

Energy efficiency solutions for buildings

# Leading the way to energy savings

For professionals  
& designers

**Schneider**  
Electric





Save energy and  
reduce your impact  
on the environment.  
Schneider Electric  
Energy Efficiency  
Solutions can help you  
reduce your energy  
consumption by up  
to 30%.

# Contents

1

## Today's challenges

Our energy future starts now	4
Energy efficiency: tighter regulations, new incentives	6

2

## A commitment to energy savings

A more efficient, smarter, cleaner energy future	8
Be your customers' leading energy-efficiency partner	12

3

## Our solutions

Power distribution	16
HVAC control	30
Lighting control	40
Energy monitoring	50
Building management	68
Renewable power generation	90



# Our energy future starts now

x2

Global energy demand is expected to double by 2050

:2

At the same time, we must reduce CO<sub>2</sub> emissions by half if we are to limit the effects of climate change

## Today's challenges

### Buildings, a major source of global energy savings

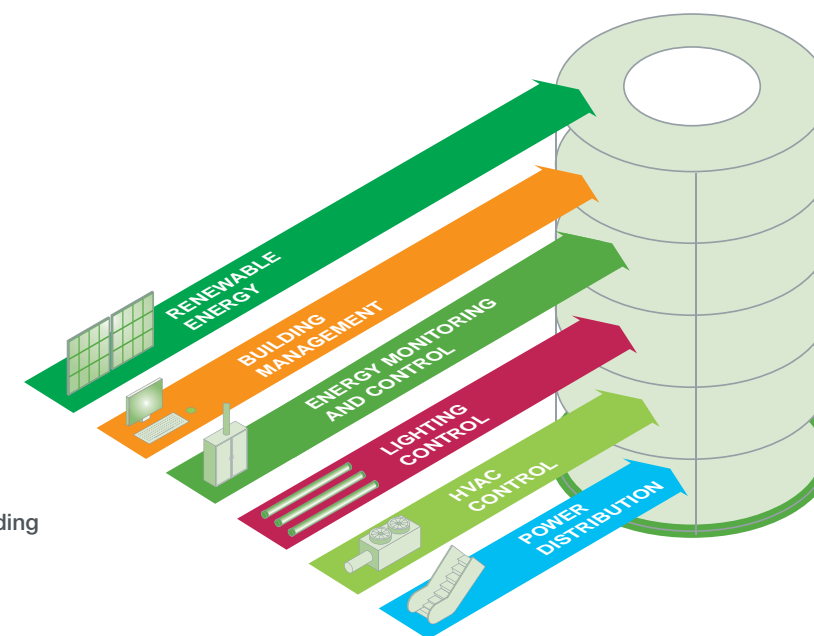
Rising use of heating, air conditioning, lighting, and information technologies has made our buildings increasingly energy hungry. These systems far outstrip other applications as the number-one consumer of electricity. In fact, electricity accounts for up to 50% of CO<sub>2</sub> emissions attributable to residential and commercial buildings.

Under the Kyoto Protocol, industrialized countries have agreed to curb their CO<sub>2</sub> emissions by 5.2% by 2012 and by 75% by 2050. Buildings are today a major source of potential energy savings that can help us meet these targets and protect our environment.

40%

Residential and commercial buildings account for 40% of total global energy consumption

Solutions for all building applications



30%

Reducing our energy consumption by 30% by 2020 would eliminate the need for 1,000 new power plants

### Greater energy efficiency starts today

If we are to meet our Kyoto targets, we must start today. Boosting energy efficiency is the quickest, cheapest, and cleanest way to reduce both consumption and CO<sub>2</sub> emissions.

Making your building more energy efficient does not necessarily involve costly and disruptive changes to your installation. Based on existing building systems, it is possible to reduce energy consumption by an impressive 30% simply by implementing easy-to-use services and technologies already available – but the time to start is now!

This guide is designed to point designers and other professionals to the right solution for each building's unique needs. Inside, you will find a comprehensive range of solutions to make your energy safer, more reliable, more efficient, and cleaner.



Schneider Electric supports the Princess Elisabeth Antarctica Station, the world's first zero-emission research station



# Energy efficiency: tighter regulations, new incentives

## Today's challenges

### New regulations now require energy-efficiency measures and more energy-efficient equipment

Energy efficiency is no longer an option. The Kyoto Protocol has spurred governments worldwide to pass legislation to ensure smarter energy use in buildings.

The European Union, for example, made a firm commitment in March 2007 to reduce CO<sub>2</sub> emissions by 20% by 2020. Part of a package of measures known as 3x20 by 2020, the reduction will come with a 20% improvement in energy efficiency and a shift in the EU's energy mix to include 20% renewable energy.

Other countries have adopted a slightly longer timeline and more ambitious targets, aiming for a 50% reduction in CO<sub>2</sub> emissions by 2050.

Reaching these targets will require real change, and governments are stepping up their efforts to legislate, regulate, and set standards to improve energy efficiency.

# 3x20

**20%** reduction  
in CO<sub>2</sub> emissions

**20%** improvement  
in energy efficiency

**20%** energy from  
renewable resources

#### New legislation, new rules

The new trend toward tighter energy-efficiency legislation started with the Kyoto Protocol. Laws like the US Energy Policy Act and the European Union Energy Directive effectively set the rules for our energy future.

#### Public- and private-sector initiatives

##### EU standard EN 15232

This standard is used to estimate the impact of building automation systems on active energy efficiency, stating potential savings on heating and electricity according to the type of building.

High-energy-yield  
control system

Class A

Advanced control system

Class B

Standard control system

Class C

Control system does not  
generate energy savings

Class D

#### White certificates

White certificates are granted for energy-efficiency measures. Some governments require all electrical and gas utilities over a certain size to provide proof that they have helped customers reach a particular level of energy savings. Utilities that meet minimum requirements can then sell their surplus certificates to other utilities.

#### LEED

LEED is a green building rating system developed by the US Green Building Council (USGBC). It provides a suite of standards for environmentally-sustainable building construction and renovation practices. Since its inception in 1998, LEED has grown to encompass over 50 US states and 30 countries.

#### Financial incentives

Many governments are using financial incentives or market mechanisms to encourage energy efficiency. These include tax credits, interest-free government loans, partial sales tax exemptions on energy-efficiency equipment and services, subsidized bank loans, and local grants from government agencies and organizations in the private sector.

#### The new regulations will have an impact on all buildings

All buildings both existing and new and all energy systems are concerned:

- > Lighting
- > Electrical distribution
- > Heating, ventilation, and air conditioning
- > Cooling systems





A more efficient,  
smarter, cleaner  
energy future

## A commitment to energy savings

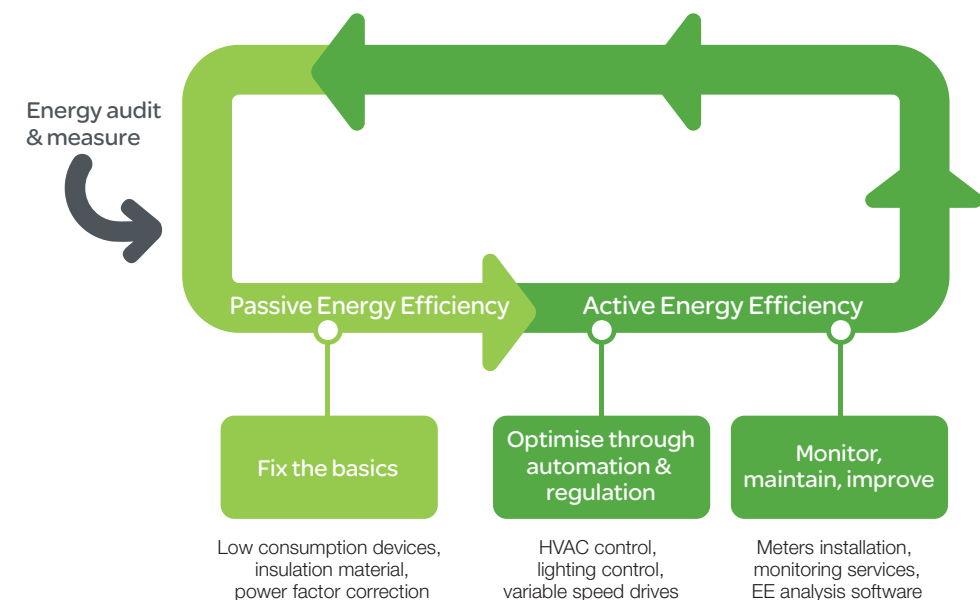
Ask any building professional. So-called passive energy-efficiency measures like insulation or low-energy-consumption equipment are not enough to meet the challenges our energy future has in store.

Today, it is a building's **net energy consumption** that counts: the difference between energy consumed and energy produced. And, to ensure that the buildings of the future are net energy producers, we must reduce consumption and offset what we do use by producing energy from renewable sources.

We can help you achieve net-producer status, and generate substantial savings by optimizing the **3 pillars of energy-efficiency**:

- > Reduce consumption by implementing active energy-efficiency solutions
- > Produce clean energy from renewable resources
- > Optimize consumption by using the latest technologies

We can help you make savings!





# How to achieve active energy efficiency



## Start with measurement

You can't manage what you can't measure. Measuring is the first essential step in raising awareness and changing habits and behaviours.



## Reduce energy consumption

Use automation and control systems to ensure that you only use the energy you really need

Add monitoring and maintenance services to achieve lasting improvements



## Reduce energy cost

Use strategies that optimize or reduce energy acquisition and management costs

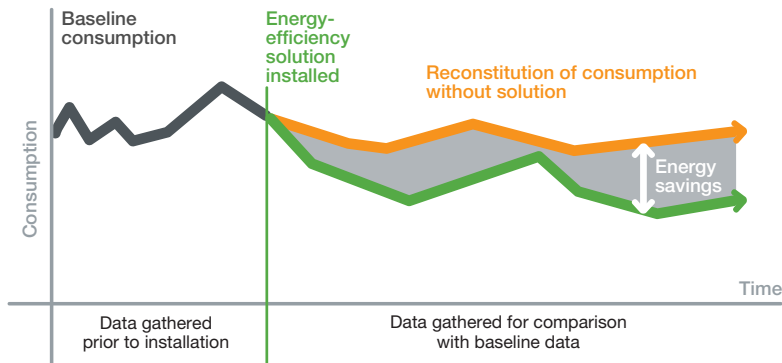
Opt for renewable energy like photovoltaics to generate electricity

## Achieve measurable savings

We use the **International Performance Measurement and Verification Protocol (IPMVP)** to measure and verify the energy savings we promise for our energy-efficiency solutions:

**Pre-installation audit:** baseline energy consumption data are measured and calculated

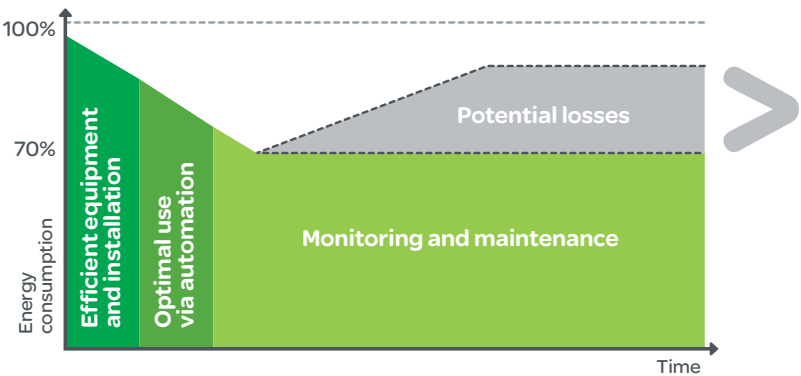
**Post-installation audit:** baseline data are compared with post-installation consumption data to determine actual savings



Save up to **30%** starting now  
by combining robust automation, control,  
and monitoring of energy use

## And secure the savings achieved by eliminating the following risks

- Unplanned, unmanaged shutdowns of equipment and processes
- Lack of automation and regulation for applications like motors and heating
- Unpredictability of user behaviours



Up to **8%** per year is lost  
without monitoring and  
maintenance programs

Up to **12%** per year is  
lost without regulation and  
control systems

## Ensure lasting progress

Implementing energy-efficiency solutions generates immediate results. However, a few additional steps will ensure long-term savings.

Installing a management system to monitor and analyze data

Maintaining the installation

Completing appropriate system upgrades throughout the installation's lifecycle

Training personnel on the products and systems installed

Our active energy efficiency solutions include **a range of service levels**. Our Energy Performance Contract, for instance, can help you ensure that the initial savings your solutions generate last well into the future.





# Be your customers leading energy-efficiency partner

## A commitment to energy savings

### Meet and exceed your customers expectations

Schneider Electric energy-efficiency solutions provide you with a comprehensive offering designed to meet your customers changing needs and boost your sales. When you sell Schneider Electric energy-efficiency solutions, you add a new environmental dimension to your technical offering, and become your customers trusted energy-efficiency expert.

#### Offer your customers the added value they demand

Innovative solutions with measurable results

Substantial energy savings

- > Up to 30% energy savings for existing buildings
- > The capacity to contribute to meeting Kyoto targets for new buildings
- > Lower operating costs

Recommendations to help your customers comply with regulations and increase the value of their property

Measures to enhance your customers environmentally-friendly image and further their Corporate Social Responsibility strategy

#### Save energy and stay on budget

Start with measurement solutions for quick and often immediate and measurable return on investment

Offer your customers the right solutions for their budget:

- > Without compromising between energy efficiency and budget restrictions
- > By offering innovations at a fixed cost
- > By promoting incentives for which your customers are eligible

Present compelling proof of the expected savings to your customers.



Some companies make their energy savings targets public:

Nestlé is aiming for **5%** savings per year from 2005 to 2010

STMicroelectronics is targeting **2.5%**

## Achieve significant and sustainable savings with Schneider Electric

### Your energy manager

Metering, monitoring, control solutions, and cost optimization services

### Your energy expert

Consulting, training, and planning and implementation of energy-efficiency solutions

### Your green partner

Environmentally-friendly and renewable-energy products



# Our solutions



Power distribution



HVAC control



Renewable power generation



Lighting control



Energy monitoring



Building management

## Power distribution

Shed non-priority loads automatically	18
Correct your installation's power factor and reduce energy costs	20
Reduce power loss by filtering harmonics	22
Design smart to reduce capital expenditures and operating costs	24
Start saving energy by monitoring your MV network locally	26
Take advantage of discount MV utility rates without the risk of counterparty power cuts	28

## HVAC control

Regulate kitchen exhaust hood speed according to temperature	32
Regulate cooling-tower water temperature and save energy	34
Regulate temperature by maintaining air pressure	36
Reduce your electrical consumption by controlling your HVAC system's motors	38

## Lighting control

Use KNX presence and daylight detectors for precision lighting control	42
Automate lighting control using KNX presence daylight detectors	44
Achieve simple lighting control using natural light and building occupation	46
Save energy by controlling lighting scenarios for different areas of your building	48

## Energy monitoring

Meet essential energy measurement needs with a simple metering solution	52
Get essential electrical information for each area of your building	54
View and monitor the energy used by your lighting installation	56
Analyze your energy consumption online without a BMS	58
Manage WAGES in your small to medium-sized building	60
Manage WAGES in non-critical large industrial buildings	62
Manage and sub-bill WAGES in large commercial buildings	64
Analyze energy data to optimize operation of your industrial buildings	66

## Building management

Schedule selected loads simply via your BMS	70
Monitor and control electrical loads in your retail shopfront	72
Control lighting and heating at room level with a KNX-based system	74
Control room lighting, temperature, and blinds automatically	76
Manage hotel energy consumption according to guestroom occupancy	78
Reduce hotel electrical consumption and improve comfort with a full KNX system	80
Combine various control systems to achieve maximum savings	82
Monitor your building's power supply and control HVAC, lighting, and blinds	84
Boost energy efficiency and increase the availability of your electrical installation	86
Control and monitor HVAC, lighting, security systems, and energy consumption	88

## Renewable power generation

Use available rooftop space to install and operate solar panels	92
Boost your green image and save photovoltaic energy	94
Supply a small group of remote, off-grid buildings with electricity	96





When you target your electrical installation, you have the potential to generate substantial savings by **optimizing the three pillars of energy efficiency**:

- > Measurement
- > Optimization of energy consumption
- > Sustainable performance for lasting results

The solutions on the following pages can help you turn your power distribution system into a source of **savings**. These simple, cost-effective solutions do not require a Building Management System and can help you optimize your installation's main functions, such as power supply, uninterrupted service, protection, and energy quality. Additional functions deliver useful information to aid in optimizing your installation and energy consumption.



## Choose the solution that's right for you

- > Shed non-priority loads automatically (p. 18)
- > Correct your installation's power factor and reduce energy costs (p. 20)
- > Reduce power loss by filtering harmonics (p. 22)
- > Design smart to reduce capital expenditures and operating costs (p. 24)
- > Start saving energy by monitoring your MV network locally (p. 26)
- > Take advantage of discount MV utility rates without the risk of counterparty power cuts (p. 28)



Power distribution

Application: all buildings

Shed non-priority loads automatically

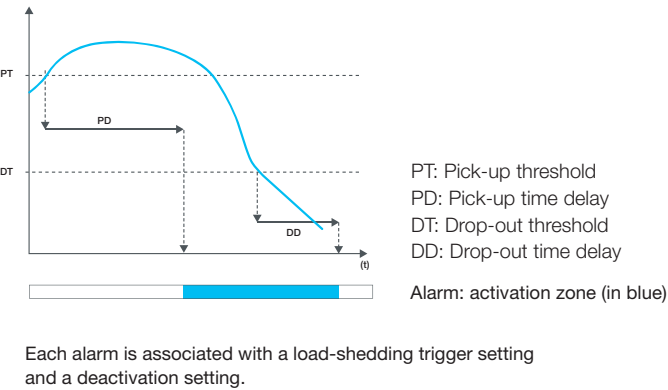
“ I want to switch to a more cost-effective contract with my electric utility. I can shed non-critical loads to make sure I stay within my utility rate block, but I cant afford sudden power cuts. ”

Solution

Design your electrical system around Compact NSX circuit breakers

Compact NSX circuit breakers allow you to manage reflex load shedding: the automatic shedding of specific loads.

The Compact NSX circuit breaker with integrated Micrologic 5.2 E electronic trip unit sends the reflex load shedding command. The trip unit measures I, V, P and E, and produces the appropriate alarms. Each alarm is associated with a load shedding trigger setting and a deactivation setting, each with time delay. The reflex load shedding order is sent via the Compact NSX circuit breaker s SDx output module.



Benefits

For the user



> Save up to 10% off your energy bills

Subscribe to a more cost-effective utility contract and avoid costly utility rate-block overrun penalties



> Get the most out of your investment

and enjoy greater reliability with the Compact NSX circuit breaker, integrating both protection and measurement capabilities

> Increase power availability by preventing overload tripping

For professionals

+ Easy design and use

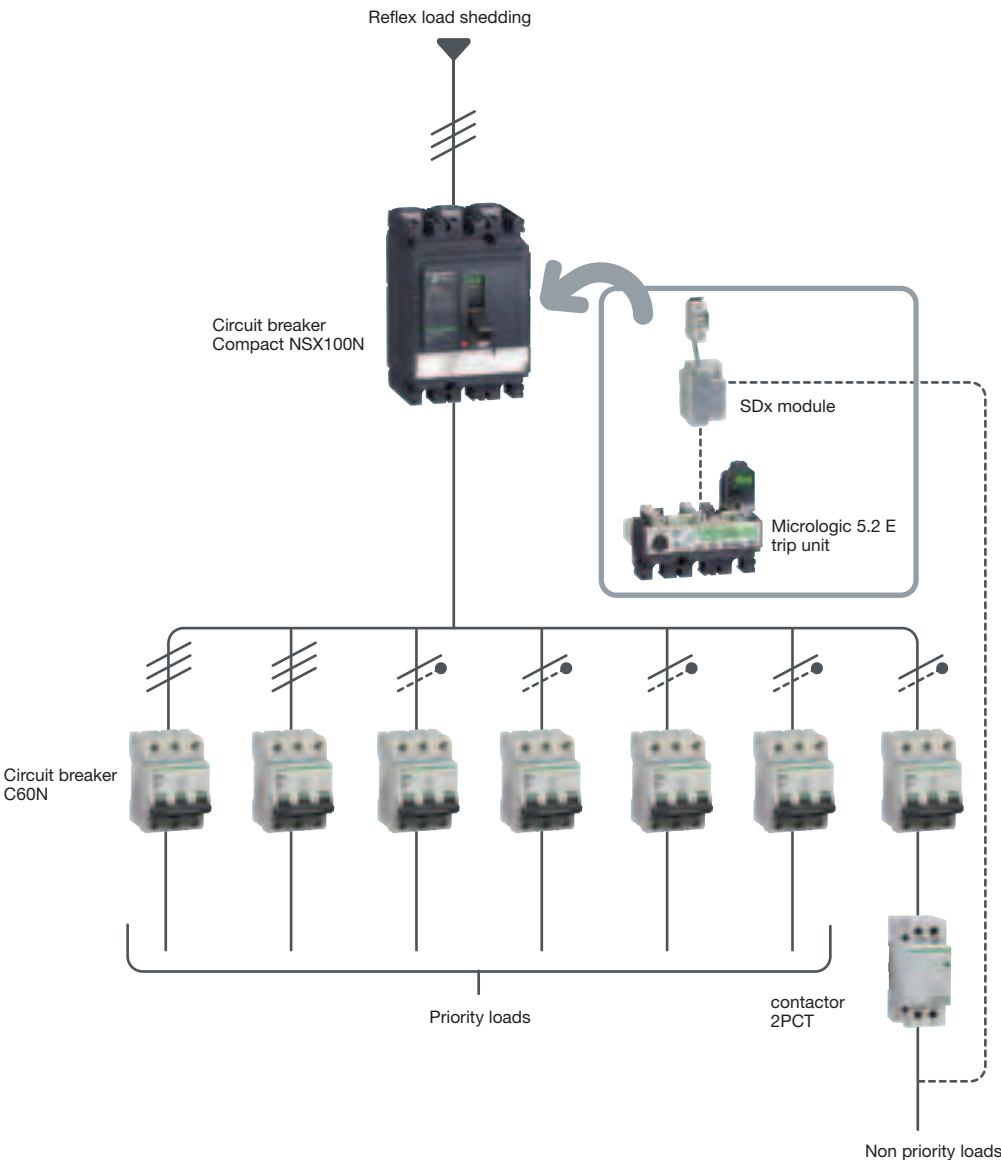
Limited part numbers for easy selection and ordering  
No need for a current transformer

+ Easy installation and maintenance

A single reference for the SDx output module  
Easy configuration via user-friendly RSU\* software, your PC and a maintenance modulea available on order as part of the maintenance kit  
Easy testing using the LSU\* software, your PC, and the maintenance module

\* Free download available online at [www.schneider-electric.com](http://www.schneider-electric.com)

- ☐ Measure
- ☒ Reduce energy consumption
- ☒ Reduce energy costs

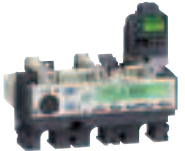


Compact NSX 100-630 A circuit breaker

The first-ever moulded-case circuit breaker to include protection, measurement, and communication capabilities in a single unit

Independent, configurable alarm time delays with flexibility from 1 to 3,000 seconds in a single unit

Micrologic 5.2 E trip unit with integrated energy measurement unique on the market



SDx Module with two outputs and power supply from 24 V to 415 V, AC or DC



Power distribution

Application: all commercial buildings

Correct your installation s  
power factor and reduce  
energy costs

“ I plan to upgrade my electrical installation to meet the new standards. I want to take advantage of the opportunity to reduce my electricity bills and boost the available power without switching to a new utility contract.”

Regulate power factor automatically  
by using a **Varset reactive energy compensator**

The solution automatically regulates power factor correction according to load fluctuations. The resulting power factor, close to 1, frees up additional available power, allowing you to add on to your installation. The system is built around a Varlogic power factor controller, which is also available in a Modbus-based communicating version.

Example:

With a utility contract for 250 kVA with an average power factor of 0.7, penalties are charged for consumption over 175 kW (175 ÷ 0.7 = 250 kVA).

The Varset system includes a bank of 200 kvar capacitors, which are automatically switched on or off depending on the power factor detected. A current detector measures consumption.

The system guarantees a power factor greater than 0.92, regardless of load, raising the actual consumption limit to 230 kW (250 x 0.92=230 kW), or 55kW of available energy.

Solution

Benefits

For the user

> **Save up to 10%** on your electricity bills, with ROI within two years (actual savings vary depending on local utility penalties)

> **Increase your installation s available power by up to 30%**

> **Eliminate excessive consumption of reactive energy**

> **Reduce your carbon footprint**

> **Boost your installation s reliability and lifespan by filtering harmonics with the Varset Harmony range**

For professionals

+ Easy to install

+ 100% factory tested capacitor bank

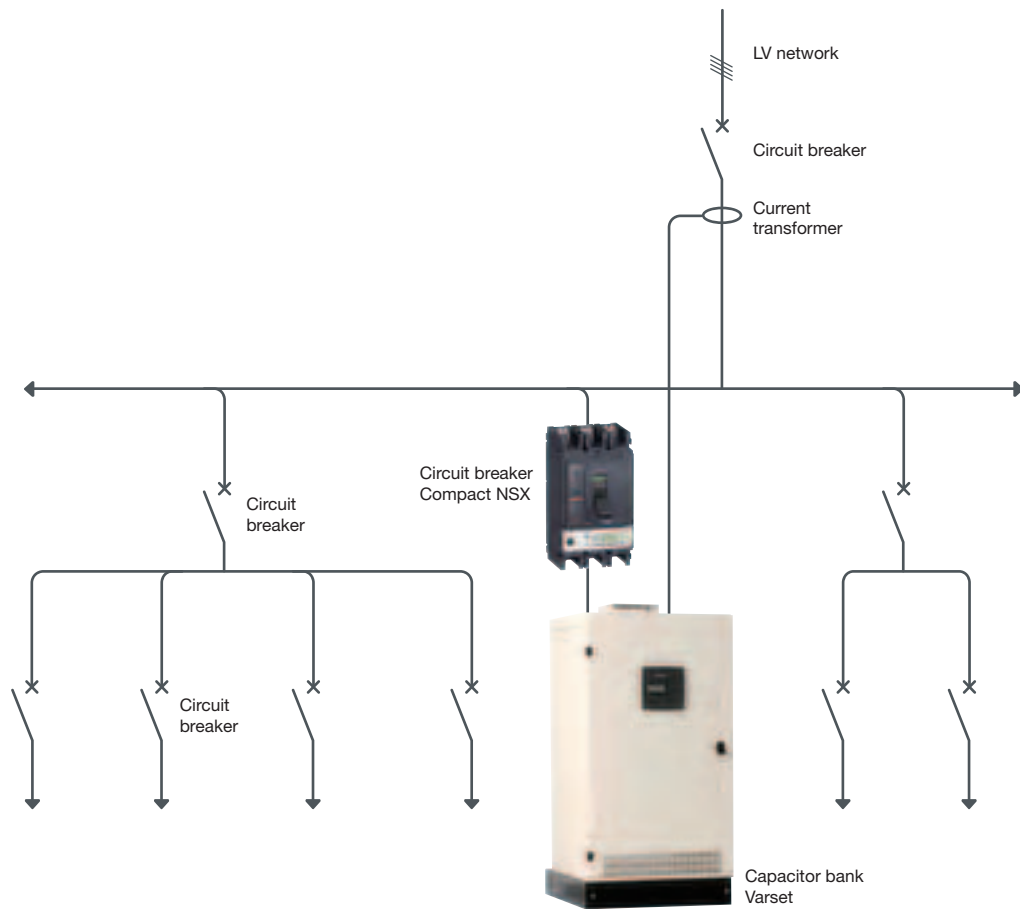
+ Lifespan of around 15 years

+ Optional harmonics filtering

+ **SISvar software** for easy equipment selection and configuration

+ **Communicating Modbus version** available for remote data transmission

Measure Reduce energy consumption ☒ Reduce energy costs



Varset

Network voltage: 230 V to 690 V - 50/60 Hz  
Reactive power: 7.5 kvar to 1200 kvar  
Harmony range: 2.7 (135 Hz), 3.8 (190 Hz), 4.3 (215 Hz)  
Standards: IEC 60439-1, IEC 61921, EN 60439-1  
Automatically regulated forced ventilation  
With or without incoming circuit breaker



Power factor correction via Varlogic controllers

Controls reactive power to obtain the target power factor. Provides installation data and analysis  
Monitors and provides data on compensation equipment status

Easy to use  
Easy to set up; self-configuration available  
Intuitive user interface  
Direct, real-time display of main measurement  
Optional communicating version available (Modbus)



Power distribution

Application: small to medium-sized buildings

Reduce power loss by filtering harmonics

“ I need to reduce the overall harmonics generated by my factory's variable speed drives and uninterruptible power supply. My budget is limited, and the solution has to be simple. ”

Solution

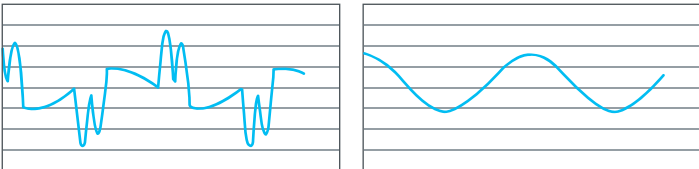
Install AccuSine PCS active filtering for your electrical installation

Variable speed drives and uninterruptible power supplies constitute non-linear loads. They use a fundamental sine wave (the same frequency as the network) and generate additional harmonic waves whose frequencies are multiples of the network's frequency.

