

Energy Management Systems

Solutions for Municipalities



Technology for energy efficiency

Energy Management Systems

*At **CIRCUTOR**, we have been manufacturing and distributing electrical energy efficiency management systems and equipment for more than 35 years. All the knowledge acquired during this time is reflected in our products, which are reliable, robust, easy to use and most importantly: innovative.*

The rational and consistent use of energy is vital in order to make current and future energy needs compatible. Therefore, there is an urgent need to implement strong Energy Efficiency policies.

Energy must be measured to guarantee its correct management. Likewise, communications equipment must be used to centralise all data at one point to make sure that it is handled correctly.

Solutions for Municipalities

Habits vs. energy costs

The most important handicap for any installation lies in the fact that it must make sure that the equipment that consumes electrical energy is disconnected when the workday is over, thus preventing unnecessary consumption.

Said equipment is usually disconnected manually, although it is frequently left on by mistake, thereby generating unnecessary consumption.

If we multiply these costs by "n" sites or buildings, the overall costs associated with these installations can represent potential savings to energy managers in municipalities.

Particularities

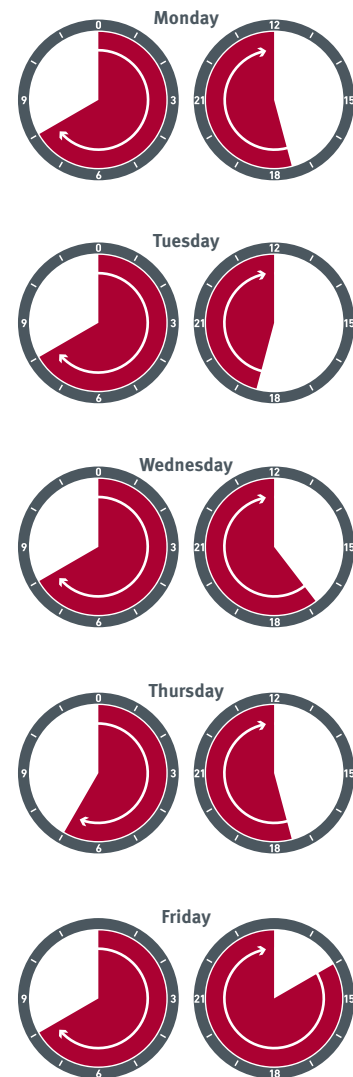
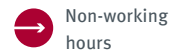
Unnecessary costs outside of the daily operations of municipality offices or sites

$$1 + 2 + 3 + \dots + n = \text{Cost } 0\text{€}$$

Actually, the working hours of different municipal buildings (schools, sports centres, administration, etc.) are never pre-established nor are they the same for every building. This means that timers or programming systems can not be installed with determined time periods.

These installations are not only accessed by workers, but also by maintenance staff, users, etc., who provide an office with services that are vital for performing its daily operations. Therefore, there is a constant influx of people that includes not only the installation's clients but also external suppliers who provide services for the installations.

For example, the cleaning staff entering a school building during the afternoon after the lessons are over and leaving the lights or air-conditioning systems on after they leave would mean that the loads would remain constantly connected until the next working day.



Working hours are not pre-established and vary in accordance with the type of installation.



Manual disconnection can increase electricity costs due to carelessness on the part of staff (internal or external).

Centralisation and supervision of the energy consumption of municipalities

CIRCUTOR manufactures equipment that can be used to improve electricity consumption efficiency and can provide advice to the installation company about the most efficient method of installation. The purpose of these systems is to guarantee the disconnection of loads when there is no activity or when no people are present at the installations.

To do so, we must prepare the installation so that, via the disconnection of a switch, contact or remote switch, we can shut down in a controlled manner the various loads that provide comfort (air conditioning, lighting and power). The electrical design of these three elements must guarantee that they can be used individually, regardless of their use or time of day when the installation is accessed.



The loads that provide an installation with comfort are divided into: air conditioning, lighting and power (computers, printers, etc.)

Air-conditioning

Obviously, the units should shut themselves off as a function of their operation, and never by power or by supply of the load itself.

