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ENERGY INTELLIGENCE IN THE INDUSTRIAL SECTOR

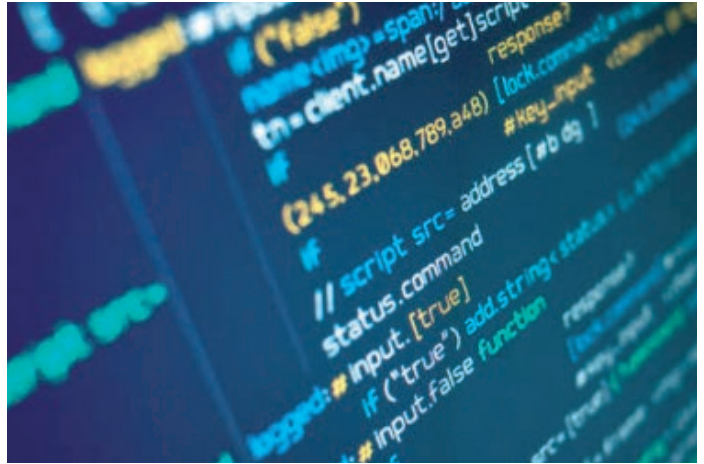
In medium and large industries there are automation architectures that include the programming of control systems and the graphic visualization of plants (SCADA).

These are often expensive and rigid solutions in terms of possible improvements or system updates.

However, the Internet of Things (IoT) market is generating a true revolution with the introduction of new solutions that use reliable and cost-effective software platforms and hardware devices.

These low-cost open platforms also appeal to small and medium-sized companies.

The "Virtual Energy Platform" (VEP) is a software platform dedicated to the monitoring of data collected on-site and the management of the energy efficiency of corporate networks.



THE VEP SERVICE

The VEP exploits the potential of integration between control technologies and the world of IoT.

It uses real time data, analytics, IoT technologies and implementations to increase the efficiency level of a network plant.

It is built according to 4.0 industry logic and follows the organizational structure of a company in a modular manner.

It integrates with the customer's basic software (datawarehouse, SCADA systems, other IoT software), using its functionality and data to implement the chain of activities and efficiency processes for the managed networks.

