EcoStruxure™ Power
Energy Usage Performance eGuide

Life Is On | Schneider Electric

Contents

EcoStruxure Power digitizes electrical distribution

EcoStruxure Power helps facility operations achieve greater operational and energy efficiency

In large buildings, critical facilities, and electro-intensive operations, gaining better insight into energy usage and opportunities to improve can have a significant impact on operational and energy efficiency.

Save money by reducing energy spend

EcoStruxure Power leverages digitization to gain a deep understanding on how energy is being consumed in processes and other operations with a comprehensive but simple toolset to allow for:

- Energy Usage Analysis & Benchmarking
- Cost Allocation
- Energy Performance Analysis & Verification
- Energy Efficiency Compliance

Read the white paper

Challenges and Opportunities

The future: more energy demanding, more devices connecting

40% — Amount of available energy consumed by buildings worldwide
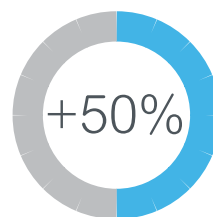
+50% — Level of increase in global industry energy demand by 2050
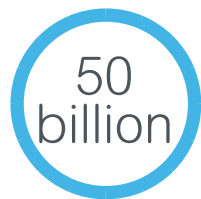
50 billion — Number of smart, connected devices by 2020
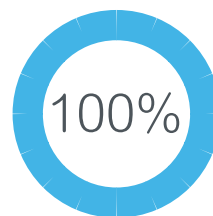
100% — Expected uptime for buildings worldwide

Energy challenges facing companies today

> "We set this big target for sustainability, and now we are scrambling to figure out how to achieve it."

[Lack of clear plan to achieve energy performance goals

> "It's hard to manage something you can't see... we are basically guessing."

[Companies lack information to track and quantify savings

> "We're not an energy company."

[Energy management is not a core strength

> "It's difficult to keep up. There is so much to consider it's hard to know where to focus."

[Energy management continues to increase in complexity

Turning the challenges into opportunities

Save money by reducing energy spend

Many different tools and strategies are available to help with identifying energy savings opportunities.

The first step in energy reduction is to develop awareness: gaining a basic understanding of the challenge and beginning the journey of improving the energy efficiency in your facility.

Now you can begin to make improvements.

Once you've made the improvements, you can track your improved performance, verify those improvements have economic returns, and report savings.

Also, make sure to sustain your improved performance and associated savings; this step will even help you find new ways to improve.

Become aware

Track and
show results

Step 1   Step 2   Step 3   Step 4

Make
improvements

Monitor, maintain,
and improve
return to step 2
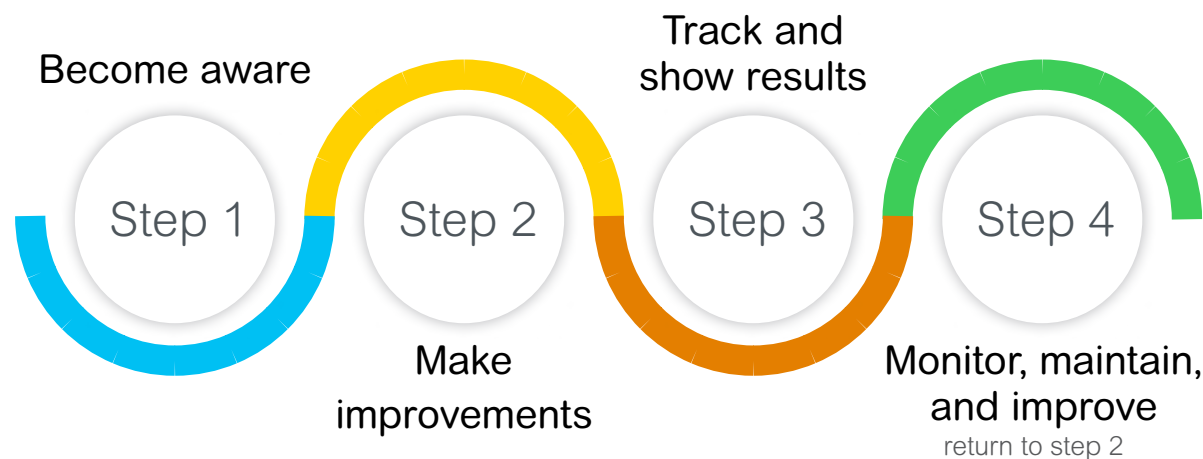
IoT enabled applications for energy usage performance

Energy usage analysis

How can you reduce energy spend?