The AccuSine PCS active filter constantly generates an equal yet opposite current to the harmonic currents generated by non-linear loads, leaving only the fundamental frequency on the network.

The AccuSine PCS is fed from a specific outgoing feeder. It detects and analyzes the current upline in real time from the non-linear loads and sends out a compensating current via its power line.

The following oscillograms illustrate the total current harmonic distortion (THDI) before and after the installation of the active filter.



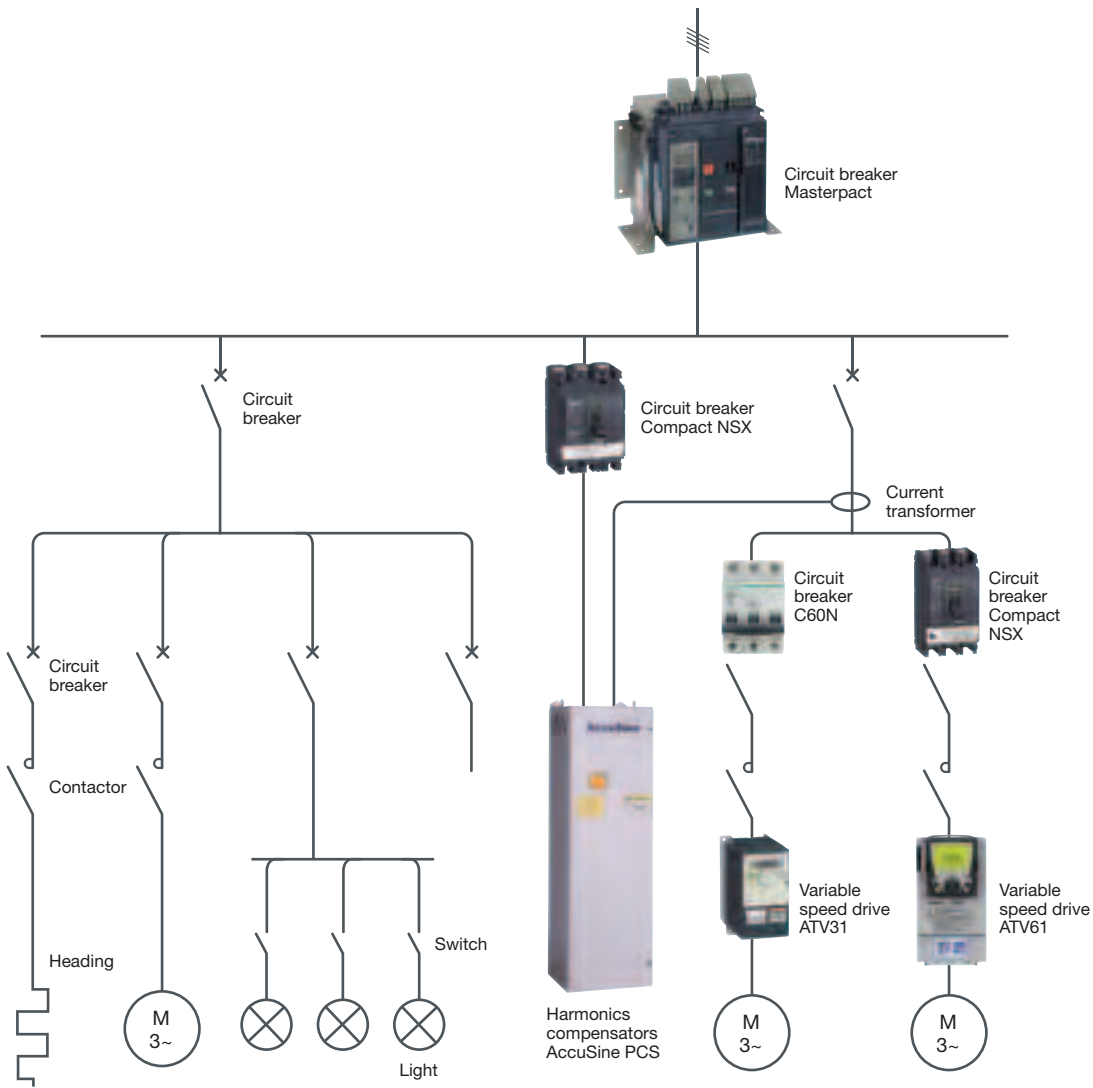
Benefits

For the user

- > Harmonic filtering reduces power loss in the upline circuit and equipment by 10%
- > Ensures harmonics of less than 5%
- > Reduces overloading and frees up additional useable capacity
- > Minimizes system losses and demand power
- > Lowers outage risk
- > Extends equipment lifetime
- > Reduces wire heating (especially neutral)

- For professionals
- + Easy to install
  - + Compensation automatically adjusted depending on load
  - + Easy upgrades and add-ons
  - + Optional power factor correction possible (recommended by utilities)

- ☐ Measure
- ☒ Reduce energy consumption
- ☐ Reduce energy costs



AccuSine PCS



- > A simple line up, including
  - 50A, 100A and 300A power ratings
  - Universal Voltage: 208V - 480V, 3 phase 3 wire
  - NEMA 1, NEMA 12, IP30, IP54 enclosure options
  - Worldwide offer: Meets UL, CSA, CE, ABS, C-Tick standards
- > Powerful performance
  - Meets all major worldwide harmonic standards; IEEE-519, G5/4 -1, GB/T 14549, IEC61000-3-2/-3-4
  - Ultra fast response to load changes within microseconds
  - Cancels all harmonics from 2nd to 50th order
- > Expandable capabilities
  - Parallel up to 10 units with different ratings on one set of current transformers
- 225% VAR current injection to meet instantaneous load requirements and provide voltage support



Power distribution

Application: all types of buildings

Design smart to reduce capital expenditures and operating costs

When it comes to having an energy-efficient electrical installation, the most important thing to me is to minimize power losses while keeping capital expenditures on target.

Use ID-Spec Large software to design the ideal electrical installation for your building and your budget

- ID-Spec Large software offers an array of design capabilities unique on the market:
- Assess the actual cost savings generated by energy-efficiency solutions like power factor correction and low loss transformers
- Reduce wiring lengths and diameters for lower materials and installation costs
- Lower capital expenditures by scaling equipment down to optimized use scenarios
- Calculate the percentage of recyclable wiring and busbar trunking materials
- Assess the cost of the electrical system over the entire building lifecycle

ID-Spec Large reports provide compelling data to back up the recommended solutions and can quickly and easily calculate the impact of alternative solutions.

Solution

Benefits

For the user



- > Reduce capital expenditures by 10% by scaling equipment down to optimized use scenarios
- > Lower energy consumption by 3% simply by optimizing your electrical equipment
- > Avoid utility penalties through more responsive power consumption



- > Reduce raw materials and installation costs by optimizing wiring lengths and cross section area



For professionals

- + Shorten the design cycle by up to 40%
- + Increase quality by using a single tool for the whole design process
- + Present hard data to back up your recommended solution
- + Enhance your image as an environmentally-conscious professional

- + Produce Bill of Equipment, reports, and specifications with a single tool



Examples

- > Food and beverage plant in Jakarta, Indonesia  
ID-Spec Large demonstrated the savings achieved by moving low voltage switchboards to alternative locations:  
35% reduction in power loss for savings of €200K over 15 years  
Amount of cabling reduced by half

Measure

Reduce energy consumption

Reduce energy costs

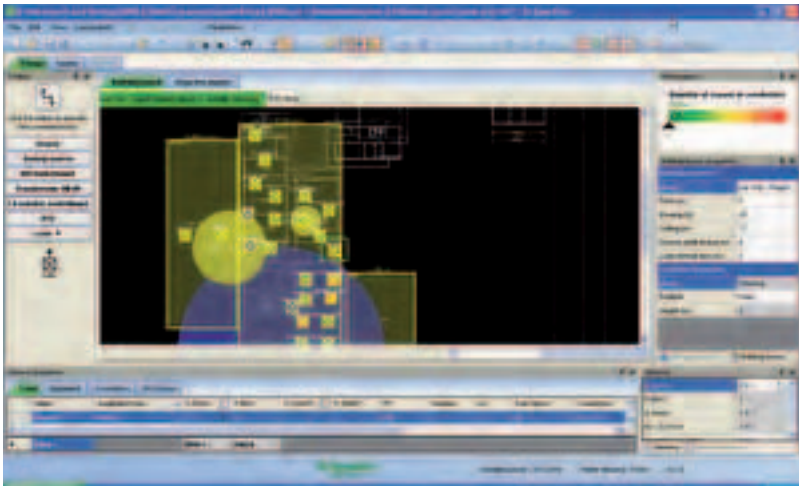


At the Solution stage

View energy dissipation cost, CO2 emissions and ROI of power factor correction

Sort components by energy consumption to identify the most efficient choices

At the Design stage, use the power barycenter tool to:  
find out the best equipment locations in the layout  
define the electrical architecture for your project



ID-Spec Large functions

- Power Summary
- Installation drawings (CAD layout and single line drawings)
- Automatic equipment selection and sizing

- Automatic electrical installation performance evaluation
- Automatic RFQ specifications
- Budgeting





Power distribution

Application: any building with a medium voltage network

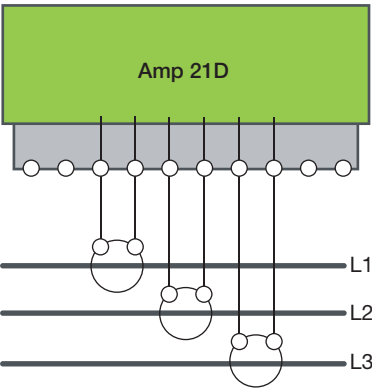
Start saving energy by monitoring your MV network locally

I am seeking a simple, cost-effective way to make sure my MV network is functioning properly so I can take actions to reduce energy consumption if necessary.

Solution

Use a digital ammeter to display information about your MV network

The solution is based on a cost-effective digital ammeter installed on the front plate of the switchboard. The ammeter provides a constant readout of the MV network's present and maximum current. Users can find out the current on the MV load breaker switches at a glance.



Benefits

For the user

> Easy-to-read information at MV level helps save energy by:

Allowing you to identify unnecessary loads and take immediate corrective measures

Telling you which lines are overloaded so that you can rebalance loads on MV and LV transformers

> This solution offers a number of benefits compared to traditional analog ammeter systems:

A single part number (digital ammeter with integrated sensors) for easy selection and ordering

Enhanced readout accuracy, especially for small currents

Cost effective

For professionals

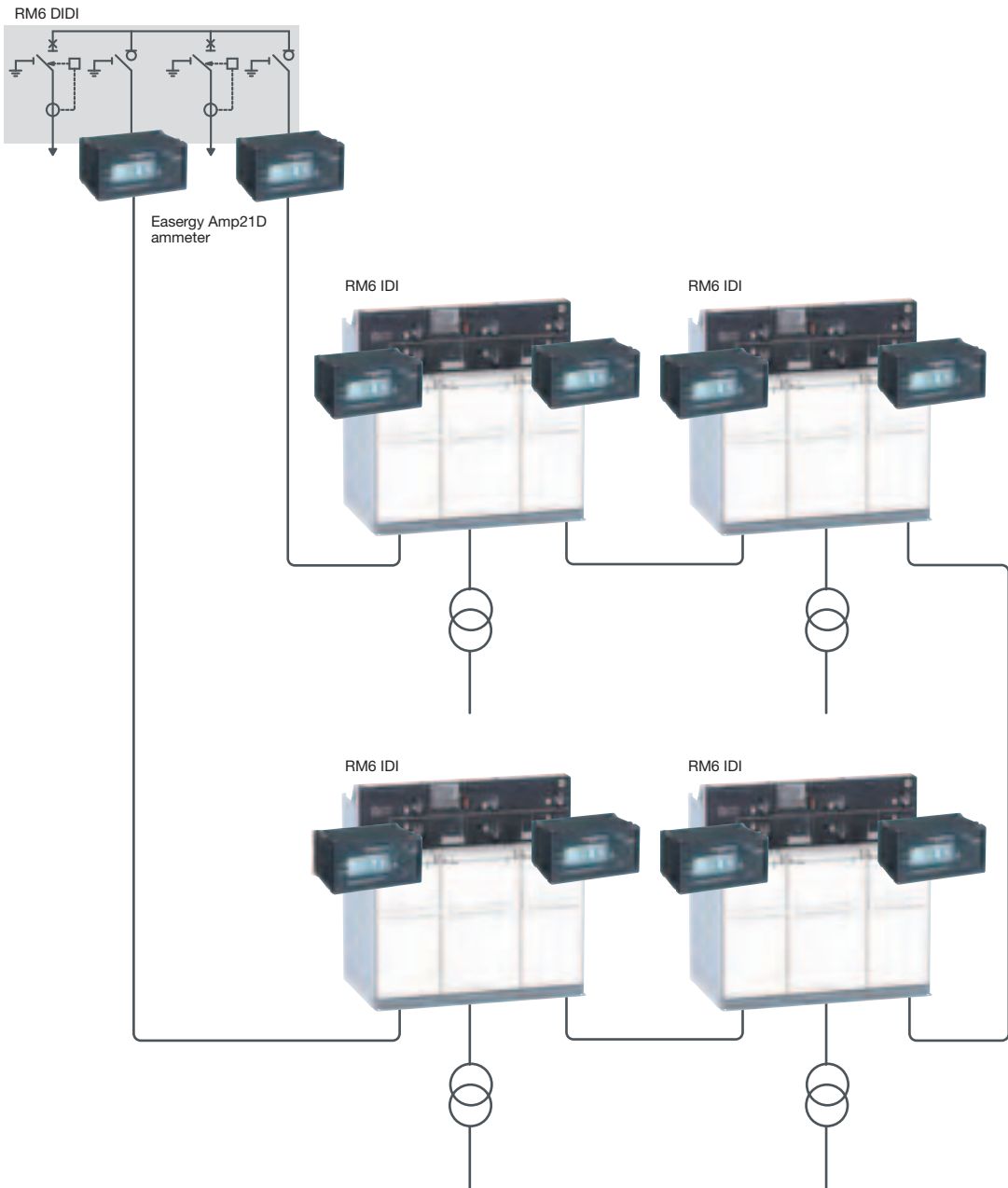
+ Easy, engineering-free design based on a single product (ammeter with integrated sensors)

+ No training needed

+ Easy to install:  
For the RM6:  
ammeter and sensors are factory mounted and tested; nothing to do on site  
For the SM6:  
ammeter is factory mounted and tested; sensors are installed around the MV cables on site and are designed for easy connection to the ammeter

+ Easy rollout:  
no on-site configuration needed

- Measure
- Reduce energy consumption
- Reduce energy costs



Amp21D ammeter

- 4-digit display
- Self-powered batteryless unit
- Measures current on the switchboard load break switch function





# Power distribution

Application: any building connected to a MV network

## Take advantage of discount MV utility rates without the risk of counterparty power cuts

“ To guarantee the lowest possible utility rates, I have agreed to go off the power grid during peak hours. Therefore, to avoid costly downtime, I need a back-up power supply that kicks in automatically after just a few seconds. ”

### Install an Automatic Transfer System (ATS) to switch the MV connection to a back-up generator

#### Save energy

Depending on your rate agreement, the utility sends out a signal just before the higher peak rate kicks in or power is cut off. The ATS receives this signal and:  
S tarts the generator  
T urns on the main switch once the generator is ready  
T urns off the generator switch

Power is restored in **less than 10 seconds**.

#### Increase power availability

ATS ensures power availability, performing the same functions if voltage loss is detected on the main electrical line, with power generally restored in **less than 15 seconds**.  
Th e fault passage indicator (FPI) ensures the ATS is locked if a fault current is detected to avoid cutting off power to a properly-functioning line.

Solution

Benefits

### For the user



> **Guarantee lowest possible utility rates**

Savings of **10%** are achievable in many countries in some countries, when demand is high and supply is short, the price per kWh can be multiplied by more than 10

> **Boost operating efficiency** with automatic monitoring and guaranteed power availability  
ATS comes with an optional communication module to transmit information to a remote control system

For professionals

+ **Factory-tested, preconfigured design**

ATS comes ready to install on an RM6 switchboard in a T200I box  
The T200I automation comes pre-programmed, eliminating sequence errors during set-up

+ **More efficient procurement:** easy-to-order based on existing part numbers

+ **Quick, easy installation**  
Plug-in connections only  
Kit included for mounting T200I on wall or RM6

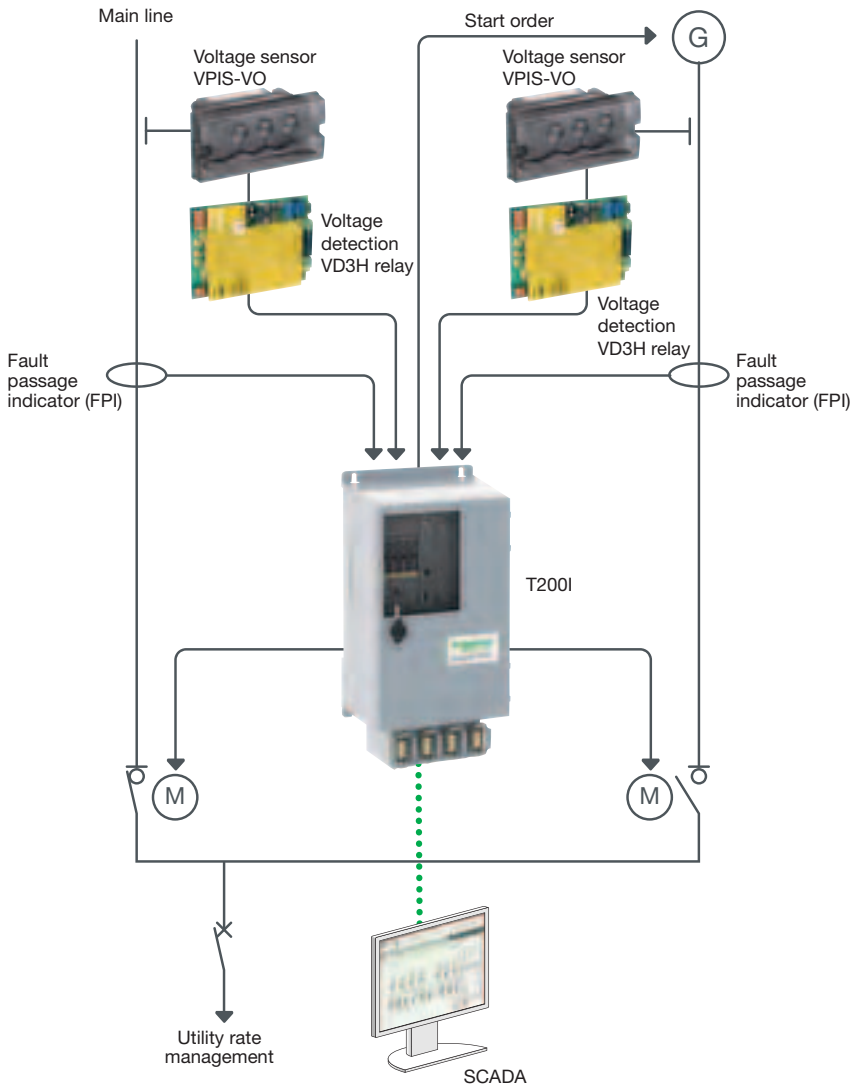
+ **Simple commissioning:** easy to configure service voltage, time delays, and ATS operating modes

+ **Maintenance free:** automatic testing and troubleshooting

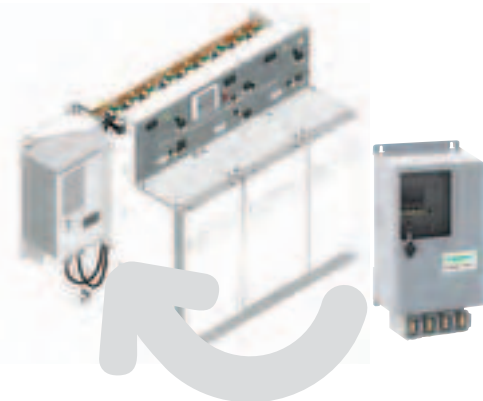
Examples

> **Users save 10% per year off standard rates by opting for the national utility's special peak rate in France, for example**

☐ Measure ☐ Reduce energy consumption ☒ Reduce energy costs



**RM6 ring main unit**  
24 kV  
includes sensors  
VPIS-VO VD3H relays  
and motorized switches



**T200I**  
Embedded electronics  
Includes ATS  
Specifically designed for the MV network: unlike other solutions on the market, the 10kV insulation for AC supply protects the T200 against over voltages coming from substations





Depending on your business and type of building, HVAC can account for over 40% of energy consumption. **You can reduce HVAC energy consumption and sustain optimal consumption levels** by improving the control and management of ventilation, temperatures, and system usage.

You can meet today's demand for energy efficiency, occupant comfort, and compliance with standards by implementing one or more of the following solutions:

- > Install variable speed drives on pumps and fans to adjust energy use to actual need.
- > Design control architectures that facilitate operation and interaction of heating, ventilation, air conditioning, and window blinds, zone by zone.
- > Choose equipment that improves energy quality by eliminating power surges and reducing harmonics.

Depending on whether you choose simple, stand-alone control devices, a comprehensive building management system, or a solution somewhere in between, **you can reduce the amount of energy your HVAC system uses by up to 30%.**



### Choose the solution that's right for you

- > Regulate kitchen exhaust hood speed according to temperature (p. 32)
- > Regulate cooling-tower water temperature and save energy (p. 34)
- > Regulate temperature by maintaining air pressure (p. 36)
- > Reduce your electrical consumption by controlling your HVAC system's motors (p. 38)



# HVAC control

Application: commercial kitchens

## Regulate kitchen exhaust hood speed according to temperature

“ My restaurants exhaust hood is always running at full speed, even when my cooking equipment isnt being used. Id like to find a way to reduce the amount of energy wasted and lower my utility bills. ”

### Solution

The solution consists in using variable speed drives (VSD) to adjust exhaust operation to the amount of activity in the kitchen.

Fan speed is controlled according to air temperature. A sensor inside the exhaust hood detects air temperature, and an Altivar 12 variable speed drive adjusts the exhaust fan motor speed.

The cooler the air, the slower the fan runs, down to a minimum ventilation level. The exhaust hood is automatically turned up or down to meet actual needs, resulting in substantial savings.

An optical smoke sensor can be added to boost the system s regulation capabilities. This configuration requires an additional control system.

### For the user

> **Energy savings of 20% to 50%, depending on use:** maximum exhaust hood operation is usually limited to just a few hours a day

> **Fast ROI,** usually within 18 to 24 months

> **Quieter operation**  
Lowering fan speed by 20% reduces noise by 20%  
Reducing speed by half virtually eliminates noise

> **Lower maintenance costs**

### For professionals



+ **Design**  
Simple and economical: the VSD picks up the signal directly from the temperature sensor  
Reduced maintenance: the VSD can be mounted right on the fan, eliminating maintenance-intensive gearboxes  
Easy design and upgrades

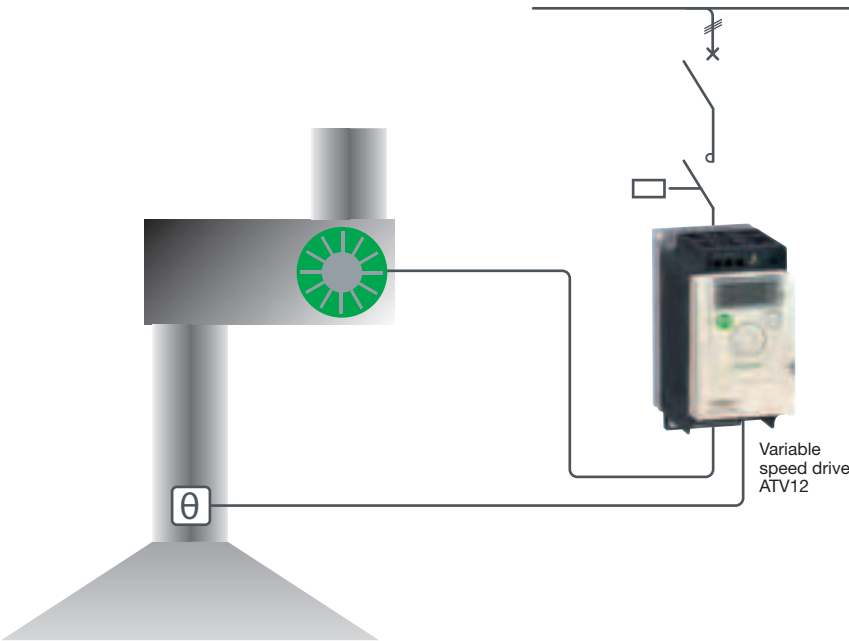
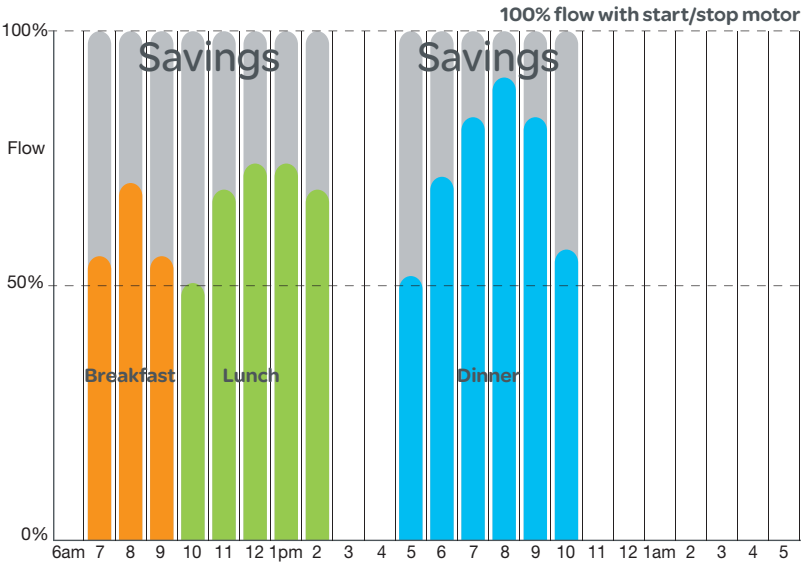
+ **Installation**  
Complies with international standards  
Integrated EMC filter  
Simple, beltless system  
Easy installation thanks to plug-and-play design



**Projects**  
> **United States:** VSDs were installed on 12 exhaust hoods at a university kitchen. A VSD controls the speed of each exhaust fan via smoke and temperature sensors. The system is expected to generate annual savings of 126,244 kWh.

