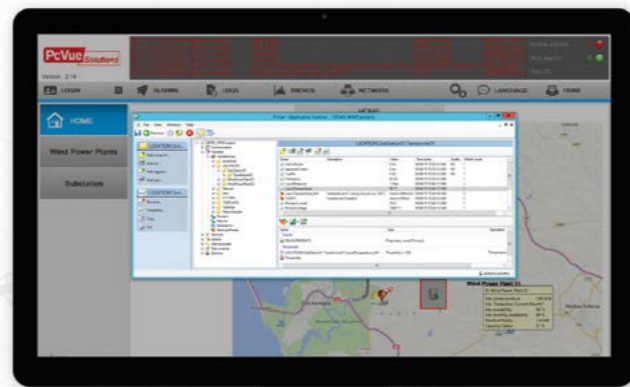
Smart Grid interoperability

Your system connected seamlessly to heterogeneous environments

Our policy is always to provide open and secure connectivity to various legacy and modern devices. PcVue supports a wide range of communication drivers and standards, including built-in drivers for the Energy management and the Smart Grid interoperability such as IEC 61850, IEC 61400-25, IEC 60870-5-104, IEC60870-5-101, IEC60870-6/TASE.2 - ICCP DNP3, OPC and Modbus TCP/IP.

IEC 60870-5-104

✓ Direct execute (DE) and Select before operate (SBO)
✓ Double points
✓ Quality descriptors and time tagged values

IEC 61850 & IEC 61400-25

✓ 8-1 client driver
✓ Direct execute (DE,DEw) and Select before operate (SBo, SBow)
✓ Pre-defined and extensible data class catalog
✓ Buffered and unbuffered report control blocks (BRCB, URCB)
✓ DNV KEMA Certified

DNP3

✓ Level 2+ implementation
✓ Support for both polling and spontaneous messages
✓ Comprehensive handling of objects groups & variations
✓ Control relay and analog output block (CRoB, AOB)

Monitor and control your system efficiently while reducing the users training

The support of innovative run-time features such as dynamic busbar coloring or a GEO Map control for GIS decision making, enhanced the operator experience and efficiency.

The user friendly environment, the set of built-in animations and viewers, objects libraries but also the generic approach of the design, facilitate the development using an on-line configuration.
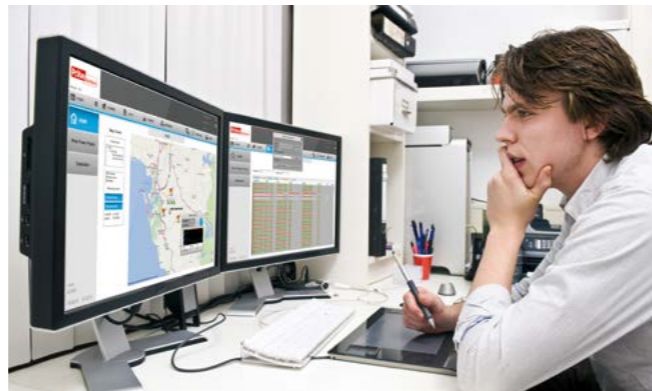
Human Machine Interface

✓ Ready-to-use graphic animations and pre-defined libraries
✓ Capability to mix simulated and real time data on the same mimic
✓ Contextual navigation
✓ GEO map control for GIS
✓ Dynamic busbar coloring
✓ Zoom and layers system
✓ Mimic navigator : help user to navigate through a very large busbar

ALARM & EVENT LOGGING

Event and alarm logging:

✓ Full featured viewers
✓ Sequence Of Events for fault analysis
✓ User & System activity logging

Alarm management:

