Power Solutions for Buildings

19th Aug 2015



GAINING VISIBILITY INTO POWER CONSUMPTION WITH SMART BMS

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Schneider Electric

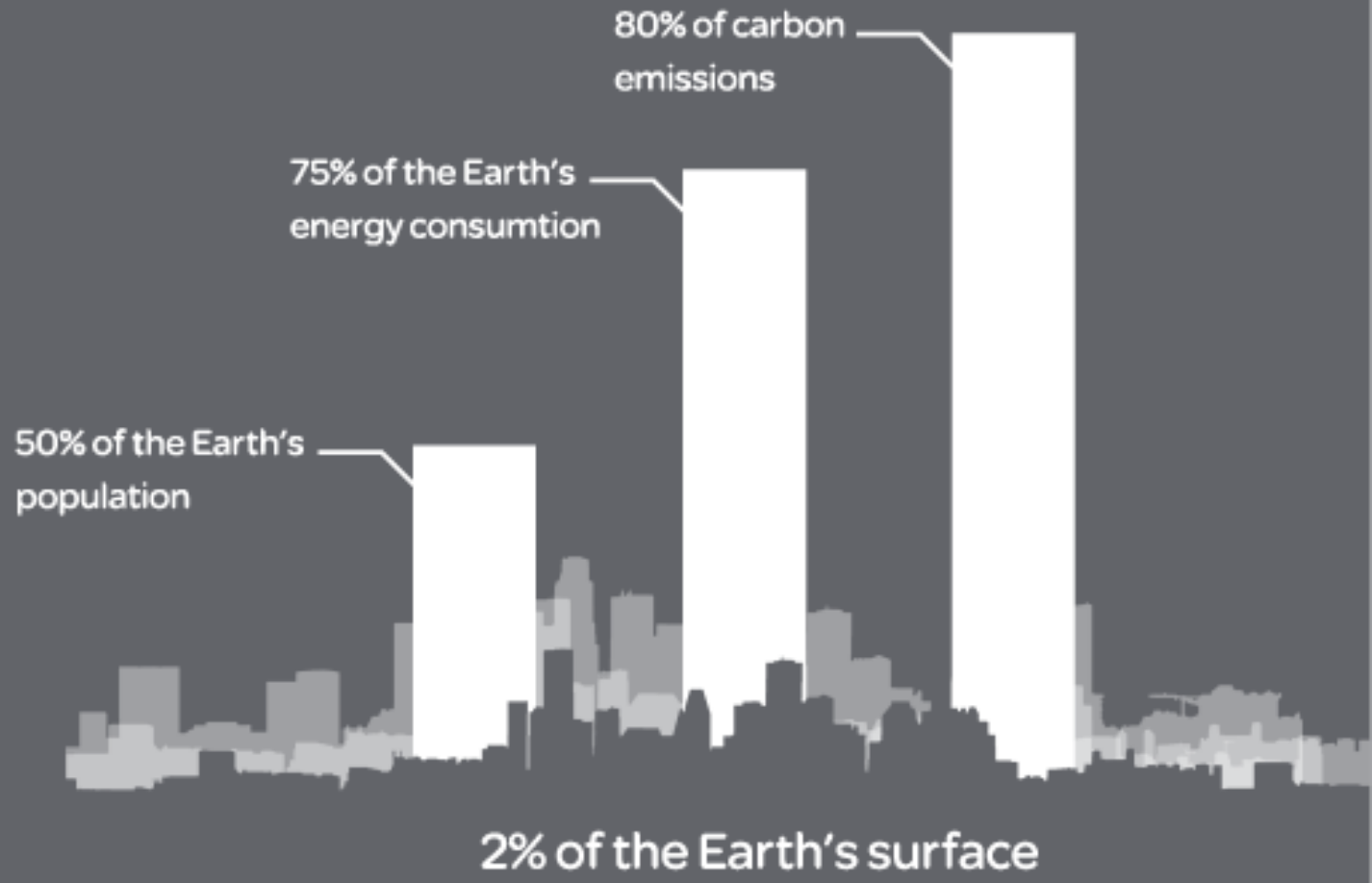
Energy Visibility –
Do you know where the energy goes to?

Schneider Electric

Energy Challenge

Our cities are **growing**.





40% of the energy consumed in most countries, is by **Buildings**



Why is it energy visibility is so important?

Energy Cost Management

Energy costs can comprise up to 30% of an operating budget

Sustainability

Energy regulations are forcing businesses to develop energy efficiency strategies (Singapore, USA, Australia, France, and UK)

Life Cycle Services

Up to 75% of a building's life cycle costs are ongoing operations

Network Management

8 to 10 disruptions are due to power failure (in UK), representing a significant cost due to lost productivity



18% of energy consumed in the US is in Commercial Buildings

PME Buildings Edition Modules

Power Monitoring Expert Buildings Edition

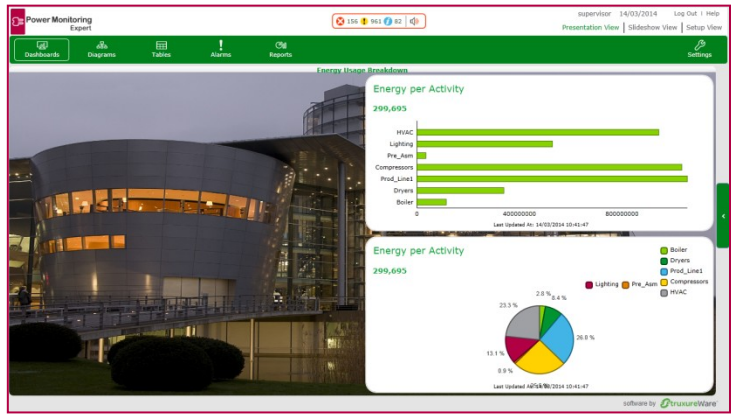
- Ability to integrate into SmartStruxure solution (based on StruxureWare Building Operation BMS)
  - **Dashboards and Reports are integrated into SBO BMS**

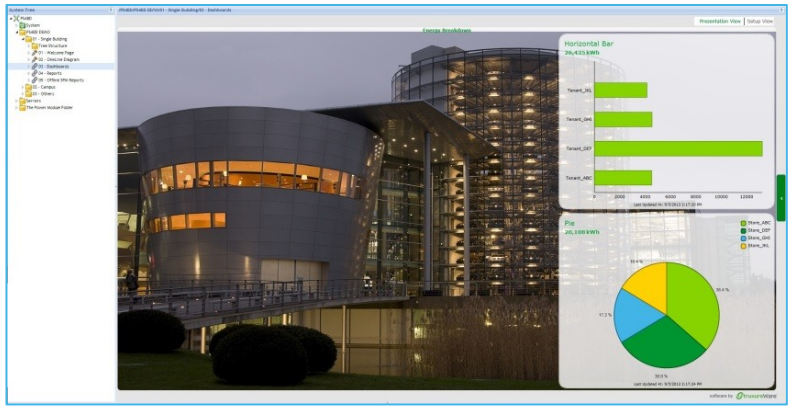
Power Monitoring Expert Buildings Edition

