



# Energy measurement and management solutions for the **ISO 50001 standard**

with **PowerStudio SCADA**

# Energy Management System. **ISO 50001 standard**

*With the aim of providing support to the environmental policy of the European Union, and in response to the challenges posed by its 20-20-20 strategy, the certifiable standard, **EN16001 - Energy Management System** was approved in first instance, which acted as a guarantee of the commitment to energy efficiency within an organisation. In August 2011, this standard went on to become the **ISO 50001 standard**, which thus made its field of action a global one.*





International  
Organization for  
Standardization

## Why the ISO 50001?

The aim of the is to enable organisations to implement the systems and processes they require to improve the energy performance of their installations, with the clear aim of reducing greenhouse gas emissions and operational energy costs.

To give greater coherence and guarantee in the implementation of an , companies obtain their certificate after undergoing the corresponding auditing and certification process.

## What is an Energy Management System?

An **Energy Management System** is understood as referring to the set of inter-related or inter-acting elements that work to establish the energy policy, the energy objectives and the processes and procedures for achieving these aims.

To do this, the standard is based on a system of **Plan > Do > Check > Act** for continuous improvement that includes the **EMS** (Energy Management System) in all company practices.

### Specifically:

#### Plan

Carry out an energy review, establish the base line, the energy performance indicators, targets, objectives and plans of action.

#### Do

Implement the necessary plan of action.

#### Check

Monitor and measure the processes and their operational features that allow for contrasts with the policy and its objectives, and report the results.

#### Act

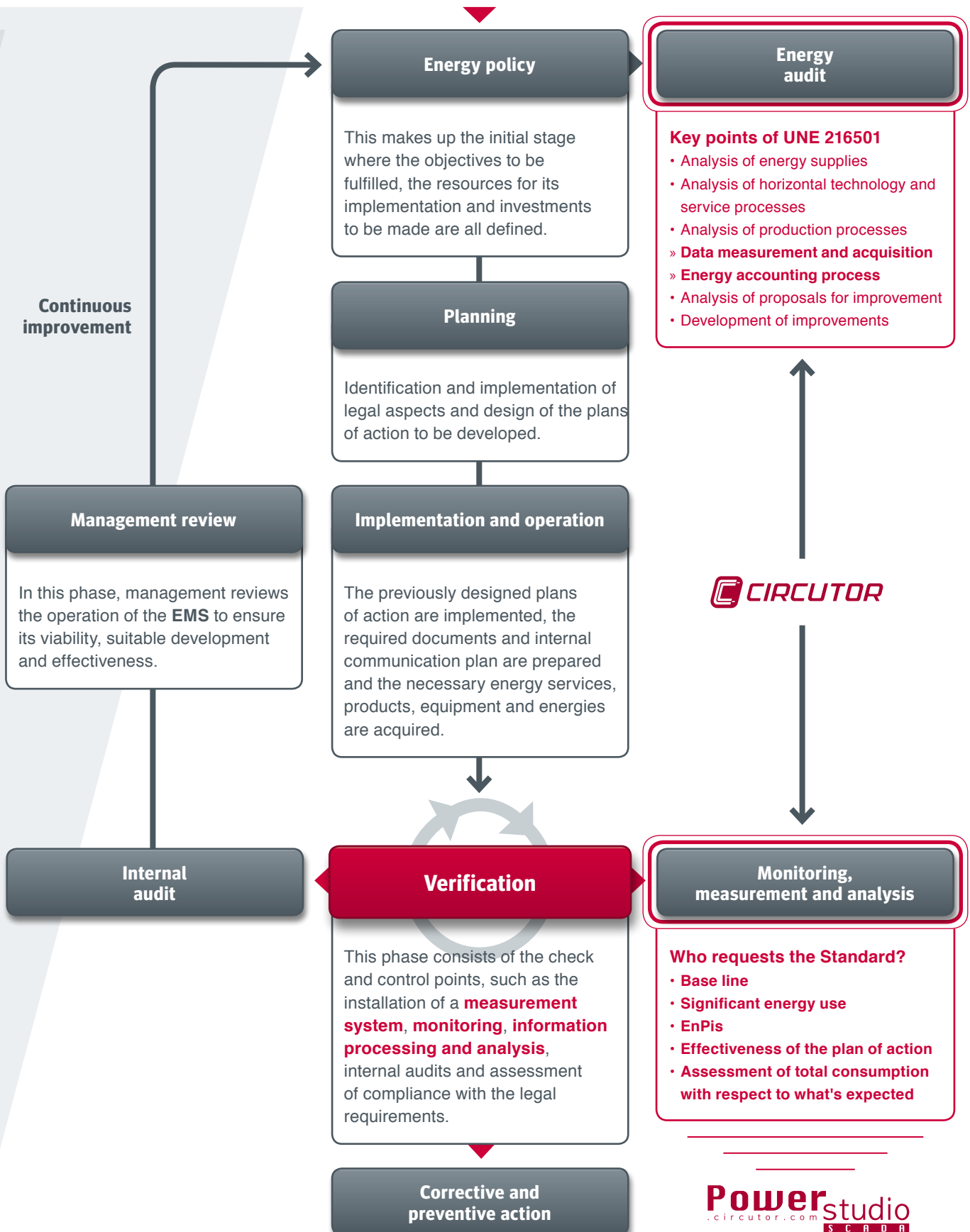
Take the necessary actions to continuously improve energy performance and the **EMS** itself.