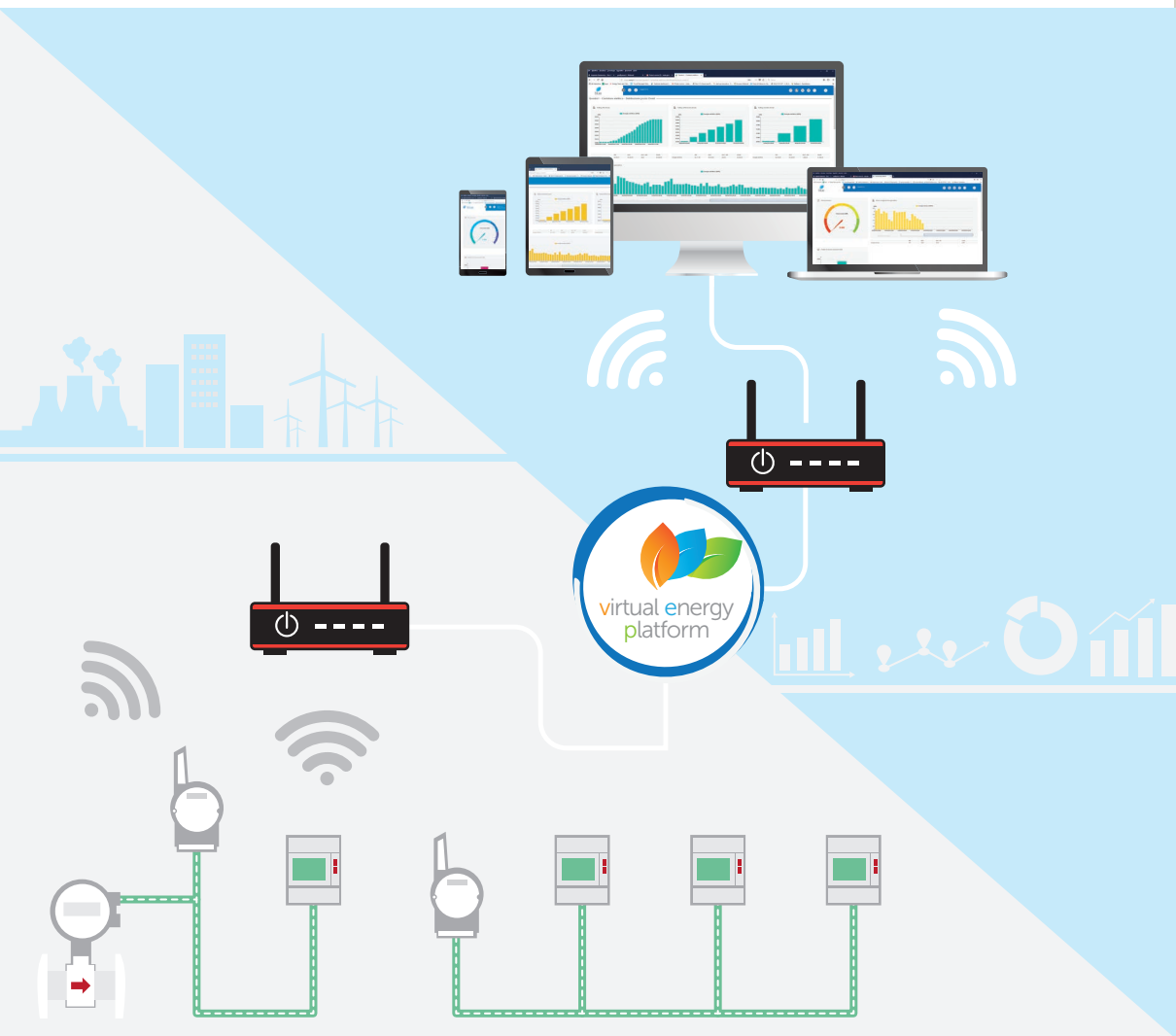


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The system uses a central hub which collects and processes the data received from peripheral units, called White Boxes. The White Boxes interface with smart-metering tools for electrical or thermal energy, installed in the production unit, and send the data collected on site via internet to the central system.

The central system is equipped with software that acquires and processes data before sending them to registered users on the VEP platform, in the form of SCADA visualizations or widgets. All information regarding system utilities can be read remotely from a PC or mobile device.



SYSTEM ARCHITECTURE

The VEP system operates through four interconnected elements.

The White Boxes

A White Box is a smart-metering device consisting of measuring sensors for on-site data collection and IoT development equipment. Each White Box contains the components necessary to monitor electrical and heat consumption by Whitenergy customers.



The data management software platform

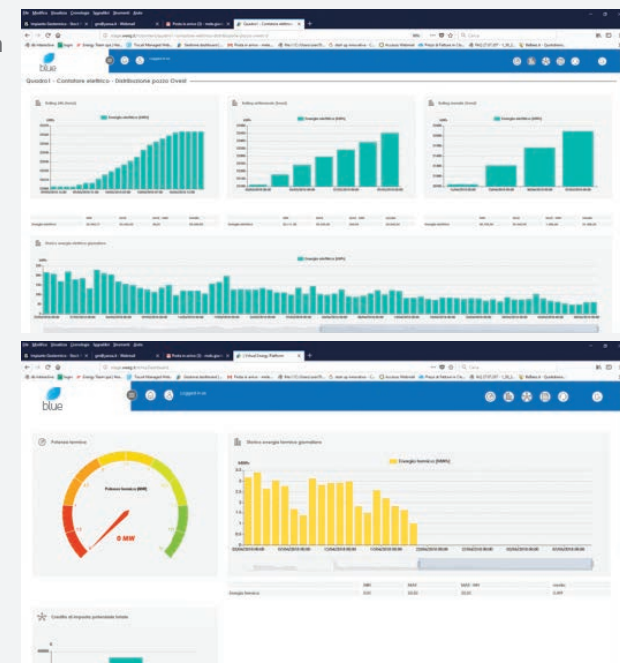
In parallel with active control logic, a software platform was developed to manage and process the collected data.

The control logic

A fundamental part of the system regards the development of active control logics for data management software and implementation.

Connectivity

Connectivity is achieved through the use of dedicated M2M (machine-to-machine) communication solutions, which allow the automatic transfer of information without human interaction.