SmartStruxure

StruxureWare Building Operation

Power Monitoring Expert





Schneider BMS with PME vs Conventional BMS

- BMS systems are “open” software platforms primarily designed for **controlling HVAC systems**
  - Strong in graphics, setpoints, scheduling and distributed control
  - Systems can be extended to include lighting control, access control and energy monitoring

Engineered to Order

- Power Monitoring Expert Modules are specifically designed to monitor and control **electrical distribution systems**
  - Strong in “out-of-the box” applications for power and energy monitoring
  - Systems can be extended to include HVAC monitoring, lighting control in BMS

Engineered to Order

Energy Monitoring vs Power Monitoring

> Building automation is king
  > Large buildings require a Building Automation System (BAS) or Building Management System (BMS) but they do not require a Power Management System
  > Energy Management requirements are often specified with the BAS/BMS
  > Buildings Channels perceive Power Monitoring as only supporting electricity: They consider it to be weak in energy management and WAGES support

Energy Monitoring vs Power Monitoring



> Value of Power Management is poorly understood
  > The power distribution system in a building is often considered static infrastructure
  > Facility management teams do not consider power monitoring and power quality as important to their bottomline



Power Monitoring Expert **Buildings Edition Modules** helps:

- **Ensure electrical system health**
- **Increase operational efficiency**
- **Gain energy insight**
- **Improve energy accountability**



Mapping benefits to users

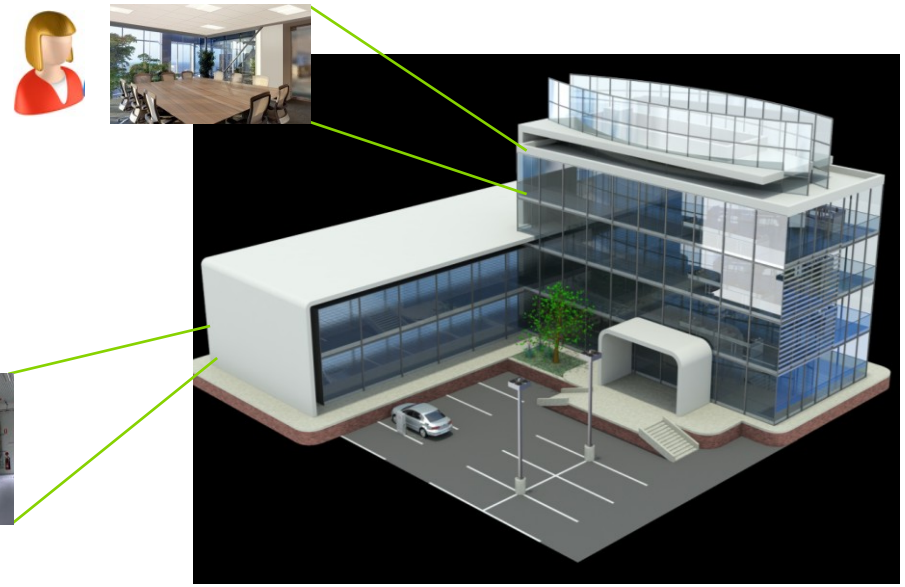
Enables you to monitor, measure and optimize your building's performance throughout its lifecycle

Improve Energy Accountability

> Allocate energy costs and share energy billing data
> Prevent unnecessary utility charges

Gain Energy Insight

> Raise energy awareness to achieve conservation goals
> Conduct energy analyses for improved efficiency



Increase Operational Efficiency

> Optimise electrical system performance
> Maximise energy performance of building systems

Ensure Electrical System Health

> Diagnose electrical problems and improve response times
> Avoid outages and prevent equipment damage

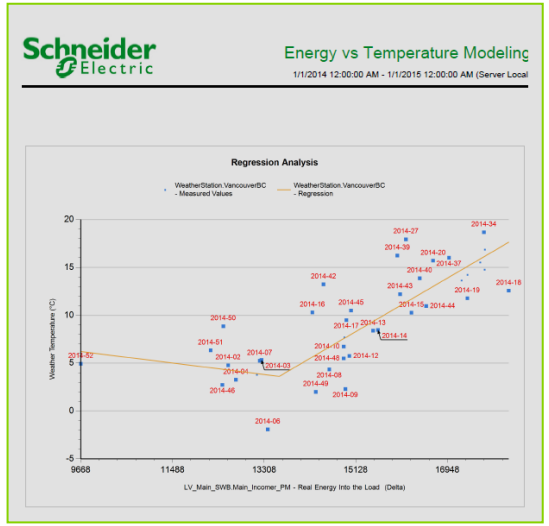
What a conventional BMS cannot affordably provide

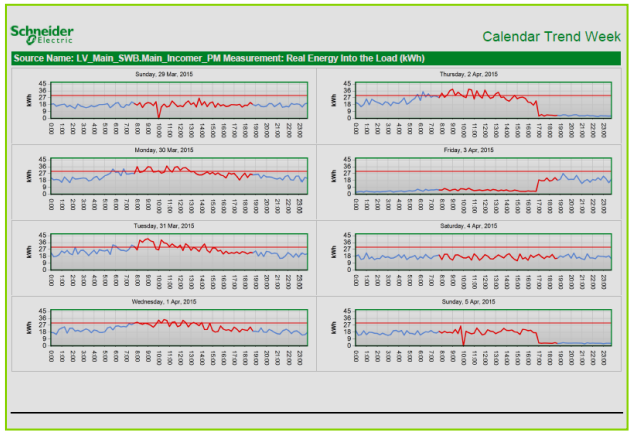
> Advanced “**Out-of-the-Box**” energy management tools that **allow users** to easily:

- > Compare, rank and normalize all forms of energy usage (WAGES)
- > Visualize energy usage patterns
- > Analyse relationship between energy usage and key variables (temperature, occupancy, etc)
- > Compare actual usage to expected usage using linear regression modeling
- > Calculate costs for all forms of energy, including water, air, gas, electricity and steam (WAGES).





