

Energy Operation with Energy Performance Service for ISO 50001

ISO 50001



- ISO 50001 is intended to Improve Energy Performance through activities like:

- Creation and achievement of energy performance goals
- Tracking key performance indicators

- ISO 50001 officially launched in June of 2011 with Schneider Electric's World Headquarters "The Hive" as the first certified site, globally.

ISO 50001 Main Requirements



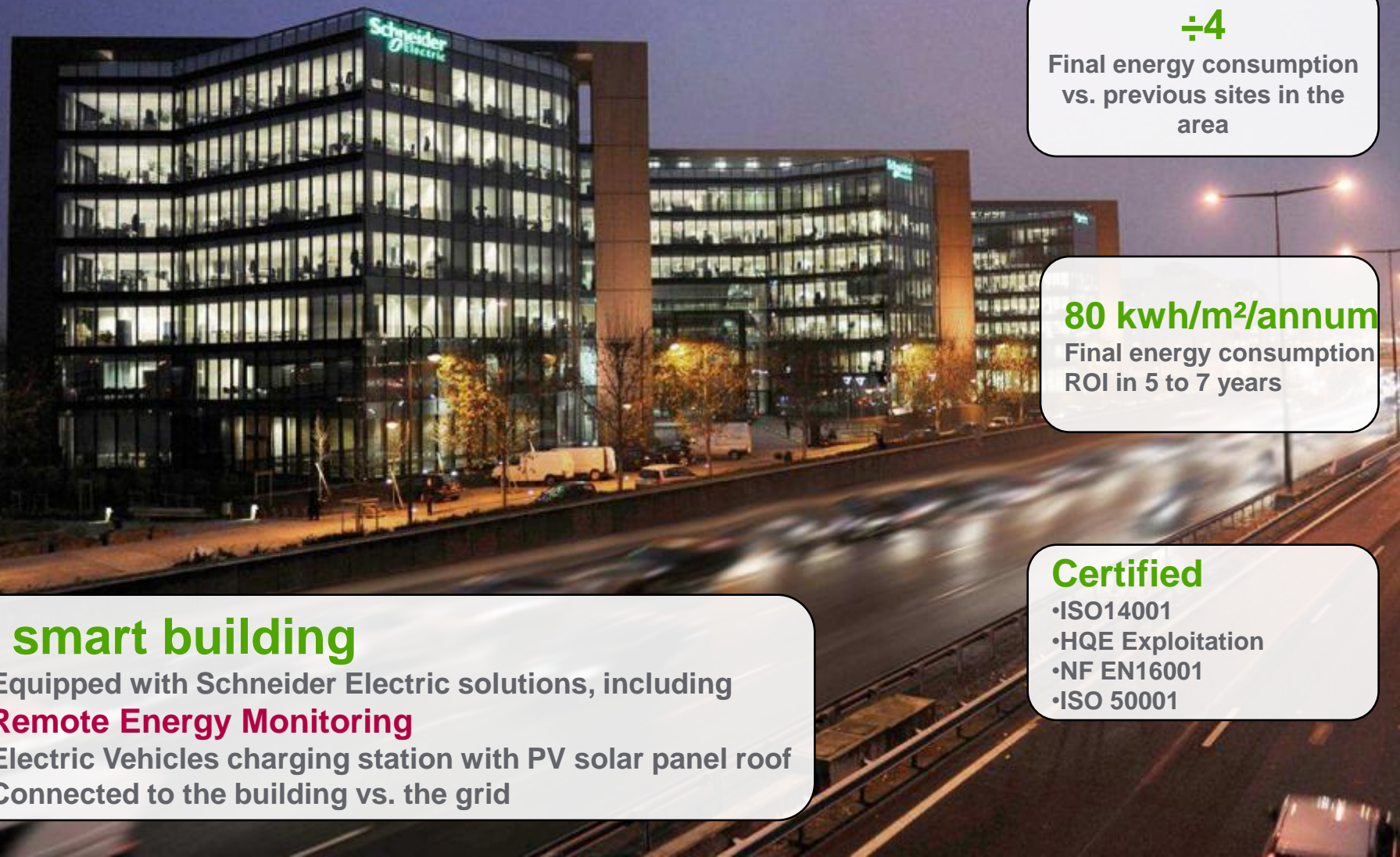
- Continuous Improvement
- Usage Tracking
- Energy Review
- Recommendations for Improvement
- Action Plans for Improvement
- Periodic Maintenance
- Documentation of Operational Procedures
- Communication Protocol
- Training Program

The Hive

- Schneider Electric's global headquarters
- FIRST ISO 50001 Certified EnMS in the world



The numbers tell the story!



÷4

Final energy consumption
vs. previous sites in the
area

80 kwh/m²/annum

Final energy consumption
ROI in 5 to 7 years

A smart building

- Equipped with Schneider Electric solutions, including **Remote Energy Monitoring**
- Electric Vehicles charging station with PV solar panel roof
- Connected to the building vs. the grid

Certified

- ISO14001
- HQE Exploitation
- NF EN16001
- ISO 50001

Conduct an Energy Review

Standard

Develop, record, and maintain an energy review

- Analyze energy use and consumption based on measurement and other data;
- Based on the analysis of energy use and consumption, identify the areas of significant energy use;
- Identify, prioritize and record opportunities for improving energy performance.