Lighting

Lighting is obviously an important aspect of comfort. The costs derived from lighting consumption can represent more than 35% of the total energy consumption, depending on the type of installation.

Power

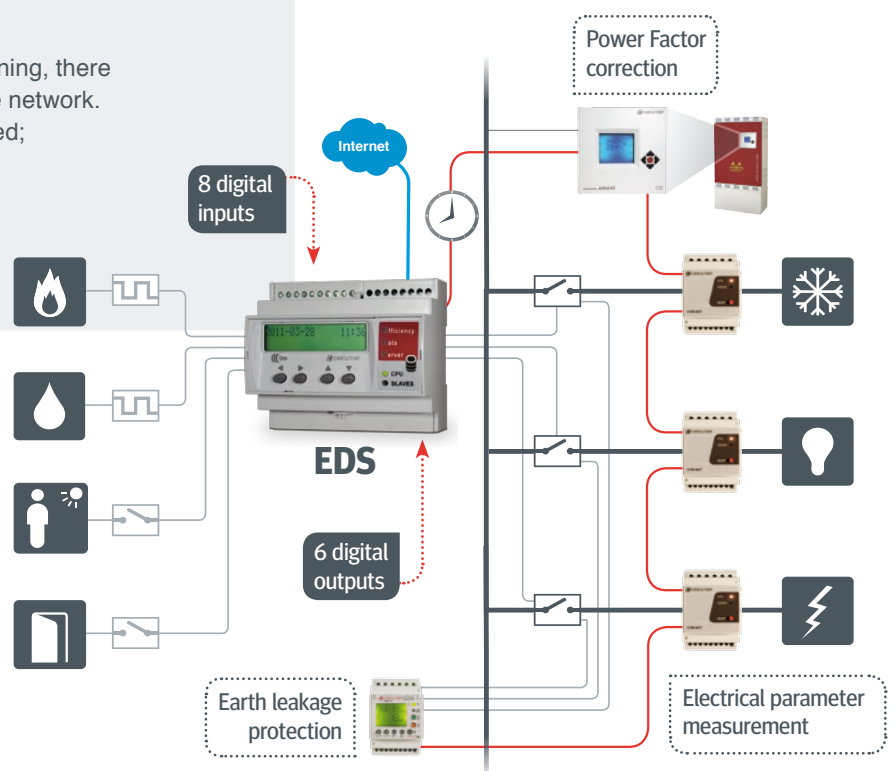
In addition to lighting and air conditioning, there are numerous loads connected to the network. Clearly, some can not be disconnected; others remain on or in *stand by mode*, generating a permanent consumption of around 10-15% of the site's total consumption.

Other consumption

Using impulses, the **EDS** equipment can also read consumption in the water and gas meters and thereby know the bill amount for these services as they arrive. It can also be used to generate an alarm if consumption shoots up, such as in a leakage.

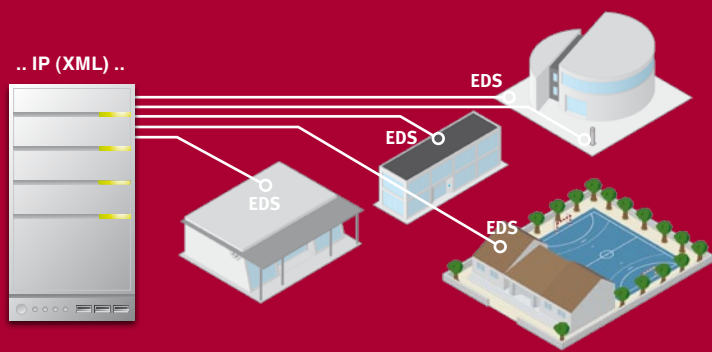


Energy Management System



The system is monitored by a central computer hosted in a safe municipal maintenance room, with IP communications to connect to the **EDS** control centre hosted in each installation.

EDS is a unit equipped with 4 relay outputs for attacking the power circuits and four digital inputs (open or hot, depending on the model). Inside, there is a monitoring and control application that responds to XML requests (**PSS Embedded**).



A central computer supervises all of the control points at each of the installations.