" I want to analyze how much energy is consumed by the various load types and/or areas in my facility to determine where to focus my energy conservation initiatives.

Energy usage analysis

Energy benchmarking

Cost allocation

Greenhouse gas reporting

Energy efficiency compliance

Energy performance analysis

Energy performance verification

Gain context to where energy is consumed

- Determine how much energy is consumed by the various load types or areas to identify where to focus energy conservation initiatives
- Understand energy usage patterns and find energy waste
- Analyze what factors contribute most to energy usage
- Assess energy usage by process area or by product output
- Create energy usage models and compare actual consumption against expected
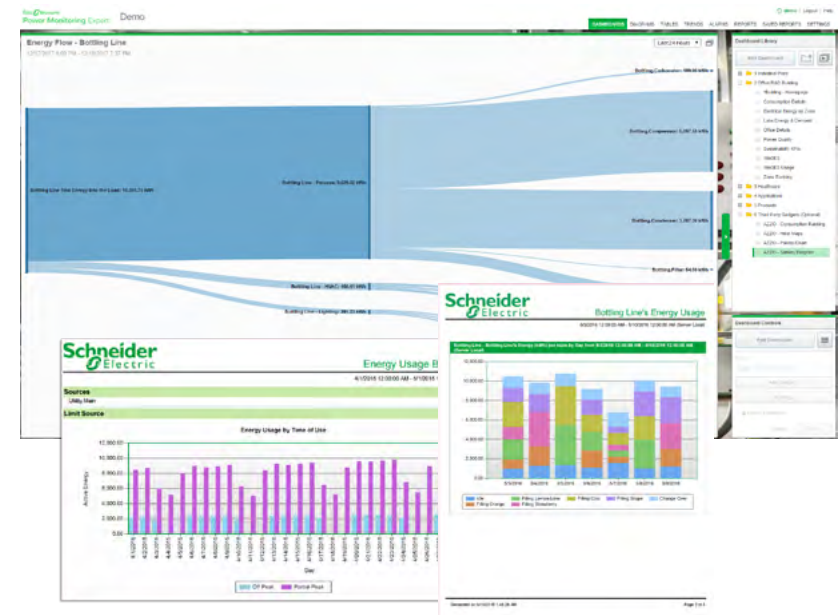
and 3rd party devices

Energy benchmarking

How can you reduce energy spend?

" I want to compare the efficiency of energy use across buildings, plants, and/or process lines.

Energy usage analysis ▶

Energy benchmarking ▶

Cost allocation ▶

Greenhouse gas reporting ▶

Energy efficiency compliance ▶

Energy performance analysis ▶

Energy performance verification ▶

Compare energy usage to find areas of over-consumption

- Benchmark energy usage with respect to other buildings / plants / process lines
- Multi-site visualization enables benchmarking across multiple sites from a centralized location
- Compare energy usage by normalizing consumption with respect to area / production volume or other drivers
- Gain understanding what makes an energy efficient facility use less energy than an inefficient facility

Energy cost allocation

How can you reduce energy spend?

" I want to encourage energy efficient behaviour and support cost accounting by accurately allocating direct and indirect energy costs to departments / processes.

- Energy usage analysis ▶
- Energy benchmarking ▶
- **Cost allocation** ▶
- Greenhouse gas reporting ▶
- Energy efficiency compliance ▶
- Energy performance analysis ▶
- Energy performance verification ▶

Pinpoint best opportunity for energy conservation measures

- Measure energy costs using standalone metering (e.g. BCPM, iEM3000, PM5000, PM8000, ION9000) or embedded metering (e.g. Compact NSX, Masterpact MTZ, etc.)
- Measure and allocate energy costs by business unit, department, area, floor, or building through metered data reporting and business or process hierarchies in PME
- Before initiating an energy savings project, it is necessary to understand which load type, business unit, area, floor, or building provides the biggest savings opportunities
- Allocating energy cost to different departments or process areas often results in reduction as a result of a change in behaviour