Schneider Electric Solution



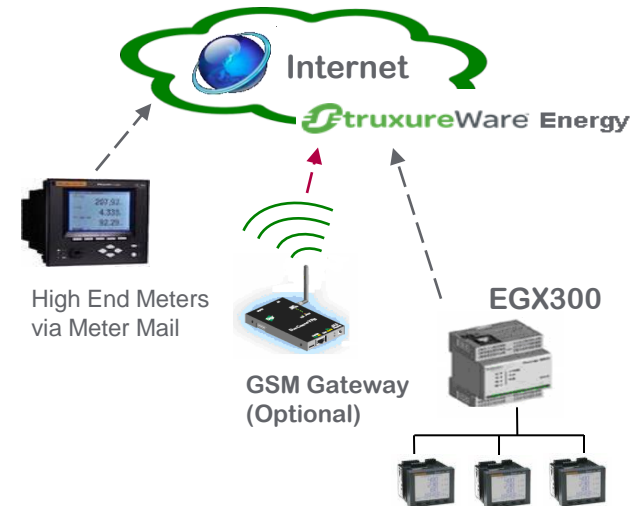
> In depth **EnergySTEP Audits** from walkthroughs, detailed audits, performance follow up to performance contracting.

> Schneider Electric **Metering Solutions** ensure accurate measurement for a true analysis of energy use

Energy Audits and Metering solution



Metering device connectivity to Energy Operation



Our Energy Audit method

- Conduct walk-through audit
- Determine feasibility of opportunities
- Calculate estimated cost savings and ROI
- Present preliminary report

Our Metering Solution

- Identify right energy meters at right locations
- Connect all energy meters to EGX300 Gateway or System
- Connect energy data to cloud based Energy Operation
- Build Dashboards and Reporting



Establish Energy Baseline

Standard

Establish an energy baseline using the information in the initial energy review, considering a data period suitable to the organization's energy use and consumption. Changes in energy performance are measured against the energy baseline.

Schneider Electric Solution



The Energy Manager utilizing **SE Energy Operation Software with Energy Performance Service** identifies and maintains ongoing energy information for benchmarking and analysis



Establish Energy Baseline

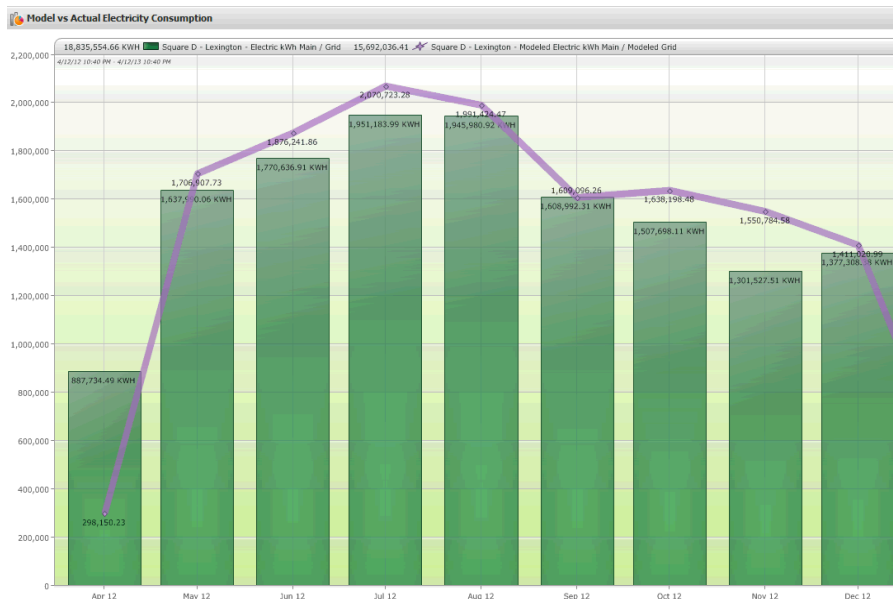
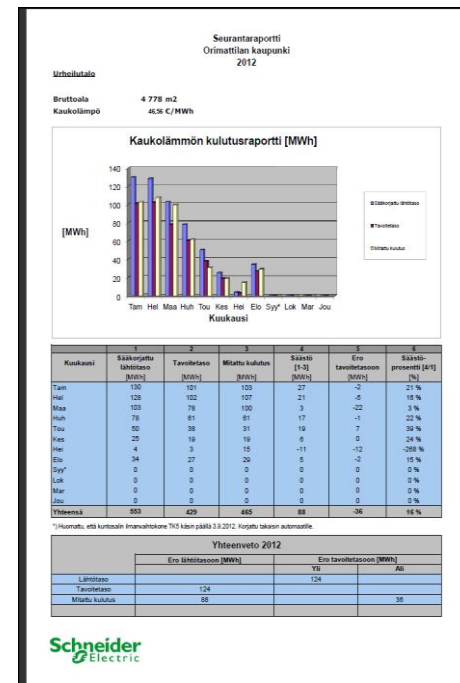
• Monthly baselines today

✓ Easy to set baseline targets and define in contract

$$Baseline = K_d * D + K_G * hdd + K_C * cdd + F + \ddot{O}$$

Facility	KD	KG	F [MWh]	Ö [MWh]
Facility 1	0,5	0,11	7	
Facility 2	0,25	0,07	3	
Facility 3	0,32	0,16	53	
Facility 4	0,22	0,19	29	