☐ Measure ☒ Reduce energy consumption ☐ Reduce energy costs

Installing a VSD can reduce energy consumption (in grey below) by up to 40% compared to a traditional start/stop motor, reducing total consumption by about 25%.



### The Altivar 12

Variable speed drive for small machines and applications with three-phase 240 V asynchronous motor 0.18 to 0.75 kW, 120 V single-phase power supply 0.18 to 2.2 kW, 240 V single-phase power supply 0.18 to 4 kW, 240 V three-phase power supply

Can be configured in its packaging  
Quick start option requiring no adjustment  
Intuitive navigation  
Even more compact  
Category 1 EMC filter  
Local control on the front panel  
Modbus serial link

Resistant to harsh operating environments  
Integration of Standard (U/f),  
Performance (sensorless flux vector control, or SVC) and Pump/Fan (quadratic profile Kn) control profiles

High dynamic performance on acceleration as well as on braking  
Excellent speed regulation on machine load surges



HVAC control

Application: medium-sized to large buildings with cooling tower

Regulate cooling-tower water temperature and save energy

My cooling tower is a constant concern. Maintenance needs vary widely depending on the season, and the installation uses too much energy. I want a solution that will improve yield and reduce costs.

Solution

Use speed drives to regulate the tower s fan and pump

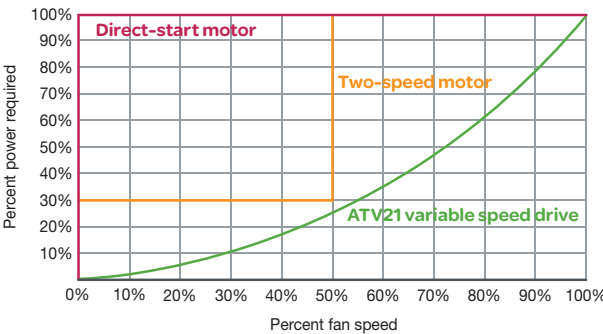
The best way to control air-water exchange in a cooling tower is to use variable speed drives to control the tower s fan and pump, eliminating additional maintenance-hungry mechanical systems while meeting the tower s needs. A PLC regulates fan airflow and pump volume via the variable speed drives.

This solution uses up to 50% less energy than direct-start fans and pumps and eases maintenance.

Over a given season, the fan and pump motors must operate at full speed just 2% to 5% of the time the rest of the time this energy is wasted. Direct-start motors require additional mechanical systems to solve problems like fan blade rotation due to wind, or additional resistance due to freezing.

This solution uses 20% less energy than two-speed motors and also improves maintenance.

While two-speed motors offer a partial solution to energy consumption issues, they do nothing to resolve maintenance issues.



Benefits

For the user

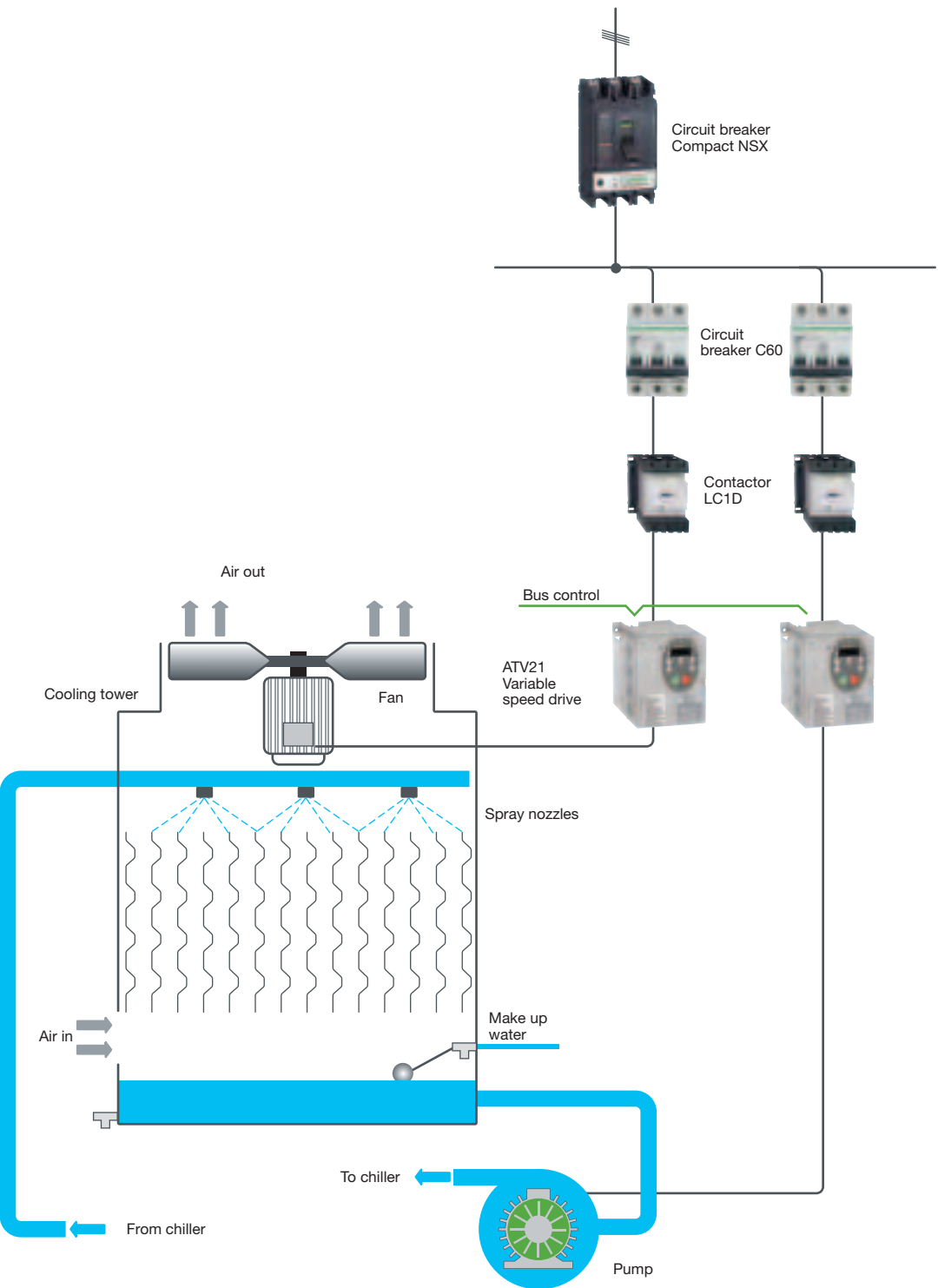


- > Reduce energy consumption
- > Improve yield by regulating water temperature
- > Lower maintenance requirements, especially in extreme weather
- > Quieter operation
- > Low harmonics: THDI < 30%
- > Eliminates inrush current due to motor start-up

For professionals

- + Simpler mechanics (no brakes, sensors, or rotation inverters)
- + Facilitates motor sizing (over-speed and standby modes available)
- + Enhanced process regulation
- + Extends lifetime of mechanical components
- + Facilitates maintenance planning

- Measure
- Reduce energy consumption
- Reduce energy costs



ATV21 speed drive



Range dedicated to building HVAC applications. All essential functions for variable torque pumps and fans applications: 3-phases 200/240 V, 380/480 V UL Type 1/IP20 and IP54 up to 75 kW

Speed range: 1:50 Overload : 110% - 60 s Integrated EMC filters class A or B Main communication bus used on the building market: LonWorks, Metasys N2, BACnet, and Apologe FLN.

Conformity to the international standards and certifications : CE, UL, CSA, C-Tick... Reduced-Capacitance technology: immediately operational and without harmful effect, harmonics treatment without added artifices: THDI < 30%



# HVAC Control

Application: all buildings

## Regulate temperature by maintaining air pressure

It is difficult to make heating and air conditioning systems more energy efficient without affecting occupant comfort. The fact that HVAC systems are often set up by floor further complicates the situation. I need a flexible solution that can adapt to fluctuating occupancy while using only the amount of energy that is actually needed.

### Use variable speed drives to regulate air pressure and temperature

Take a chilled-beam heating system, for example. The most energy-efficient solution for this type of heating system would be to add temperature regulation functions via a thermostat, plus pressure regulation in the beam and the room.

The thermostat (T) (see diagram opposite) controls air flow by adjusting the shutters on the intake vent (1). The pressure in the heated beam (2) and the room (3) are kept at constant levels by varying fan speed. The two ATV21 variable speed drives feature an integrated proportional regulation function that allows them to control the fans directly based on information from the pressure sensors (P).

The solution optimizes regulation regardless of fluctuating occupancy patterns. To fine tune energy consumption even further using presence detectors, automatic blind controllers, and timers, a building management system would be required. In this type of setup, the variable speed drives and sensors would be connected to the BMS via a communication bus.

Solution

## Benefits

### For professionals

- + Design**
  - Eliminates direct starts, so motor size can be decreased
  - Simplifies electrical architecture as all functions are integrated into the variable speed drive
  - Eliminates the need for additional anti-harmonics filters
  - Includes integrated communication bus

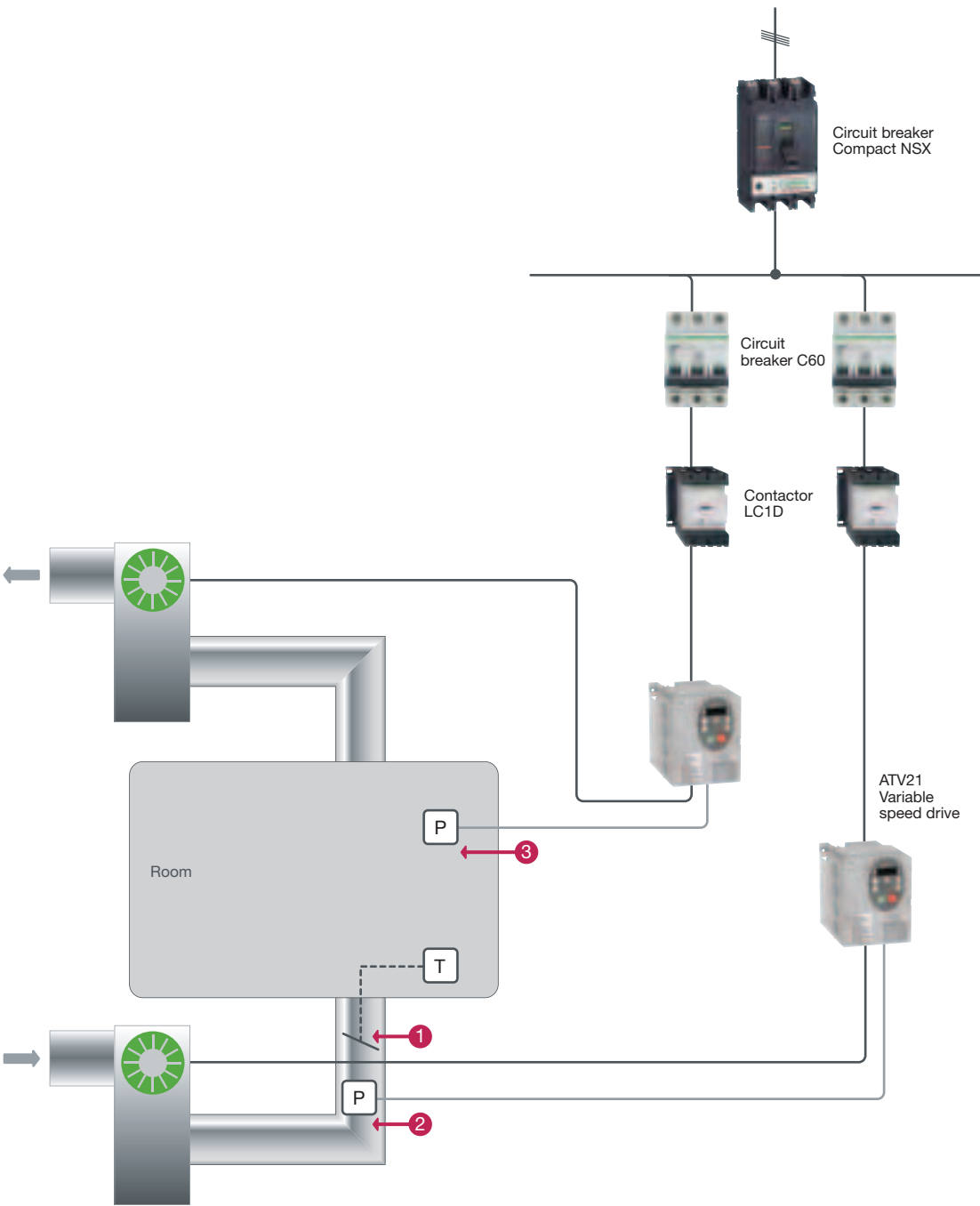
- + Installation**
  - Products are compact in size
  - Optional features can be added without increasing product size
  - Simple user interface

- + Maintenance**
  - Local or remote troubleshooting
  - Smoother starting increases the lifespan of mechanical components and reduces frequency of maintenance

### For the user

- > Save up to 20% off your energy costs** by using independent variable speed drives
- > Minimize maintenance and filter clogging**
- > Quieter operation**
- > Use up to 50% less energy** by integrating variable speed drives into your building management system (BMS)
- > Regulate temperature within a limited range**
- > Provide constant ventilation**
- > Add presence detectors and automation systems** to further optimize the system

- ☐ Measure
- ☒ Reduce energy consumption
- ☐ Reduce energy costs



The Altivar 21 variable speed drive is designed specifically for building systems

Low harmonics (THDI < 30%) thanks to C-less technology (with reduced DC bus capacitors)  
Optional versions with integrated EMC (electromagnetic compatibility) filters

Modbus standard on all models  
LonWorks, Metasys N2, Apogee FLN, and BACnet available as options



## HVAC control

**Application:** medium to large size buildings

# Reduce your electrical consumption by controlling your HVAC system's motors

“ I want to reduce the amount of electricity my HVAC system uses by installing the most relevant control devices. ”

## Install **TeSys U starter-controllers** to protect and control constant-load motors and **ATV variable speed drives** to control variable-load motors

Designed for constant loads, TeSys U intelligent starter-controllers offer control, protection, and measurement functions. When you install TeSys U units, you generate indirect savings by detecting abnormal operation and taking the appropriate corrective measures, and direct savings through lower consumption of the control and protection equipment. TeSys U electronics are designed to cut consumption four-fold as compared to traditional electro-mechanical solutions.

TeSys U offers protection while constantly measuring motor current so that the following information can be transmitted via the communication module (Modbus, CanOpen, Profibus, DeviceNet, Asl, or Advantys STB) or by direct display via the multifunction control unit:

- Operating faults, so that corrective measures can be taken quickly
- Overheating, to avoid breakdowns

Designed for variable loads, ATV variable speed drives ensure that consumption is scaled to match motor needs at all times. Variable speed drives generate significant direct savings over direct-start motors.

## Benefits

### For the user

> **Reduce electrical consumption by 20% for variable loads**

> **Reduce electrical consumption of the protection and control system by 75% for constant loads**

> **Save up to 20% space due to TeSys U compact unit size**

> **Lower the amount of heat generated by TeSys U motor start-up by up to 75%, reducing the need for cooling fans in the enclosure**

> **ROI in under two years**

## + For professionals

### + Design

Simple, innovative solution

TeSys U: fewer part numbers due to modular base with plug-and-play options for easy preparation, selection, and ordering

### + Installation

Easy upgrades: during installation, each motor can be adjusted to nominal speed; TeSys U can be easily customized without tools or wiring

Save time: with TeSys U there is no need for wiring between the contactor and the circuit breaker; it is easy to integrate into the HVAC system via RJ45 Modbus connectors

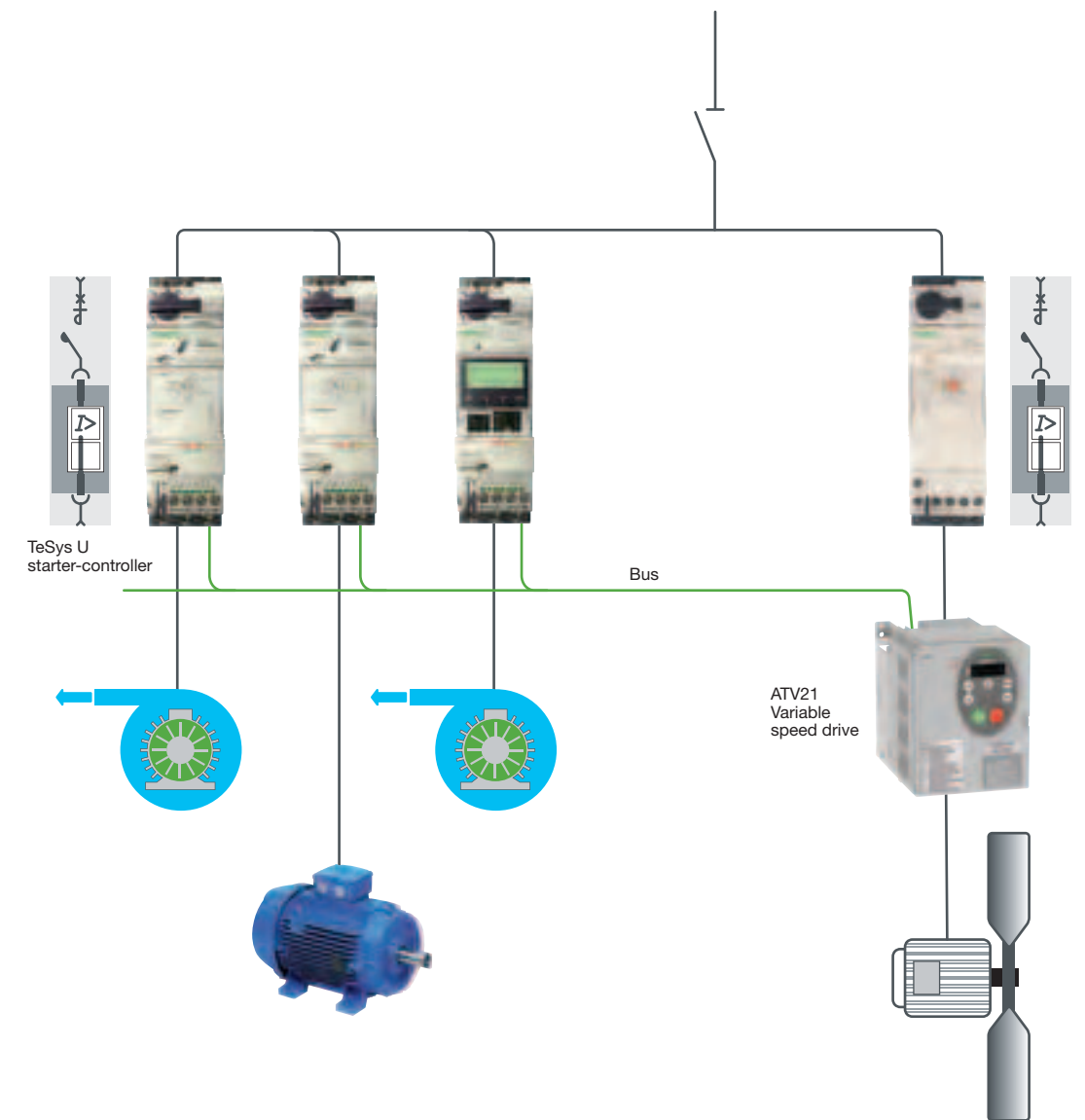
### + Maintenance

Plug-and-play makes changing the control unit faster and easier, minimizing downtime

Access motor settings (heat, overloads, breakdown log) at all times to better avoid breakdowns

TeSys U: highly modular design reduces spare parts stock tenfold

- ☒ Measure
- ☒ Reduce energy consumption
- ☐ Reduce energy costs



## TeSys U offers a capacity of up to 32A/15 kW, and consists of

- One 45 mm power base:
- Two ratings, reversing or non-reversing
- Circuit-breaker function
- Built-in interference suppression

One of a choice of three clip-on units:

- Standard CU for protection against overloads and short-circuits
- Expandable CU plus alarm and fault differentiation
- Multifunction CU for real-time control of motor load, local or remote troubleshooting, and settings

One of a choice of three automation control modules:

- Modbus, CanOpen, AS-Interface
- Profibus DP, Ethernet, DeviceNet, Fipio, Interbus S via Advantys STB
- Simple parallel link
- Two optional 45-mm power functions:
- Limiter-isolator
- Changeover relay







Lighting control is one of the easiest ways to save on energy costs.

The right lighting control solution slash your lighting costs by 50% compared to traditional systems.

Our lighting control solutions are flexible and designed to ensure occupant comfort. From small, local devices like timers and occupancy sensors to sophisticated customized solutions based on KNX standards, there is a solution to meet your building's needs and your budget.



Choose the solution that's right for you

- > Use KNX presence and daylight detectors for precision lighting control (p. 42)
- > Automate lighting control using KNX presence and daylight detectors (p. 44)
- > Achieve simple lighting control using natural light and building occupation (p. 46)
- > Save energy by controlling lighting scenarios for different areas of your building (p. 48)



## Lighting control

**Application:** all commercial buildings

# Use KNX presence and daylight detectors for precision lighting control

“ I want to cut energy use substantially in the main areas of my office building. I also want the flexibility to expand and reconfigure the system as needed, without having to rewire. ”

## Use **KNX open bus technology** to link presence detectors to switching and dimming actuators for flexible, expandable automatic lighting control

The solution entails using presence detectors to activate artificial lighting if and when natural light is below a preset level. Lights are automatically switched off when areas are unoccupied or when there is sufficient natural light. Push-button or remote controls can be used to set brightness levels (100, 300, or 500 lux, or always off, for instance) and predefined scenarios.

## Benefits

### For the user

> **Use up to 35% less energy** by tailoring consumption to occupation patterns (based on reference buildings stated in DIN V18599 resp. EN 15232)



> **Reduce installation labour and costs** (compared to a traditional system with the same capabilities)

> **Flexible** local or centralized switching and on/off indicators



### Project

> A Paris bank branch office (Caisse d'Épargne Réaumur) took advantage of a renovation to equip three 1,500 square meter floors with the system

## For professionals

### + Increased flexibility

Easy to reconfigure and expand  
Settings can be adjusted at any time and the system expanded without costly demolition or rewiring

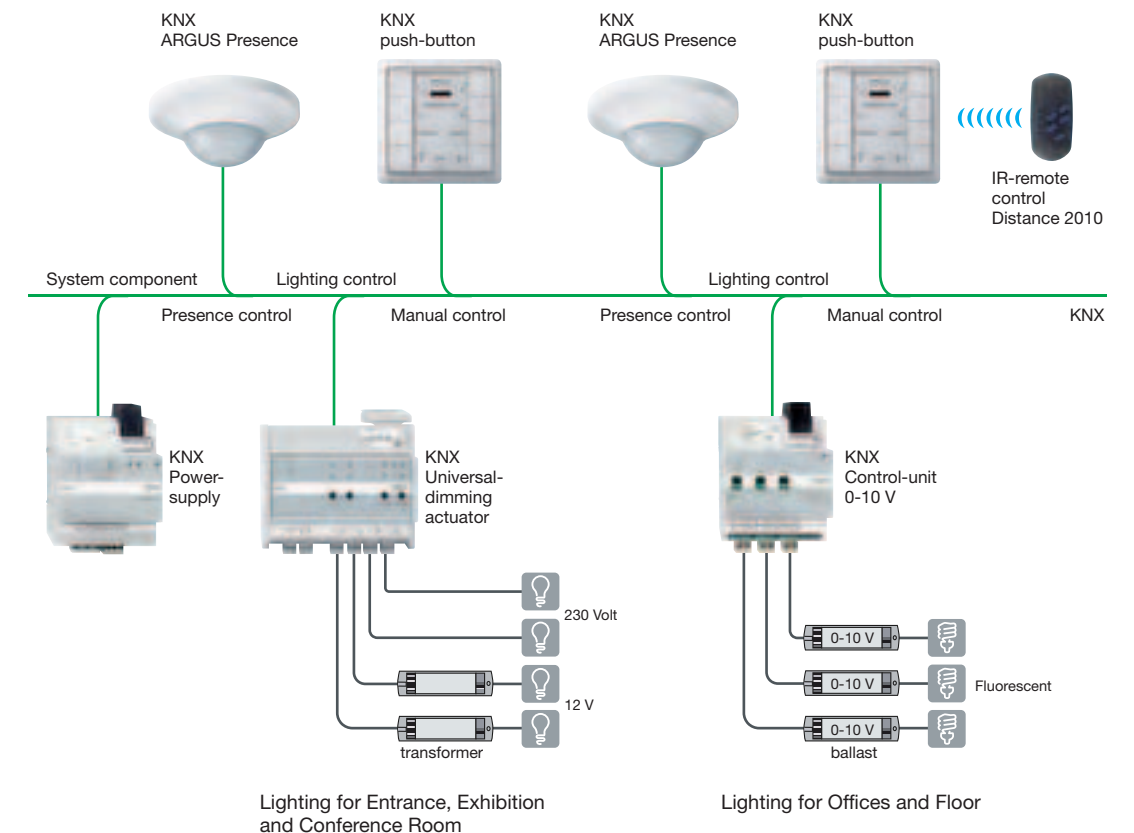
All devices are connected to a common bus line

### + New business opportunities

KNX solutions are implemented by skilled electricians or integrators

They offer a broad range of user-friendly and cost-effective functions

☐ Measure ☒ **Reduce energy consumption** ☐ Reduce energy costs



### Complies with standards

KNX ISO IEC 14543  
EN50090 standard

**System programmable via a simple PC using ETS software**



### KNX ARGUS

> **Presence detector**  
Angle of detection: 360°  
Range: a radius of max. 7 m (at a mounting height of 2.50 m)  
Number of levels: 6

Number of zones: 136 with 544 switching segments  
Number of movement sensors: 4, separately adjustable

### > Light sensor

Internal light sensor infinitely adjustable from approx. 10 to 2000 Lux (ETS)  
External light sensor via KNX



**KNX Universal dimming actuator**  
AC 230 V, 50-60 Hz: for switching and/or dimming incandescent lamps or LV halogen lamps using dimmable wound transformers or electronic transformers



# Lighting control

Application: all buildings

## Automate lighting control using KNX presence and daylight detectors

“ I want to save energy by automating my schools classroom lighting. The system also needs to be flexible and easy to expand and upgrade. ”

### Control room lighting automatically according to occupation and natural light

The solution is built around presence detectors linked to switching actuators, and features a push-button control for use in manual mode. The entire system is connected via KNX open bus to facilitate extensions and upgrades.

Thanks to the presence detectors, lights are automatically switched on when a person enters the room if natural light is below a preset level. Lights are automatically switched off when no movement is detected in the room and the preset time delay has passed.

In manual mode, lights can be switched permanently on or off. Switching the system on in manual mode restarts automatic presence and natural light detection mode.