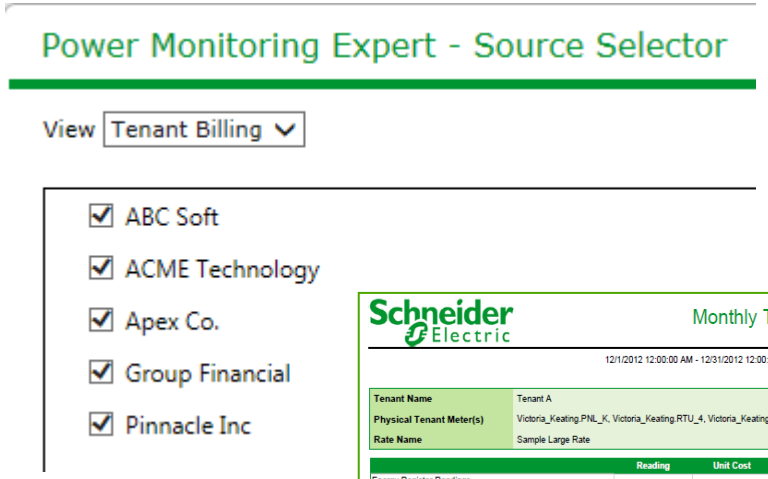


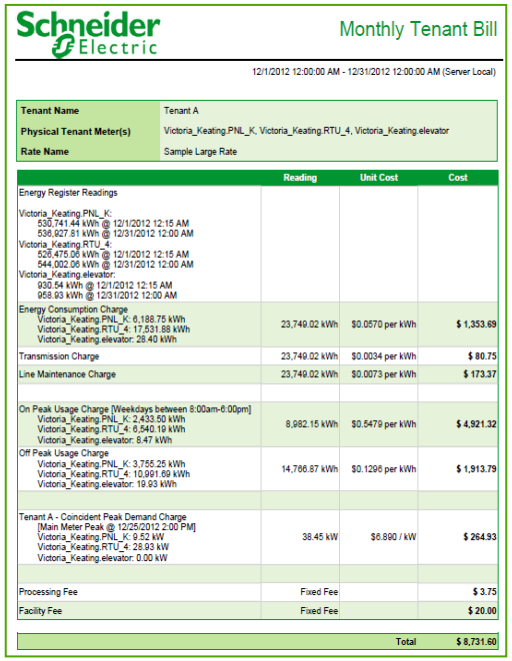


What a conventional BMS cannot affordably provide

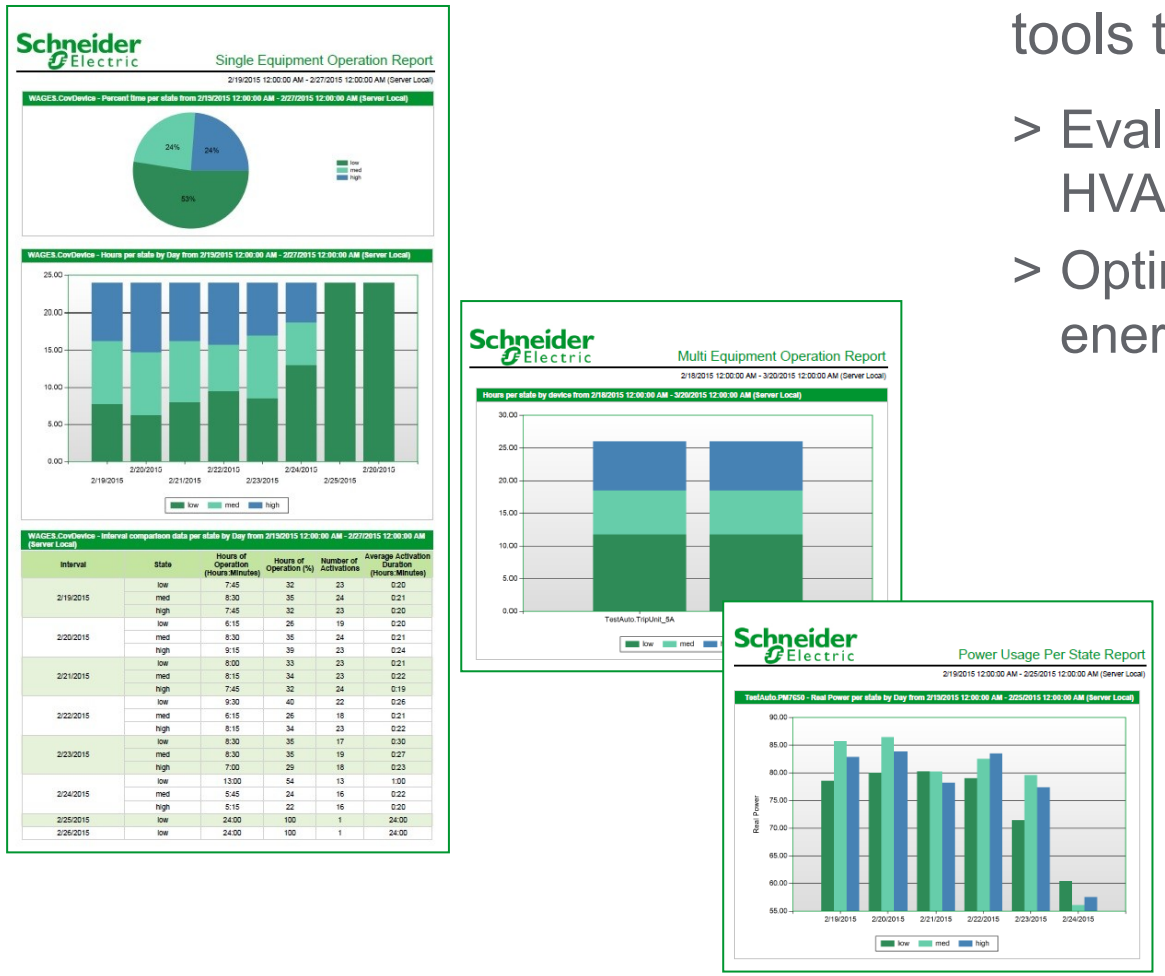
> Advanced "**Out-of-the-Box**" energy cost allocation tools that **allow users** to easily:

- > Calculate costs for all forms of energy, including water, air, gas, electricity and steam (WAGES).
- > Allocate energy costs to user-defined entities such as areas, departments, tenants, etc.
- > Support advanced allocation methods such as common area allocation, net metering, apportionment and tenant move-in / move-out
- > Provide a simple, flexible means to share billing data with other systems and applications.
- > Prevent unnecessary utility charges by verifying that utility bills are correct.





What a conventional BMS cannot affordably provide



> Advanced "**Out-of-the-Box**" energy performance tools that **allow users** to easily:

> Evaluate the true power and energy consumption of HVAC and other systems

> Optimise the operations of building systems for improved energy efficiency

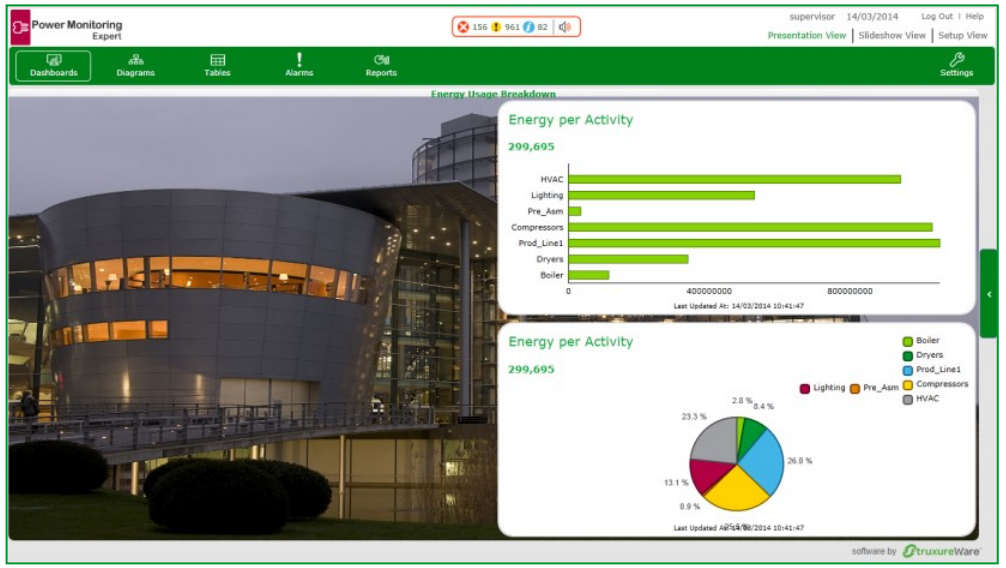


What a conventional BMS cannot affordably provide

> PME “**Dashboards**” and **“Reports”** are true **end-user applications** **NOT custom engineered** dashboard screens or reports constructed on a software platform.

> PME “Dashboards” application also provides **“Slideshow” mode** which makes it **easy to share energy usage information** to a **broader audience** within the customer organization for **improved energy awareness** → which is an important part of any energy conservation initiative.

> Conventional BMS systems do not provide pre-engineered dashboard / report applications designed for end-users to create, modify and publish energy usage information

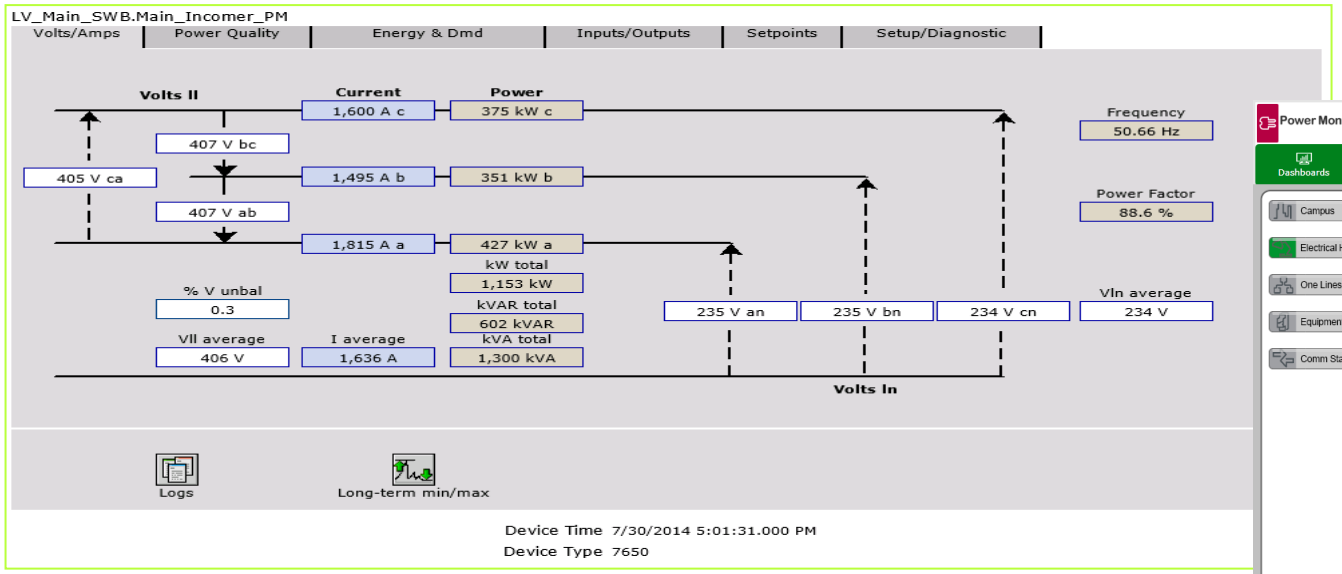


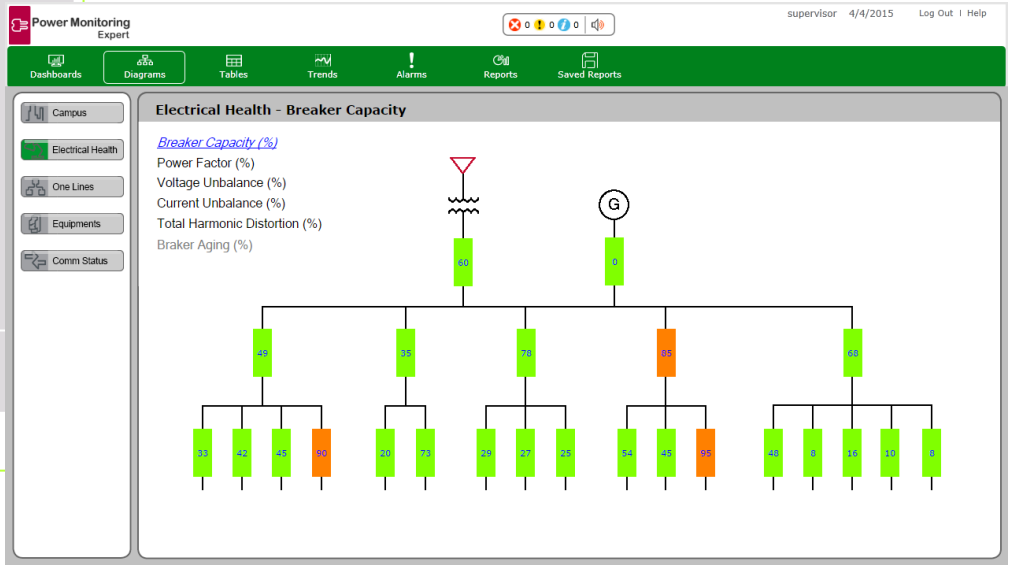
What a conventional BMS cannot affordably provide

> **Standardized views** of the electrical system and power equipment **designed for the non-electrical expert** allow them to quickly and easily:

> Determine if there is an electrical problem in the building

> Quickly find our more information related to alarms with “zoom in” and “drill down” navigation