Centralised manual disconnection

All **EDS** are monitored remotely, providing information about the status of all installations. Its staff is often available 24 hours a day, 365 days a year. This staff supervises the installations remotely and are responsible for disconnecting the loads in the afternoons, evenings or on weekends.

Mass disconnection alarms can also be scheduled, depending on the site profile.

Centralised automatic disconnection

At the end of the workday, the installation's supervisor activates the security system, thereby activating the installation's security alarm.

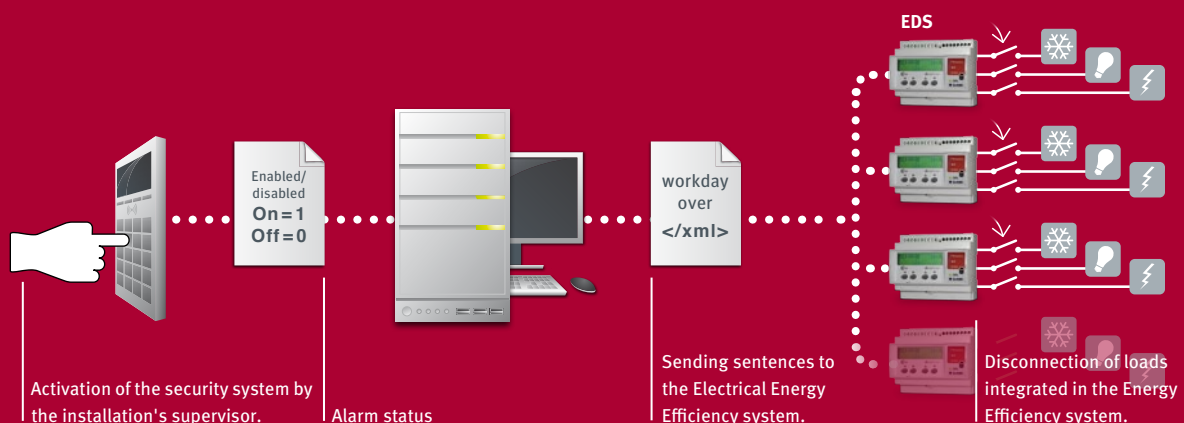
The activation of this system sends a remote activation signal, confirming that the workday is over at the installation. The security systems give real time status reports, and it is precisely then when the energy-consuming loads should be disconnected completely.

Therefore, the most efficient option is to combine the security system with the Energy Efficiency system, thereby forcing the automatic disconnection of local loads (air conditioning, lighting and power).

In fact, the system disconnection signal can take the form of a local, on-site digital signal if necessary.