Solution

## Benefits

### For the user

> Use up to **20% less energy** by aligning lighting use with room occupation (based on DIN V18599 or EN 15232 reference buildings)



> **Reduce installation costs** and time compared to conventional systems with similar functions

> **Enhance occupant comfort**

### + For professionals

+ **Flexible for easy upgrades and extensions**

All functions may be set and extended at any time without costly building work

All devices are connected to a common bus line

+ **A source of new business opportunities**

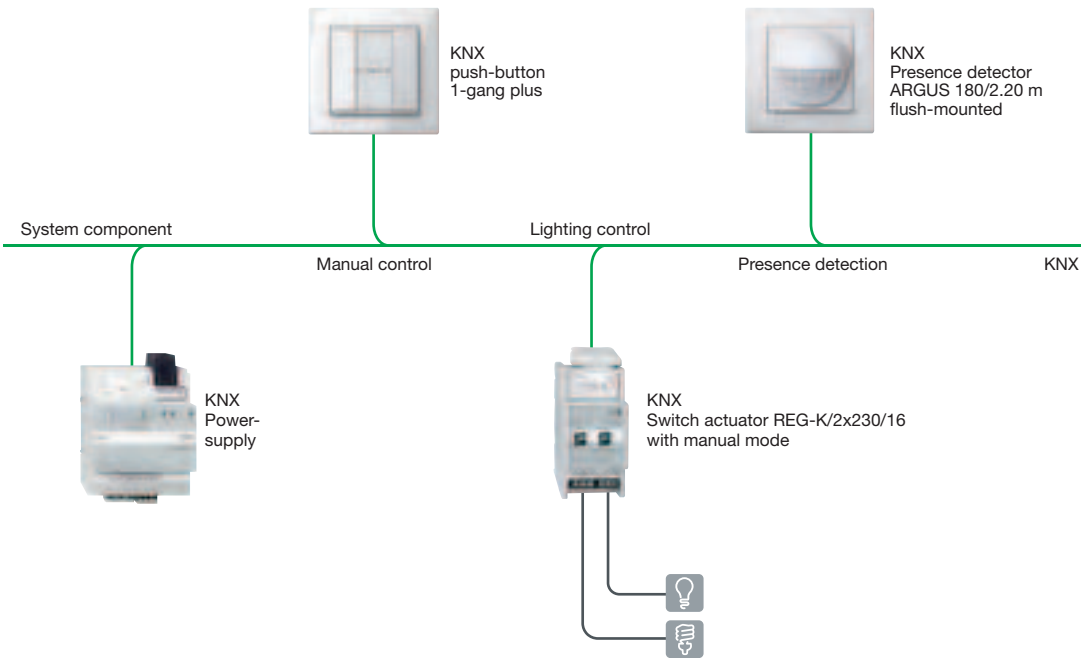
KNX solutions must be installed by skilled electricians or integrators and offer many user-friendly and cost-efficient functions

+ **Lower, more predictable maintenance costs**

Automated switching cuts down on lighting use, extending the lifetime of light fixtures

Replacement scheduling is facilitated because the number of hours of use is known in advance when optional switch actuators with current detection are used

☐ Measure ☒ Reduce energy consumption ☐ Reduce energy costs



### KNX ARGUS 180/2.20 m flush-mounted presence detector



Angle of detection: 180°  
Range: 8 m right/left, 12 m to the front  
Mounting height: 2.2 m or 1.1 m with half the range

Number of levels: 6  
Number of zones: 46  
Number of movement sensors: 2, sector-oriented, adjustable  
Sensitivity: infinitely adjustable (ETS or potentiometer)  
Light sensor: infinitely adjustable from approx. 10 Lux to 2000 Lux (ETS or potentiometer)  
Time: adjustable in steps from 1 s to 8 min (potentiometer) or adjustable from 1 s to 255 hours (ETS)

**KNX switch actuator**  
Capable of switching two loads independently  
Integrated bus coupler and screw terminals  
For installation on EN 50022 DIN rails  
230 V switch output can be operated with a manual switch  
Time delay for each switch output  
Nominal voltage: AC 230 V, 50-60 Hz  
For each switching contact:  
- Nominal current: 16 A, cosφ = 0.6  
- Incandescent lamps: 230 V AC, max. 3600 W  
- Halogen lamps: 230 V AC, max. 2500 W



- Fluorescent lamps: 230 V AC, max. 2500 VA  
- Capacitive load: 230 V AC, 16 A, max. 200 µF  
Device width: 2.5 modules = 45 mm  
Contents: bus connecting terminal and cable cover



## Lighting control

**Application:** any building without a Building Management System and with good natural light

# Achieve simple lighting control using natural light and building occupation

“ I want to reduce the amount of energy used by my buildings lighting by taking advantage of natural light in corridors and areas with large windows. Most importantly, I want to keep lights from being left on all weekend! ”

## Solution

A controller is programmed with each area's occupation patterns. A light sensor allows the lights to be switched on, via the controller, when natural light levels are too low. The system is flexible enough to allow occupants to override the restriction, switching lights on for short periods of time as needed.

Each area is outfitted with the usual light fixtures and push-button on/off switches, and is powered by an electrical circuit controlled by an impulse relay that receives commands from a controller. The controller also includes digital inputs from one or more twilight switches that constantly measure natural light levels.

Depending on the configuration, the controller can either automatically switch lights on in a given area, depending on time of day, or periodically send lights-off commands when natural light is high, or when the programmed occupation time is over. Flexible programming ensures an optimal balance between energy savings and user comfort.

### For the user

> **Save 10% off** lighting costs, one of the top three sources of electrical consumption

> **Easy-to-control,** independent system does not affect other building systems

## Benefits

### For professionals

**+ Design**  
Fully-configurable for a variety of building occupation situations

**+ Installation**  
Offer the added value of automation  
Impulse relays work with standard wiring

**+ Maintenance**  
Easy-to-maintain traditional architecture

### How it works

Corridor lighting is switched on when employees begin to arrive at 7.30 am.

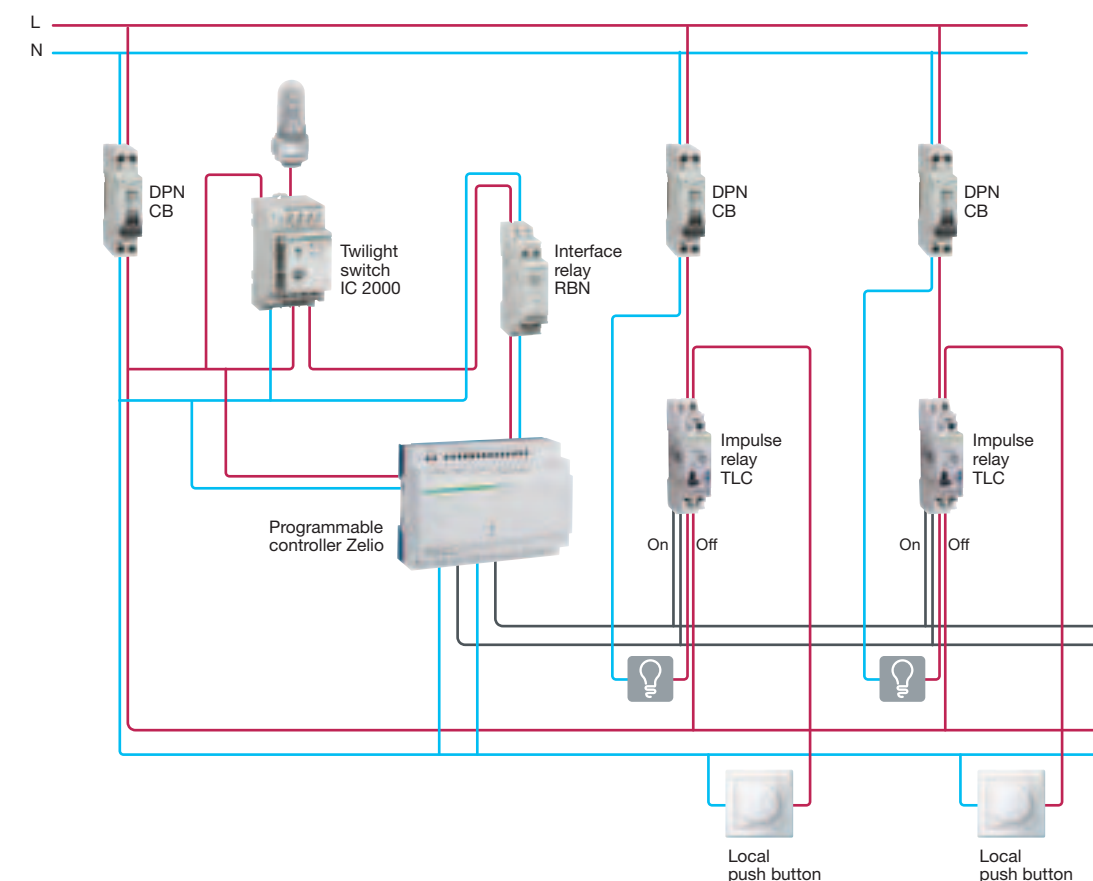
There is enough natural light for people to use the area comfortably, so the lights remain switched off until 5.41 pm, when the natural light is no longer sufficient.

In the meantime, Mr Smith switches on the lights in his office when he arrives. A short time later, at 8.50 am, the lights are switched off automatically due to good natural light. Mr Smith switches them on again to perform a task at his desk, and the lights remain on for 15 minutes.

From 4.55 pm on, when natural light is lower, Mr Smith can again leave the lights on as long as he wants.

At 7 pm, the automatic shut-off kicks in again.

☐ Measure ☒ Reduce energy consumption ☐ Reduce energy costs



**Zelio Logic smart relay** is designed for use in small automated systems

The number of inputs/ outputs can be:  
- 12 or 20 I/O, supplied with a 24 V or c 12 V,  
- 10, 12 or 20 I/O, supplied with a 100 to 240 V or c 24 V with clock Programming language

To improve performance and flexibility, Zelio Logic modular smart relays can be fitted with communication modules



and I/O extension modules to obtain a maximum of 40 I/O  
Programming can be performed:  
independently, using the buttons on the Zelio Logic smart relay (ladder language), on a PC using Z elio Soft 2 s software

**RBN Interface: between low voltage and extra low voltage**

Enhanced isolation between circuits (4KV)  
Mini 5mA 5V CA/CC to maxi 2A 250V CA  
Standard IEC 255-100, IEC 529

**IC 2000 Twilight switch**

Adjustable from 2 lux to 2000 lux  
Supplied with wall-mounted IP54 light sensor cell

**TLC impulse relay with centralized control**



# Lighting control

**Application:** all commercial buildings

## Save energy by controlling lighting scenarios for different areas of your building

“ I want an easy way to manage different lighting scenarios in different areas of my building and save energy. ”

### Solution

#### Implement remote or manual controls to automatically manage different lighting scenarios

This solution uses KNX network technology to link push-button controls with switching and dimming actuators. Different lighting scenarios configured according to occupancy and use can be activated via KNX push-button controls. Individual KNX actuators may be used to switch or dim lights manually at any time. A remote control provides added practicality.

## Benefits

### For the user

> Use up to **10% less energy** than with a traditional installation for a similar-sized room

> **Improve occupant comfort and room ambiance**

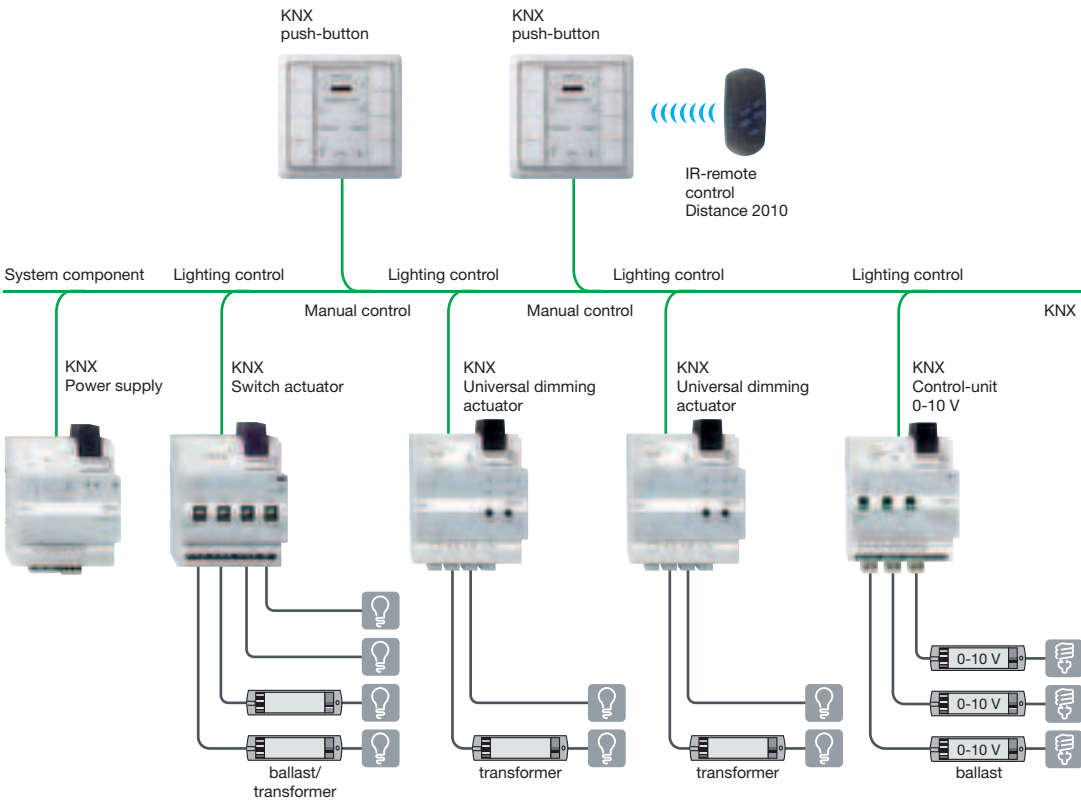
> **Control by lighting groups eliminates unnecessary use**

### For professionals

+ **Maximum flexibility**, making adjustments to layout much easier than with traditional systems

+ **Requires working with a skilled electrician or planner/integrator** to get maximum user-friendliness and cost-effectiveness

☐ Measure ☒ **Reduce energy consumption** ☐ Reduce energy costs



#### 4-gang plus push-button control with IR receiver



Push-button control with 8 operating buttons, operating and status display, and labelling field. The operating display can also be used as an orientation light. All functions can be controlled via IR remote control. The push-button is pre-programmed for operation with a

Schneider Electric IR remote control. Many other IR remote controls (e.g. existing TV or CD player remote controls) can be programmed to work with the unit.

**KNX software functions:** switching, toggling, dimming (single/dual-surface), blind (single/dual-surface), pulse edge trigger 1-, 2-, 4- or 8-bit telegrams (distinction between short and long operation), pulse edge with 2- byte telegrams (distinction between short and long operation), 8-bit linear regulator, scene retrieval, scene saving, disable functions.

**KNX switch actuator**  
For independent switching of four loads. With integrated bus coupler and two screw terminals. For installation on EN 50022 DIN rails. The 230 V switch output can be operated with a manual switch.

Nominal voltage: AC 230 V, 50-60 Hz  
For each switching contact:  
- Nominal current: 16 A,  $\cos\phi = 0.6$   
- Incandescent lamps: 230 V AC, max. 3600 W  
- Halogen lamps: 230 V AC, max. 2500 W  
- Fluorescent lamps: 230 V AC, max. 2500 VA

- Capacitive load: 230 V AC, 16 A, max. 200  $\mu\text{F}$   
Device width: 4 modules = approx. 72 mm  
Contents: with bus connecting terminal and cable cover







Measuring energy consumption is one of the keys to understanding how your building works so you can better exploit potential opportunities for savings.

This section presents two types of simple solutions:

- > Measuring electrical consumption directly on your installation s different devices
- > Measuring and transmitting consumption data to a PC or Web server for analysis

Both types of solutions can be implemented without an automated data management and analysis system.



### Choose the solution that s right for you

- > Meet essential energy measurement needs with a simple metering solution (p. 52)
- > Get essential electrical information for each area of your building (p. 54)
- > View and monitor the energy used by your lighting installation (p. 56)
- > Analyze your energy consumption online without a BMS (p. 58)
- > Manage WAGES in your small to medium-sized building (p. 60)
- > Manage WAGES in non-critical large industrial buildings (p. 62)
- > Manage and sub-bill WAGES in large commercial buildings (p. 64)
- > Analyze energy data to optimize operation of your industrial buildings (p. 66)



# Energy monitoring

**Application:** small commercial and industrial buildings

## Meet essential energy measurement needs with a simple metering solution

“ I need a basic energy measurement system that allows me to identify areas where corrective actions could help decrease my buildings energy usage. ”

### Install digital kilowatt-hour meters on selected loads

The solution is based on simple digital kilowatt-hour meters to track energy consumption. Users simply read consumption information directly from the meters displays to identify the leading sources of overconsumption for each area of the building.

These cost-effective pulse meters are designed for sub-metering of active energy consumed by a single phase or three-phase electric circuit with or without distributed neutral. Direct measurement up to 40/63 A is possible. Above 63A, a current transformer must be used. The meters can be connected to a PC or PLC for analysis and reporting.

Solution

## Benefits

### For the user

> Metering can **reduce energy consumption by up to 10%** by raising users awareness of consumption habits

> **Easiest way to start tracking consumption**

> **Can be used for sub-billing and cost allocation**

### For professionals

+ **Easy to install**, even in existing buildings

+ **Easy to wire**: no current transformer to install

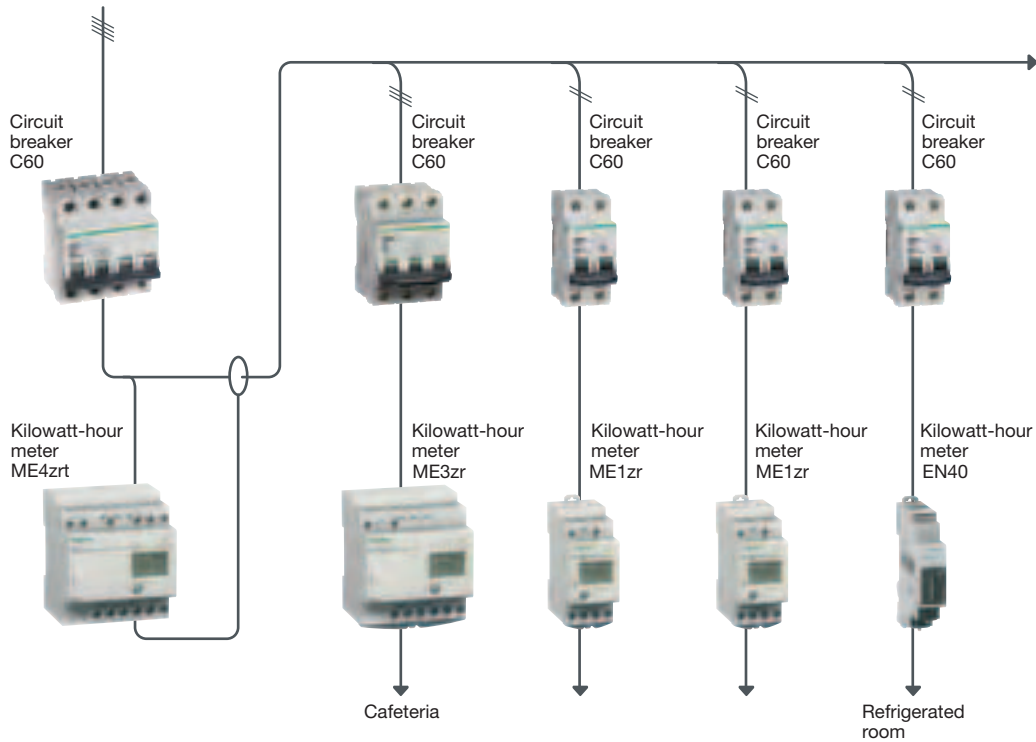
+ **Small size for easy installation on compact switchboards**

+ **Remote measurement possible**

+ **The bottom-bottom connection of current inputs facilitates connection to circuit breakers**

+ **A pulse output can be used to manage a set of meters remotely**

- ☒ Measure
- ☒ Reduce energy consumption
- ☐ Reduce energy costs



### ME range

> **ME watt-hour meters** are designed for single-phase or three-phase circuits, with or without a distributed neutral  
Direct measurement up to 40/63A, up to 6000A with current transformer  
DIN rail mounting  
5 to 7 digit display

Possible remote transfer by NO contact  
Complies with:  
IEC 62053-21 and  
IEC 61557-12 standards



### EN range

> **EN40 / ENcllic kilowatt-hour meters** measure the active energy consumed by a single-phase circuit  
> Complies with  
IEC 61557-12,  
IEC 62053-21(class 1)



# Energy monitoring

**Application:** small to medium-sized buildings

## Get essential electrical information for each area of your building

“ As facility management contractor, I need a system that can gather, track, and clearly display electrical information for different areas of my building. ”

### Solution

#### Install meters to send information to a PC equipped with **PowerView consumption-tracking software**

PowerView software is one of the easiest ways to improve a building's energy efficiency. It is also the perfect foundation for upgrading to more sophisticated systems later on.

The easy-to-use interface displays measurements and the associated curves in real time. Both PM9c and more advanced PM710 meters use a RS485 Modbus protocol. An EGX100 gateway converts Modbus into Ethernet TCP IP protocol.



## Benefits

### For the user

> **Savings of up to 10%** with ROI within the first year

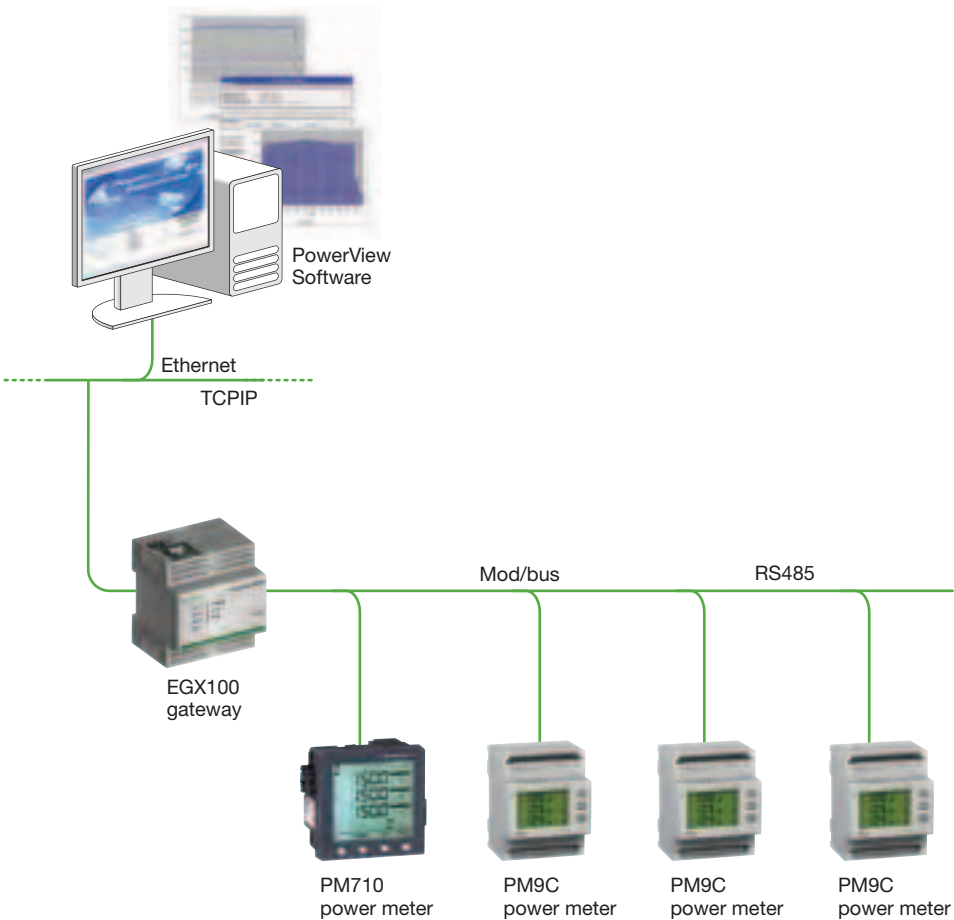


> **Individual metering** raises occupants awareness of consumption  
Power is switched off immediately to unoccupied areas to keep consumption on track  
Power factor is adjusted to ensure optimal efficiency and reduce power-factor-related penalties

### + For professionals

- + Installation**
  - Available as a power-meters-plus-software bundle
  - PowerView software is easy to use
  - PM9c, PM710 and EGX100 meters suitable for LV switchboard installation
  - DIN-rail-mounted PM9c and EGX100 suitable for renovation projects
  - PM710 meters same size as old analog ammeters or voltmeters for door mounting
  - Factory-calibrated PM9c meters leave just a few settings to be selected on site
- + Maintenance**
  - Automatic identification of any new Schneider Electric meter installed, for fast and easy upgrades

- ☒ Measure
- ☒ Reduce energy consumption
- ☐ Reduce energy costs



**PowerView software**  
Allows up to 32 meters  
Delivers data in spreadsheet format at pre-determined intervals

**PM9c and PM710 meters**  
Integrated displays with local information useful for maintenance  
PM9c meters measure: real-time and maximum current, voltage, real power, apparent power, real energy, neutral current, reactive energy, and demand readings  
Auxiliary power is 220V AC



PM710 meters take the same measurements as the PM9c plus demand reactive power, demand current, apparent energy, voltage and current harmonics  
Unlike most other meters on the market, the PM9c and PM710 meet EN61557-12 cost-allocation standards



# Energy monitoring

Application: small retail buildings

# View and monitor the energy used by your lighting installation

“ I want to get an overview of the different loads in my retail space so that I can identify areas for potential savings. ”

Solution

Install a **KNX system** to meter and monitor the different loads in your building

The solution is based on EN40p electric meters at the electrical distribution level. For each kWh used, a given number of pulses are sent from the meter to the KNX binary input. Consumption data is then transferred to the 10" IP touch panel, where it can be viewed and processed. The touch panel can also be used to view and control current building states and functions.

# Benefits

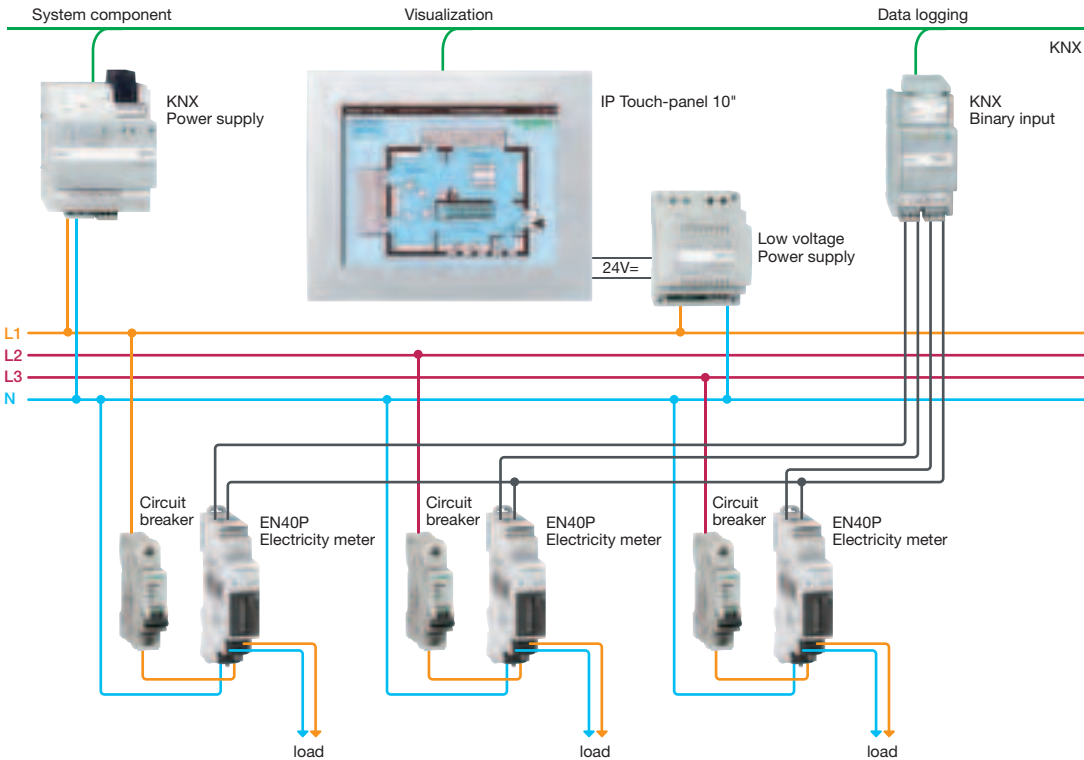
## For the user

- > **Reduce energy consumption by up to 10% and more:** monitoring energy use enables you to identify waste and encourage more energy-efficient behaviour
- > **Increase safety** by automating alarms and emergency calls
- > **Enjoy the convenience** of remote monitoring and control
- > **Lower installation costs** than traditional systems with similar functions

## For professionals

- + **Flexible, for easy add-ons and modifications:** all equipment is connected via a common bus line allowing you to reconfigure or expand the installation without costly building work
- + **New opportunities for your business:** KNX solutions must be implemented by skilled electricians or integrators and offer an array of user-friendly, cost-effective functions

- Measure
- Reduce energy consumption
- Reduce energy costs



**The 10 KNX interactive touch panel** is used to display and control building states and functions. It comes pre-installed with Windows CE for fast, easy data management, web, client/server, and network configuration.