## Implications

The concept of continuous improvement involves the for later analysis, to make it possible to check if the stated objectives are being fulfilled, and follow up the designed and implemented energy performance improvement plans of action. If not, the appropriate measures are then taken.

# The Standard's Structure

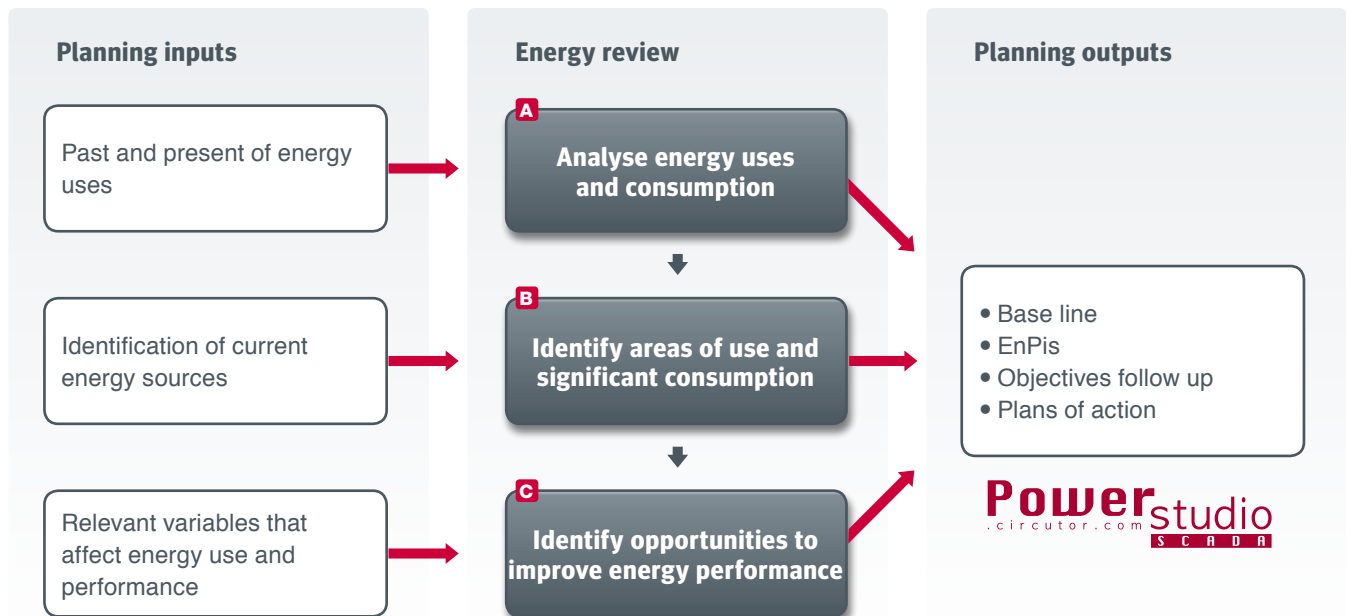
The phases of the standard are shown in the following diagram:





## Basic diagram of energy planning

The following diagram shows how based on a series of inputs and outputs of energy planning, the key meeting points are structured.



## Important concepts of energy management

A summary of the concepts in the **ISO 50001 standard** that are especially important for measurement systems and energy monitoring is attached below.