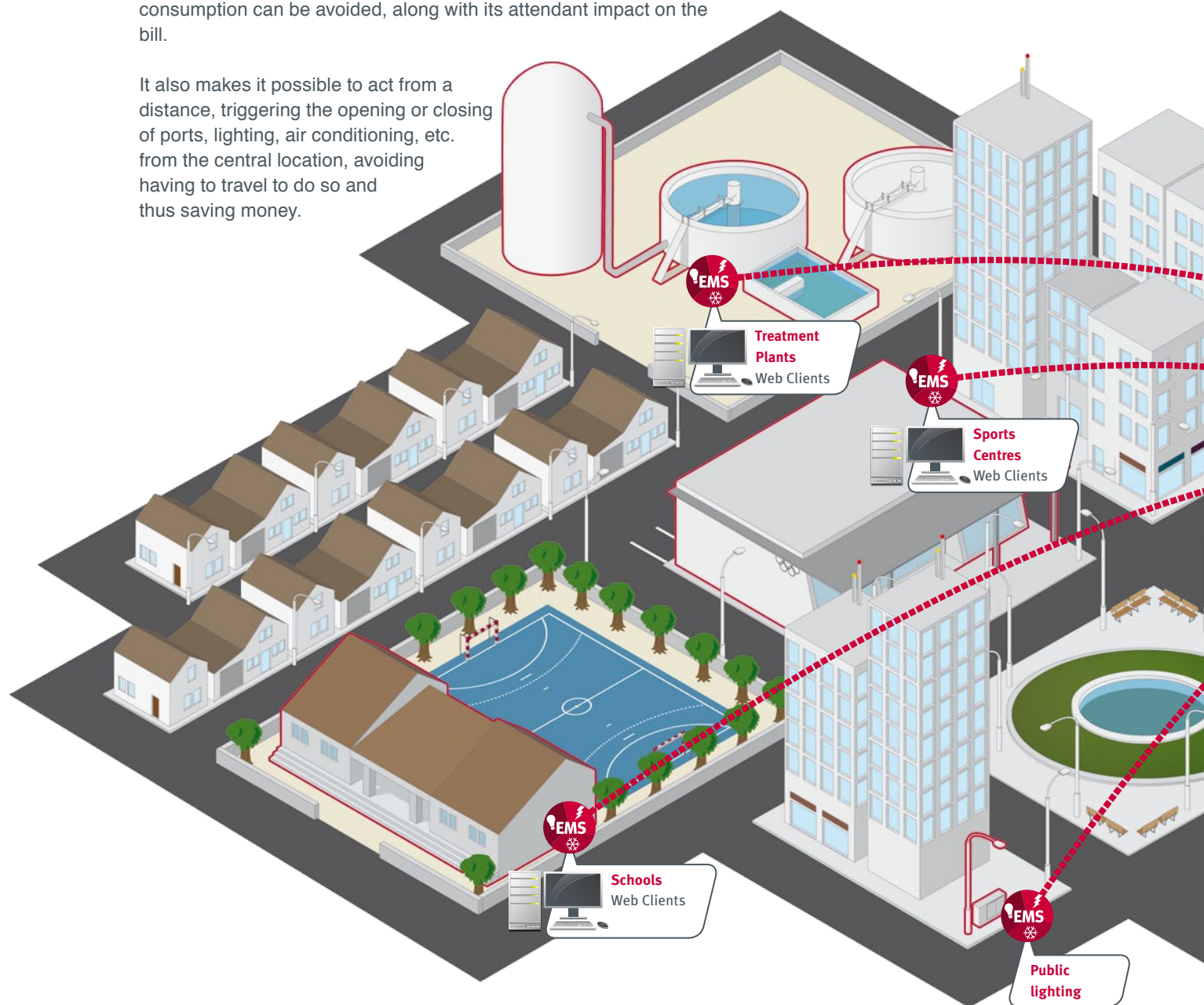
The implementation of this Electrical Energy Efficiency system can lead to savings of up to 15%.