KNX software configuration via TP VISU  
Display size: 10.4 (24.4 cm)  
Resolution: 800 x 600 pixels, SVGA  
Display type: TFT, resistive touch  
Colours shown: > 65,000  
Mains voltage: DC 24 V  
Power consumption: < 20 W  
RAM: 128 MB

**EN40p kilowatt-hour meters**  
Single-phase kilowatt-hour meter with remote transfer of metering impulses (static output)  
Compliance with standard IEC 61557-12, IEC 62053-21(class 1), EN50470-3  
Provides direct measurement up to 40A without CT's, an auxiliary power supply for even greater savings in term of wiring





# Energy monitoring

Application: any existing commercial building

## Analyze your energy consumption online without a BMS\*

\*Building Management System

“ I want to get an accurate view of when lights and other equipment are in use in my building, but I don't want to invest in a Building Management System. ”

### Open an EnergyView Online account for one-stop web-based access to your building's energy information

EnergyView Online (EVO) is a web-hosted remote energy monitoring service that eliminates the need to install servers or software on site. The service can either be linked to existing meters or new PowerLogic meters via an Internet gateway.

Schneider Electric can provide end-to-end services including installing and configuring meters and communication devices.

Once the necessary hardware is installed and configured, data is directly and automatically sent by email to EVO's secure servers.

Simply log in to your personal EVO account for 24-7 access to at-a-glance information on your building's energy use:

- Energy load profile
- Normalization
- Rate calculations and comparisons
- Reports

Solution

## Benefits

### For the user

> **Save 2% to 4% off your utility bills** by adapting building operations to actual use patterns



> **Reduce building operating costs by 2% to 5%** by optimizing equipment use and avoiding unnecessary investments

> **Analyse costs and manage operations** in real time without waiting for your utility bill

> **Remote system maintenance**

> **Annual service contracts and priority support**

> **Expert analysis and solutions** for power quality and energy management

### For professionals

+ No need to install additional servers or software

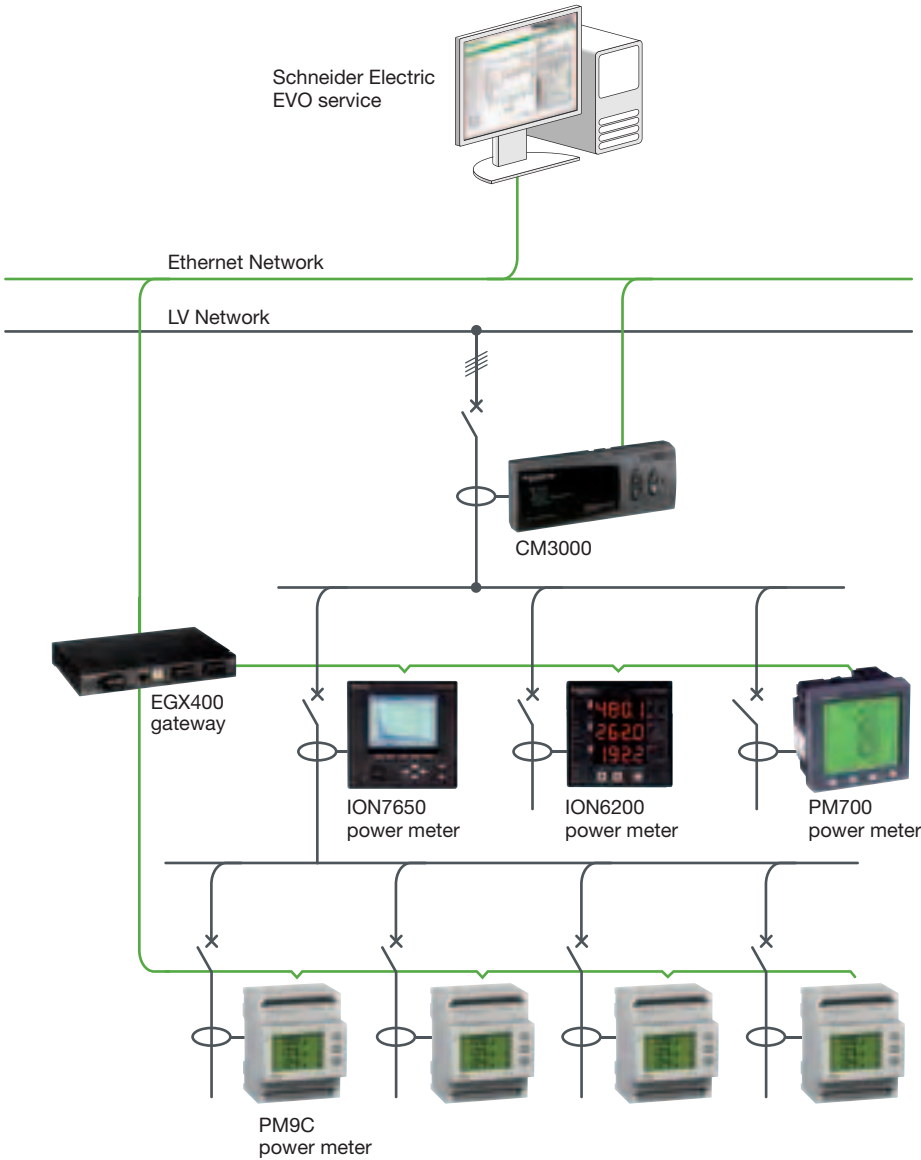
+ Use existing meters or incorporate new PowerLogic meters

+ Suitable for existing buildings

+ Easy to install and use; on-site start-up and training available

+ Custom solutions to meet your specifications

- ☒ Measure
- ☒ Reduce energy consumption
- ☐ Reduce energy costs



### EnergyView Online includes

Secure access to data from any computer via a web browser

Pre-configured energy analysis reports in both graph and table formats:

- Load profiles
- Usage history
- Interval data

Normalization of energy information to compare similar facilities or the same facility for different time periods by:

- Square footage
- Units of production
- Weather

Estimated energy bills using a revenue-accurate rate engine

Automated reporting and scheduled daily, weekly, or monthly energy report emails



# Energy monitoring

**Application:** small to medium-sized commercial buildings  
(1,000 to 5,000 square meters)

# Manage WAGES\* in your small to medium-sized building

\*Water, Air, Gas, Electricity, Steam

“ I need to be able to identify abnormal or atypical consumption easily and at regular intervals so that I can control the overall flow of energy throughout the building. ”

## Gather metering data via an iRio RTU, track consumption and detect problems

The hub of the system is an iRio RTU (Remote Terminal Unit), which picks up metering data from power meters (pulsing contacts or Modbus Serial Line communication) and flow meters (pulsing contact, Modbus Serial Line communication, or M-Bus open metering communication). The terminal then generates the necessary databases, dashboards, curves, and reports. It also transmits data.

The solution detects problems like flow leakages, overrides, and equipment left on, and then provides preconfigured indicators and curves at set intervals or on demand via a standard web browser as well as a downloadable metering database for in-depth analysis.

Additional functions are also available, including an alarm generator for maximum energy consumption overruns, power faults, and abnormal consumption cycles and a load controller for load shedding, automatic shut down, and override limitation.

Energy metering can be provided by a number of meter options depending on budget and performance requirements:  
Comp act NSX built-in power meter  
P M9C/200/700 communicating power meters  
Cos t-effective EN40/PM9P/ME4zr pulsing power meters

Solution

Benefits

### For the user

#### > 10% energy savings thanks to usage analysis

Even greater savings if additional controls like load scheduling, conditioning shedding are implemented

#### > Reliable industrial RTU technology

ensures information is available

#### > Cost-effective

The solution works with pulse metering technology

Possible small initial rollout to secure quick ROI can be scaled up later with additional metering

#### > iRio pre-developed software modules

minimize software development costs

#### > Web based for easy implementation;

no dedicated workstation required

### For professionals

#### + Low software development costs:

iRio comes with pre-developed software modules

#### + Powerful customization capabilities:

implement additional control functions if and when required

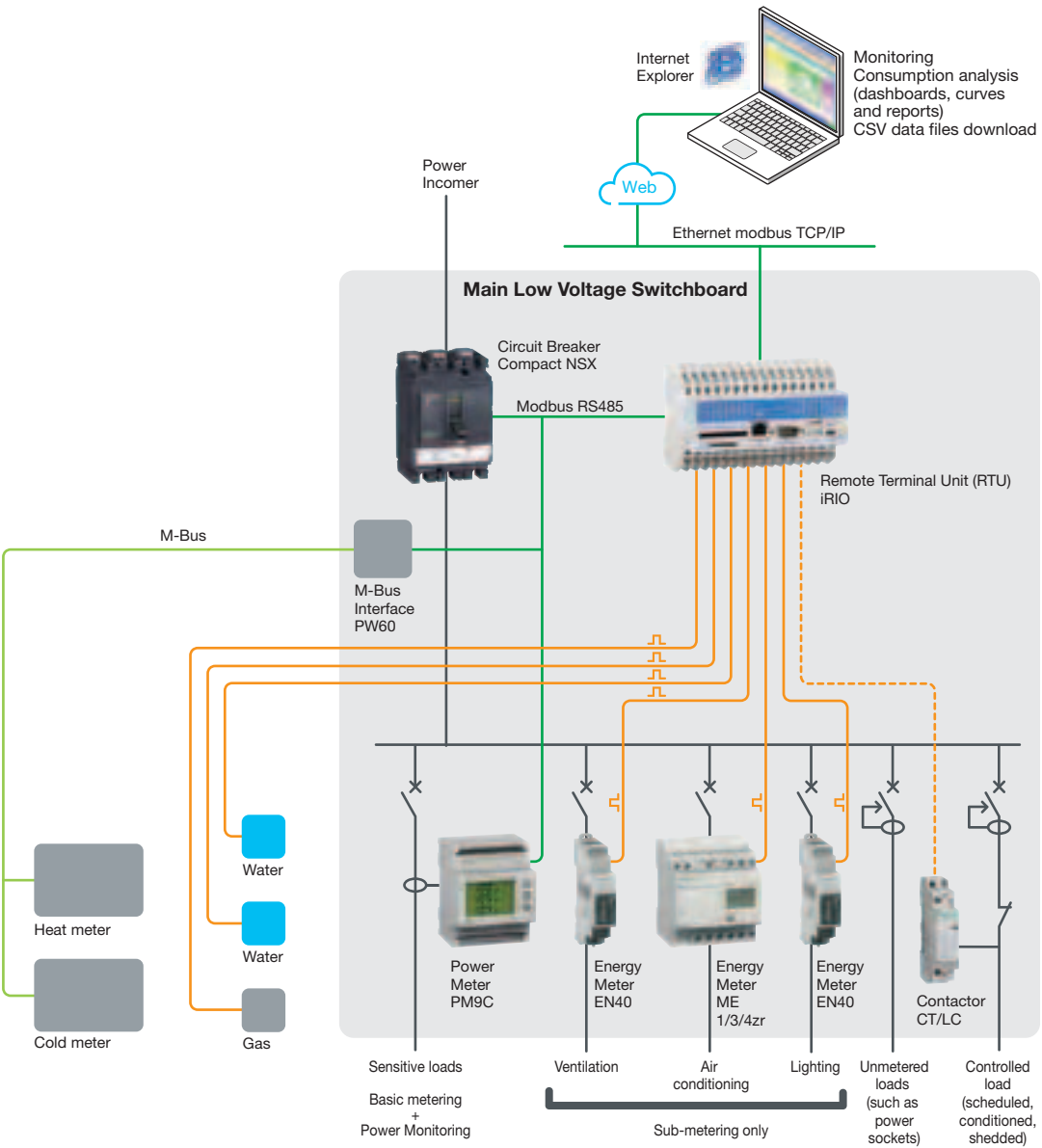
#### + Less time spent on-site:

remote alarm and operation

#### + No additional switchboard cabling:

Compact NSX built-in power meter

- Measure
- Reduce energy consumption
- Reduce energy costs



### PM range

PowerLogic large range of power meters offering all the measurement capabilities required to monitor an electrical installation and are backed by the most complete range of monitoring devices and software on the market  
Energy class 1 as defined by IEC 62053-21 and class 0.5 as defined by IEC 62053-22

### EN40

Economical KWh meter for metering active energy consumed by a single phase electric circuit in all < 10kVA installations  
Class 1 complies with IEC 62053-21 and IEC 61557-12 (PMD DD)  
Class B complies with EN 50470-3



### iRio RTU

Modular system, with integrated web server; sends information by GSM, GPRS, Ethernet,

RS485; optional additional cards for external inputs and outputs



# Energy monitoring

**Application:** non-critical large industrial buildings > 500 kVA

# Manage WAGES\* in non-critical large industrial buildings

\*Water, Air, Gas, Electricity, Steam

“ I need to make sure my processes are running at maximum efficiency without generating any shortages. Plus, I want a breakdown of individual energy costs for each workshop.”

## Combine an iRio RTU, Rio extensions and meters to track workshops consumption

The system is based on an iRio RTU (Remote Terminal Unit), plus Rio extension modules on the secondary switchboards for each workshop or production line. The terminal and modules pick up metering data from power meters (pulsing contacts or Modbus Serial Line communication) and flow meters (pulsing contact, Modbus Serial Line communication, or M-Bus open metering communication). The terminal then generates the necessary databases, dashboards, curves, and reports and transmits data.

The solution provides WAGES consumption information for each workshop or production line, and then provides ratios and curves showing each machine's or each area's consumption profile. The metering database can be downloaded for detailed budgeting and usage optimization needs.

Electric metering can be provided by a number of meter options depending on your distribution architecture and metering performance requirements:

- Mas terpact or Compact NSX built-in power meter
- P M9C/200/700 communicating power meters
- Cos t-effective EN40/PM9P/ME4zr pulsing power meters

Solution

# Benefits

## For the user

> **10% energy savings thanks to usage analysis**  
Even greater savings if additional controls are implemented

> **More efficient operation and maintenance**

> **Reduced utility fees and penalties** through load shedding

> **Reliable industrial RTU technology** ensures information is available

> **Customizable data processing, user interfaces, reports, and controls**

> **Cost-effective**  
The solution works with pulse metering technology  
Possible small initial rollout to secure quick ROI; can be scaled up later with additional metering

> **iRio pre-developed software modules** minimize software development costs

> **Web based for easy implementation;** no dedicated workstation required

## For professionals

+ **Low software development costs:** iRio comes with pre-developed software modules

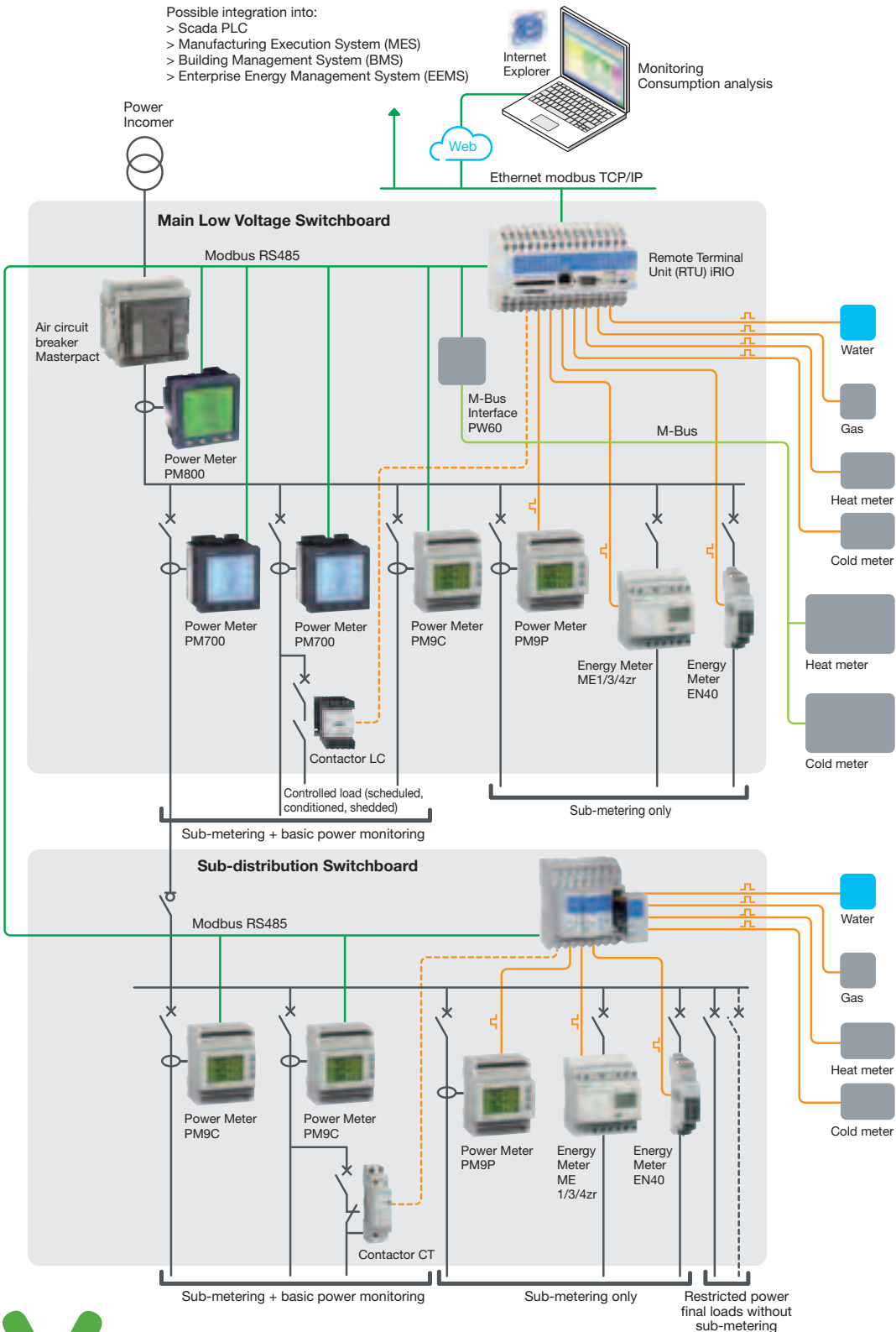
+ **Flexible data acquisition capabilities** (pulse, Modbus SL, M-Bus) for compatibility with existing meters

+ **Powerful customization capabilities:** implement additional control functions if and when required

+ **Highly scalable for maximum cost-effectiveness**

+ **Less time spent on-site:** remote alarm and operation

- Measure
- Reduce energy consumption
- Reduce energy costs



### Masterpact

Nominal current 630 to 1600 A  
Breaking performance 42 to 150 kA at 220/415 V AC  
Voltage rating: up to 690 V

4 Micrologic control units with metering, energy management and network analysis functions  
Compliance with IEC 60947-1 and 2, IEC 68230, UL489, ANSI, and CCC standards

### iRIO RTU

Central unit of Rio modular system features with integrated web server  
Sends information by GSM, GPRS, Ethernet, RS485

Optional additional cards for external inputs and outputs  
iRio RTU PW60 interface accepts M-Bus Protocol of flow meters



# Energy monitoring

**Application:** all commercial buildings greater than 5,000 square meters

# Manage and sub-bill WAGES\* in large commercial buildings

\*Water, Air, Gas, Electricity, Steam

“ I want to make sure I get the most out of my HVAC and lighting control systems. I also need reliable consumption data to sub-bill my tenants utility use. ”

## Meter key energy points to acquire consumption data and identify abnormal use patterns

Each tenant s utility use is sub-metered, and the resulting consumption files can be downloaded via a standard web browser for use with an invoicing application.

Ethernet-based architectures are particularly suitable for commercial buildings where IT network connections are generally already available. The solution is built around an iRio RTU (Remote Terminal Unit) at main switchboard level and Twido PLCs distributed at secondary or final switchboard level.

Metering is provided through power meters using pulsing contacts or Modbus Serial Line communication and flow meters using pulsing contact, Modbus Serial Line communication, or M-Bus open metering communication.

The system ensures data acquisition, processing, and transmission, including database generation, dashboards, curves, and reports.

Electric metering can be provided by a number of meter options depending on your distribution architecture and metering performance requirements:

- Mas terpact or Compact NSX built-in power meter
- P M9C/200/700 communicating power meters
- Cos t-effective EN40/PM9P/ME4zr pulsing power meters

Solution

# Benefits

## For the user

> **10% energy savings through usage analysis**

Even greater savings if additional controls are implemented

> **Lower energy consumption** through load scheduling, conditioning, and shedding

> **Reliable industrial RTU technology** ensures information is available

> **Cost-effective**  
The solution works with low-cost pulse metering technology  
Possible low-cost initial rollout to secure quick ROI; can be scaled up later with additional metering  
iRio pre-developed software modules minimize software development costs  
Uses existing IT infrastructure (Ethernet TCP IP)

> **Web based for easy implementation;** no dedicated WAGES workstation required

> **Ready-to-use data files** facilitate sub-billing

## For professionals

+ **Low software development costs:** iRio comes with pre-developed software modules

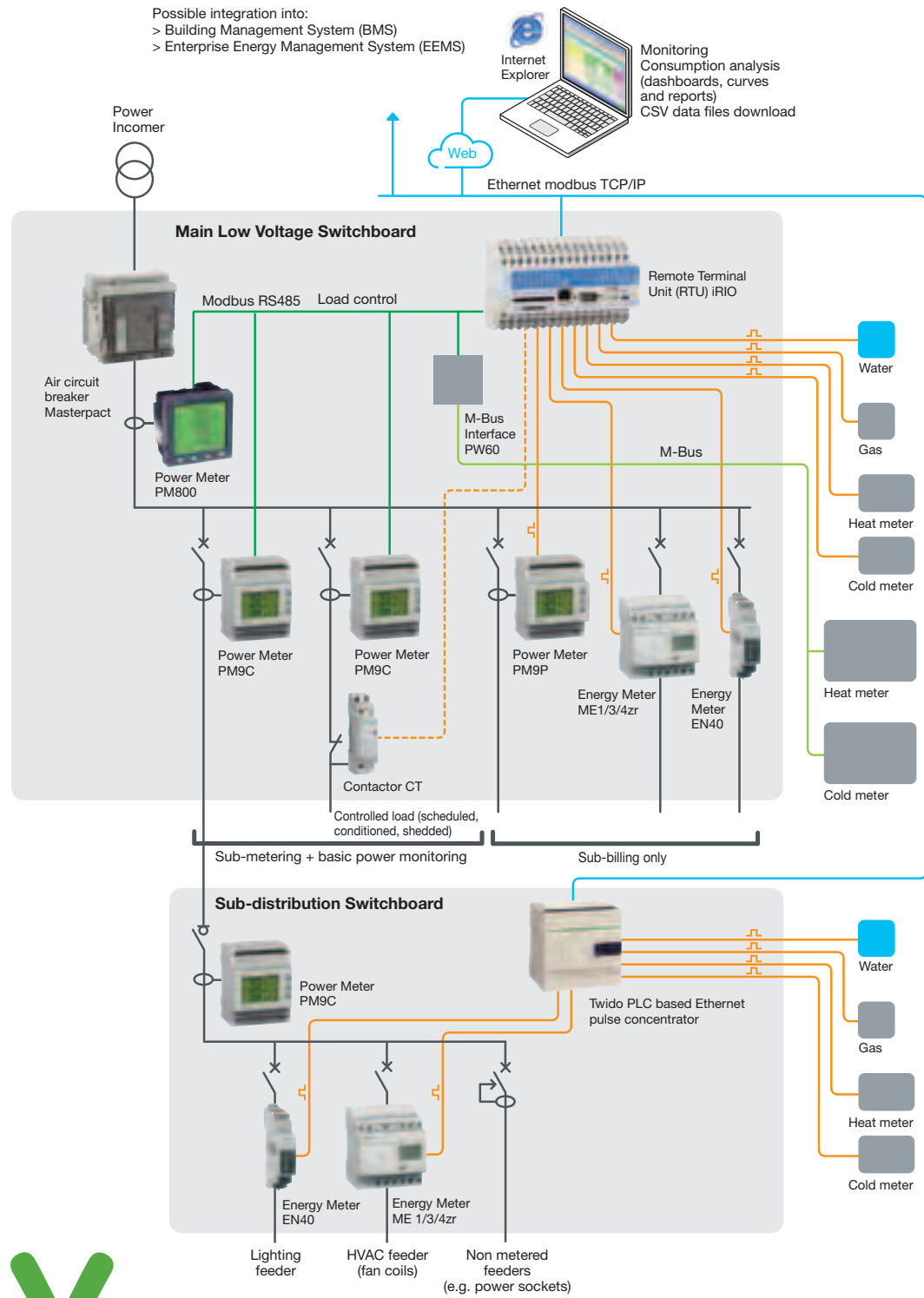
+ **Powerful customization capabilities:** implement additional control functions if and when required

+ **Highly scalable for maximum cost-effectiveness**

+ **Uses existing IT infrastructure (Ethernet TCP IP):** no need to install new communication bus

+ **Less time spent on-site:** remote alarm and operation

- Measure
- Reduce energy consumption
- Reduce energy costs



## Masterpact

Nominal current 630 to 1600 A  
Breaking performance 42 to 150 kA at 220/415 V AC  
Voltage rating: up to 690 V  
4 Micrologic control units enriched by measurement, energy

management and network analysis functions  
Compliance with IEC 60947-1 and 2, IEC 68230, UL489, ANSI, and CCC standards

## PowerLogic Series 800 Power Meters

IEC 62053-22 class 0.5S for real energy

Accurate energy measurement for sub-billing and cost allocation

## iRIO RTU

Central unit of modular system features with integrated web server  
Sends information by GSM, GPRS, Ethernet, RS485

Optional additional cards for external inputs and outputs

## Twido programmable controller

Compact base controllers with integrated Ethernet port  
100240 V AC supply or 24V DC



# Energy monitoring

**Application:** all large, non-critical industrial buildings (>1,000 kVA)

# Analyze energy data to optimize operation of your industrial buildings

“ I need a complete system to manage my water, air, gas, electricity, and steam (WAGES) consumption and reduce maintenance costs. ”

## Use ION Enterprise software to acquire energy meter and circuit breaker data for complete installation monitoring

The solution delivers the indicators, curves, and trends you need to:

- I dentify potential savings
- P inpoint investment opportunities that can help you use less energy, like lighting, heating or air treatment control systems
- A ssess your installation's performance via status and fault alarms and measurements

ION Enterprise power monitoring and control software features:

- E nergy metering (WAGES) and power monitoring data acquisition (voltage, current, power factor) through:
  - SEPAM, Masterpact, and Compact NSX power meters with integrated protection
  - PM, CM, and ION power meter ranges
  - Remote devices connected via the Internet, Ethernet, wireless, modem, satellite and serial connections

The software controls loads and power sources, peak rate management, and power factor correction.