✓ Alarm filtering and masking
✓ Suppression by dependency
✓ User acknowledgement
✓ Contextual pop-up mimics
✓ Notification by email and text message
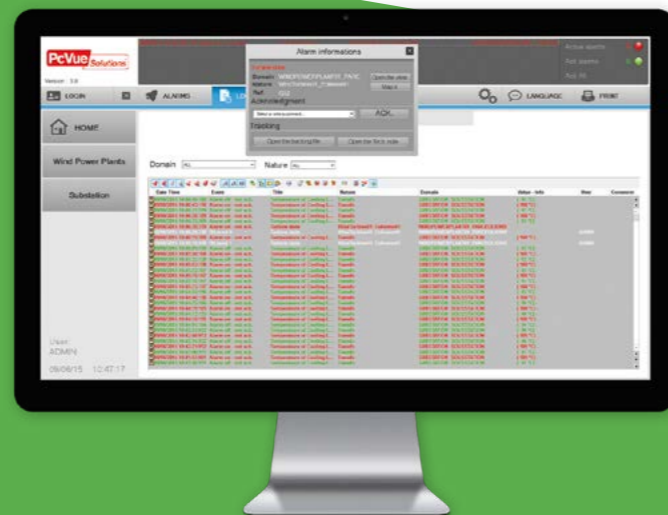
Extract value from data: Post mortem analysis and reporting

PcVue offers all the necessary tools for data extraction, stats and reporting to cover the need for information.

PcVue records data to a SQLServer database with its built-in Historical Data Server which make the data available for short term or long term analysis and reporting.

Statistical data can be exported to Excel using the built-in Data Export of PcVue. For advanced reporting PcVue can connect to DreamReport software.

In addition, for maximum flexibility and high-level of customization the reporting platform SQLServer Reporting Services can be used with PcVue.

An innovative mobile app for smarter supervision

Deployment solutions that adapt to system changes while ensuring a constant availability and a high security level

PcVue is designed to support multi-station architectures, offering a high scalability of the system and flexible deployments solutions. Inter-messaging and redundancy mechanisms for critical applications are built-in and easy to configure using a networking wizard. PcVue is also mobile ready allowing a quick access to the data anytime, anywhere and from any devices.

Taking advantage of the cutting edge mobile technologies, the latest mobile app for PcVue introduces **an innovative indoor positioning system** to deliver the right information to the right person at its current location.

From stand alone station to client/server and distributed architectures for wide geographical deployment of the system