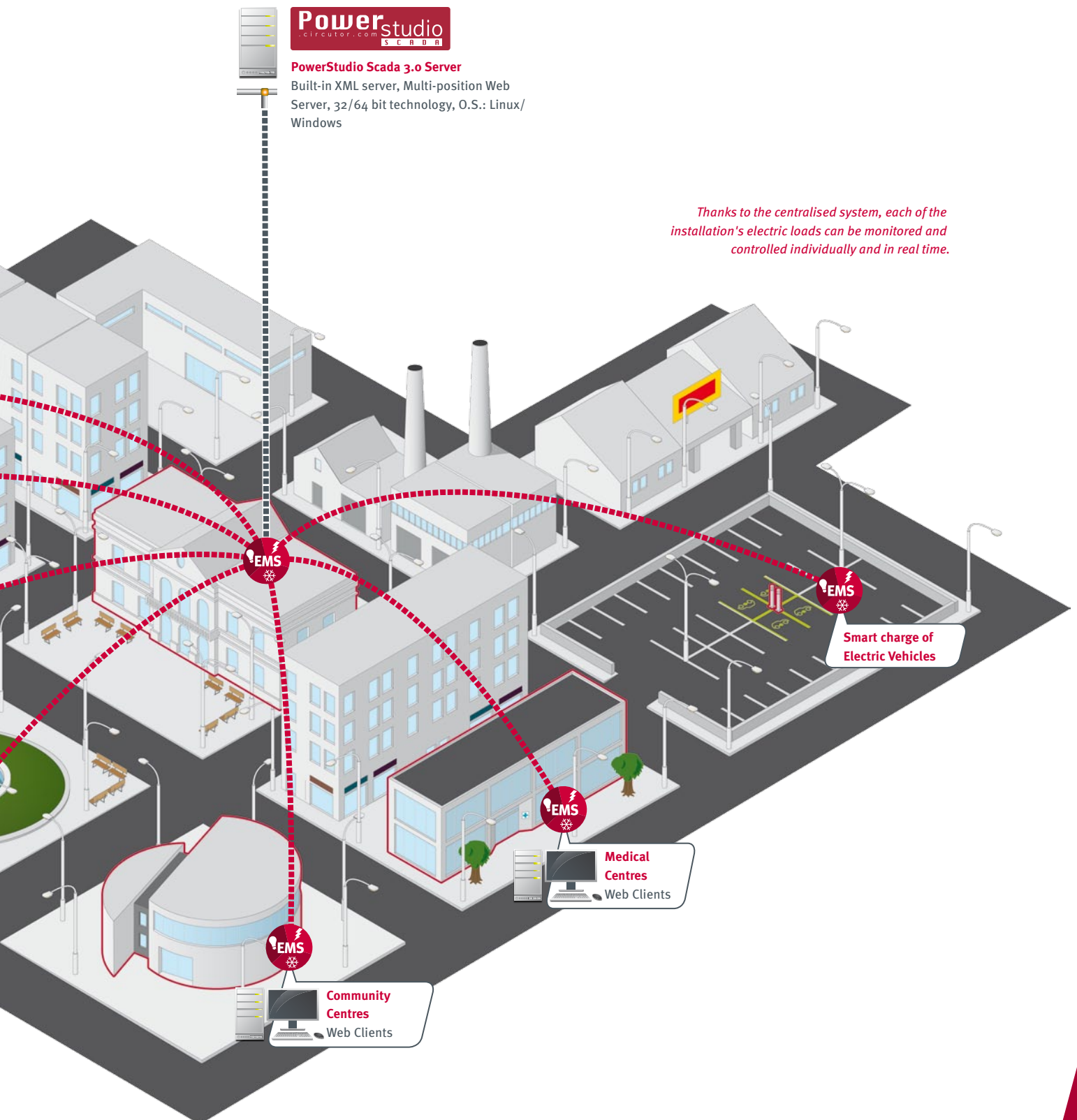


Centralisation and supervision diagram for the energy consumption of municipalities

With **CIRCUTOR**'s energy management system, the consumptions of all municipal buildings can be centralised and supervised from a central office. The head of municipal maintenance can connect to each installation, read the historical logs and generate the bills for the various energy services such as electricity, gas and water, before receiving them. If the connection is made on a daily basis, consumption can be contrasted with previous levels and leakages can be detected through to excessive consumption. In this way, excess consumption can be avoided, along with its attendant impact on the bill.

It also makes it possible to act from a distance, triggering the opening or closing of ports, lighting, air conditioning, etc. from the central location, avoiding having to travel to do so and thus saving money.





Smart charge of Electric Vehicles

Electric mobility is a reality, and although its implementation has been slow, this presents the ideal situation to be able to gradually bring the necessary infrastructure up to speed. From the standpoint of a municipality, charging points should be installed in streets (isolated points), in public car parks and also for charging their own municipal vehicle fleets (multi-point recharges).

Isolated charges



Street recharging is done at isolated points where an adequate power supply should be provided. Communications with the control centre can be achieved through a GPRS/3G modem, Ethernet, etc.

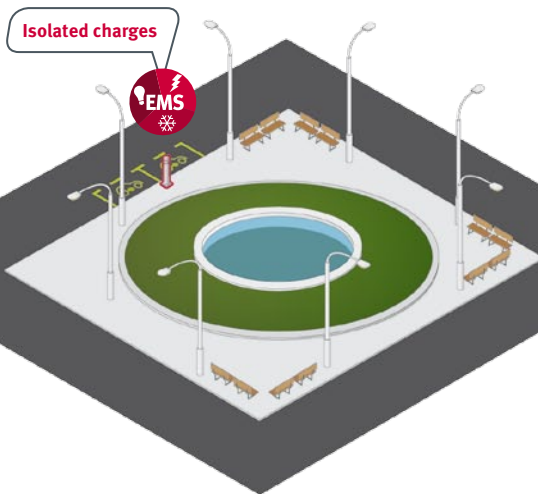
CIRCUTOR equipment integrates electric security systems and vandalism protection systems and are able to withstand adverse weather conditions, for their installation in public spaces.