Advanced data management:

- L oad aggregation, multi-site meter aggregation and trending, bill verification, cost allocation and sub-billing
- T rigger on complex conditions, alarming, event logging, power quality analysis and compliance monitoring

Advanced information delivery:

- W eb-enabled, local or remote preconfigured and custom reports
- M anual, scheduled or event-triggered reports via email or web

Solution

# Benefits

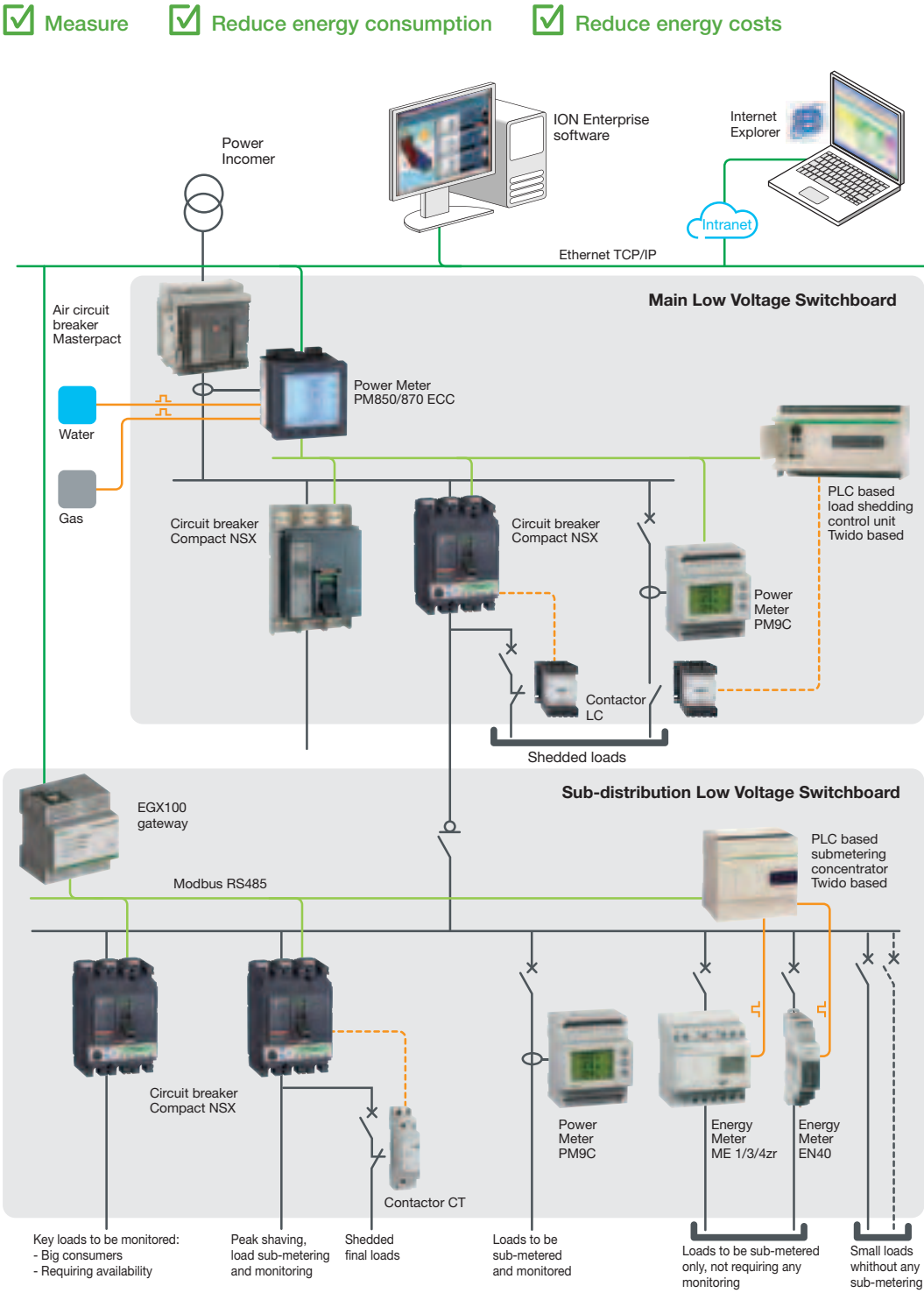
## For the user

- > **10% energy savings** through consumption tracking
- > **Covers full WAGES (water, air, gas, electricity, steam) consumption**
- > **Reduced energy costs** by avoiding higher utility contract fees and penalties through demand response and curtailment programs
- > **Increase loads and equipment lifetimes** by detecting anomalies on the installation
- > **Boost reliability of information** by gaining a comprehensive overview of all energy management data via a single system
- > **Enjoy greater flexibility** with fully customizable data processing, user interfaces, reports and controls

## For professionals

- + **Full Modbus and OPC connectivity** to third-party meters, sensors and other equipment
- + **High interoperability** with third-party systems, applications and services such as BAS, MES and ERP via ODBC, OPC, XML, FTP, email, CSV, PQDIF
- + **Cost-effective implementation** through preconfigured reports
- + **Optimised cost** through fully scalable hardware, software and system architecture
- + **Power meters with built-in protection** deliver switchboard instrumentation without installing dedicated power meters.

Sepam, Masterpact and Compact NSX enable full monitoring across the entire power distribution architecture



## ION E V6.0

Compatible with all PowerLogic ION-series meters, PowerLogic PM750 and PM710 meters

Supports third-party meters, sensors and other equipment through Modbus protocol or OPC

Connect to remote devices via Internet, Ethernet, wireless,

modem, satellite, and serial connections

Integrated metering of all utilities (water, air, gas, electricity, steam)

Enterprise web portal access to system-wide displays

Preconfigured and custom reports, report wizard, scheduled distribution via email or web

Power quality analysis including compliance with international standards (IEC 61000-4-30, EN50160)

**PM 850**

Easy to install panel-mount with only two clips, or DIN rail mount with or without remote display

Direct-connect voltage inputs, with no need for

potential transformers (PTs) up to 600 VAC

Intuitive navigation with self-guided, language-selectable menus

Individual harmonic magnitudes and angles and waveform capture (PM850 and PM870)

IEC 62053-22 class 0.5S for real energy





For many buildings, HVAC and lighting combined account for over 70% of energy use.

You can optimize this major source of energy consumption by installing a powerful, integrated Building Management System based on open, scalable devices and applications.

In addition to measuring consumption data and transmitting it to automated systems, our Building Management Systems deliver capabilities like complex data analysis and detailed consumption trend reporting while integrating consumption and installation control features.

These solutions are within reach for all buildings, regardless of type of use, current installation, or budget.



### Choose the solution that s right for you

- > Schedule selected loads simply via your BMS (p. 70)
- > Monitor and control electrical loads in your retail store (p. 72)
- > Control lighting and heating at room level with a KNX-based system (p. 74)
- > Control room lighting, temperature, and blinds automatically (p. 76)
- > Manage hotel energy consumption according to guestroom occupancy (p. 78)
- > Reduce hotel electrical consumption and improve comfort with a full KNX system (p. 80)
- > Combine various control systems to achieve maximum savings (p. 82)
- > Monitor your building s power supply and control HVAC, lighting, and blinds (p. 84)
- > Boost energy efficiency and increase the availability of your electrical installation (p. 86)
- > Control and monitor HVAC, lighting, security systems, and energy consumption (p. 88)



# Building management

**Application:** any building with a Building Management System

## Schedule selected loads simply via your BMS\*

\* Building Management System

“ My business is flexible enough to schedule certain energy-consuming activities during less expensive off-peak hours. Whats the best way to take advantage of this opportunity? ”

### Solution

#### Integrate a centrally-managed load-shedding system into your BMS

The solution is built around a PC or PLC that controls load shedding. The controller is used to generate load shedding orders based on the electrical variables of the entire electrical installation, taking into account time bands, operating, or even process-related information. The system communicates with selected Compact NSX circuit breakers. Power to outgoing loads is cut for a given amount of time, and selected loads are restarted at more optimal times chosen by the controller.

The system is simple, with an IFM Modbus interface between the PC or PLC and the circuit breakers. The Compact NSX circuit breakers are equipped with Breaker Status Control Module (BSCM) input/output modules, which are hooked up to the remote control (MTc) that opens and closes the Compact NSX.

#### For the user



**> 10% lower electricity bills,** with savings proportionate to rates negotiated with the utility

**> Get the most of your investment:** the FDM121 switchboard

includes, at a cost similar to traditional push-button/lighting/commutator solutions, local circuit breaker open/close command local/remote commutator

## Benefits

### + For professionals

**+ Easy design and use**  
Limited part numbers for easy selection and ordering  
Available worldwide

**+ Easy installation**  
The circuit breaker's integrated communication capabilities eliminate the need for I/O wiring between the circuit-breaker and the PLC

RJ 45 connections between the circuit breakers and the communication network

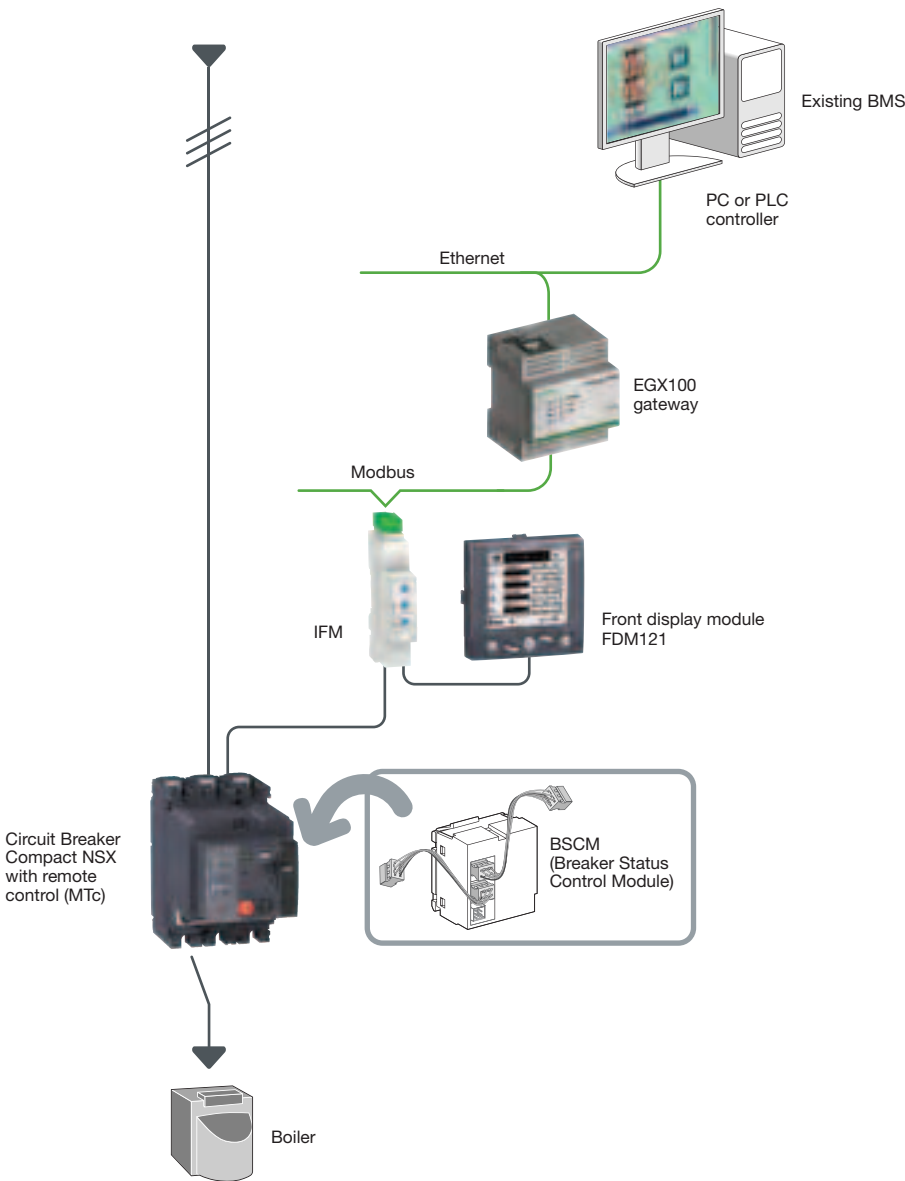
The FDM121 mounted on a standard cutout on the front panel is easy to install with its RJ 45 connection

**+ Easy testing and configuration,** using your PC installed with RCU\* software

\* Free download available online at [www.schneider-electric.com](http://www.schneider-electric.com)

**+ Efficient operation and maintenance,** thanks to the FDM121's central and local management capabilities

- ☐ Measure
- ☒ Reduce energy consumption
- ☒ Reduce energy costs



**Compact NSX 100-630**  
Circuit breaker with remote control (MTc)

**BSCM (Breaker Status Control Module)**  
I/O module sends circuit breaker O/C status and O/C commands

**FDM121 switchboard display unit**  
Local measurement and alarm readings  
Local circuit breaker O/C command with status display  
Local/remote circuit breaker command management  
Connected to Modbus network via interface module



**Ethernet/Modbus EGX100 communication gateway**



# Building management

**Application:** all commercial buildings; particularly suitable for retail

## Monitor and control electrical loads in your retail shopfront

“ I need to be able to check the status of the oven, refrigerator and security cameras quickly and easily when I close up my shop. I want to make sure everything is secure and avoid wasting energy. ”

### Solution

#### Install **KNX current sensing switch actuators** connected to a touch panel to monitor loads

The touch panel shows the status of the different loads and indicates potential riskss such as the refrigerator, oven, or security systemd uring shop opening hours.

The system cuts power to specific loadslike an oven left on at nightt hus eliminating waste. It also helps to ensure proper operation of the security system by monitoring devices like security cameras and lighting.

A KNX logic module rotates the lighting sources used at night from one night to the next for more even use of light fixtures. The touch panel provides information on the operating hours and expected lifetime of each fixture, for more efficient maintenance and replacement.

#### For the user

> **Monitoring consumption and identifying unnecessary use can generate savings of up to 10% and more**

> **Lower maintenance costs** by rotating lighting sources



> **Reduce energy consumption**

> **Increase safety of people and property** through automatic alarms and emergency calls

> **Added convenience** of remote monitoring and control

> **Easy upgrades and extensions**

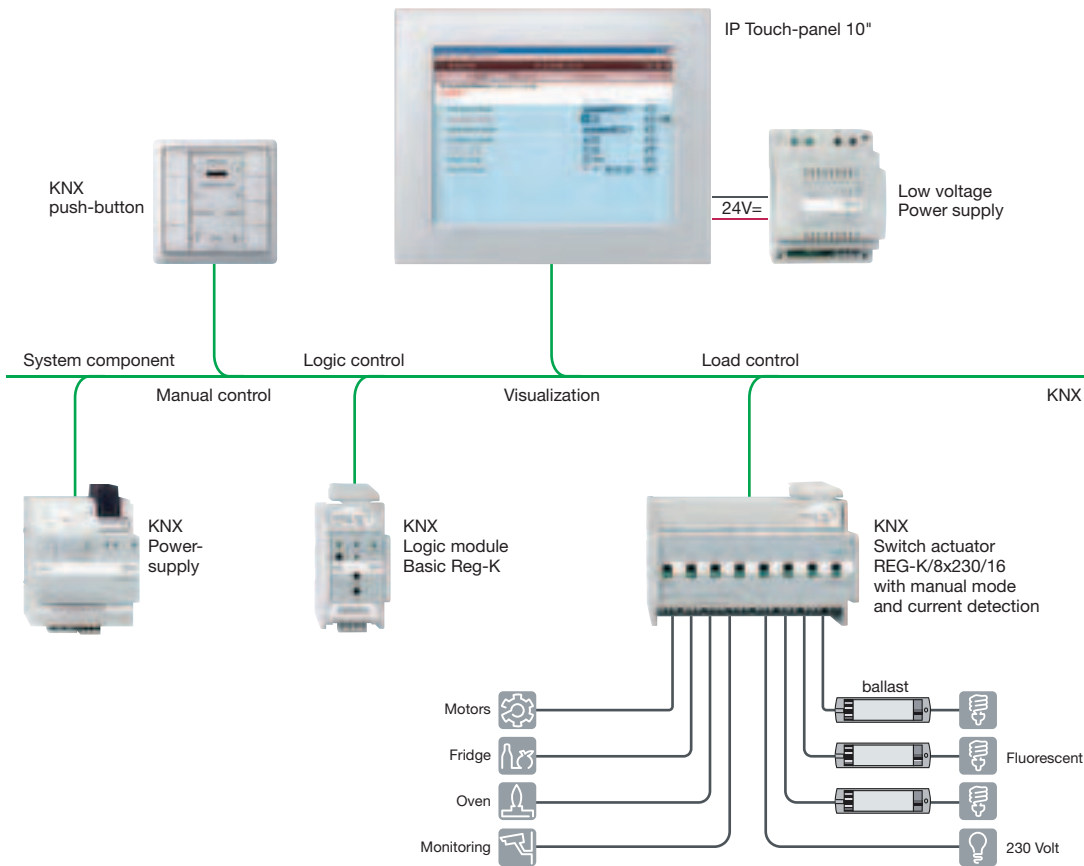
#### For professionals

+ **KNX systems are easier to design** than traditional systems with similar functions

+ **Requires working with a skilled electrician or planner/integrator** to get maximum user-friendliness and cost-effectiveness

+ **Maximum flexibility**, making adjustments to layout much easier than with traditional systems

☐ Measure ☒ **Reduce energy consumption** ☐ Reduce energy costs



#### **REG-K/8x230/16 switch actuator with manual mode and current detection**

Capacity to switch eight loads independently  
Integrated current detection on each channel  
Nominal voltage: AC 230 V, 50 - 60 Hz  
Nominal current Per switching contact: 16 A, cos = 0.6

#### **The 10 KNX interactive touch panel**

is used to display and control building states and functions. It comes pre-installed with Windows CE for fast, easy data management, web, client/server, and network configuration  
KNX software configuration via TP VISU  
Display size: 10.4 (24.4 cm)  
Resolution: 800 x 600 pixels, SVGA



Display type: TFT, resistive touch  
Colours shown: > 65,000  
Mains voltage: DC 24 V  
Power consumption: < 20 W  
RAM: 128 MB



# Control lighting and heating at room level with a KNX-based system

“ We are reorganising our office space. We are looking for a simple, yet flexible system that will enable us to start saving on heating and lighting right now. ”

## Install a **KNX-based room-level control system** for lighting and heating

The solution offers an optimum combination of different control levels: presence, brightness, time-dependency for lighting, and temperature.

Settings are adjusted via KNX presence detectors, lighting and heating actuators, binary inputs, and multi-function push-button controls. Automatic interaction of sensors and actuators eliminates unpredictable and costly human activation and deactivation for increased comfort and safety.

The solution is much more flexible than traditional installations for easy repurposing of office spaces after a reorganization or move.

**Lighting control:** the bus system includes a presence-detector and multi-function push-button control.

**Heating control:** the multi-function push-button controls room-temperature and switches to standby whenever the room is unoccupied or a window is open.

## Benefits

### For the user

#### > Room automation reduces energy consumption

According to EU standard EN 15232, Class A office buildings must be equipped with room-level controls, which have the greatest impact on energy consumption. KNX room control solution combines presence- and brightness-controlled lighting with presence-controlled heating and window monitoring, **for potential energy savings of up to 35%**

#### > Increased safety with automated alarms and emergency calls

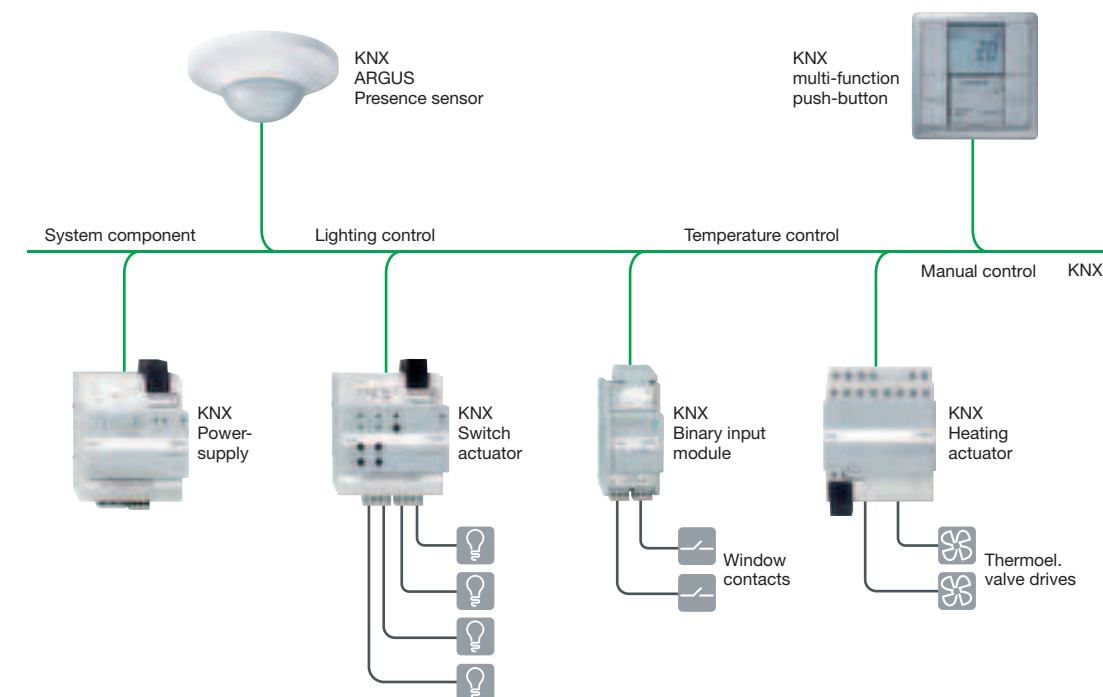
#### > Easy to upgrade or add on to the system

### For professionals

**+ Saves time on installation:** easier to install than traditional systems with similar functions

**+ New opportunities for your business:** KNX solutions must be implemented by skilled electricians or integrators and offer an array of user-friendly, cost-effective functions

☐ Measure ☒ Reduce energy consumption ☐ Reduce energy costs



#### KNX multi-function push-button with room temperature control unit

Convenient control unit with four operating buttons

Includes room temperature control unit and display for:

- Switching, toggling, dimming, blind control, pulse-edge trigger, alarm functions, cyclical reading of external temperatures, etc.

- Continuous PI control, switching PI control (PWM)

Output: continuous  
Type of control: 2-step control range 0% to 100% or on/off

#### KNX heating actuator

For actuation of thermoelectric valve drives for heating or cooling ceilings

Six electronic outputs  
Up to four valve drives can be connected to each output

Outputs are either switch activated (1 bit) or PWM signal (1 byte) activated

Each output is overload-protected and short-circuit-protected

For installation on EN 50022 DIN rails

Reporting connected to all valves, transmission of the largest 1 byte variable value

Nominal voltage: AC 230 V, 50-60 Hz  
Nominal current: 0.05 A, ohmic  
Starting current: max. 1.5 A

Minimum load per used output: 1 valve drive

Number of valve drives max. 4 per output

Device width: approximately 72 mm for four modules

#### KNX binary input module

Switching, dimming or blind control via one or two inputs

Positioning values for blind control (8-bit)



Pulse edges with 1-, 2-, 4-, or 8-bit telegrams

Differentiation between short/long operation

Initialisation telegram  
Cyclical transmission

Pulse edges with 2-byte telegrams  
8-bit linear regulator

Disable function  
Break/make contact  
Debounce time  
Inputs: 4



# Building management

Application: all types of buildings

## Control room lighting, temperature, and blinds automatically

“ I want to automatically manage my buildings lighting and air conditioning depending on occupation, orientation, and natural light. ”

### Combine a variety of room-level controls for dramatic cost savings

The solution is built around KNX detectors and fan and blind actuators, which interact automatically, eliminating unpredictable and costly human activation and deactivation. By combining presence and brightness detectors with timers to control lighting, blinds, heating, and air conditioning, you can save dramatically on your energy bills while increasing occupant comfort and safety.

Lights are switched on only when areas are occupied and depending on natural light. Heating and air conditioning are automatically regulated to achieve the desired temperature, switching to standby mode in the event of prolonged absence or if a window is open. Blinds are activated according to room temperature.

## Solution

## Benefits

### For the user

> Save up to 50%

Combining room climate control, lighting, and blinds in a single flexible, automated system is the best way to align energy consumption with room use and occupant behavior while eliminating waste

According to EU standard EN 15232, Class A office buildings must be equipped with room-level controls, which have the greatest impact on energy consumption

All-in-one solution for optimized room control

Reduces energy consumption

Flexible, with centralized or local switching and indicators

Increased safety with optional automated alarms and emergency calls

Optional user-friendly remote monitoring and control

Easy to upgrade or add on to the system

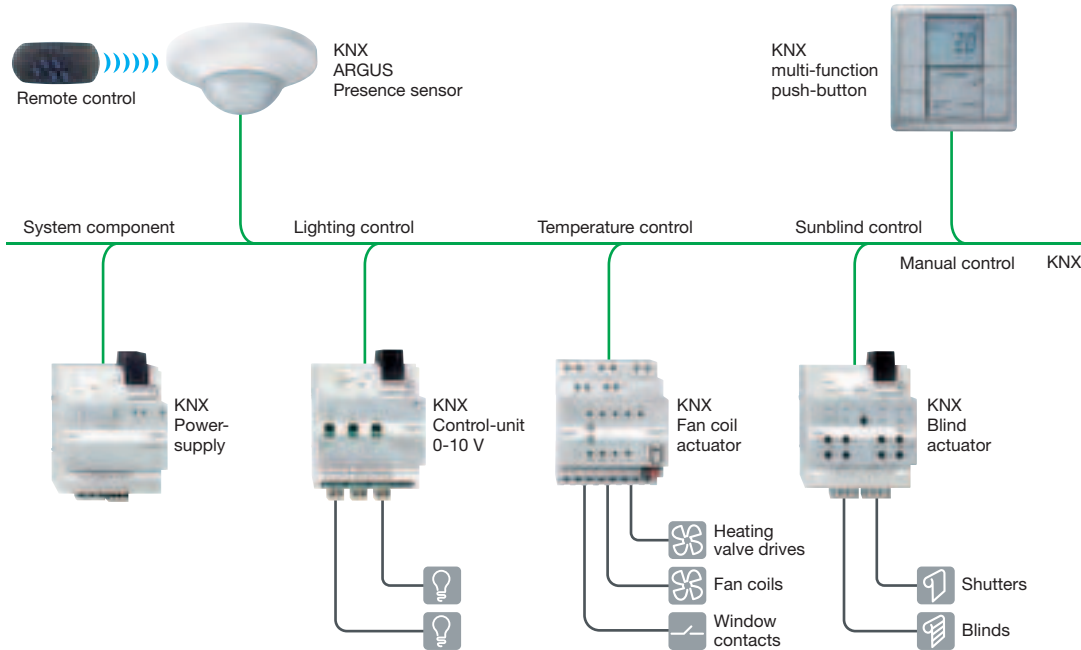
### For professionals

+ Saves time on design (support available) and installation (easier to install than traditional systems with similar functions)

+ Facilitates maintenance

+ More flexible than traditional systems; can be changed easily if when tenants move out or when workspaces are reorganized

Measure ☒ Reduce energy consumption ☐ Reduce energy costs



### KNX Argus presence detector with lighting control and IR receiver



Angle of detection: 360°  
Range: a radius of max. 7 m (at a mounting height of 2.50 m)

Number of levels: 6  
Number of zones: 136 with 544 switching segments

Number of movement sensors: 4, separately adjustable

Light sensor: internal light sensor infinitely adjustable from approx. 10 Lux to 2,000 Lux (ETS); external light sensor via KNX

### REG-K/4x24/6 blind actuator with manual mode



For independent control of 4 blinds or roller shutter drives. The function of the blind channels is freely configurable. All blind outputs can be operated manually using push-button operation.

Integrated bus coupler  
For installation onto DIN rails EN 50022

For each blind output:  
- Nominal voltage: DC 24 V ±10 %  
- Nominal current: 6 A  
- Load types: 24 V direct current drives  
- Device width: 4 modules = approx. 72 mm  
- Contents: With bus connecting terminal and cable cover

### KNX REG-K fan coil actuator

For heating, ventilation and air conditioning control. For controlling



fan convectors with up to three speeds, or three-step motor drives.