### Base line

As such, this is understood as a quantitative reference for comparing energy performance.

### Energy efficiency

This is understood as the relationship or ratio between the activities, goods or services of an organisation and energy expenditure. For example, in the case of a process industry, kWh/units produced would be referred to.

### Energy variable

Relevant magnitudes that significantly affect energy use and consumption.

### Energy performance indicator (EnPi)

These indicators, previously defined during the preparation of the company's energy policy, express a quantitative value of the energy performance measurement. The value of energy consumption has to be related to a reference variable that allows it to be correctly interpreted. For example: kWh/m<sup>2</sup>, kWh/m<sup>3</sup>, etc.

### Energy target

Detailed, quantifiable energy performance requirement applicable to the organisation or a part of it deriving from the energy objective and that needs to be established and fulfilled to reach the objectives.

### Objective

Specific *output* in accordance with the defined energy policy to increase the organisation's performance.

### Energy use

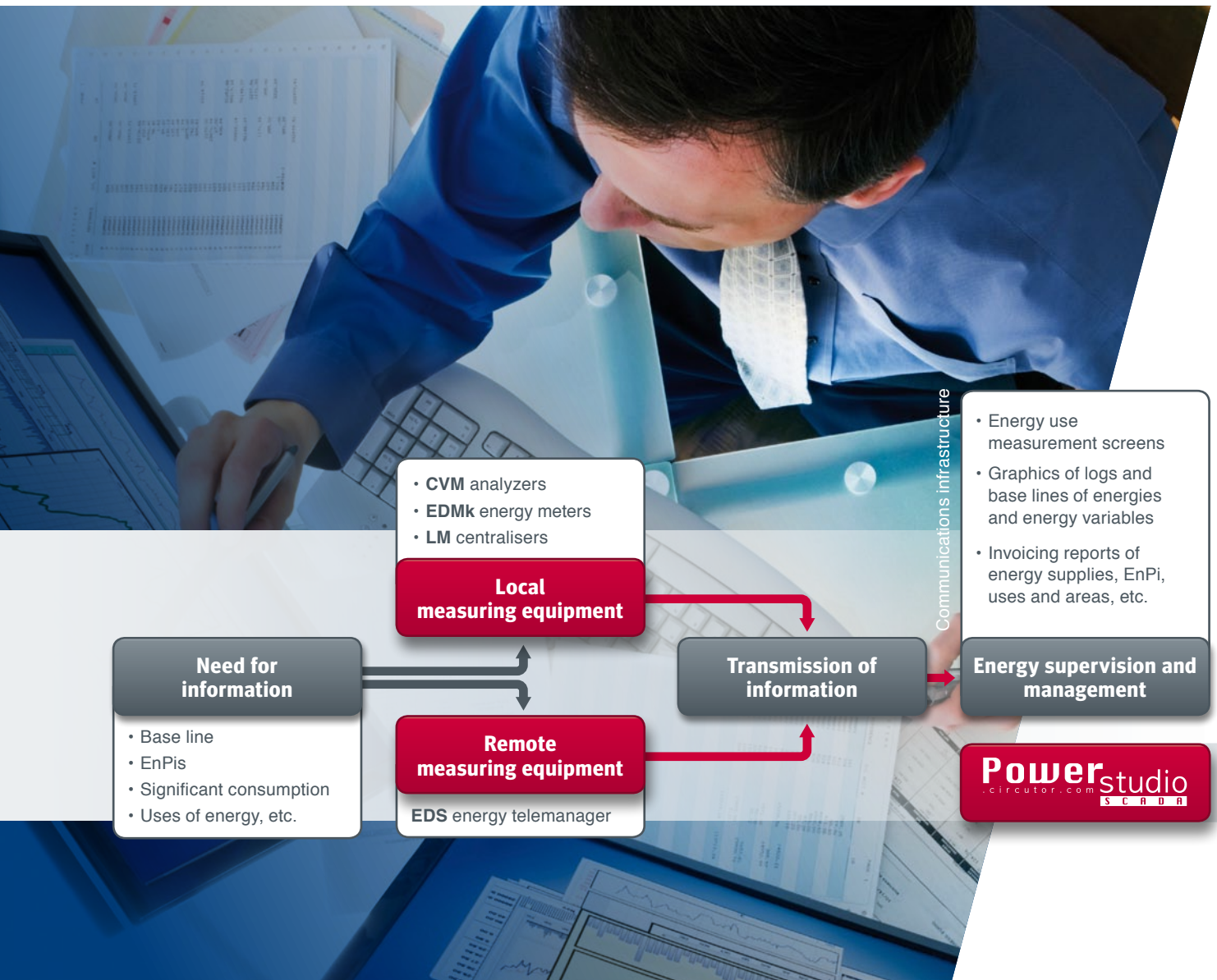
Type of application in energy consumption. The standard also defines a series of basic concepts, such as the base line, energy performance indicator (EnPi), and energy uses, etc., for later processing and management.