✓ Easy to monitor and make monthly reports on overall building performance



Monthly baselines target can be computed , set and monitored with actual using **Energy Operation**

Establish Energy Performance Indicators

Standard

Identify EnPIs appropriate for monitoring and measuring its energy performance

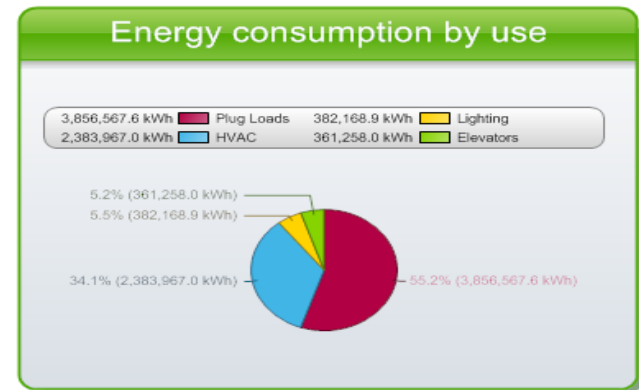
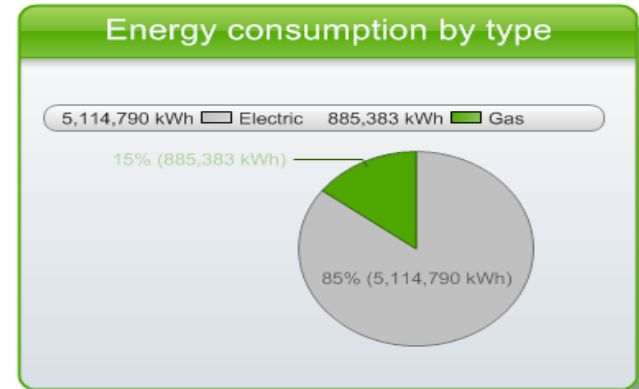
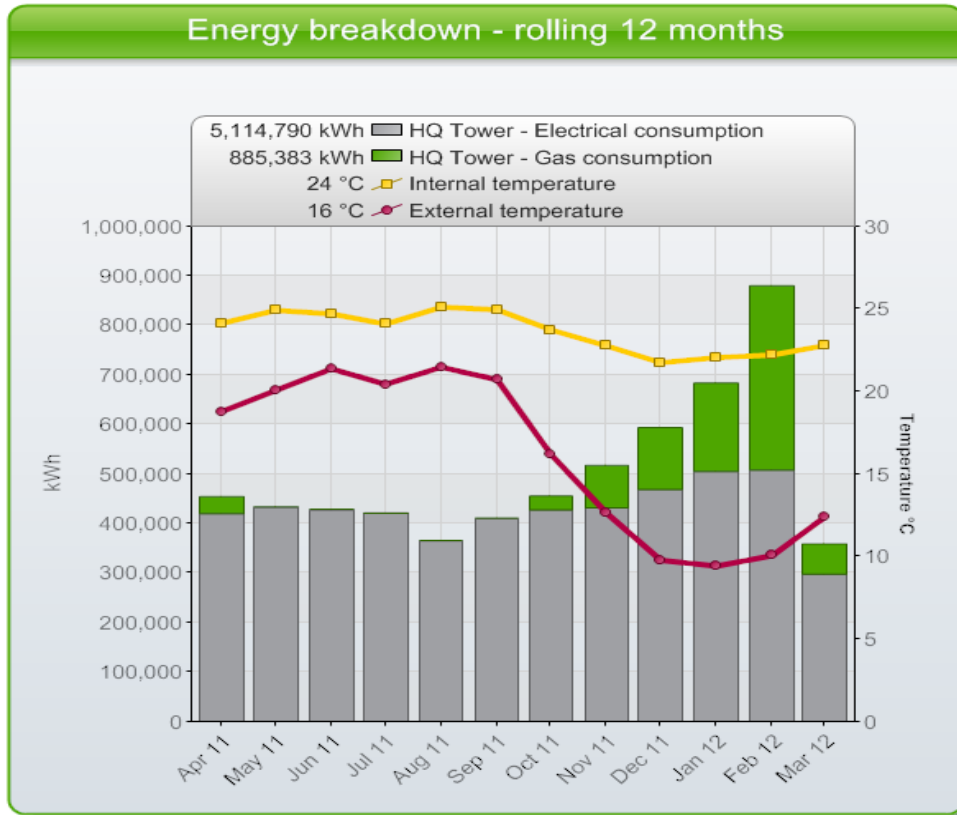
Schneider Electric Solution



Schneider Electric's Energy Manager utilizing **SE Energy Operation Software** identifies and maintains ongoing energy information for benchmarking and analysis. Normalization indicators are enabled for analysis

Establish Energy Performance Indicators

Energy breakdown [Icons]



Start Energy br...