Power supply: 230 V AC ±10 %, 50/60 Hz  
Power consumption: max. 3 VA

Outputs: 3 floating contacts (fan coil), 2 semi-conductor switches (valve connections)

Switching capacity for valves: 0.5 A, 24V - 230 V AC

Additional relay switching capacity: 16 A  
Fan relay switching capacity: 8 A

Inputs: 2, max. cable length 5 m



# Manage hotel energy consumption according to guestroom occupancy

“ My hotels occupancy rates fluctuate depending on the time of year, something that is not reflected in my energy costs. I want a system that will help me keep costs in line with occupancy and boost my hotel s profitability. ”

## Integrate **guestroom management** into your hotel s reservation system

Your hotel s Property Management System (PMS) handles reservations, but it can also provide information about the status of each room: rented, rented and unoccupied, or rented and occupied. When the PMS and the guestroom management system interface, this information can be used to optimize room management and even save guest preferences for automatic customization of settings when the guest checks in.

Schneider Electric offers both guestroom management systems and complete building management systems, and delivers the expertise needed to integrate these systems into third-party Property Management Systems like Micros Fidelio and Opera.

Information concerning functions like temperature, lighting and electricityman aged at room levelc an be monitored and controlled in line with information from the Property Management System, for instance:

Un rented: Room is in economy mode. Room lights are turned off. Room heating or air conditioning is automatically lowered. Window blinds and ventilation are set to maintain optimal conditions while the room is unoccupied.

R ented and unoccupied: Room is in pre-comfort mode. Temperature and air quality can be automatically set to a position closer to comfort mode.

R ented and occupied: All room settings can be adjusted by the guest.

> **Solution**

# Benefits

## For the user



> **Reduce energy use by more than 20%**

> Opt for simple guestroom management (to lower heating or air conditioning while guests are away from their rooms) **for savings of 10%;** add advanced management of unrented rooms for an additional 10% savings

> **Guests retain control of their environment while in their rooms for total comfort and ease of use**

+ **For professionals**  
+ Simple communication between the systems via a gateway ensures easy implementation and integration

☐ Measure ☒ Reduce energy consumption ☐ Reduce energy costs

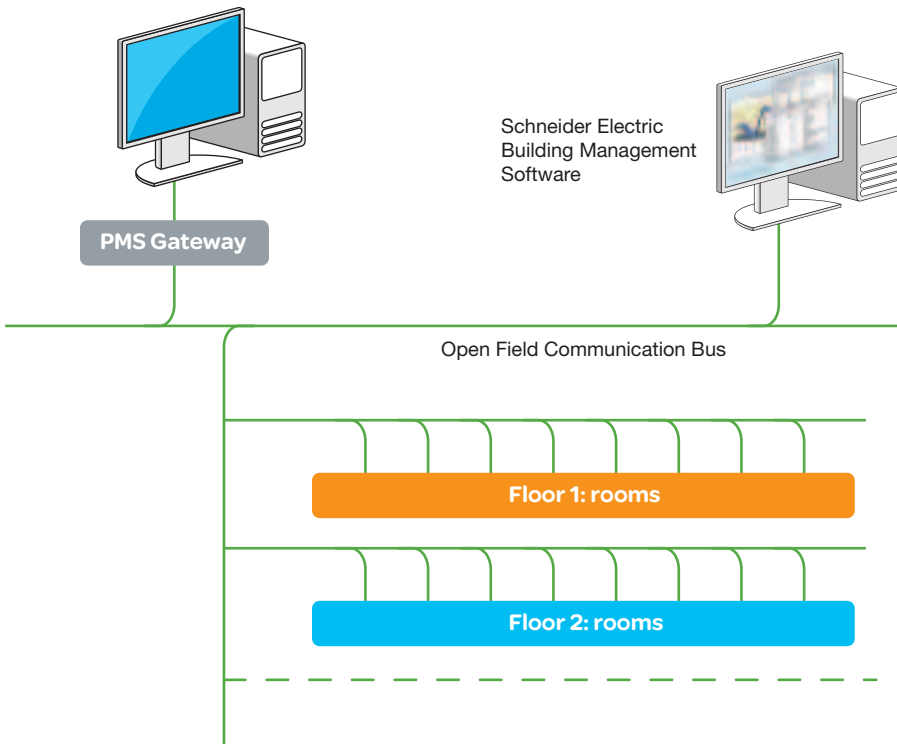
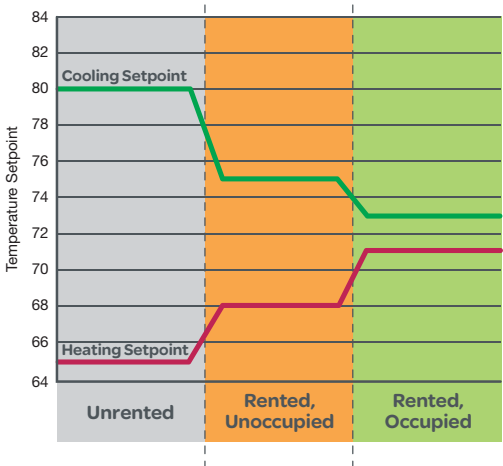
## ★ Projects

### Hilton Americas-Houston becomes one of the world s most energy-efficient hotels

For this 24-story facility with 1,200 guest rooms and over 91,000 square feet (84,500 m²) of meeting space, Schneider Electric provided a comprehensive Andover Continuum™ building management system with a unique, energy-saving guest room control sequence.

### Hilton Copenhagen Airport automates HVAC according to guest check-in and check-out

For this five-star, 382-room hotel, Schneider Electric focused on finding a practical way to key the HVAC system to guest arrivals and departures. The solution used a LonWorks®-based TAC Vista™ system and integrated HVAC control with the hotel s booking system to trigger heating and cooling adjustments when guests check in and out.



**Schneider Electric s open Building Management System line-up** featuring Andover Continuum™ and TAC Vista™ enables full integration of all hotel equipment, providing a central point of control and communication with third-party systems





# Building management

Application: four- and five-star hotels

## Reduce hotel electrical consumption and improve comfort with a full KNX system

“Energy has become a major expense for my hotel. I would like to reduce costs, but not to the detriment of my guests' comfort or my own peace of mind – my top priorities.”

### Install an intelligent guestroom management system to control lighting, HVAC, and blinds

This intelligent system controls lighting, HVAC, and blinds according to guest presence, ensuring maximum comfort via the following functions:

- Advanced control of all room equipment such as lighting, heating, air-conditioning, curtains, and blinds
- Management of hotel functions like do-not-disturb and make-up-the-room orders
- The capacity to communicate with other hotel systems

Energy use is managed automatically according to occupancy, resulting in reduced energy consumption. Of course, HVAC is a top consumer of energy, but so is lighting. Guests are usually only in their hotel rooms for around eight hours per day, therefore, the times when the room is unoccupied represent a major opportunity to save energy without affecting guest comfort.

The solution is based on a KNX/EIB bus system, which connects all the different sensors and actuators inside the room to form an intelligent system.

- Sensors: key card holder, presence detector, thermostat, open/close windows
- Actuators: lighting control, air conditioning control
- A single, easy-to-use interface, from simple push buttons to user-friendly touch screens
- Automated functions provide additional energy savings and smoother operation, without any inconvenience for the guests

Solution

## Benefits

### For the user

> **10% energy savings** off each guestroom's electric bill

By lowering room temperature by just one degree, you can shave 3% off of your HVAC system's energy consumption

Achieve additional savings through smart lighting and blind management

> **Ensure greater comfort** and an enhanced experience for your guests

Install a convenient central point of control (bedside, for example)

Provide one-touch access to selected lighting scenarios

Eliminate the need to turn off each light when leaving the room or going to sleep

### For professionals

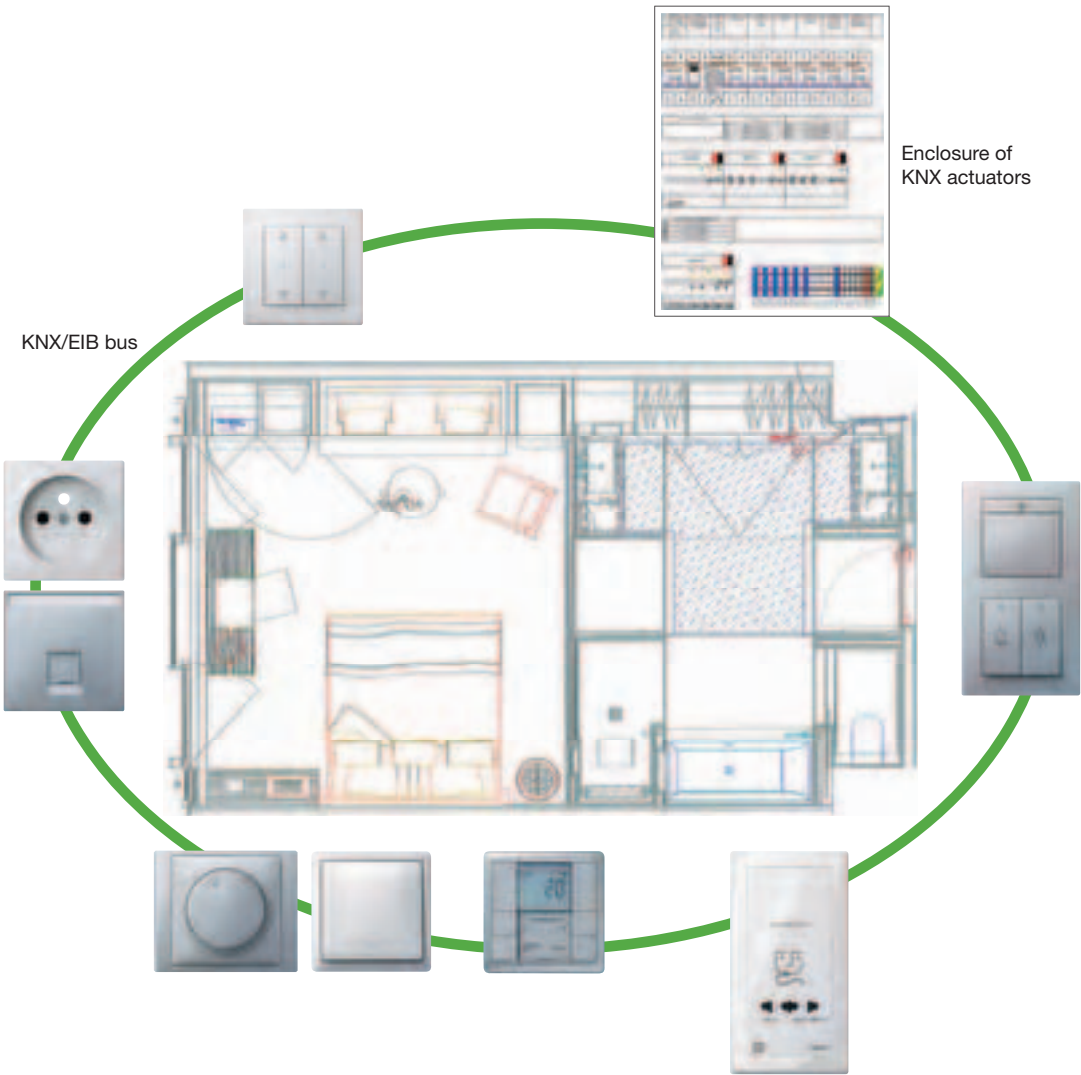
+ **A differentiating design**

A skilled electrician or systems integrator must be brought in to install the guestroom management system to ensure maximum user-friendliness and cost-effectiveness

+ **Easy upgrades and add-ons**

Thanks to the flexibility of the bus system, the system can be easily upgraded with new functions during future hotel renovations

- Measure
- Reduce energy consumption
- Reduce energy costs



Schneider Electric provides a complete range of hotel guestroom products designed to work seamlessly together.

Customer-facing products are designed with ease-of-use in mind

Available in a broad array of stylish finishes to match the interior design of the guestroom

Cover the full range of needs unique to hotel guestroom use

Guestroom thermostat



Card key holder for installation in room entrance turns room systems on and off when guests enter and leave the room





## Building management

**Application:** large commercial buildings (> 5000 m<sup>2</sup>)

# Combine various control systems to achieve maximum savings

“ We want our new head office to be as energy-efficient as possible while delivering the level of comfort our employees need. One goal we have is to reduce operating costs and secure green certification for our building. ”

Install a **multi-technique Building Management System (BMS)** to supervise heating, cooling, air conditioning, ventilation, power, elevators, plumbing, access control, lighting, and blinds

The solution is built around a TAC Continuum™ supervision system and subsystems made up of gateways and command-control devices for different applications:

- A n SMI system for window blind control
- A DALI system for lighting control
- X enta controllers for the air conditioning system
- A n access control and video surveillance system

Heating is programmed on an hourly basis and setpoints are checked to ensure that building temperature is lowered at night and raised before occupants arrive in the morning. Presence detectors plus automatic lighting shutoff functions with re-start capabilities provide further energy savings even when employees work after normal office hours.

Daylight and presence detectors are used to optimize regulation of lighting and air conditioning in each individual office. Lighting, window blind, and cold beams are managed by system scenarios such as presence, natural light, arrival (first occupant), departure (last occupant), and others.

The solution enables facilities managers to view the status of, monitor, and operate all systems throughout the building, including alarms, temperatures, faults, on/off, and more.

The TAC Continuum system offers a display detailing energy consumption throughout the building, providing the specific information needed to raise occupant awareness of energy consumption and savings.

## Benefits

### For the user

> **Achieve 30% energy savings** by controlling the entire installation and raising occupant awareness of consumption

> **Pinpoint areas for potential energy savings**

> **Enhance employee working conditions**

> **Project a high-tech, environmentally-aware image**

### For professionals

+ **Reconfigure workspaces without recabling**

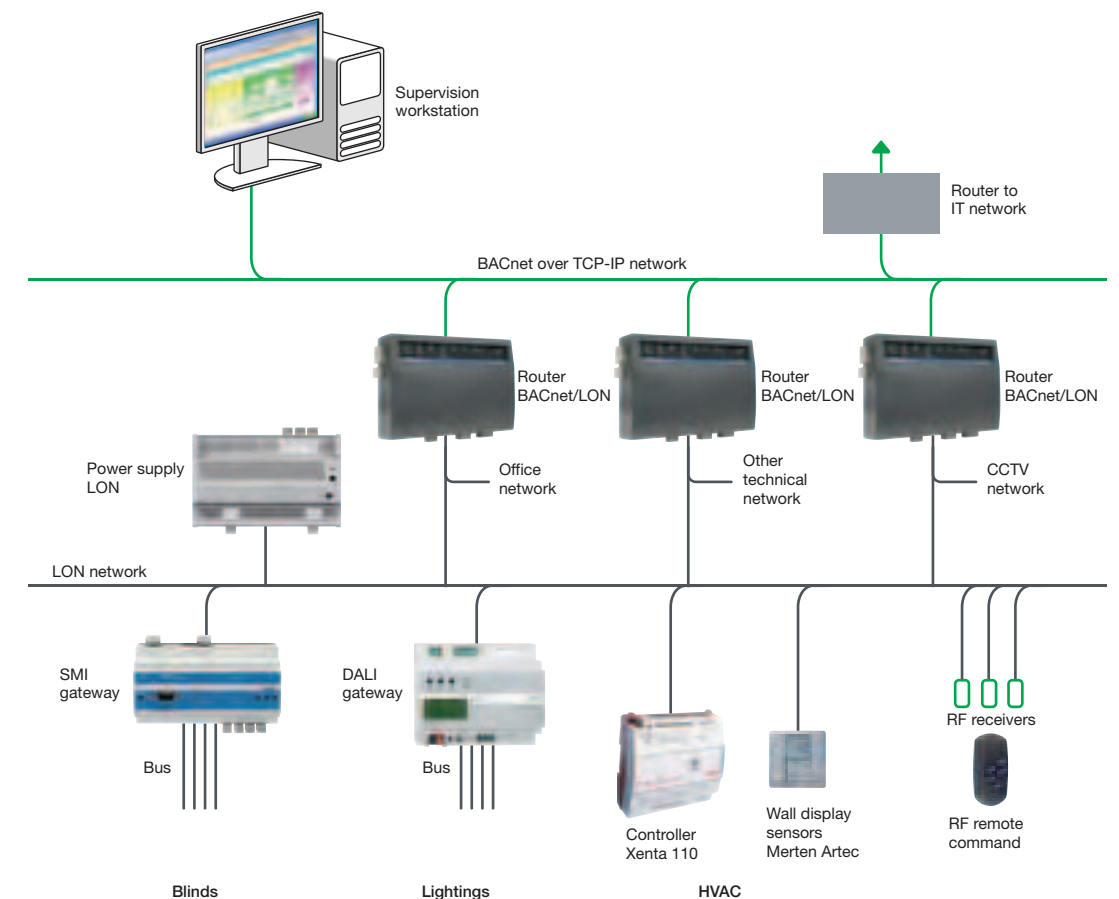
+ **Enjoy the convenience of standard lighting (DALI) and motor (SMI) interfaces**

+ **Use lighting and ballast status information to help reduce maintenance costs**

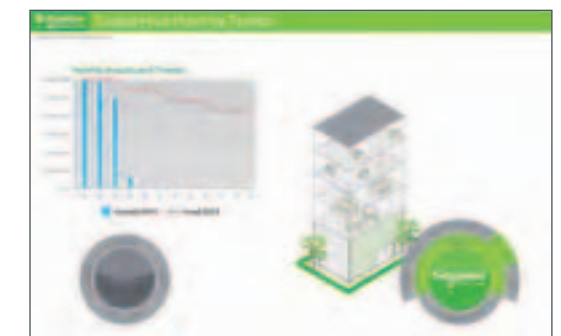
### Example of Schneider Electric headquarters

Schneider Electric recently built a new head office just outside Paris, France. The six-storey building offers 35,000 square meters of office space for 1,700 employees. After the November 2008 move-in, the building generated energy savings of €250,000 over a five-month period that's 35% savings off the previous head office's energy bills.

- ☒ Measure
- ☒ Reduce energy consumption
- ☐ Reduce energy costs



Example of display screens in the Schneider Electric Headquarters



**The LON DALI-Gateway** can be connected to four DALI control units. Up to 256 devices, divided into 64 DALI groups, can be connected.



**The LON SMI Controller (Gateway)** has four SMI-outputs to control up to 16 SMI-Slaves (motors) each. Up to 64 SMI motors can be controlled.





## Building management

**Application:** all commercial and industrial buildings

# Monitor your building's power supply and control HVAC, lighting, and blinds

“ I want to deliver the level of comfort my buildings occupants expect while limiting energy costs. I also need to ensure that my equipment is available and keep operating and maintenance costs to a minimum. ”

## Install a **Building Management System** to monitor and control your building's equipment and provide energy consumption data

Based on the TAC Vista Building Automation and Control System, the solution integrates the best of both power monitoring functions and HVAC, lighting, and blind control capabilities thanks to data acquisition via Xenta 731 multi protocol IP controllers.

The solution provides comprehensive managed energy data covering water, air, gas, electricity, and steam (WAGES) via TAC Xenta 400 I/O modules or additional PM850 digital inputs. Electric metering is provided by the PM meter range and Masterpact and Compact NSX meters with built-in protection. TAC Xenta 4XX and 3XX controllers run HVAC, lighting and blinds, as well as loads and power sources.

**TAC Vista software provides advanced data management, including**  
Load aggregation, multi-site meter aggregation and trending, bill verification, cost allocation and sub-billing

Trigger on complex conditions, alarming, event logging, power quality analysis and compliance monitoring

Coordinated control functions and complex calculations

### Advanced information delivery

Web-enabled, local or remote preconfigured and custom reports

Manual, scheduled or event-triggered reports via email or web

Trending graphing for any parameter measured

Analysis of efficiency, losses, and capacity

### Scalable architecture

IP-based communication via existing building IT infrastructure

Internet communication tools for remote or local operation

## For the user

Helps achieve European Building Automation and Control System standard IEC EN15 232 target savings for different controls

> Heating energy savings of around **30%**

> Electrical energy savings of around **13%**

# Benefits

For professionals

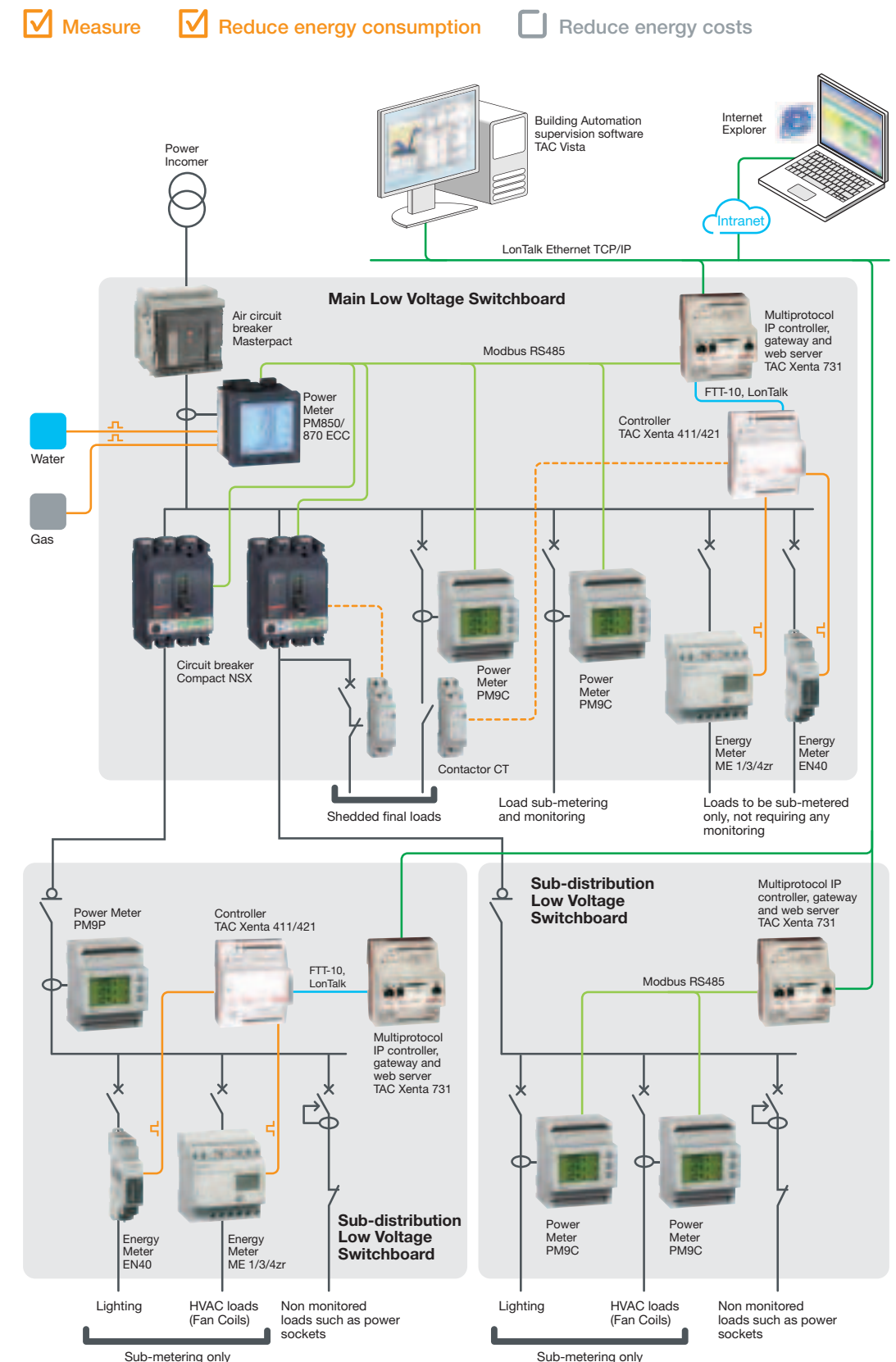
+ Advanced TAC tools deliver increased efficiency to system integrators and contractors

+ Compatible with all Schneider Electric metering devices

+ Powerful customization for easy implementation of all power control functions

+ Highly scalable system, hardware, and software architectures for maximum cost effectiveness

+ Remote alarming, reporting, and operation for reduced on-site presence



**TAC Xenta 731 multiprotocol controllers** provide a broad array of communication capabilities

Open LonWorks® field bus compatible with multi-vendor equipment:

- Fan coil, cold beam or air handling unit controllers

- Lighting controllers
- Sensors and actuators
- Modbus communication for power monitoring and control



# Solution



## Building management

**Application:** all large critical industrial buildings (>1000 kVA)

# Boost energy efficiency and increase the availability of your electrical installation

How can I save energy in an industrial building where there's zero tolerance for power cuts?

## Combine ION Enterprise power monitoring software and Power SCADA operations and maintenance management software

The solution delivers a detailed analysis of events while optimizing control of your building's power supply.

### ION Enterprise software manages energy-efficiency-related functions

Comprehensive managed energy information:

- > Electric metering through PM and CM meter ranges and Sepam, Masterpact, and Compact NSX meters with built-in protection
- Electric parameters: voltage, current, frequency, power factor
- Power and energy parameters: apparent, active, reactive
- Power quality
- > Load aggregation, trigger on complex conditions, alarming, event logging, trend graphing for any measured parameter, analysis of efficiency, losses and capacity, bill verification, cost allocation, and sub-billing
- > Web-enabled, local or remote preconfigured and custom reports; manual, scheduled or event-triggered reporting and distribution via email or web
- Load and power source controls; demand and power factor correction
- > Collection of all WAGES (water, air, gas, electricity, steam) metering data through additional meters or directly via Ethernet, from a PLC-SCADA for example

### PowerLogic SCADA mainly addresses availability related functions

- Real-time monitoring and control of the entire power installation for even the most complex facilities
- Advanced alarm and shift management functions for smoother maintenance scheduling
- Powerful troubleshooting thanks to precision time stamping accurate to within 1ms
- Advanced communication architectures: hot/warm redundant I/O device configuration, self-healing ring communications and primary and standby server configurations
- Fast manual control operations by clicking on-screen trigger buttons, and remote breaker, protection relay, and other power distribution equipment operation

## Benefits

### For professionals

+ Compatible with all Schneider Electric products, including PowerLogic ION-series meters and PowerLogic PM750 and PM710 meters

+ Connectivity to third-party devices via Modbus or OPC

+ Powerful customization facilitates implementation of all power control functions

+ Remote alarming, reporting, and operation for reduced on-site presence

### For the user

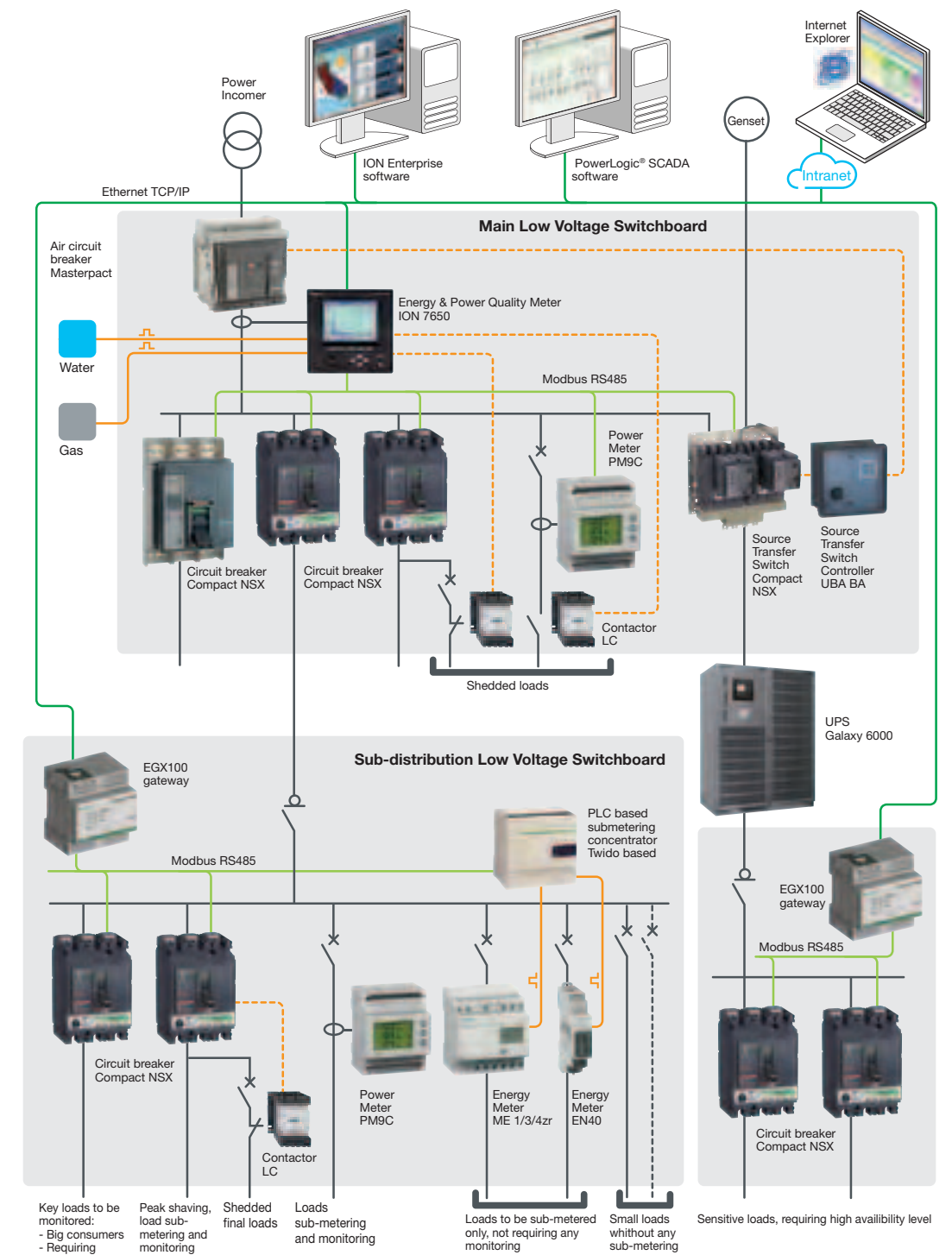
> Reduce energy consumption by **10%** by analyzing usage

> Implement additional controls such as curtailment programs for even greater savings

> Improve availability of your facilities through faster access to decision-critical reports and automated multi-source controls

> Increase accuracy of monitoring and troubleshooting with highly-accurate 1ms time stamping capabilities

- ☒ Measure
- ☒ Reduce energy consumption
- ☐ Reduce energy costs



### ION E V6.0 software

High interoperability with third-party systems, applications, and services such as BAS, MES, and ERP via ODBC, OPC, XML, FTP, email, CSV, and PQDIF

Integrated metering of all utilities (water, air, gas, electricity, steam)  
Enterprise web portal access to system-wide displays  
Power quality analysis including compliance with

international standards (IEC 61000-4-30, EN50160)  
Windows SQL Server 2005 database, ODBC-compliant, support for multiple distributed servers and clients

**Power SCADA software**  
Control an entire electrical distribution system with up to 2,000 devices  
Web interfacing  
Library of objects and page templates  
Calculations (MVA, Power Factor, MWh, etc.)