### Energy performance

Measurable results related to energy efficiency, use or consumption.

# Energy measurement and management solutions for the ISO 50001 standard

*As seen in the previous points, implementation of the ISO 50001 standard goes through the definition, implementation and follow up of compliance with the energy objectives. To this end the standard clearly defines a basic point within the checking section: "monitoring, measurement and analysis". Therefore, for the energy performance to be correctly checked, it is necessary to implement measurement equipment, a communications network and **PowerStudio Scada** energy management software.*



## Measuring equipment

Once the necessary measuring points have been defined, the equipment is chosen according to the needs of each area. Notable features of the equipment include:

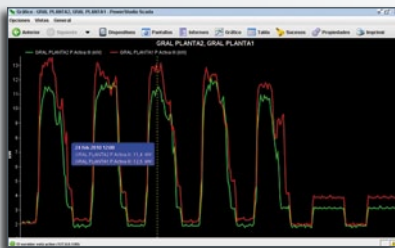
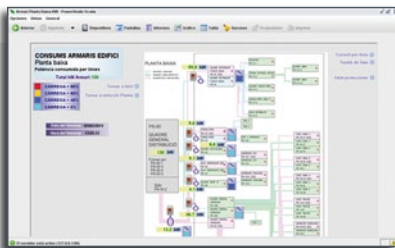
- **CVM** power analyzers. Equipment with the capacity to measure energy, power and electric variables such as voltages, currents, harmonics, etc.
- **EDMK, MKD, EMS** energy meters. Measurement equipment to measure active and reactive energy.
- **LM** impulse centralisers. Variable integration equipment for electric, thermal, mechanical and other energy types.
- **EDS** energy telemanagers. Concentrators of energy consumption and variables designed for companies with distributed branches.

## Measurement diagram

The purpose of the measurement diagram depends on the type of installation that is the aim of the standard, basically consisting of two types:

**Energy management system for a local management plant**, where the aim is the division of the plant into areas and then into energy uses. Examples are industries, office buildings, malls, health centres, etc.

**Energy management system for remote centres.** Energy telemanagement. In this case, the main consumption uses of a remote centre is measured and the information is automatically sent to the central control centre. Examples are company dealers, store chains, bank branches, network of primary health care centres, etc.



Informe Medio Ambiental de Objetivos de Consumo			
Comparativa de Consumos Eléctricos con Objetivos			
Fecha de emisión: 02/02/2011 10:10:00			
Período de consumo: Desde: 01/01/2011 00:00:00 Hasta: 01/02/2011 00:00:00			
SALIDAS			
	kWh Objetivo	kWh Consumida	Resultado
Zona 1	8.000	8.500	96
Zona 2	10.100	10.400	103
Zona 3	10.000	10.000	100
Zona 4	11.000	10.500	95
Zona 5	800	800	100
Zona 6	3.000	3.000	100

## Power Studio SCADA energy software

For monitoring and analysis, the **CIRCUTOR** solution is based on the use of *energy* software by **PowerStudio SCADA**, which makes it possible to obtain the basic points the standard requires:

- Logs of energy consumption and variables
- Determination of the base line
- Measurement of significant energy uses
- Measurement and calculation of EnPis
- Effectiveness of the plan of action
- Assessment of total consumption with respect to what's expected.