Full support for virtualized environments such as vmware® or Hyper-V™

Full integration of the latest Windows OS security features

Solutions for remote access and thin clients
Web solution to monitor and control the system using a standard webbrowser
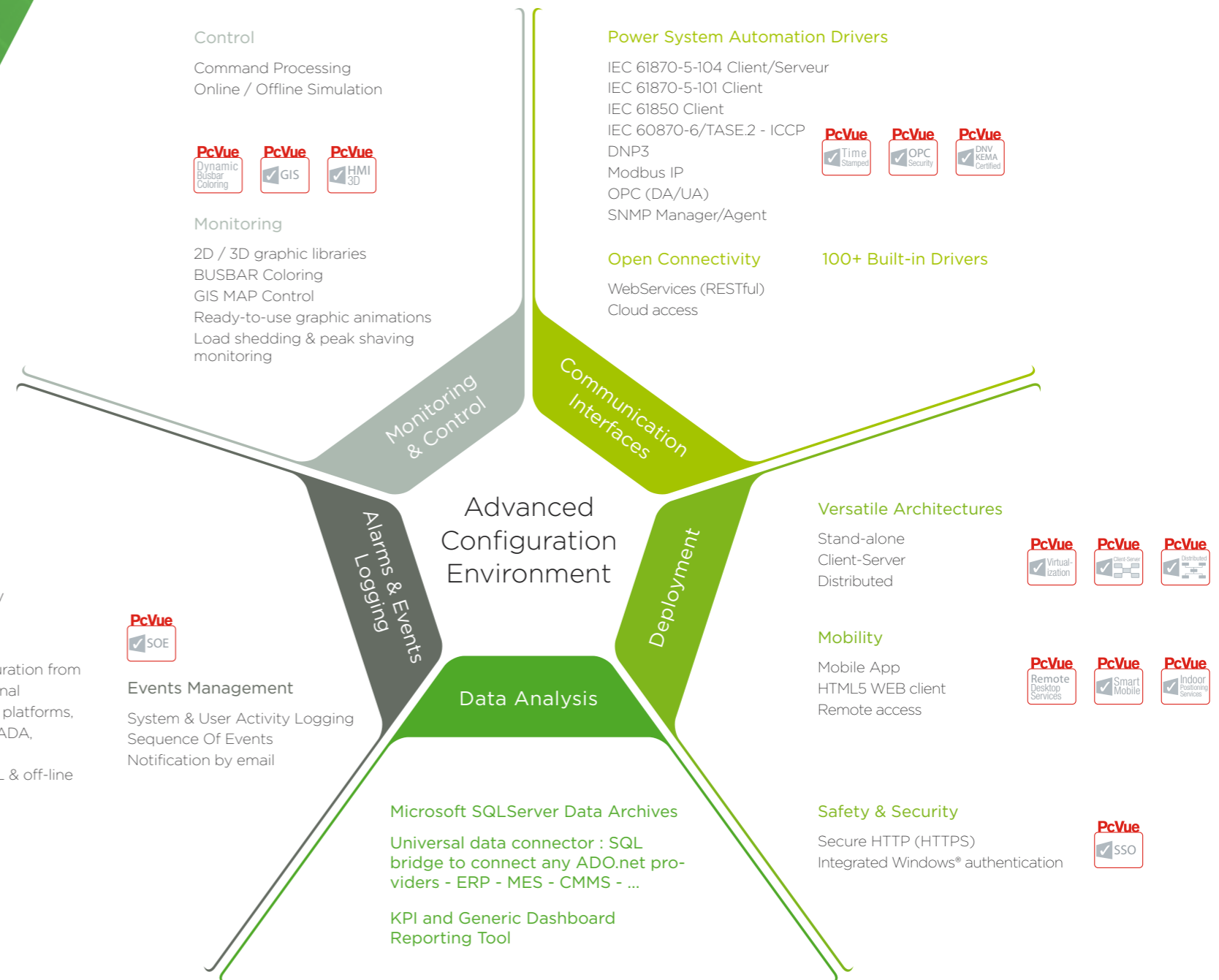Remote access solution to monitor and control the system from any operator station or HTML5-compliant web browser

Mobility solutions
A mobile app for asset based and proximity based services
Monitor and control the data, GPS tracking, Indoor positioning system

Designed for supervising Power Systems

PcVue Solutions provides a HMI/SCADA platform with technologies and features which ensure reliable and efficient system for monitoring and controlling power generation and distribution assets.

Control

Command Processing
Online / Offline Simulation

PcVue Dynamic Busbar Coloring
PcVue GIS
PcVue HMI 3D

Monitoring

2D / 3D graphic libraries
BUSBAR Coloring
GIS MAP Control
Ready-to-use graphic animations
Load shedding & peak shaving monitoring

Power System Automation Drivers

IEC 61870-5-104 Client/Serveur
IEC 61870-5-101 Client
IEC 61850 Client
IEC 60870-6/TASE.2 - ICCP
DNP3
Modbus IP
OPC (DA/UA)
SNMP Manager/Agent

PcVue Time Stamped
PcVue OPC Security
PcVue DNV KEMA Certified

Open Connectivity   100+ Built-in Drivers

WebServices (RESTful)
Cloud access

Alarms Management

Filtering & masking
Alarm flood prevention
Suppression by dependency

Smart Generators

Import tool for mass configuration from third party software or external configuration platform (PLC platforms, CAD software, 3rd party SCADA, proprietary software).
- IEC61850 - support for SCL & off-line configuration
- BACnet
- OPC
- SIEMENS TIA portal
- Schneider Unity®
- ...

PcVue SOE

Events Management

System & User Activity Logging
Sequence Of Events
Notification by email

Monitoring & Control

Communication Interfaces

Advanced Configuration Environment

Alarms & Events Logging

Deployment

Data Analysis

Versatile Architectures

Stand-alone
Client-Server
Distributed

PcVue Virtualization
PcVue
PcVue

Mobility

Mobile App
HTML5 WEB client
Remote access

PcVue Remote Desktop Services
PcVue Smart Mobile
PcVue Indoor Positioning Services

Microsoft SQLServer Data Archives

Universal data connector : SQL bridge to connect any ADO.net providers - ERP - MES - CMMS - ...