Power Monitoring Expert (PME) Modules for your building needs



PME Buildings Edition Modules – Overview

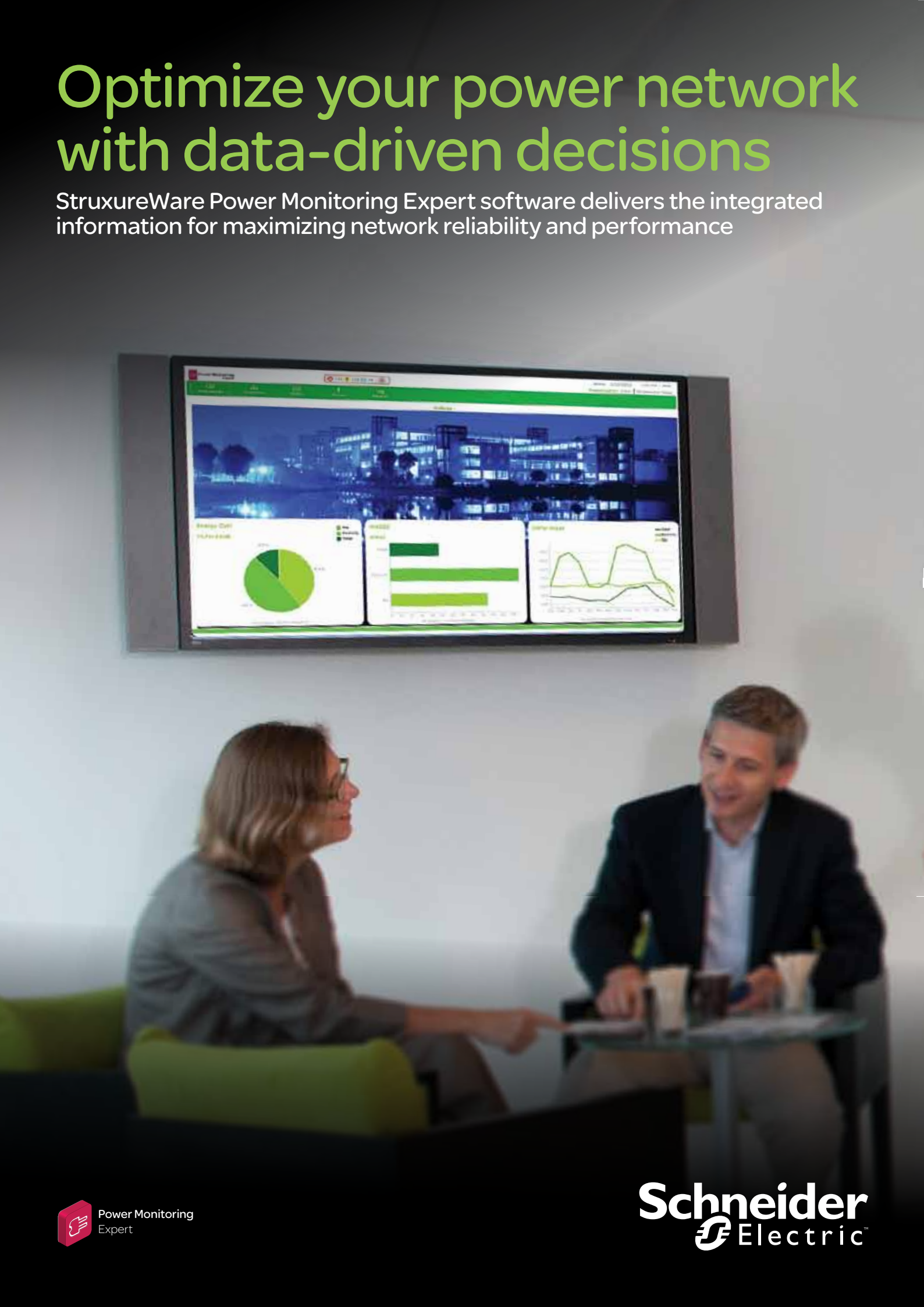
Power Monitoring Expert Buildings Edition

- PME screens focused on basic power monitoring for **Green Buildings**
  - **Standardized approach to Electrical Health Summary screens**
- PME reports focused on energy awareness and cost allocation for **Green Buildings**
  - **Energy Usage reports for:**
    - Building comparison (benchmarking)
    - Normalized by area
    - By load type (HVAC, lights, receptacles)
    - Consumption Ranking
    - Time of Use
  - **Energy billing**
    - Data export to third-party billing systems
    - Billing summary
    - Multiple billing
    - Multi billing export
- PME components focused on operational efficiency for **Building systems**
  - **Report on true power and energy consumption of HVAC and other systems**


Make the Most of your Energy !

Optimize your power network with data-driven decisions

StruxureWare Power Monitoring Expert software delivers the integrated information for maximizing network reliability and performance



Power Monitoring Expert

Schneider Electric



The need to clearly understand your entire facility's power performance



Flexible, scalable, and intuitive Power Monitoring Expert software

Timely access to actionable data for maximizing network reliability and performance

Enhanced data visibility for improved performance across your facility



Today, facility managers are pushed to the limit with demands on their time, staff reductions, increasing responsibilities, complexity of systems, and capex and opex pressures. At the same time, critical business operations depend on your ability to maintain reliable operations, reduce energy costs, and get the most out of your electrical assets.

StruxureWare Power Monitoring Expert brings your facility together

StruxureWare™ Power Monitoring Expert is a complete, interoperable, and scalable supervisory software dedicated to power monitoring that enables you to maximize operational efficiency, optimize your power distribution system, and improve your bottom-line performance.

Real-time monitoring, alarming, and power quality analysis helps you avoid critical conditions that can cause equipment failures and downtime. Track consumption and the cost of power, gas, and other resources, and allocate costs by building, department, or process. The software helps you uncover energy waste, unused system capacity, and shows new ways to extend equipment performance and life span. Plus, cutting-edge flexibility let you extend your power management system at your own pace, and allows for an open system with the integration of third-party devices and systems. Save thousands of engineering hours with ready-to-use device drivers, preconfigured tables, views, and reports dedicated to power and energy management.

30%

Monitoring and control systems can save you up to 30% of your annual energy consumption

Healthcare Buildings Data Centres Industry

Power management at your fingertips



Easy-to-implement energy efficiency measures with quick results

Power availability and reliability

Verify the reliable operation of power equipment

> Ensure and indicate that operations are normal
> Proactively optimise electrical distribution network
> Monitor breaker status, trip counting, real-time voltage, transformers, ATS, generators, capacitor banks, and tap changers
> Stay alert to adverse trends; take corrective action when necessary

Improve response to power-related problems

> Verify normal activities and provide information to help proactively assess issues
> Quickly review events, trends, and load status before, during, and after a problem

Validate that power quality complies with the energy contract

> Analyze and verify metrics to ensure compliance with agreed-upon levels of quality