Schneider Electric — Machine Shop Monthly Energy Cost

9/1/2013 12:00:00 AM - 10/1/2013 12:00:00 AM (Server Local)

Tenant	Welding Shop
Contact	Mr Jeff Schneider II
Devices	Victoria_Keating.main_7650
Rate	PGandE-E20 Rate

	Number of Units	Unit Cost	Cost ($)
Energy Consumption Readings			
Victoria_Keating.main_7650:			
Start: 1,064,331.50 kWh @ 9/1/2013 12:00 AM			
End: 1,243,235.25 kWh @ 10/1/2013 12:00 AM			
Energy Consumption - Off Peak Summer	107,159.00 kWh	$0.04786	5,126.63
Energy Consumption - Partial Peak Summer	37,724.00 kWh	$0.07026	2,650.49
Energy Consumption - Peak Summer	34,020.75 kWh	$0.10855	3,692.95
kW Demand - Peak Summer			
Demand Peak Time @ 9/27/2013 3:30 PM	320.81 kW	$4.56	1,462.89

Greenhouse gas reporting

How can you reduce energy spend?

" I want to track and report carbon emissions for public disclosure/ transparency, green image, regulatory compliance, or participation in carbon markets.

Energy usage analysis ▶

Energy benchmarking ▶

Cost allocation ▶

Greenhouse gas reporting ▶

Energy efficiency compliance ▶
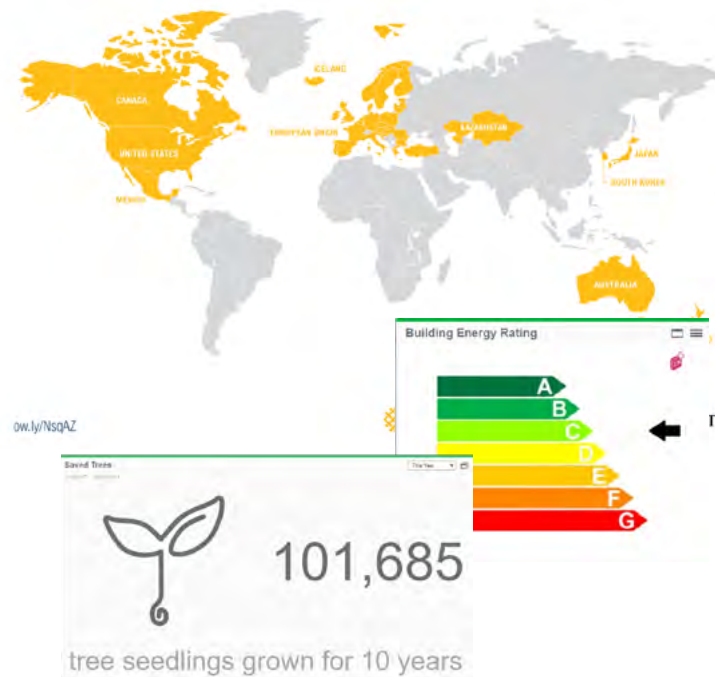
Energy performance analysis ▶

Energy performance verification ▶

Outputs of energy visibility can help with reporting requirements

- Greenhouse Gas reporting based on:
  - Equivalent tons of CO_2 emissions
  - Saved Trees, km driven, etc.
- Period-over-period usage comparison
- Building Energy Rating
- Carbon emissions are reported and segmented by source, scope, and pollutant and can be indexed to various metrics you specify

Mandatory Greenhouse Gas Reporting Programs

ow.ly/NsqAZ

Building Energy Rating

A
B
C
D
E
F
G

Saved Trees

101,685

tree seedlings grown for 10 years

Digitizing Electrical Distribution

Challenges and Opportunities

Application Overview

Digital Architecture

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Energy efficiency compliance

How can you reduce energy spend?

"I want to benchmark my energy consumption with respect to a national or international energy efficiency certifications body and display our energy reduction success to the public.