KPI and Generic Dashboard Reporting Tool

Safety & Security

Secure HTTP (HTTPS)
Integrated Windows® authentication

PcVue SSO

> 66 *Thanks to the flexibility provided by the PcVue suite we have been able to manage the integration of a very high number of different control systems in many different environments resulting in an homogeneous supervision of a huge number of real-time variables.*
>
> *To date, and besides other standalone conventional generation facilities also using PcVue, about 300 PcVue nodes are combined in Iberdrola to supervise all its renewable assets around the world.* 99

Javier ONTANON

*Telecontrol Group Leader
in Iberdrola Engineering & Construction*

Success Story

Going with the wind

Remote control of wind farms for an ever efficient service

The company

Iberdrola Renovables 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 two hundred and seventy wind farms across the world. 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 Renovables aim is to provide the service without geographical limits.

The project and the supervisory system

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.

The CORE uses these data to identify and diagnose potential problems and so to intervene to effect a solution.

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 which was then passed to whoever did the data recording.

Business Challenge

To make the information from the wind farms available remotely
To ensure an ever efficient service

Success keys

✓ Reliability of the SCADA software
✓ Scalability
✓ High performance in managing the data within a Client-Server architecture
✓ Openess of the SCADA software so as to interface with third-party automation technology

For remote monitoring of the wind farms and so for remote control through a dedicated VSAT network, Iberdrola Renovables has chosen to install in the CORE an OPC® based architecture with PcVue SCADA and several FrontVue light 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 2 million real-time variables and the network can be extended without limits or structural changes.