**PowerStudio SCADA** also has the following possibilities:

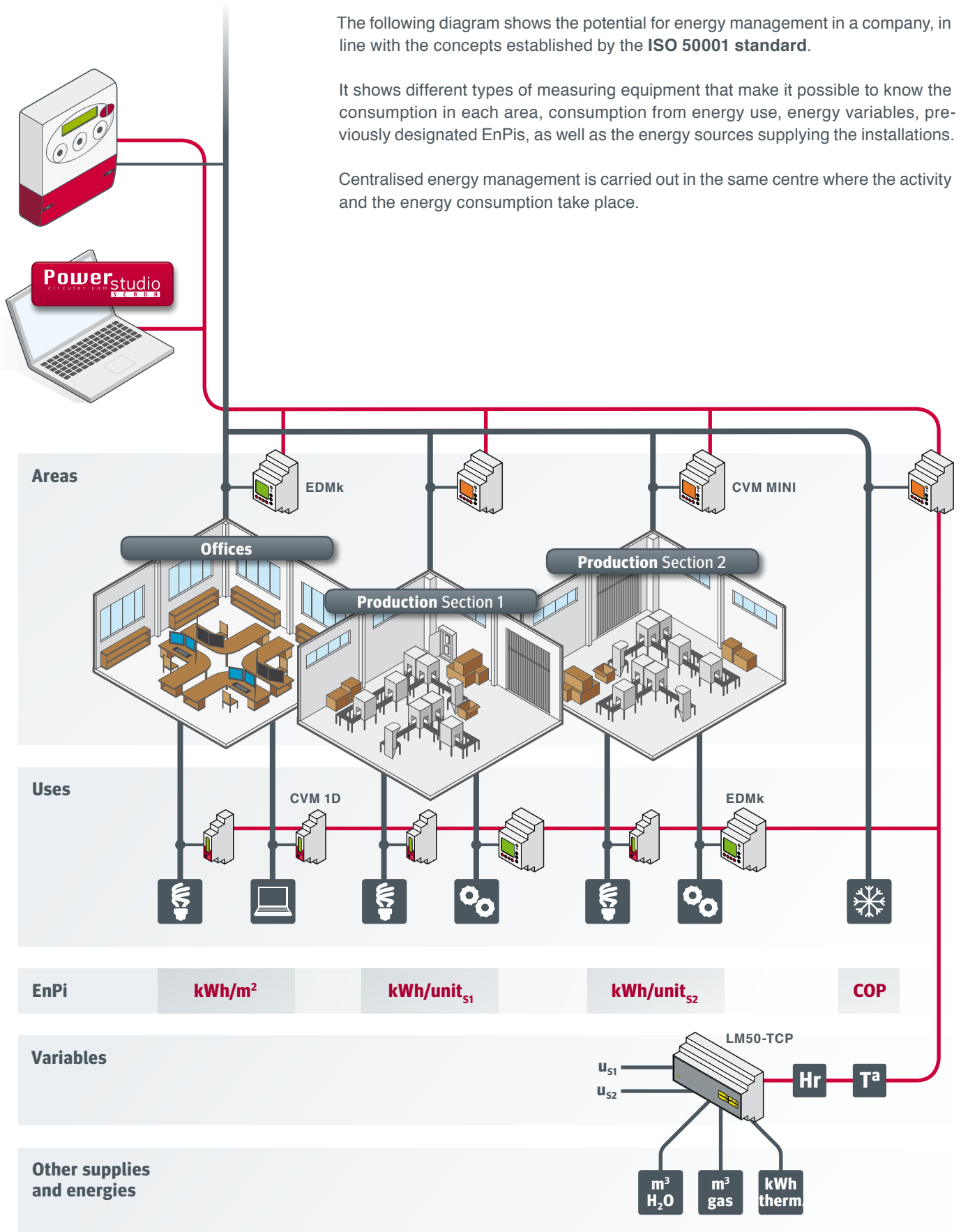
- Real time display of technical parameters.
- Control of energy costs. Consequent follow up of supply invoicing and the correct attribution of energy consumption costs.
- Creation of reports that bring together the previously defined basic points to be controlled or others that the company considers relevant. This makes follow up of the energy objectives to be fulfilled and the measures taken possible.
- Possibility of integration into a *software* for general management of the company via the incorporated XML server.
- Multi-point *software* with web server. Consequent possibility of remote access.

# Energy management system for a local management plant

The following diagram shows the potential for energy management in a company, in line with the concepts established by the **ISO 50001 standard**.

It shows different types of measuring equipment that make it possible to know the consumption in each area, consumption from energy use, energy variables, previously designated EnPis, as well as the energy sources supplying the installations.

Centralised energy management is carried out in the same centre where the activity and the energy consumption take place.