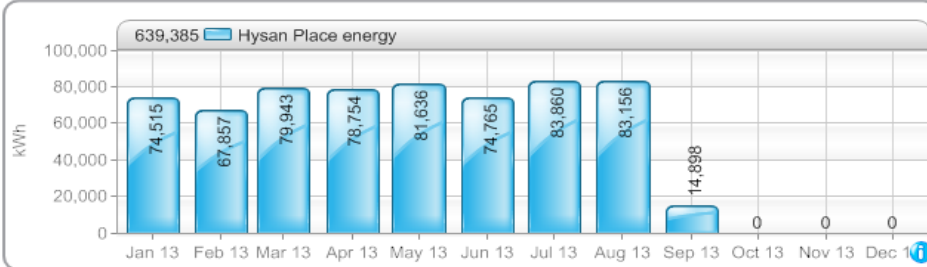
Energy Operation Dashboard :

- The Electrical and Gas energy performance can be monitored and normalized with internal and external temperature and alarm can be triggered for any deviation .
- The Energy breakdown by Type and use will measure any improvement on each KPI's

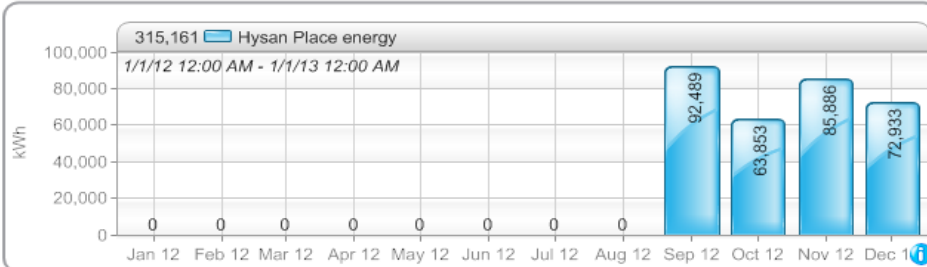
Energy Performance Indicator-Energy Banding

Energy comparison

Current year



Last year

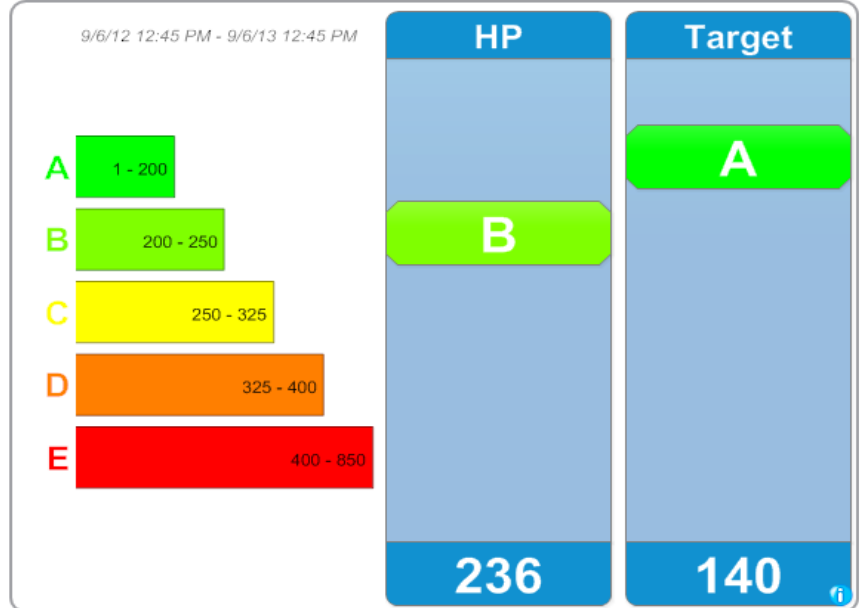


Energy usage YTD



606,346 kWh exceeded versus last year

Estimated Energy Utilization Index kWh/sqm for current year



EUI for last year



81 kWh/sqm/year

- **Energy Operation dashboard for Benchmarking**
- Above graph is showing the area normalized benchmark of customer building.

Sample Kiosk for Building customer



Scottswalk, Singapore



Singapore, Singapore

Current	Friday	Saturday	Sunday	Monday	Tuesday
27°C	24°C 29°C	24°C 28°C	24°C 30°C	24°C 30°C	24°C 29°C
humidity: 84	Sunrise: 06:59	Sunrise: 06:59	Sunrise: 06:59	Sunrise: 06:58	Sunrise: 06:58
time: 15:17	Sunset: 19:07	Sunset: 19:07	Sunset: 19:06	Sunset: 19:06	Sunset: 19:05



Energy consumption

For last 30 days is 147,917 kWh



Total carbon emission

For last 30 days is 94,038 kg



Energy comparison

4.34 % saved versus last month



Energy equivalent to

27 trees saved versus last month



Energy equivalent to

81 cars off road versus last month

- Kiosk is used for circulation to internal staff so that every level of people should be aware about the Facility energy facts