Billing and cost allocation

Produce accurate tenant energy bills

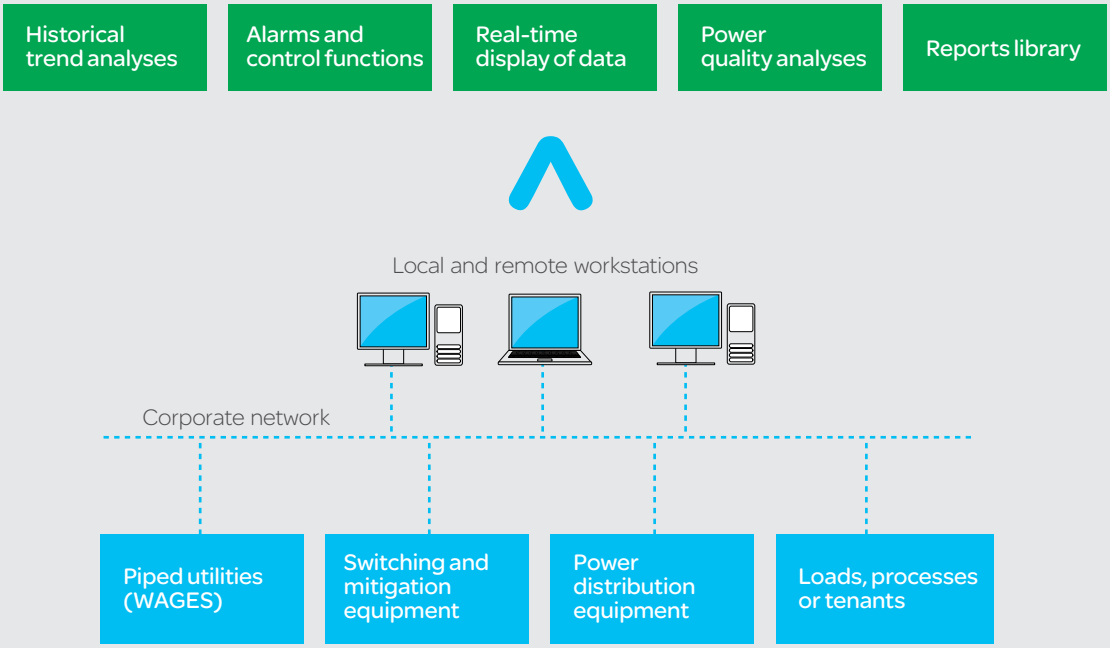
> Automatically collect meter energy consumption data (AMR)
> Calculate the cost for energy (WAGES) usage based on tiered rates, coincidence demand, Time of Use (TOU), Power Factor penalties, taxes, and other charges
> Totalize metering points for accurate energy usage allocation
> Account for changing tenants at any time

Identify billing discrepancies

> Validate utility bills, document errors, and measure energy contract compliance
> Identify false penalty charges and validate benefits of on-site generation

Allocate costs to departments or processes

> Collect, calculate, and report costs for buildings, departments, processes, shifts, lines, or equipment
> Reduce expenses, enable best practices, and validate all your conservation initiatives



Energy efficiency

Measure efficiency, reveal opportunities and verify savings

> Measure and compare consumption across departments, processes, and industry KPIs to identify the optimal places for improvement or adjustment
> Confirm ROI for system improvements with advanced reporting and analysis

Reduce peak demand, power factor penalties

> Identify locations of poor power factor and justify power factor improvement measures
> Automatically monitor capacitor banks, load tap changers
> Alert on demand levels, analyze trends to identify demand reduction and load shifting opportunities

Participate in load curtailment programs

> Review historical patterns to build a curtailment plan to enable participation in utility programmes
> Automate, aggregate load management to verify curtailment, coordinate backup systems, and ensure contract compliance
> Negotiate to reduce loads in response utility curtailment requests

Electrical distribution monitoring

Leverage existing infrastructure capacity and avoid over-building

> Reveal historical and current load patterns and hidden capacity
> Determine if existing infrastructure will accommodate new equipment

Support proactive maintenance to prolong asset life

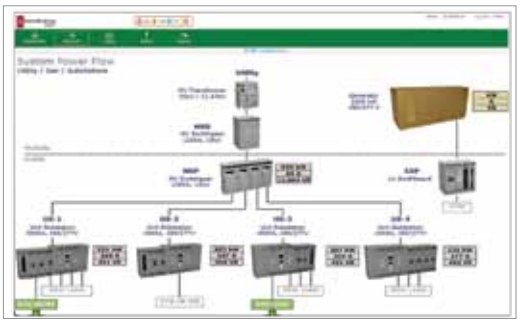
> Real-time and historical data reveals relationships between equipment and the conditions affecting system stability

Expand your energy capabilities



Your power monitoring system needs to be an integral part of your business strategy. Power Monitoring Expert software fits in with your objectives and expands its capabilities with flexible deployment options that meet the needs of your IT group. Whether supporting custom solutions and advanced requirements, or through its capability to communicate with third-party devices in your system, Power Monitoring Expert adds value now and especially over the long term.

Designed for step-by-step investment



Integrated data from the whole network

Scalable, flexible architecture

> Grow to hundreds of metering points
> Integrate legacy and third-party devices
> Leverage and optimise existing infrastructure

Interoperable

> Share data with third-party SCADA, automation, building management, and accounting systems
> Open standards-based interoperability via ODBC, OPC, XML, Modbus, OPC Server, OPC Client, and Web Services



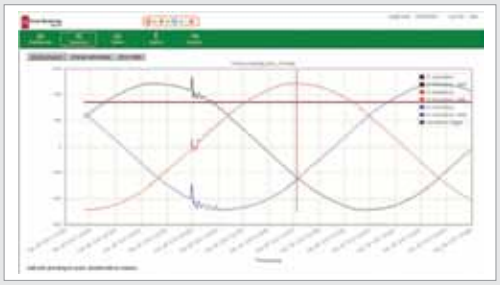
Attractive dashboard displays



Alarm and event displays



Historical trends



Power quality analyses

Customized, real-time monitoring

Smart dashboards

> Share information with your external stakeholders
> Display any parameter in your power network
> Kiosk or slide-show mode for flexible presentation options
> Combine metering of all utilities (WAGES)
> Integrate content from other web sites

Intuitive data formats

> Collect system-wide data, display, and perform calculations
> Customise views of your data
> Graphics templates and table libraries provide plug-and-play views of your facility

Alarms and events

> Trigger on complex conditions, on-screen alarm notifications
> Log all relevant data and sequence of events for diagnosis
> Flag and avert potential problems
> Acknowledge alarms with authenticated web access and audit trails

Trend, analyze, and report

Analyze data and power quality

> Trend any parameter to reveal demand peaks and track system-wide energy costs
> Identify patterns in operational usage trends
> Optimise network capacity, avoid over-building