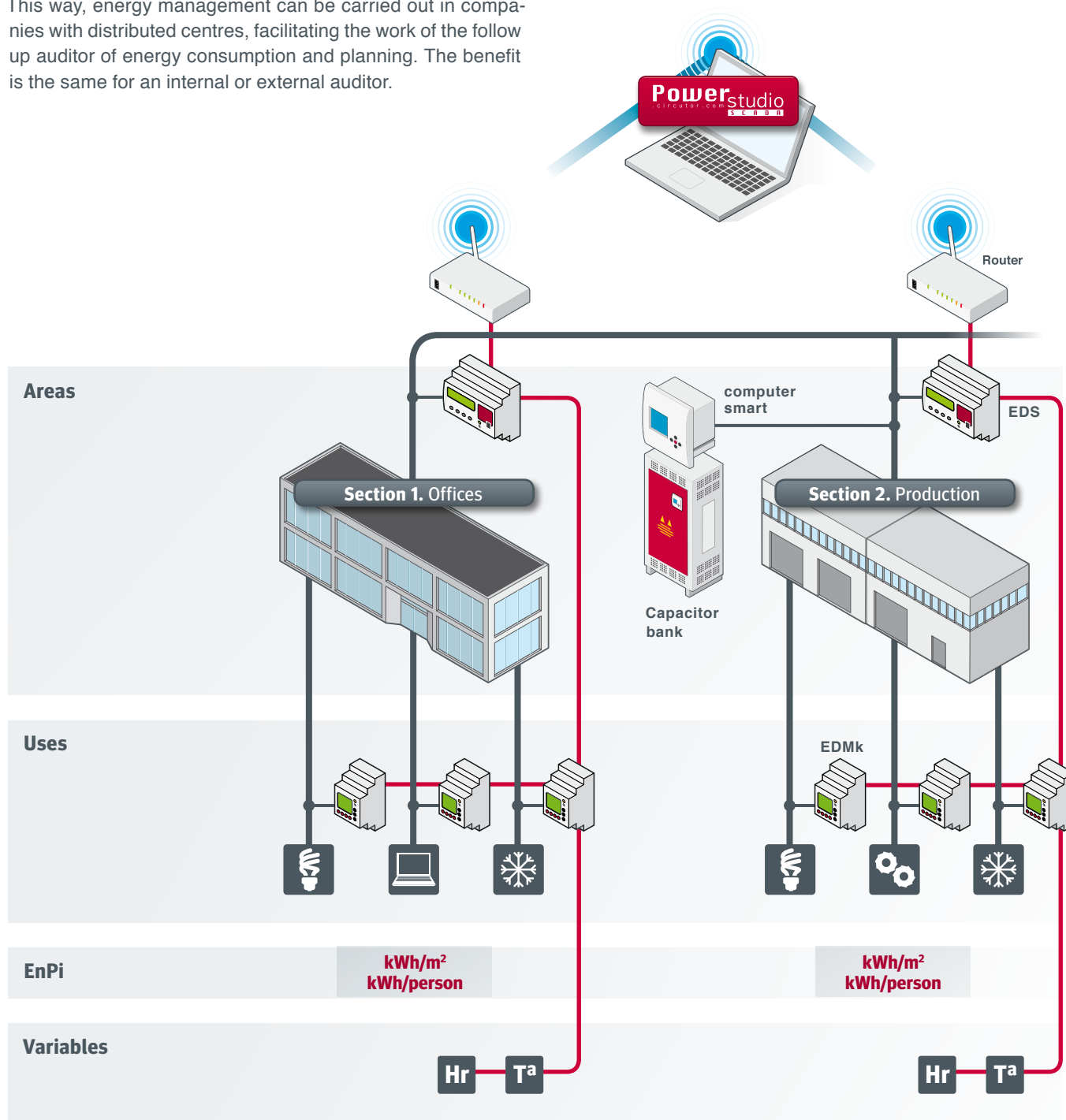




# Energy management system for remote centres. Energy telemanagement

In this case, measurement is carried out according to use areas, energy variables, EnPi and energy sources as in the previous case, but with the added feature of being a remote system.

This way, energy management can be carried out in companies with distributed centres, facilitating the work of the follow up auditor of energy consumption and planning. The benefit is the same for an internal or external auditor.