Monitoring, Measurement, Analysis

Standard

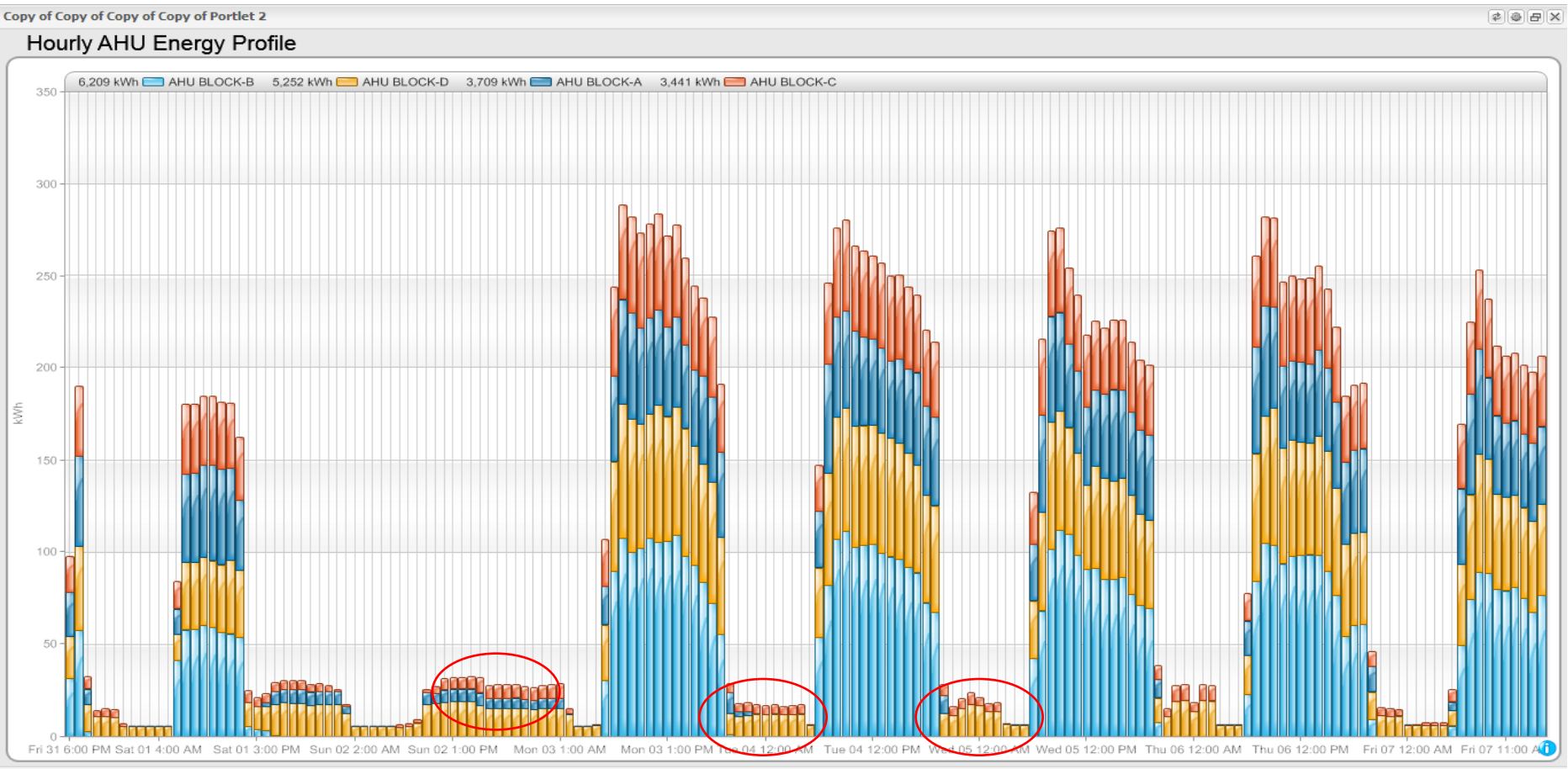
Define and periodically review measurement needs. Key characteristics of its operations that determine energy performance need to be monitored, measured, and analyzed at planned intervals

Schneider Electric Solution



- > Our comprehensive solutions include **Metering and Energy Operation applications** to meet client's monitoring and measurement goals
- > **Energy Performance Services** analyze customer data and make suggestions on improvements to boost efficiency

AHU Consumption at night time



EPS Analysis :

- **KPI:** AHU Consumption has been analyzed from 1st June to 6th June on hourly basis.
- **Observation:** Continues AHU Operation in night time with an average load of 30 kW per hour.
- **Recommendation:** AHU units should be turned off after office hours. Savings possible is $30\text{kW} \times 10\text{hours/day} \times 365\text{ days}$ is 109500 kWh/year.

ISO 50001 – Single package solution

● Comprehensive Energy Audits

- will help to conduct feasibility study for ISO 50001

● Energy Metering solution

- will enable all equipments and systems monitored and measured accurately for energy monitoring

● Energy Operation connectivity

- Enable to measure, set and monitor base line targets.
- Monitor performance indicators for improvements
- Centralized monitoring and standardize reporting in organization
- Internal employee awareness using Kiosk & best practices

● Energy Performance Services

- Identify energy saving opportunity and improvement
- Sustain the savings and continuous improvement

Power Monitoring Expert & ISO 50001



Schneider
Electric

AGENDA

Customer Examples



ISO 50001 & Power Monitoring Expert

SGS HELPS TAIWAN ADVENTIST HOSPITAL BECOME THE WORLD'S FIRST ISO 50001:2011 CERTIFIED HOSPITAL

MARCH 15, 2012

(Geneva, Switzerland, March 15, 2012) –SGS is pleased to announce that it has certified Adventist Hospital in Taiwan against the ISO 50001:2011 Energy Management Systems in February 21, 2012. Taiwan Adventist Hospital is the world's first hospital to have obtained certification just following the publishing of ISO 50001:2011 by International Organization for Standardization (ISO) on June 15, 2011.

Google Data Center EMS ISO 50001 Certified

August 1, 2013 by Energy Manager Today Staff



Google has become the first company in North America to obtain a multi-site ISO 50001 certification for the energy management system covering its corporate data center operations and six US data centers.

ISO 50001 aims to support organizations in all sectors to use energy more efficiently, through the development of an energy management system.