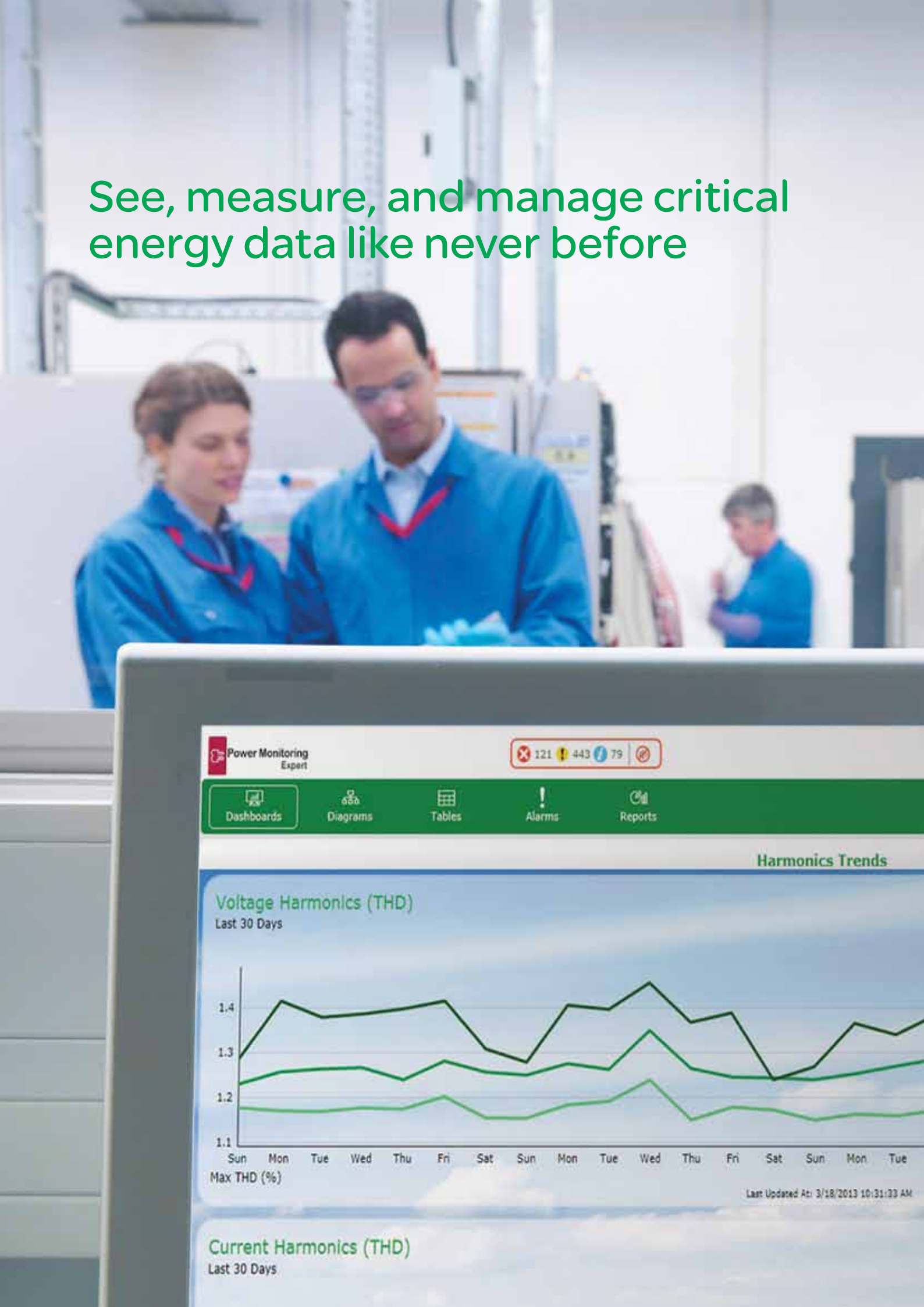
Power quality analyses

> Monitor events and waveform plotting system-wide
> Monitor harmonics, K-factor, crest factor, symmetrical components
> Diagnose and isolate PQ problems to increase reliability
> Automatically detect and report on voltage disturbances
> Quickly evaluate PQ events plotted on standard ITIC curve

Comprehensive reports

> Sixteen preconfigured report templates to get you up and running immediately
> Options for fully-customized reports
> Manual, scheduled, or alarm/event-triggered distribution via email or web
> Options for tenant billing and cost allocation reports

See, measure, and manage critical energy data like never before



Part of a broader, integrated solution

Power monitoring made easy

Schneider Electric™ helps companies overcome challenges and achieve an efficient enterprise through our integrated solutions, namely EcoStruxure™ integrated hardware and software system architecture and StruxureWare software applications and suites. EcoStruxure architecture unifies power, process, IT room, building, and security systems. StruxureWare software allows users to see, measure, and manage critical energy data across buildings, industrial plants, and data centres.

The depth of StruxureWare Power Monitoring Expert software makes it simple to match to your operational needs, your facility's portfolio and your budget. The software is compatible with a host of devices, and new device drivers are added continuously.

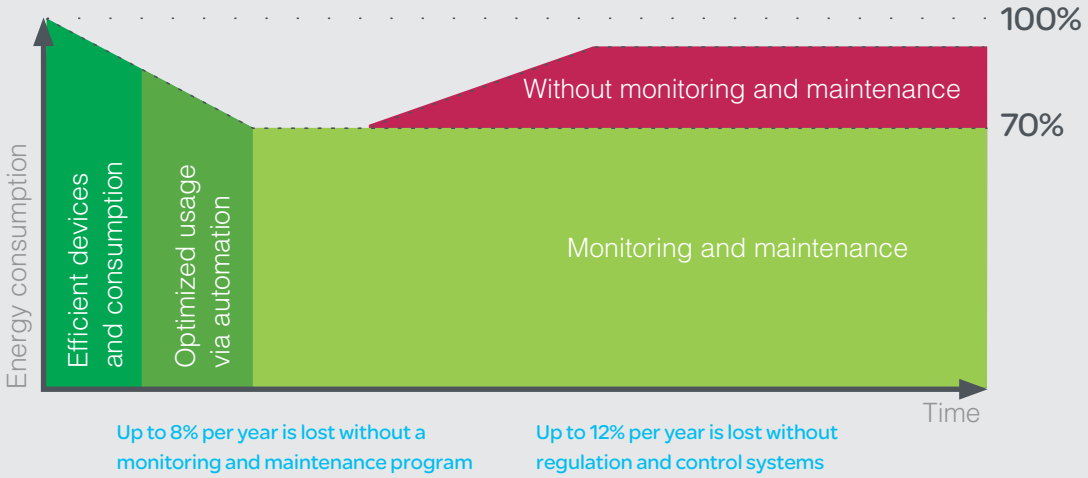
PowerLogic power and energy meters	Legacy power and energy meters
ION8800 series	ION8300/8400/8500/8600
ION8650 series	ION7700
ION7550/ION7650, ION7550RTU	ION7500/7600 series
ION6200	ION7550RTU
PM5000 series	ION7300 Series (ION7300, ION7330, ION7350)
PM3000 series (PM3250, PM3255)	ACM3720, ACM3710, ACM3300
PM1200	**PowerLogic circuit monitors**
PM800 series (PM810, PM820, PM850, PM870)	CM2000 Series (CM2050, CM2150, CM2250, CM2350, CM2450)
PM700 series (PM710, PM750)	CM3000 Series (CM3250, CM3350)
PM600 series (PM600, PM620, PM650)	CM4000 Series (CM4150, CM4250, CM4000T
PM210, PM9C	**PowerLogic branch circuit power meters**
EM5600	BCPM (A, B, C models)
iEM3000 series	**Protective relays**
EM1200	Sepam series 10, 20, 40, 48, 60, 80
DM6200, DM6300	**PLCs for WAGES**
Insulation monitors	Modicon Momentum M1 - TR (A8, D10, D16)
Vigilohm IM20	Twido Modular PLC (D12, D28, D44)
Circuit breaker trip units	**Limited edition (LE) drivers for download**
Micrologic A, E, P and H devices	Modbus-compatible devices
Micrologic Compact NSX Type A and Type E	Other devices through OPC

ION

Power Monitoring Expert is fully compatible with ION technology

Sustain your gains with our services

Investing in a power and energy monitoring system pays. It helps you manage your energy efficiently and gives you unique insight into energy-related costs, risks, and opportunities. Protect and optimize your investment by signing up to Schneider Electric Energy Management Services.