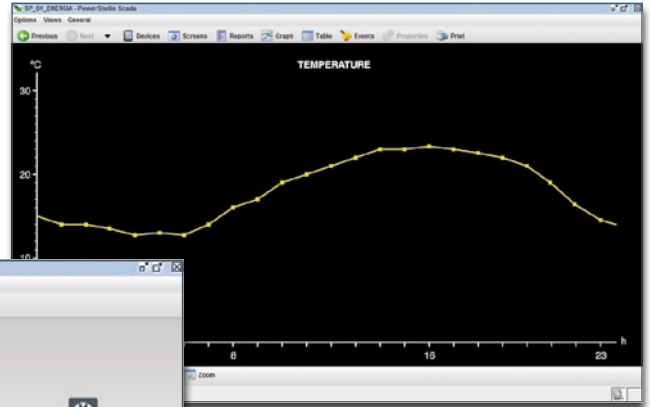


# PowerStudio SCADA ISO 50 001 application

This page shows the displays of a PowerStudio SCADA application, where the basic points of the previously described standard are correctly followed up.

Control of energy variables

Control of energy by areas and uses



Energy performance indicators (EnPis)

Environmental Report of EMAS Indicators  
of electrical consumptions regarding surface and occupation

Date: 03/02/2011 13:12:09  
From: 31/01/2011 00:00:00 To: 07/02/2011 00:00:00

	kWh Consumed	kWh / m <sup>2</sup>	kWh / person
Zone 1	8 501	6,31	53,13
Zone 2	13 923	8,70	87,02
Zone 3	12 682	7,93	79,26
Zone 4	10 601	6,83	66,26
Zone 5	687	5,13	61,34
Zone 6	9 815	4,90	48,06
Zone 7	7 834	7,85	76,54

Determination of base line according to logs



Follow up of energy objectives

Environmental report of consumption targets  
Comparison of electrical consumptions

Date: 03/02/2011 13:12:09  
Consumption period: From: 31/01/2011 00:00:00 To: 07/02/2011 00:00:00

OUTPUTS	kWh Target	kWh actual	Result
Zone 1	8 600	8 501	99
Zone 2	13 100	13 923	-823
Zone 3	13 000	12 682	318
Zone 4	11 200	10 601	599
Zone 5	800	687	113
Zone 6	9 500	9 815	-315
Zone 7	8 200	7 834	366

# Products required to comply with the ISO 50 001 standard

## Audits



### AR6

#### Portable power analyzer

For three-phase networks with neutral current and leakage measurement. The AR6 is a high performance analyzer with VGA display, 10 measurement inputs, quality events log and PHOTO capture.

## Metering



### CIRWATT

#### Multi-function energy meters

Capable of satisfying the maximum needs of energy measurement systems, with other outstanding features such as quality, accuracy, safety and reliability. Single and three-phase, with PRIME system.

## Measurement

### EDS

#### Energy telemanager

Through EDS the user can obtain and centralise the consumption of the installation. EDS has an integrated web-based server that enables any variable to be consulted without additional software.



### CVM MINI

#### Three-phase power analyzer

It measures more than 230 electrical parameters and has RS-485 Modbus/RTU communications for contact with master software. Backlight display. DIN rail / panel.



### EDMk

#### Three-phase energy meter

Active and reactive energy meter for up to 3 tariffs. Suitable for consumption control and cost attribution. Measuring in 4 quadrants. DIN rail. Measuring in medium and low voltage networks.

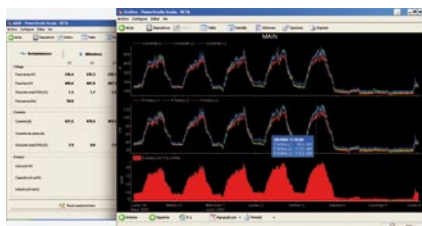


### MC

#### Efficient transformers

Three efficient transformers in a single enclosure. It offers significant advantages to the professional during the installation phase of power analyzers in modular panels.

## Energy management system



### PowerStudio SCADA

#### Energy management software

Powerful, simple and user-friendly software that makes total energy supervision possible for power analyzers, energy meters, earth leakages and complete control of different magnitudes in the industrial process field.



## Power factor correction



### Capacitor banks

#### Power factor correction

Designed for power factor correction in networks where the load levels fluctuate and power variations are of a few seconds.



### Filters

#### Harmonic filtering

Power factor correction, phase balancing and harmonic filtering. The perfect solution for resolving quality problems in industrial, commercial and service installations.

# Energy measurement and management systems for the **ISO 50001 standard**

with **PowerStudio SCADA**

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