- Energy usage analysis
- Energy benchmarking
- Cost allocation
- Greenhouse gas reporting
- **Energy efficiency compliance**
- Energy performance analysis
- Energy performance verification

Maintain compliance to regulations and sustainability

- Energy Efficiency Certificates and Industry Benchmarking are:
  - Becoming requirements for many new buildings
  - Often resulting in tax credits

- It is difficult to participate in many new projects if we cannot meet the requirements of the respective standard
- There are many different standards such as ISO50001 that are becoming commonplace
- Following guidelines defined in global standards can contribute to a significant improvement in energy intensity (energy normalized by production or square footage)

CERTIFICATE

Certificate-ID: C-07-2015-21229661

Certificate for: Audited energy data management system

Certificate holder: Schneider Electric SA, 35 rue Joseph Monier, 92500 Rueil Malmaison, France

Test report: B-07-2015-21229661

Energy Performance Analysis

How can you reduce energy spend?

> " I want to analyze the energy performance of my facility or building against a modeled baseline, which takes into account relevant energy drivers.

- Energy usage analysis ▶
- Energy benchmarking ▶
- Cost allocation ▶
- Greenhouse gas reporting ▶
- Energy efficiency compliance ▶
- **Energy performance analysis** ◉
- Energy performance verification ▶

Analyze energy usage in the context of operations to continuously improve

- Import "contextual" data for tracking energy performance, conducting energy analysis, and calculating important KPIs
- Gain insight into operational energy consumption shift, production line, production output, or equipment to find opportunities to optimize
- Duration curve reporting for transformer load capacity analysis
- Define a model of energy usage by heating/ cooling degree days or other parameters that influence energy consumption.
- Visualization of energy KPIs in context provides a feedback loop between energy manager and operations so decisions can be made to maximize energy efficiency
- Process SCADA or BMS do not have standard capabilities for providing this information

Energy Performance Verification

How can you reduce energy spend?

" I want to verify the energy savings from an energy retrofit or energy savings program.

Energy usage analysis ▶

Energy benchmarking ▶

Cost allocation ▶

Greenhouse gas reporting ▶

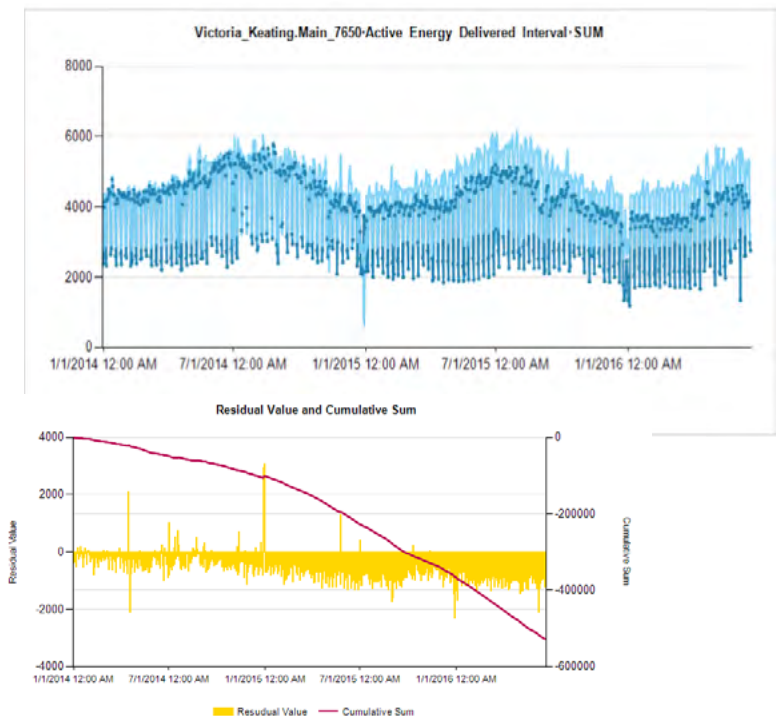Energy efficiency compliance ▶

Energy performance analysis ▶

Energy performance verification ▶

Ensure you are getting returns on your energy conservation efforts

- Verify energy savings resulting from an energy retrofit
- Important if performance contract is used to fund retrofit
- Similar to Energy Performance Analysis, it is essential to have a dynamic baseline to account for the variability of energy consumption in the context of environmental factors or production
- Typically, the model is generated using baseline data from before the retrofit
- The model is used to show the difference between the modelled data (pre-retrofit) and the actual data (post-retrofit)
- Weigh the results of energy conservation measures with targets or goals