Success Story

IBERDROLA
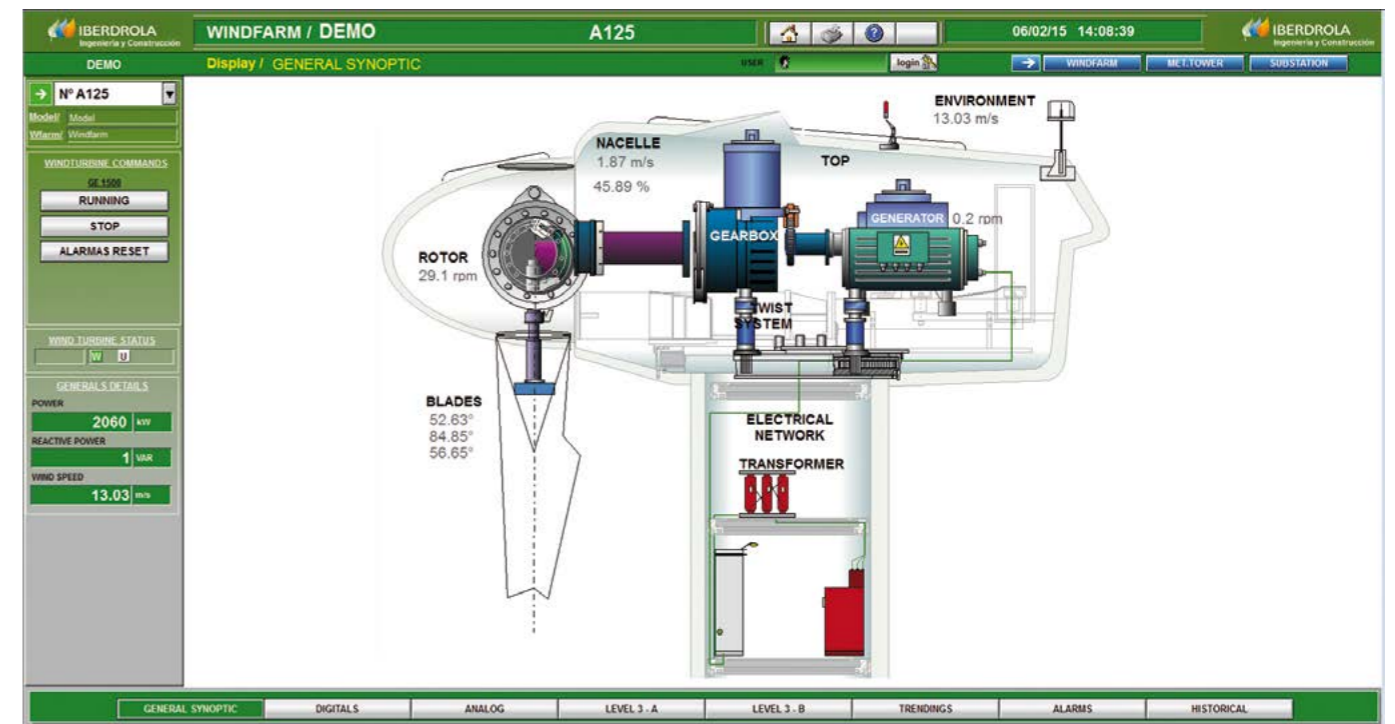
An easy efficient process

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;

✓ 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 setpoints, 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

3,500 Megawatts

6,000 turbines

30 redundant PcVue servers

Results

✓ Wind farms remotely controlled via a dedicated VSAT network

✓ Reduction of maintenance costs

✓ Centralized information

✓ The operators always have the situation under control and can perform corrective actions at the right moment in case of breakdowns.

References

Few snapshots of some of our international references

Alstom Wind / Worldwide
WindAccess™ solution for real time monitoring of wind turbines

DESCRIPTION
PcVue is used as a part of the WindAccess™ solution developed by Alstom wind for realtime monitoring of wind Turbines. Wind Access™ has been designed for greater connectivity and efficiency. Thanks to the system's web-based interface, operators can access their wind farms from any location at any time, while the system's open communication protocols enable the wind farm's easy integration with all other renewable assets in the operator's portfolio. Alstom Wind installs wind farms equipped with PcVue worldwide: Champs Perdus (France), Hamada (Japan), Higashi Izu (Japan), Harterkanaal (Netherland) & Kim Nyeong (Korea), Brazil (Alstom Energias in partnership with VOTORANTIM & RENOVA ENERGIA)

TECHNICAL ASPECTS
Each wind farm is controlled by one PcVue SCADA station 65,000 tags + 5 WebVue access. PcVue Web-Services are used for providing real-time data & alarms to the WindAccess reporting & alarming interface.

ISA / Colombia
Electrical substations automation

DESCRIPTION
ISA is one of the largest international transporters of electric energy in Latin America with a network of almost 40,000 km of high-voltage transmission circuits in Colombia, Peru, Bolivia and Brazil and international interconnections between Venezuela and Colombia, Colombia and Ecuador, and Ecuador and Peru. ISA and its subsidiaries have an important participation, by revenue, in the electric transport systems in countries where they operate.

TECHNICAL ASPECTS
IEC 61850 and SNMP protocols

Electrabel / Belgium
Monitoring and control of the Bressoux power plant cogeneration

DESCRIPTION
The electricity production handled by gas/alternator and heat recovery for the urban heating system.

TECHNICAL ASPECTS
One dual-screen SCADA station. Cegelec AC-132 PLC
Ethernet industrial network
Around 1,000 tags coming from the PLC's
The Awirs remote operation station (18 km) can handle the control of the system via modems and hertz link.

Elia - Cegelec / Belgium
Electrical substations automation

DESCRIPTION
As system operator, Elia organizes transparent and non-discriminatory access to the grid.
Elia owns all of Belgium's 150 to 380 kV grid infrastructure and almost 94% of its 30 to 70 kV grid infrastructure.

PDVSA / Venezuela

The Sistema Eléctricode Oriente (SEO) project for Substations Automation System

DESCRIPTION

The Sistema Eléctricode Oriente (SEO) project of the company Petróleos de Venezuela (PDVSA) is engaged in substations automation in Eastern Venezuela.
The project goal is the automation for 140 substations working at 138kV with a first step with 36 substations. SEO is a turnkey project that was awarded to the company PLC de Venezuela by PDVSA.