EnergySTEP (Energy Sustainability Tiered Efficiency Program)

Our EnergySTEP™ program is designed to help you to spot opportunities for energy saving and take action.

Our Energy Efficiency Power Consultants conduct energy efficiency and process audits on your premises to identify energy saving areas and equipment. They work to a methodology that is carefully structured to match your specific production-related energy needs.

<2 years

simple payback with a small initial investment

What our EnergySTEP teams do	The benefits
Benchmark major energy processes and items	Clearer view and understanding of your electricity use
Draw up energy balance sheet showing how site and its workshop perform, and define medium-term and long-term energy efficiency action plans	You are given energy saving solutions with their estimated ROI
Identify areas where energy savings can be made and their potential ROI	You can decide which action in your energy efficiency to prioritize
Recommend electricity deals and rates that will reduce your electricity bill	You use your energy more cost-efficiently

	EnergySTEP 1	EnergySTEP 2	EnergySTEP 3
EE Audit Walkthrough	●	●	●
EE Detailed Audit		●	●
EE Support Contract			●

Protect your investment with Proactive Support

Power Monitoring Expert software is an investment in your business that you want to protect. With a Schneider Electric Proactive Support agreement, it helps you maximize your investment and ensure you have a reliable power network today and tomorrow.

There are three different Proactive Support offers available depending on your needs: Software Assurance to keep your software up to date, Maintenance Support to protect and optimize your server, and Application Support to safeguard your entire Power Monitoring Expert system.

	Software Assurance	Maintenance Support	Application Support
Receive notifications and gain access to software upgrades for 12 months.	●		●
Gain access to the latest updates and software enhancements made available through service pack releases. Service pack installation is available through remote connection.	●		●
Optional SQL assurance: Get 12 months of access to SQL upgrades made available by Microsoft. (Must be purchased in conjunction with SQL license.)	Optional		Optional
Receive quarterly system audits to review and report on the state of your application and database servers. Includes suggested next steps for performance optimization, database trimming/archiving, etc.		●	●
Receive a monthly, scheduled backup of system database and configuration at a secure Schneider Electric data center. Provides important repository of system information in the event of disaster.		●	●
Gain knowledge with a 2-hour system orientation session scheduled at the start of the contract period.			●
Receive priority telephone and email support. Get up to 15 hours of direct access to a dedicated team of support engineers to address immediate concerns and questions.			●
Receive goal-based, proactive system support. We schedule six calls annually to address your specific system performance and operation goals.			●
Remote access for troubleshooting (support engineers will provide ability to remotely connect to system anywhere in the world to speed case resolution and to aid in troubleshooting)			●
Receive technical assistance for any system updates or configurations to your base system software.			●
Optional dedicated senior support engineer: We assign a support engineer to serve as your primary point of contact for all reactive and proactive support needs.			Optional
Optional 24x5 after-hours support: Extended support coverage provides you with piece of mind in case you require critical assistance after normal business hours.			Optional

Make the most of your energy℠

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Power Manager

Embedded power management option for SmartStruxure solution



Schneider Electric is the only company to offer a fully embedded building and power management solution that provides a state-of-the-art building management system with insight to your energy usage and the performance of key electrical assets.

Now you can monitor, measure, and optimize your building's power in the same way as your HVAC, lighting, and fire safety systems. The Power Manager option enhances SmartStruxure™ solution by providing actionable information to ensure electrical network health, increase power quality awareness, and improve energy accountability.

Power Manager helps you enhance your building's performance throughout its life cycle.

Ensure electrical network health
- Monitor electrical equipment and key assets
- Improve response to power related issues

Increase power quality awareness
- Understand power factor, harmonics, and voltage disturbances
- Detect faults and diagnose key electrical problems

Improve energy usage accountability
- Track energy consumption and allocate costs
- Achieve energy conservation objectives

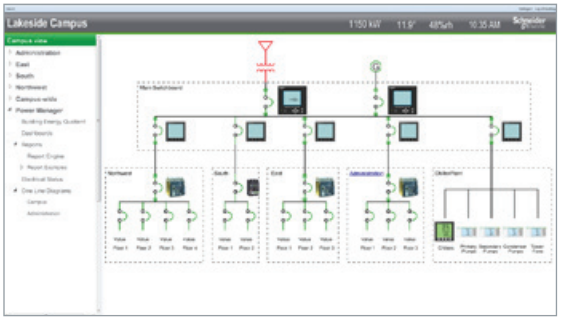
Make the most of your energy℠

Power Manager for SmartStruxure solution

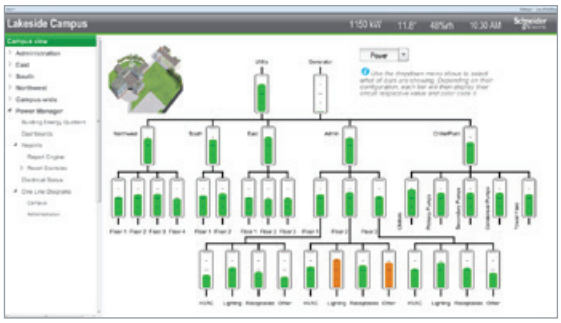
FEATURES AT A GLANCE

- Real time power monitoring and management
- Fault detection and diagnostics
- Respond and recover to reduce downtime
- Preventative maintenance of key assets
- Energy management (reports and dashboards)
- Load management
- Investment planning





Electrical One Line Diagram



Electrical Network Health Summary



Energy Dashboards

Power Manager key benefits

Monitor electrical equipment and key assets

- Differentiate between mechanical and electrical power
- Monitor transformers, breakers, PDU, ATS, UPS, generators and capacitor banks

Improve response to power related issues

- Quickly receive power system alarms
- View the critical alarm history sequences by time

Understand power factor, harmonics, and voltage disturbances

- Reduce power losses
- Prevent equipment damage

Detect faults and diagnose key electrical problems

- Identify and correct nuisance trips
- Avoid outages while identifying areas for improvement or adjustment

Track energy consumption and allocate costs

- Measure piped and non-electrical utilities (WAGES)
- Assign costs to customers, departments, floor or area

Achieve energy conservation goals

- Attain green building certification
- Support energy awareness initiatives

To learn more contact your local Schneider Electric representative.

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