TODAY'S NEWSPAPER

Business

Samsung Awarded ISO 50001 Certification across All Business Sites Globally

Marriott Hotel Achieves ISO 50001 Energy Management Standard

October 2, 2013 by Linda Hardesty



After DEKRA Certification completed an audit of the energy management system of the JW Marriott Washington DC Hotel, it presented an ISO certificate to the hotel in September.

The audit conducted by DEKRA verifies that Marriott Washington DC has implemented an energy management system, and that the normal performance at the 1331 Pennsylvania Avenue NW has improved over the baseline.

Implementing ISO 50001 increased employee awareness of energy issues, encouraged

3M Example

ISO 50001 /Superior Energy Performance Project

Andrew Hejnar, CEM, CEA, CRM, Energy Manager, 3M Canada Company



Brockville Tape Plant

3M



- Established 1992
- 10 Acre Site
- 140,000 sq. ft.
- 170 Mfg Employees



Motivations

- To build on the substantial energy performance gains achieved through earlier energy projects
- To improve our ability to sustain energy performance gains over the long term
- To respond to increasing energy cost pressures
- To reinforce our reputation with customers as an environmentally responsible supplier
- To provide US-Canada requested support for the GSEP initiative of the Clean Energy Ministerial www.cleanenergyministerial.org
- To ensure 3M's competitive position in the marketplace
- ISO 50001 is a standard that drives results directly to the bottom line by systematically driving down energy costs to improve competitiveness.



Lessons Learned & Advice to Others

- **Objectives, Targets & Energy Review are critical**
 - *Know what you want from the system*
 - *Get to energy review quickly – energy map, SEUs, team engagement, etc. are very powerful*
- **Energy Mgmt Information System (EMIS) is a major asset**
 - *Prior investments in submetering and electronic data collection and reporting provided excellent data to support the EnMS*
 - *We use ION power meters and ION Enterprise platform for energy data collection and analysis*
- **ISO 50001 does not require much documentation**
 - *Notably less than other standards*

AGENDA

Customer Examples

ISO 50001 & Power Monitoring Expert



CERTIFICATE

Certificate-ID: C-08-2014-21226200

Certificate for: Audited energy data management system

Certificate holder:



Schneider Electric SA
35 rue Joseph Monier
92500 Rueil Malmaison
France

Test report:

B-08-2014-21225600



Energy Data
Management
System
Regular
Surveillance
www.tuv.com
ID: 080043088



Products:

StruxureWare Power Monitoring Expert
StruxureWare Power Monitoring Expert for Healthcare
StruxureWare Power Monitoring Expert for Data Centers

Basis of certification:

Audited energy data management system in accordance with the catalogue of requirements Version 2.2 (as of 02/2014)

Scope of certification:

Document and system review of functionalities for use with energy management systems in accordance with ISO 50001 and energy audits in accordance with EN 16247-1

It is herewith confirmed that the functionalities and characteristics of the energy data management system StruxureWare Power Monitoring Expert described in the results report B-08-2014-21225600 as well as in the appendix to the certificate, have been verified within the framework of a document and system review. The energy data management system StruxureWare Power Monitoring Expert verifiably supports compliance with the requirements of the chapters of the standards ISO 50001 and EN 16247-1 as listed in the appendix to the certificate.

This certificate is valid until 30 September 2015.

Dated in Cologne, 1 September 2014

Norbert Heideilmann
TÜV Rheinland Group
Energy Services


Peter Maczey
TÜV Rheinland Group
Product Manager/Auditor ISO 50001

Appendix 1 to Certificate No. C-08-2014-21226200

Certification Procedure Audited Energy Data Management System StruxureWare Power Monitoring Expert