TECHNICAL ASPECTS

Ethernet network of almost 1,800 km, with optic fiber links to safety IEDs (intelligent electronic devices) from General Electric

Hyundai / Dangjin-gun - Korea

Energy Management System of Hyundai Steel Factory

DESCRIPTION

This plant is the world's first enclosed raw material processing system as part of its efforts to make it a "world-class eco-friendly steelworks."
All movement of materials from ship to processing facilities occur on enclosed conveyor belts.
In addition, the materials are stored in dome-shaped stores cutting off all contact with open air, addressing the problem of dust from coal and other materials – a major pollutant associated with steelworks – at source. PcVue was chosen to supervise the huge electrical distribution system and substations of Hyundai Steel, Korea's second-largest steel mill, in Dangjin.

TECHNICAL ASPECTS

3 levels architecture
2 SCADA stations 65K & 8 SCADA stations 5K for Local Substation and 8 Clients
Approximately 45,000 variables in Center and 3,500 variables at Local substation
400 mimics in total
450 IEDs and 100 Digital Meters and other PLCs connected over IEC61850 for data acquisition
IEC61850 (Circuit Breaker control)
Modbus TCP/IP (measuring values)
Main Energy Center connects and gets data from PcVue station and controls using OPC
Demand control by PcVue
Interface to intelligent load shedding system.
CMMS (Computerized Maintenance Management System) interface
SIEMENS Protection Relays / HYUNDAI Protection Relays / ION Meters

Gazprom / Peregrebnenskaya - Siberia

Management of the electrical installation for a compressor station in Siberia

DESCRIPTION

Gazprom is the largest gas company in the world today. It supplies 30% of France's needs and 50% of Germany's ; plus 100% of Finland's, Austria's and those of all countries close to Russia.

TECHNICAL ASPECTS

Sepam 2000 devices from Schneider Electric

Ourhoud Oil Field / Ourhoud - Algeria

Supply the Ourhoud site with all the electrical equipment and control systems required for operation.

DESCRIPTION

The Ourhoud site located 300 km from Hassi Messaoud and 1200 km southeast of Alger, is one of the largest oil fields discovered in Algeria over the past few years. This reserve, 20km long and 4km wide, should produce 230,000 barrels per day for 25 years.

TECHNICAL ASPECTS

5 SCADA stations
Ethernet network
Quantum PLCs from Schneider Electric.

Sharjah Electricity & Water Authority / United Arab Emirates

Control & protection system for optimized management of energy transport

DESCRIPTION

The objective is to optimize energy transfer through the station while coping with ongoing increases to the electricity supply network.
The 220/132/33/11 kV station at Sajja is one of the two main transport stations in the Arab Emirate of Sharjah. It has to distribute the energy produced on the 220 kV network by the Al Wasit power station situated less than 10 km away.

TECHNICAL ASPECTS

17 span meters (Sepam Bay Controller) and 6 data acquisition devices (Sepam Acquisition) are required to manage the HV portions of the station
3 Sepam Acquisition devices plus a link with tertiary protection for 33 kV and 14 digital protection devices (Sepam 2000) for 11 kV
2 redundant PcVue operating stations
A dedicated communication bridge (using IEC-870-5-101 protocol), independent of the operating stations

Unión Eléctrica / Cuba

Remote control system of the electrical supply network

DESCRIPTION

The system is used for tracking real-time variations in the loading of the electrical supply network of the country. The objective is to ensure continuity of service plus availability of electricity in the main tourist zones in Cuba. The system monitors 140 sub-stations of 138 kV with a national system control center located in Havana and 8 regional system control centers in the other main cities. 125 RTUs are installed in the HT/MT and MT/MT stations.