PLATFORM FEATURES

- 1 Multiuser:** the VEP creates and manages access levels for different user profiles, from the energy manager to the managing director.
- 2 Multiplatform:** it can be used by different devices (desktops, laptops, tablets and smartphones).
- 3 Integrable** with other Software.
- 4 Open Source**
- 5 Customizable:** it is perfectly adaptable to meet client requests.
- 6 Adaptable and scalable:** generated reports can be viewed in both and analytical formats by consumption period.
- 7 HTML 5:** the system is entirely web based, HTML 5.

- 8 Modular for plant processes:** it allows the user to visualize and control different parts of one or more establishments.
- 9 Multi Driver:** communicates using industrial protocols (MODBUS, MBUS) and supports drivers by different instrument manufacturers.

UTILITY FOR CLIENTS

- 1 Ad hoc functions depending on users:** Platform superAdmin, Energy Manager, General Manager, etc.
- 2 Realtime checks:** measurements read by data loggers are shown at intervals of a few seconds.
- 3 Set of alarms:** a set of alarms that can be programmed either locally or via SMS or email.
- 4 Reporting history and statistics:** the history of the quantities measured is displayed in graphs, with comparisons over several time intervals and correlations between different values.
- 5 Active controls:** possibility of monitoring actions on the system, in order to optimize production plant energy.
- 6 Hierarchical user structure:** different functions for client users (e.g. users in a district heating network): consumption, reporting, etc.
- 7 Help Desk and Customer Care:** area containing end user guides, FAQs and tools for requesting support.
- 8 IPMVP Compliance:** possibility of implementing IPMVP protocol and certifying efficiency measures of an industrial production plant.

CASE STUDY

Implementation of the energy monitoring system for a plant nursery

The client is an important Italian company in the production of plants and flowers for sale across the country and exported principally to the Netherlands, with over 180,000 square metres of greenhouses in Civitavecchia.

The area is rich in geothermal sources, which are used to heat the greenhouses and fulfil most of the site's energy needs.

The decision to adopt an energy supervision system such as VEP, stems from two requirements:

- to be able to correctly determine the costs attributable to the various stages of production, through the separate measurement of energy flows;
- to gain access to incentives for the exploitation of the geothermal resource in the place of fossil fuels, which require the correct measurement of energy extracted from the subsoil and used to heat the greenhouses.



Proposed solution

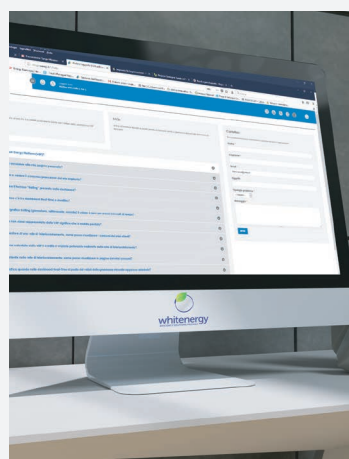
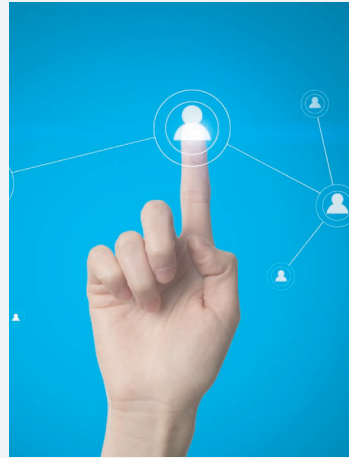
The adopted monitoring system comprises a total of 8 White Boxes, of which:

- 3 are dedicated to measuring the thermal energy contained in the underground water extracted from the wells and sent to the greenhouses.
- 4 are dedicated to measuring the electricity used by pumps to extract water from the subsoil.
- 1 is dedicated to measuring the electricity used by pumps to distribute heat energy in the greenhouses.

The White Boxes communicate in real time with the central hub and the data can be visualized in the VEP using a widget that is updated in real time. The system aggregates data on heat and electrical energy on a total, partial, hourly, daily, weekly and monthly basis, which renders the data easier to read.


A personalized report can be created by selecting the required information, such as total production costs, accrued incentives, or the amount of electricity and heat consumed.

Thanks to this system, the client company has gained greater awareness of its energy consumption and of the correct allocation of electrical and heat energy to the various stages of production and key machinery. The client has also taken measures towards increased energy efficiency and has reduced its electricity expenditures by 30% in less than a year.





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