Victoria_Keating.Main_7650·Active Energy Delivered Interval·SUM

Residual Value and Cumulative Sum

| Resudual Value | Cumulative Sum |

Architectures

Architecture 1

Energy usage performance

Energy performance infrastructure can be added over time; starting with strategic points and extending to sub-metering as more energy usage context is built, and as improvement initiatives are taken.
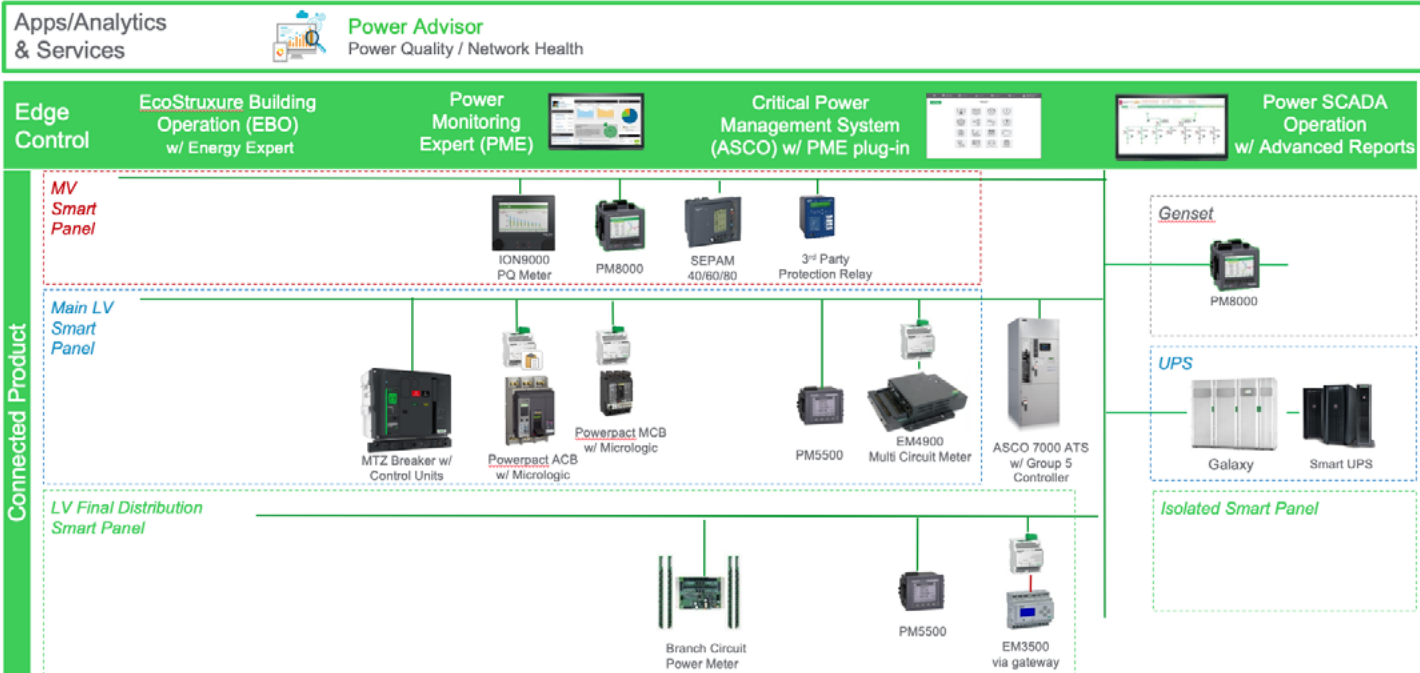
Learn more

White paper: Power Management for a Changing World.

Video: IoT EcoStruxure™ at Melbourne Cricket Ground Ensures

White paper: Mitigating Risk Using Power Management Systems

Contact us to start your journey.

schneider-electric.us

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