TECHNICAL ASPECTS

Advanced system configurator (network editor, electrical objects library etc.)
Dedicated network control using an adapted HMI (electrical objects, network topology, zooming, panning, etc.)
Advanced PcVue features (detection of a faulty section, automatic assistance with reconfiguration, etc.)
Acquiring basic data from each sub-station (running, tension, circuit breaker position etc.), generating advanced information (power active or restarted etc.), dating of it from an internal clock mechanism (with ms. accuracy)
Managing interactions with a Regional Control Center, using two redundant transport routes.

Alstom Hydro (Turkey) / Paravani - Georgia

Hydroelectric power plant

DESCRIPTION

The development plan for the River of Paravanitook final shape early in the 1990's upon conclusion of the studies by "Hydroproekti", the scientific design institute, and approval by the Ministry of Urbanization and Construction. The ParavaniHEPP (Hydro-electric Power Plant) Project site is located between the settlements of Ahalkalakiand Khertvisiabout 30-40 Km from the Turkish-Georgian Border in the south-east of Ahaltsikhein the west of the Tbilisi in Georgia.

Chinese Channel Television / Beijing - China

Electrical Distribution for this unique building: 234m high and about 550,000m² of floor area

DESCRIPTION

Public network at 10 kV, a 1 MV board with 32 cells, 16 transformers for 10kV/380V and 11 substations with LV boards.
Data acquisition for 3,200 points and variables
Remote user controls
Data logging and archiving of time-stamped alarm messages within 100ms, in Chinese
Sound alarm messages for main faults, also in Chinese
Periodic reports, from daily to annual

TECHNICAL ASPECTS

2 PcVue stations with MODBUS link
Modbus network connected to 27 SEPAM protection relays & Dialpact modules in LV board
Schneider April 5,000 main PLC

PcVue® Solutions

by ARC Informatique

Mastering interfaces between
#Humans
#Systems
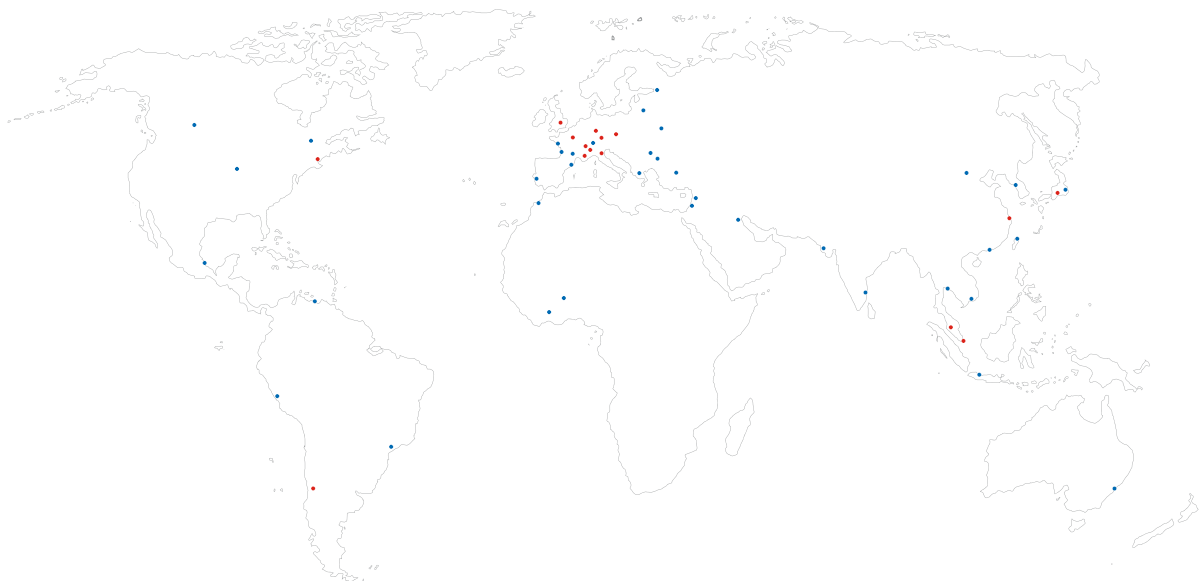## #Connected things

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