Multi-point charges

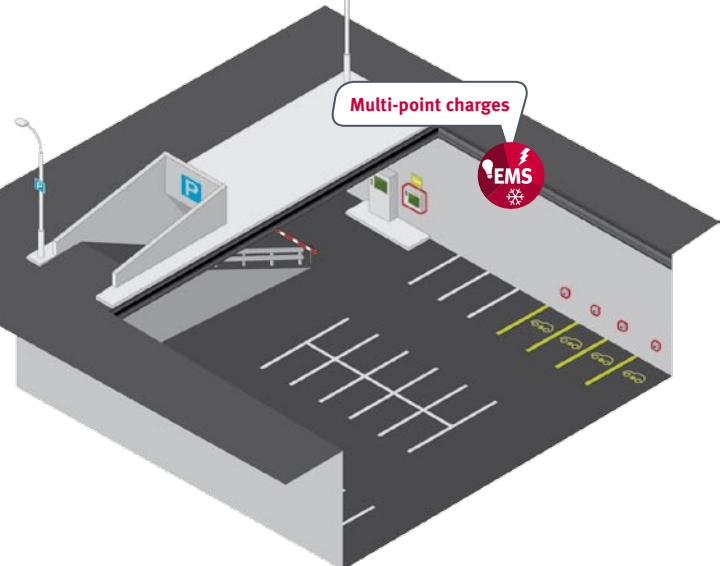


The installation of several charging points in the same place should include, apart from the equipment itself, an intelligent system to prevent the charging of all points at the same time. Depending also on whether the charges are single-phase, an active filter should be installed for phase balancing, harmonic elimination and power factor correction. **CIRCUTOR's** *know-how* is backed up by its technological resources and experience with this type of installation.

Isolated charges



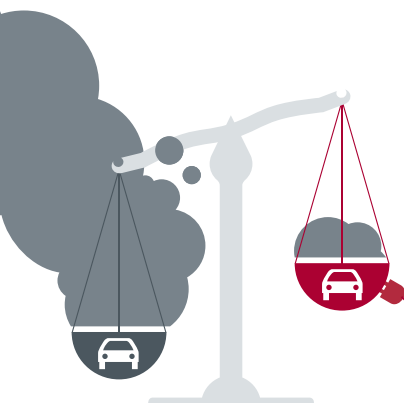
Multi-point charges



CO₂ Reduction

In today's world, one of the most important markets for electric vehicles is vehicle fleets, whether for maintenance, services or transport.

One of the most polluting sectors - with the most spillovers and costs for the government and service companies - is the vehicle fleets that routinely travel through urban or metropolitan settings.





Energy supervision and centralisation software

PowerStudio is powerful, simple and user-friendly software that allows for the full energy supervision of power analyzers, meters, earth leakages and complete control over a wide range of magnitudes.

PowerStudio, together with **CIRCUTOR** equipment and systems, adapts to the needs of the installation, offering the following efficient management measures:

Energy management

- Creation of historical logs
- Baseline determination
- Control of energy costs
- Energy balance
- Energy consumption ratios
- Consumption reports

Improvement of productivity Maintenance

- Alarm tables
- Power quality control
- Analysis and management of technical variables
- Technical reports

Production costs

- Correct allocation of energy costs
- Energy ratio / unit of production
- Cost reports / production ratios

Additional software



SQL[®] DATA

Modules for exporting historical logs to an SQL server



OPC-DA

Data connector for external systems with an OPC-DA client



Powerstudio mobile

Basic software for mobile devices

Essential tool for UNE 16001 / ISO 50001 certification

Versions

PowerStudio is available in three versions with different features, to suit the needs of the particular management system.