# Building management

Application: commercial and industrial buildings

## Control and monitor HVAC, lighting, security systems, and energy consumption

“ I want to reduce capital expenditures and operating costs, while making my building safer, more comfortable, and more energy efficient. My ideal building management solution would be user-friendly and web-accessible, providing access to the different building systems from a single user interface. ”

### Adopt an intelligent building management system

Our intelligent building management systems (iBMS) deliver reliable and efficient building management and significant energy savings. Built on open, standards-based technology, our iBMS facilitate the integration of building systems into a single network, with easy management from a single software platform even across multi-site organizations.

A single local or web-based user interface provides a complete view of all systems, including heating, ventilation, air conditioning, lighting, energy consumption, access control, video surveillance, intrusion, fire and smoke detection, electrical distribution, power quality, and monitoring.

We offer various intelligent building management systems and products, including TAC Vista, Satchwell and Andover Continuum.

Our iBMS solutions enable significant energy efficiency through:

- Schedule-based heating, ventilation, cooling, and lighting control
- Occupancy-based environmental controls
- Customizable energy reports and analysis
- Advanced alarm management
- Night setback, night ventilation purge
- Optimal start/stop
- Chiller/boiler plant optimization
- Heating/cooling equipment lockout
- Supply air temperature reset
- Variable Air Volume (VAV) pressure and flow control
- Outside air reduction
- Economizer control
- Electrical demand limits
- Domestic hot water control

Solution

Benefits

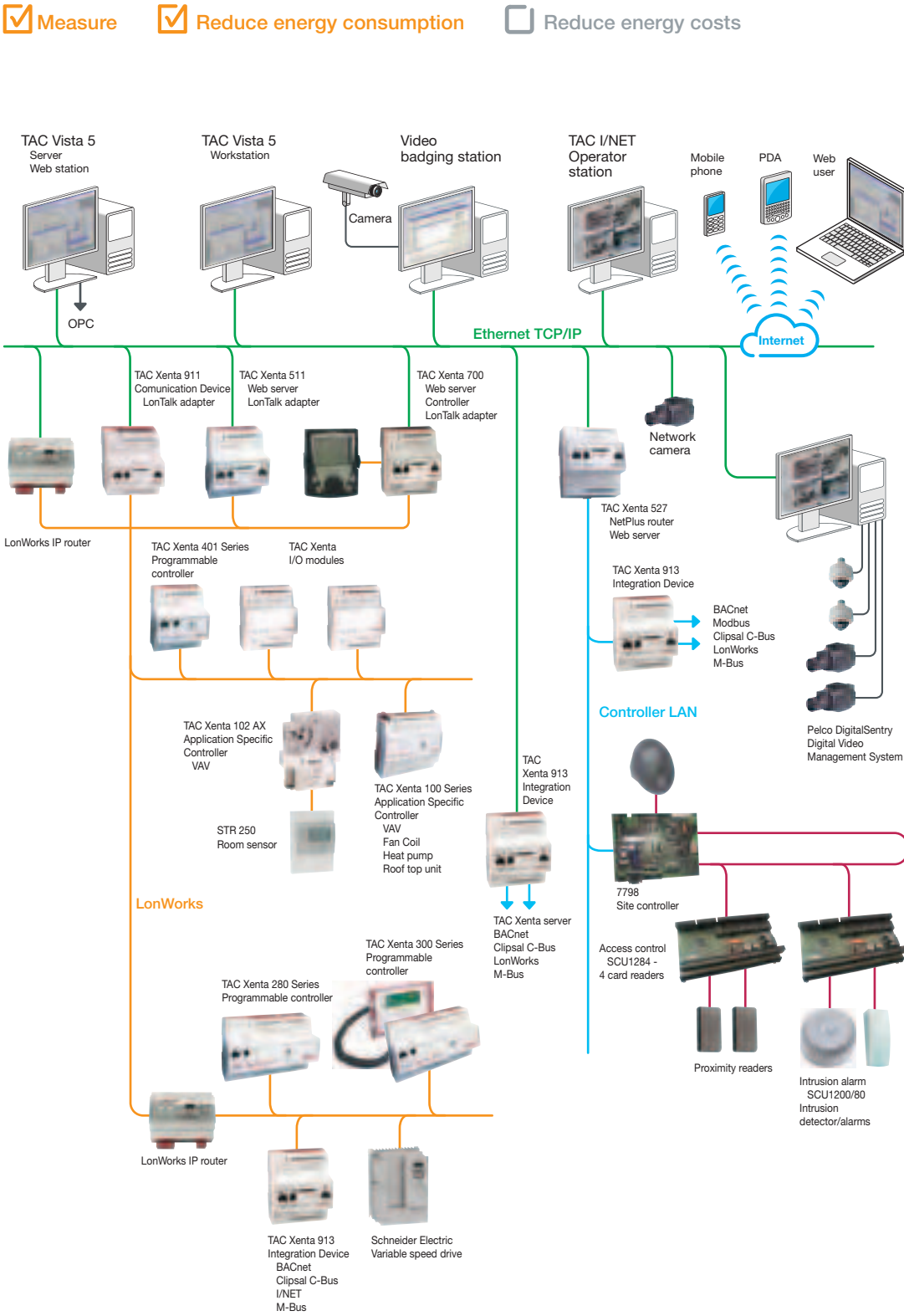
### For the user

Improve your building and business performance up to 30% by:

- > Lowering energy costs and carbon emissions
- > Eliminating unnecessary complexity by using a single software platform for all building controls
- > Cutting training, service, maintenance, and administration costs
- > Slashing capital expenditures by as much as 25%
- > Reducing ongoing operating costs by as much as 36%

### For professionals

- + Lower installation and ongoing operating costs
- + Streamlined operation, training, administration, maintenance, and service



Our iBMS such as TAC Vista, Satchwell and Andover Continuum offer the most open, scalable and IT-friendly building management system in the industry with

unique support for open protocols & interfaces: LON®, BACnet®, Modbus® OPC, ODBC Ethernet, TCP/IP SQL databases for an Open Database architecture

ZigBee-ready wireless solution SNMP, LDAP, TGML graphics/XML





Photovoltaic cells which capture the sun's energy are the heart of any solar power system. The intelligence of the system resides in the electrical installation, however.

It is the electrical installation that guarantees that the system works. It allows you to control a source of energy that fluctuates constantly due to changing weather, detect any losses, and correct problems, all with the end goal of supplying high-quality energy.

Our photovoltaic solutions respond to technical issues while addressing processes to:

- > Guarantee ROI within 10 years
- > Streamline projects with convenient product-plus-services packages
- > Ensure the reliability of the equipment installed
- > Simplify operation and optimize operating costs
- > Offer innovative functions and services
- > Protect the installation by adding remote safety and monitoring systems



Choose the solution that's right for you

- > Use available rooftop space to install and operate solar panels (p. 92)
- > Boost your green image and save with photovoltaic energy (p. 94)
- > Supply a small group of remote, off-grid buildings with electricity (p. 96)



# Renewable power generation

**Application:** commercial and farm buildings with roof surfaces < 500 square meters

## Use available rooftop space to install and operate solar panels

“ I want green certification for my farm. I would like to install rooftop solar panels on one of my outbuildings, but only if it is profitable for the business. ”

### Solution

#### Convert the energy generated by solar panels into alternating current and connect to the three-phase grid

The system consists of photovoltaic panels that produce between 30 kW and 50 kW of electricity by transforming solar energy into direct electric current. This convert, connect, protect system is built around prefabricated, interconnected panels:

Panel strings are interconnected via junction boxes to pool the electricity generated by the photovoltaic installation

An inverter then converts the direct current produced by the panel strings into alternating current

Factory-assembled, pre-wired protection units ensure the installation is safe for both people and property.

## Benefits

### For the user

> **Helps businesses qualify for green certification**



> **ROI of less than 10 years driven**

by selling surplus power back to the grid (in countries where incentives are offered)

> **Clear information thanks to SunEzy inverters**, which monitor both the electricity used and sold back to the grid

> **Easy to upgrade** to a building management system without changing the installation

### For professionals

+ **Schneider Electric support** to help you choose the right solution

+ **All products**, including panels, cables, and inverters, **provided by a single Schneider Electric-approved distributor**

+ **Add on to the installation without making costly changes**

+ **Meets environmental standards**

☐ Measure ☐ Reduce energy consumption ☒ **Reduce energy costs**

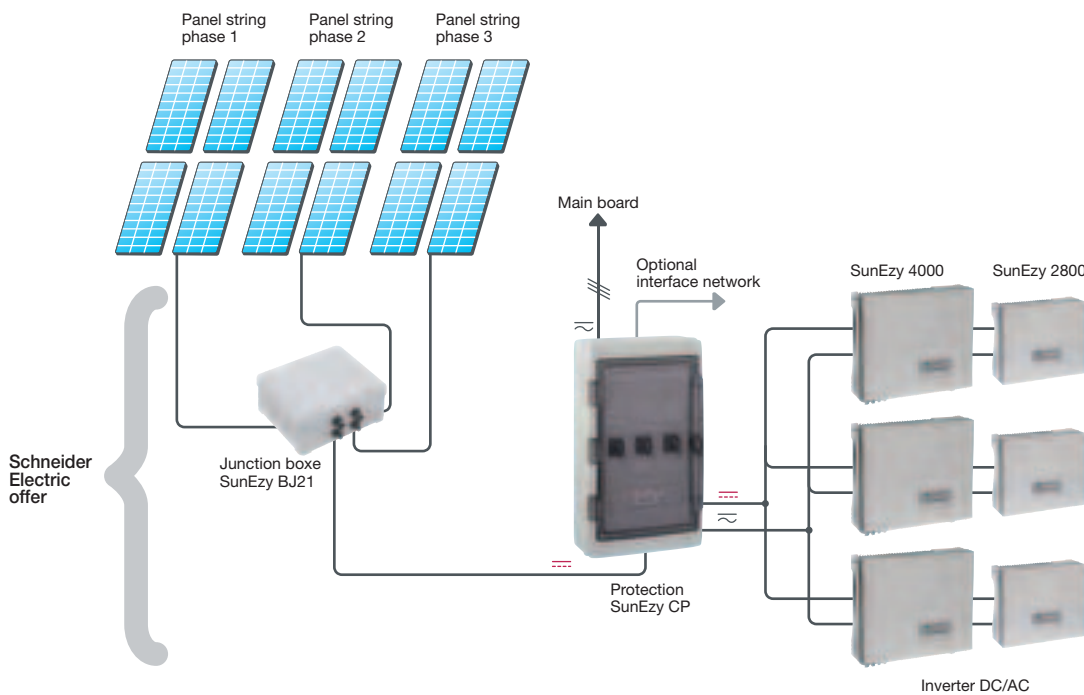
### Projects

#### South of France: farm building gets rooftop solar panels

The southern-facing rooftop of a farm outbuilding measuring just 147 square meters was the perfect location to install 105 175-watt solar panels covering a total area of 139 square meters. Because total power was just over 18 kW, a three-phase connection to the grid was installed.

The total cost of the equipment, installation, and hook-up to the grid was €90,000.

The installation is expected to generate 21,000 kWh per year, sold back to the grid at €0.60 per kWh, for total annual revenue of more than €12,000.



#### SunEzy inverters

SunEzy inverters cover power from 2 kW to 4.6 kW

They can be interconnected using SunEzy junction boxes (up to six strings)

SunEzy protection systems, which include lightning arresters, ensure the installation is safe

#### Communication functions are ensured:

via an LCD display integrated into each inverter  
via a PC installed with the SunEzy Control software delivered with each inverter; the software offers an array of additional functions to process the data produced by each inverter

- Display settings like power, current, voltage, and frequency in graph format  
- Generate reports

#### SunEzy products comply with the following standards:

EMC Directive: EN 50081, EN 50082, EN 61000-3-2

Limitation of harmonic current emissions (for currents under 16 A) LV (Low Voltage) Directive: EN 50178 VDE GS label



## Renewable power generation

**Application:** buildings from 100 to 2,000 square meters

# Boost your green image and save with photovoltaic energy

“ Our company is known for environmental awareness and advanced technology. We'd like to build on that image and cut energy costs. Given our available rooftop space, solar panels seem like a the natural choice. ”

## Generate your own electricity with rooftop photovoltaic modules

This solution is designed for three-phase electricity production. The photovoltaic modules are connected to the grid so you can sell surplus electricity back to the utility – usually at attractive rates – and all of the necessary devices and protective equipment are housed out of sight in a facilities room.

### Schneider Electric provides:

- Pre-wired, referenced junction boxes for connection to the photovoltaic generator's DC output
- Pre-wired, referenced DC disconnection boxes
- Dedicated DC/AC inverters synchronized with the utility grid
- AC protection for connection to the grid
- An iRio remote terminal unit monitors and transmits information and tracks electricity production records. It can also be used for display and customer demonstrations, to show in real time the photovoltaic production.

> Solution

Benefits

### For the user

#### > Up to 20% savings

With incentives and buy-back schemes, solar energy can offset your electricity bill by up to 20%

ROI is less than 10 years, and often far less (6 to 8 years)

#### > A smaller environmental footprint

Each kWh produced shaves an average of 0.476 kg off your building's carbon footprint (average value in Europe)



#### > A greener image

The system gives you the data you need to demonstrate your commitment to the environment

### + For professionals

#### + Design

Free, easy-to-use SunEzy Design software

#### + Installation

Junction boxes and DC disconnection boxes pre-wired according to local standards and rules

Limited part numbers for easy selection and ordering

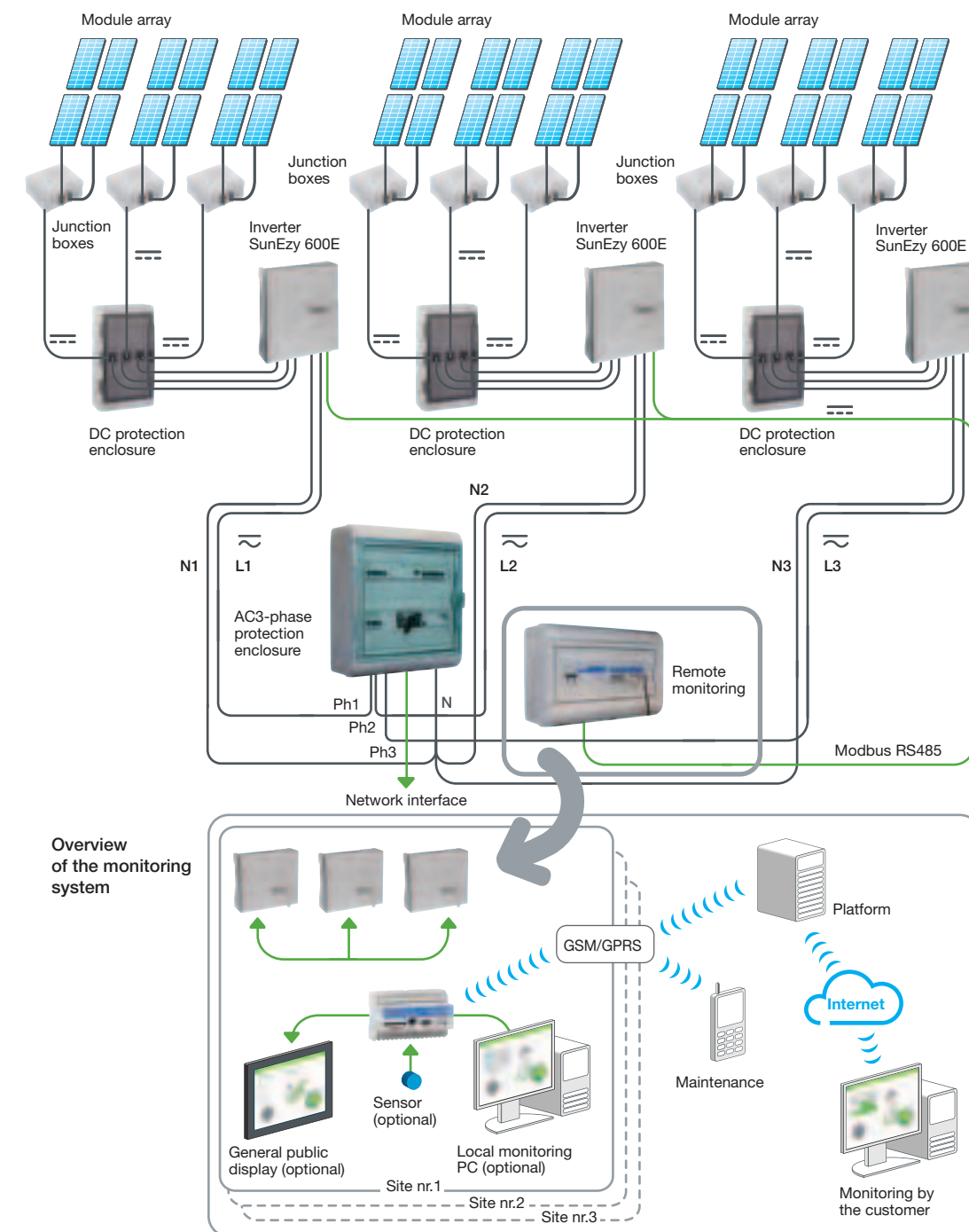
#### + Maintenance

SunEzy inverter display for easy testing

Included SunEzy Control software for inverter testing from your PC

DIN-rail-mounted iRio RTU transmits all information and monitors building PV production

- ☐ Measure
- ☐ Reduce energy consumption
- ☒ Reduce energy costs



### SunEzy DC/AC inverter from 2kWp to 5.4kWp

- Compact
- Transformerless for high efficiency (94.5%)
- High Maximum Power Point Tracker (MPPT) efficiency
- 600E performs at 750V/8.5A, with 3 MPPTs

### IP65 pre-wired disconnection enclosures meet local standards and rules

- AC protection enclosures available pre-wired or on-demand

### iRio RTU modular communication system

- Integrated web server sends information by GSM, GPRS, Ethernet, or RS485
- Optional additional cards for external inputs and outputs

### SunEzy Design software

- Includes database of photovoltaic modules and SunEzy inverters
- Recommends optimal PV generator architecture
- Generates production forecasts depending on location
- Computes cable losses



# Renewable power generation

Application: off-grid buildings

# Supply a small group of remote, off-grid buildings with electricity

“ We would like to provide electricity to a remote village in Africa. We are looking for the optimztl technical solution at the best price.”

# Solution

## Install solar panels to provide the buildings with their own independent energy supply

The system includes:

- Solar panels with a total capacity of a few kWc
- 1 Xantrex XW solar charge controller
- A set of batteries to store several days worth of electricity
- 1 Xantrex Trace TR1524 inverter
- Circuit breakers to protect the solar installation and for each building
- 1 GSM-equipped iRio unit for remote management of network operating schedule and monitoring of consumption, batteries, the charger, the solar panels, and the inverter
- Surge protection devices for PC photovoltaic generators and for the AC part of the installation.

# Benefits

## For the user

- > **Totally independent electricity supply**
- > **Local, independent management of the installation**

## For professionals

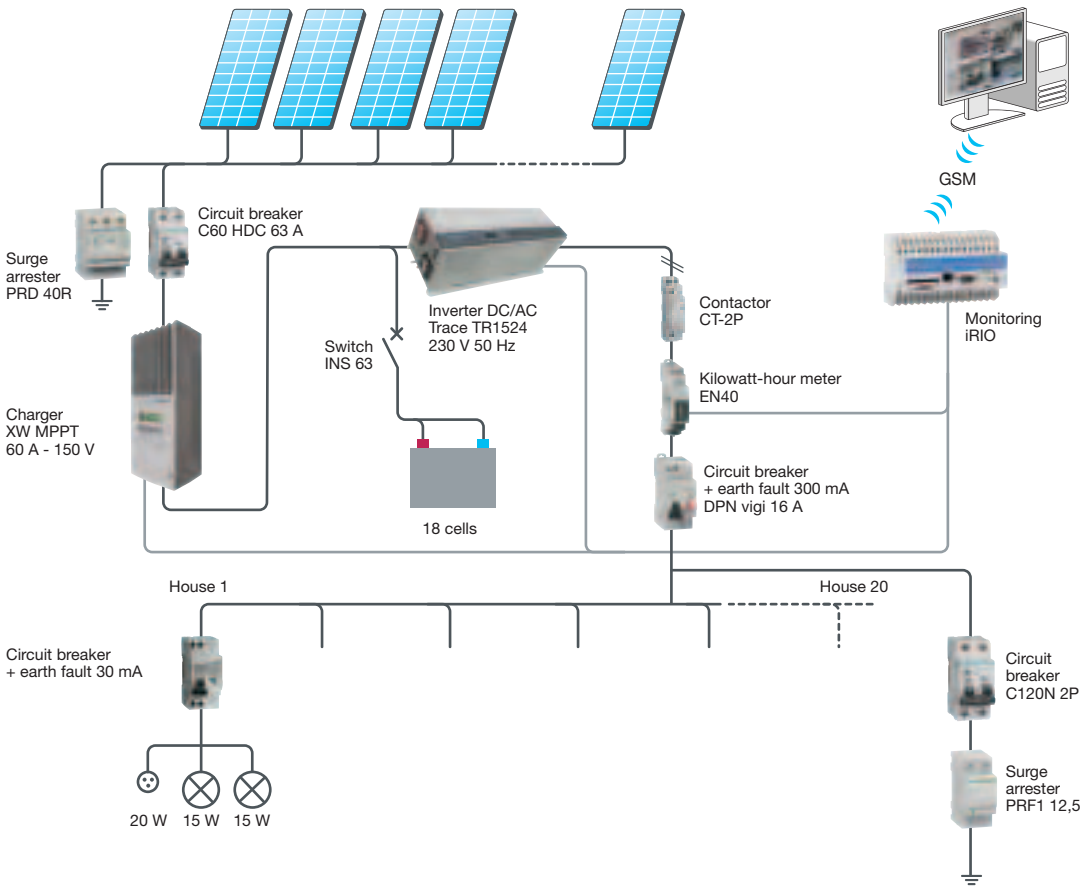
- + **A single interface for centralized management and monitoring**
- + **Local people receive maintenance and operation training from Schneider Electric**

## Projects

**Madagascar village gets solar energy**  
In early 2009, solar panels were installed in a mountain village in Madagascar. The village, which counts about 20 houses, was too remote to be connected up to the main grid. The goal was to provide 50 W for each household three hours per day a total of 1,000 W for the village or 3 kWh per day.

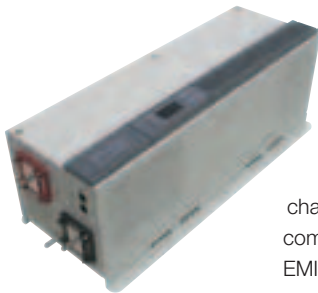
According to a survey conducted after the project was completed, the local population, which helped with the work, was satisfied with the results. A team of two local electricians received training from Schneider Electric Madagascar. They did the wiring in all of the houses and now handle maintenance and repairs.

- ☐ Measure
- ☐ Reduce energy consumption
- ☒ Reduce energy costs



### Xantrex Trace TR1524 inverter

- Thermal performance allows full output power to 50°C (122°F) without de-rating
- Sophisticated, energy-saving multi-stage battery charging algorithm
- Charger turns off once batteries are fully charged, reducing energy bills



- Battery life is prolonged because batteries are not continually held at float voltage
- Power factor corrected (PFC) charging
- Electrical draw is reduced by up to 30% less AC input current, while delivering the same DC charging current
- Better value and increased savings with maximum available AC power for loads
- Reduced electrical noise and interference with TVs and radios
- Trace Series inverter-chargers are FCC Class B compliant with necessary EMI filtering components

### Xantrex XW solar charge controller

Photovoltaic (PV) charge controller that tracks the electrical maximum power point of a PV array to deliver the maximum available current for charging batteries



### PRD 40R - 600 DC 2P

Surge arrester 600 DC: 2 poles, I<sub>max</sub> = 40A, I<sub>n</sub> = 15A





# Energy efficiency starts now. Our energy future depends on it.



## Cheaper

Each kWh not consumed equals 3 kWh our power plants don't need to generate  
Demand response programs cost about half of typical electricity costs

## Quicker

Today's energy-efficiency technologies guarantee fast return on investment

## Cleaner

Negawatt produces zero environmental impact

## More secure

Energy efficiency is something we can control at home:  
it reduces our reliance on imports





## To find out more

Simply contact your usual Schneider Electric representative.

You can also find the necessary information in the following web sites:

- > [www.contractors.schneider-electric.com](http://www.contractors.schneider-electric.com)
- > [www.engineering.schneider-electric.com](http://www.engineering.schneider-electric.com)



Make the most of your energy

---

### Schneider Electric de Colombia S.A.

#### Centro Atención Clientes

Bogotá 4269700 • Resto del país 019003312345  
[cacschneider@co.schneider-electric.com](mailto:cacschneider@co.schneider-electric.com)  
[www.schneider-electric.com.co](http://www.schneider-electric.com.co)

### Schneider Electric Ecuador S.A.

#### Centro Atención Clientes

Quito 465 792 / 793 • Guayaquil 2687350 / 351  
[clientes@ec.schneider-electric.com](mailto:clientes@ec.schneider-electric.com)  
[www.schneider-electric.ec](http://www.schneider-electric.ec)