Schneider Electric SA
35 rue Joseph Monier
92500 Rueil Malmaison
France



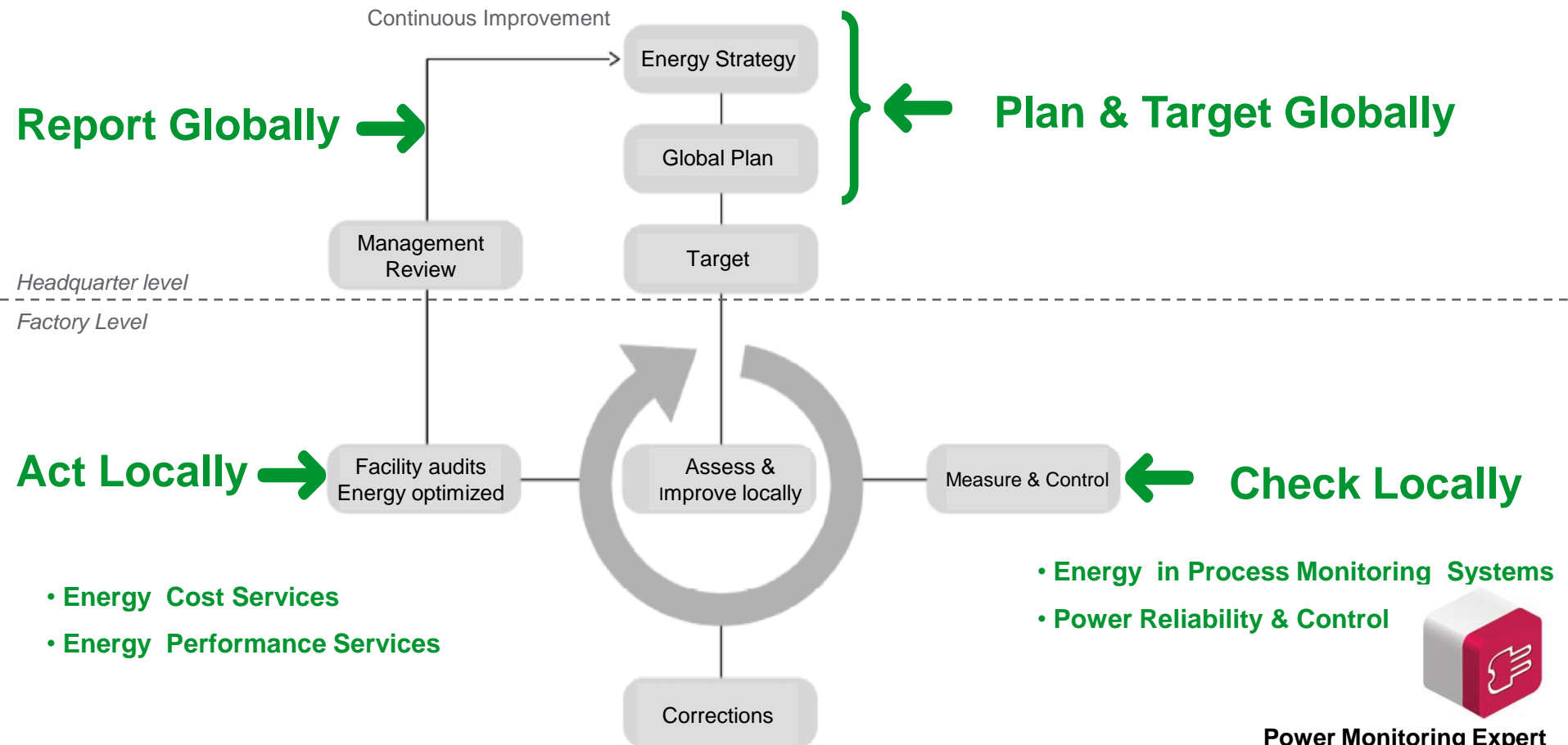
The following characteristics and functionalities of *StruxureWare Power Monitoring Expert* were verified within the framework of the auditing:

- Determination of customised business key figures (EnPIs)
- Performance of dependency analyses
- Prices can be stored for determination of costs
- The software is compatible with standard communication interfaces and data transfer technology for the import of the measurement data recorded
- Various types of diagrams and depictions of energy consumption can be selected
- Time-controlled and event-controlled reports can be drawn up automatically
- CO₂-balances can be drawn up automatically
- The contents of the automatic reports can be customised
- Report are generated in established, common formats
- Customised threshold values can be specified for an early warning system
- The software is set-up according to the PDCA-cycle or supports implementation thereof
- Access rights can be customised for each user
- The system can be operated intuitively and is user-friendly

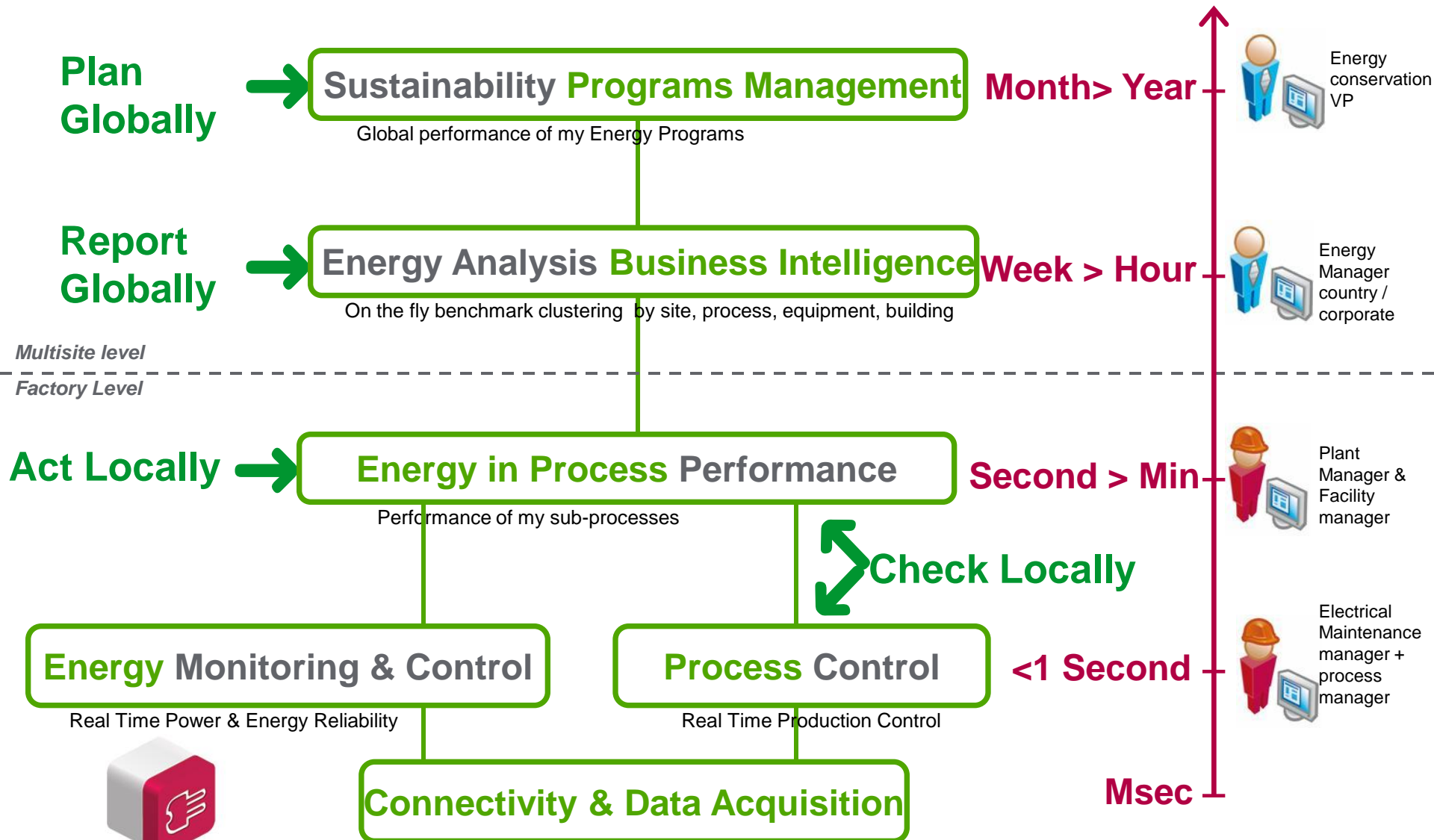
The energy data management system *StruxureWare Power Monitoring Expert* verifiably supports compliance with the requirements of the following chapters of the standard ISO 50001:

- 4.4.3 a), b) Energy review
- 4.4.4 Energy baseline
- 4.4.5 Energy performance indicators
- 4.6.1 Monitoring, measurement and analysis
- 4.7.2 c) Input to management review

ISO 50001 Plan-Do-Check-Act At Global Level

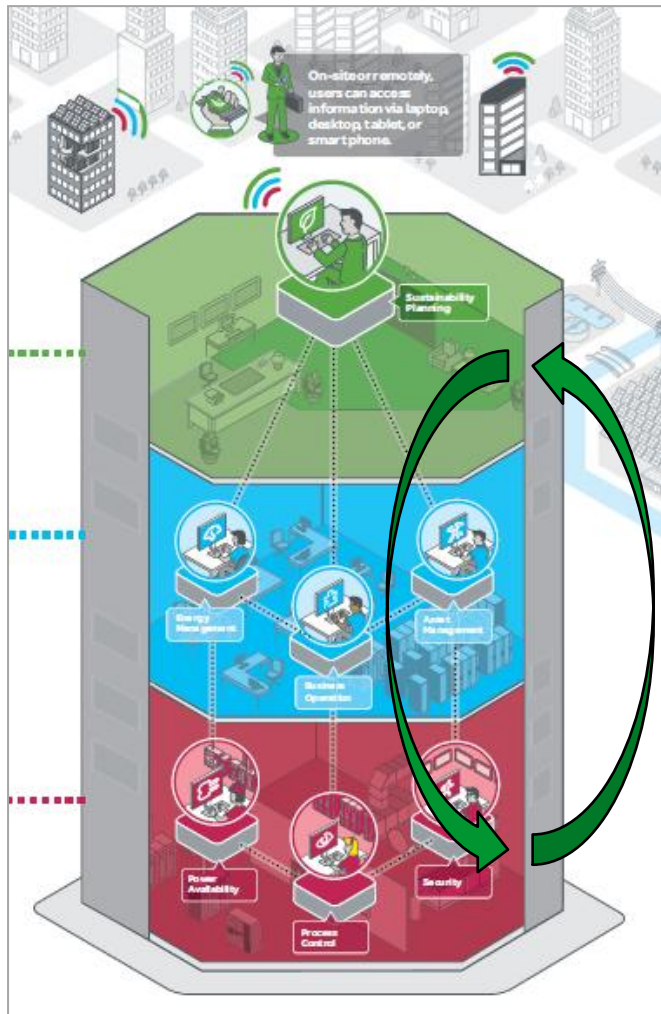


Schneider Electric Provides An Integrated ISO 50001 Energy Suite



PLC's, Gateways, sensors, meters...

Power Monitoring Expert Is Critical For Successful ISO 50001 Implementation



- The foundation of an ISO 50001 system is on the shop floor
- Of companies who have invested in ISO 50001, only 19% have more than one site certified⁽¹⁾
- Many of the electro-intensive sites where ISO 50001 is deployed have a power management system already
- Many of the Industrial sites where ISO 50001 will be implemented are not accepting cloud solutions to share their energy data.

(1) Verdantix – “Where is ISO 50001 gaining traction?” – Sept 2013

Power Monitoring Expert & ISO 50001

- PME helps industrialize your ISO50001 program with automated data collection and reporting of Energy Performance Indicators (EnPI's)
- PME delivers continued energy savings over time - with specific energy management applications that can highlight opportunities to reduce consumption, even after the "low-hanging fruit" energy conservation measures have been implemented



Schneider Electric provides ISO 50001 advisory services

- For customers who want to achieve ISO 50001 for their facility, Schneider Electric is a trusted advisor who can de-risk and simplify the journey



Thank you