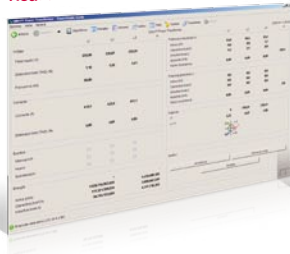
Powerstudio

Powerstudio

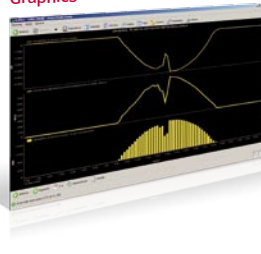
Powerstudio Deluxe



Real time variables



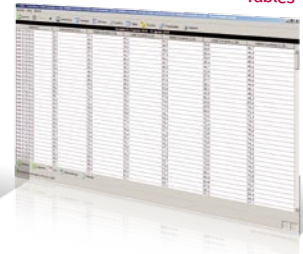
Graphics



Graphics



Tables



CIRCUTOR products used by the system

EDS

Energy manager

Powerstudio
circutor.com



EDS (Efficiency Data Server) is an energy manager equipped with **Embedded PowerStudio** and a built-in web server, which enables the user to query any electric variable by connecting via an RS-485 bus to measurement equipment. There are 8 voltage-free digital inputs and 6 programmable relay outputs.

The most salient features include:

- Parameterisation and management of automatic events
- Alarm recording system and system event management
- E-mail alarms
- RS-485 port up to 5 **CIRCUTOR** units. Ethernet connection.

Power Analyzers

CVM

Three-phase and single-phase power analyzers



Power analyzers with DIN rail or panel assembly, for the measurement of single-phase or three-phase electrical networks - both balanced and unbalanced - and specifically designed to measure up to 230 electrical parameters and to transmit data via an RS-485 communication bus.

CIRCUTOR's CVM power analyzers are suited to your needs, offering you various options. Depending on the model, it may have a display, or a memory of maximums and minimums of the principal electrical parameters (U , I , P , ...).

Transformers

MC3 63 / 125 / 250 A

Efficient three-phase transformers



The new **MC3** measurement system comprises three efficient transformers in a single enclosure. This innovative transformer layout provides significant advantages during the installation phase of power analyzers in modular panels. In compliance with the **IEC 60044-1** Transformer Standard. They have a 250 mA output for more efficient measurement.

In addition, **CIRCUTOR** has a wide range of transformers with a 5 A standard secondary output that can measure from 50 A up to 4,000 A.

Centralisers

LM Series

Analogue and digital signal centralisers



CIRCUTOR has several centralisers of analogue and/or digital signals that allow any non-electrical parameter to be integrated into the management system, for example: impulses from water meters, gas meters, temperature meters, humidity meters, production unit meters, etc.

Energy meters

CIRWATT B

Multi-function energy meters for billing



Wide range of dual-port energy meters for billing that can be integrated into the management system. Single or Three-phase meters, with direct or indirect connection (CT) and communication via RS-232, RS-485, Ethernet, GPRS or PLC.

Self-reclosing system

WRU-10/WRU-10 RAL

Earth leakage relays with automatic reclosing system



Earth leakage relays with automatic self-reclosing system allow, in the case of a differential decline due to an inopportune leakage, the system to connect back up and service to continue without the user needing to travel to reset the electrical system.

With the aim of integrating equipment into the energy management system for preventive maintenance of the lines, the units may feature RS-485 communication, depending on model.

Power Factor correction

Capacitor banks and filters for power factor correction



Power factor correction is essential for the proper management of the installation's distribution system. **CIRCUTOR** has a wide range of capacitor banks to suit any type of installation.

It has correction equipment for 5 kvar up to 800 kvar, with contactor operation or with a static system (for installations with rapid variations such as elevators) and with detuned filters for installations that have harmonics on their electrical networks.

RVE

Smart recharge of electric vehicles



Electric vehicle charging equipment with specific functions to achieve the maximum efficiency of existing or future smart networks. It is composed of outdoor charging stations (posts), charging stations for indoor and outdoor *car parks*, multi-point systems, quick-charge systems, cards and prepaid accessories. Available with RS-232, RS-485, TCP/IP, etc. communications, depending on the type of unit.



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