Schneider Electric

A Pragmatic Guide to Energy Efficiency for Buildings

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Vice President Buildings Business Units
Country Manager of Pelco Integration Security Solutions
Schneider Electric: the global specialist in energy management

20 billion € sales in 2010

37 % of sales in new economies

110,000+ people in 100+ countries

4–5% of sales devoted to R&D

Balanced geographies – FY 2010 sales
Year-end 2010 employees

North America 24%
North America 26,000

Western Europe 34%
Western Europe 41,700

Asia Pacific 24%
Asia Pacific 31,900

Rest of World 18%
Rest of World 19,200

Diversified end markets – FY 2010 sales

Utilities & Infrastructure 20%
Industrial & machines 24%
Data centres 17%
Non-residential buildings 30%
Residential 9%

90% of group sales as world #1 or 2 player

1 Proforma with Areva D integrated on 12-month basis
The Energy challenge is the cornerstone of our business strategy

The facts

Energy demand by 2050
Electricity by 2030

The need

$\frac{\text{CO}_2 \text{ emissions}}{2}$ to avoid dramatic climate changes by 2050

Source: IEA 2007

vs. 1990 level

we want to help address this challenge
5 key business developing technology and driving market growth

Transactional Business Models

Product Lines

• Critical Power & Cooling
• Low Voltage
• Installation Systems & Control
• Renewable
• Medium Voltage
• Transformers
• Grid automation
• Industrial Automation & Control
• Building Automation
• Security

5 Businesses

IT

Power

Energy

Industry

Buildings

End User Segments

Solutions Business Models

• IT
• Bank / Insurance
• Residential
• Marine
• Utilities
• Oil & Gas
• Food & Beverage
• Water
• Mining
• Retail
• Hotel
• Hospitals
• Offices

5 key business developing technology and driving market growth
Our ambition is to become the leader in helping our customers create the most energy efficient, safe and effectively managed buildings.
We bring segment-specific expertise

Offices
Data Centers
Education
Government
Hospitals
Hotels
Industry and Technology
Life Sciences
Residential
Retail
Transportation
Global trends and inefficiencies are directly impacting your success

The energy dilemma
energy demand versus the environment

Building life cycle costs
initial capital, ongoing operations and energy

Connectivity
too many disparate systems in the building

Security
as a growing concern

Sustainability
the need to green operations
An innovation eco-system for a simpler and greener future

We start today…

Partnering with 50+ best-in-class public and private organisations

Leading global projects for Intelligent buildings, renewables, nanotechnologies

Boosting standardisation
Zigbee, IEC, NEMA

Funding start-ups
Schneider Electric
Venture capital fund

So we can be…

Energy efficient

Environment friendly

Open and connected

Available 24/7, on site and remote

7,500 R&D engineers
50 centres in 25 countries

Demand response, software breakthrough

Homes Minalogic Smart Electricity
The building ecosystem

Building Management Consulting
24/7 Monitoring
Energy Efficiency/ Performance Contracting

EcoStruxure

Power
- Power Monitoring Control Systems
- Emergency Power Supply Systems

HVAC
- Building Automation Systems
- Chillers
- Boilers
- Air Handlers

Lighting
- Lighting Control
- Locks
- Doors
- Gates
- Man-traps

Access
- Active Access Control
- Biometrics

Video Security
- Digital Video Recorder
- Video Analytics

Life Safety
- Cameras
- Housings
- Fire & Smoke Detectors, Sprinklers

IT
- Network Management Systems
- White Space Management IT Applications

IP Technology
- Network Management Systems
- Routers
- Switches
- Phones

Movement
- Lift Management Systems
- Lift Escalator

Application
- Power
- HVAC
- Lighting
- Access
- Video Security
- Life Safety

Supervision & Control
- Adv Services
- Integrated System

Device
- Power
- Building / Server Room
- Management
- Utilities
- Process & Machines
- Movement

Process & Machines
- Motion
- Life Safety
- Systems
- Security
- Management
- Management
Multiple silo systems in the building

- Multiple networks from multiple vendors
- Too many systems to learn
- Complex troubleshooting
- Higher capital and operational expenditures
- Obstacles to achieving energy efficiency
Providing integrated solutions in buildings

Efficient & productive:
- Measure and control energy, automate, provide relevant diagnosis
- Manage processes
- Make all the utilities of any Infrastructure more efficient

Reliable
Prevent from power outage & quality variance

Safe
- Protect people and assets
- Transform and distribute power safely

Green: Make the connection of renewable energy sources easy, reliable and cost-effective
Enhanced value with integrated buildings

- Reduce costs – both initial investment and ongoing facility operational expenditures
- Increase employee productivity
- Long-term financial value
- Create new revenue opportunities
- Enhance building asset value
- Improve the customer experience

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Integrated solutions in a building

Software integration

Interoperability and openness to third party systems

- Renewable energies
- HVAC control
- Lighting control
- Energy monitoring & control
- Motor control
- Access control
- Security
- Critical Power & cooling

EcoStruxure

- Green: Make the connection of renewable energy sources easy, reliable and cost-effective
- Efficient & productive:
  - Measure and control energy, automate, provide relevant diagnosis
  - Manage processes
  - Make all the utilities of any Infrastructure more efficient
- Reliable: Prevent power outages & quality variance
- Safe: Transform and distribute power safely
Our answer: Investing in Innovation
StruxureWare for buildings

- Next generation intelligent Building Management System (iBMS)
- Powerful, scalable, and easy to use
- Engineered to ensure your buildings are
  - Energy efficient
  - Safe
  - Effectively managed
# StruxureWare – the best of the best

<table>
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<th>Feature</th>
<th>Satchwell</th>
<th>I/NET</th>
<th>Vista</th>
<th>Continuum</th>
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30% savings are available today…

… thanks to a combination of

- Efficient devices and installation (10 to 15%)
- Optimized usage via automation (5 to 15%)
- Monitoring & Maintenance (2 to 8%)
StruxureWare’s unified software architecture allows all data from multiple devices throughout a building to be collected, analyzed, and managed – turning system data at the automation level into valuable business information at the management level.
... but savings can be lost quickly...

- Unplanned, unmanaged shutdowns of equipment and processes
- Lack of automation and regulation (motors, heating)
- No continuity of behaviour

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

Up to 12% per year is lost without regulation and control systems
Key features of StruxureWare

- Amazing graphics capability
- Individual customizable workspaces
- Simple alarms, events, and schedule configuration
- Powerful reporting engine
- Native support for LON, BACnet and Modbus at the field bus level and the IP network level
- On-line intelligent help community

Buildings are multilingual ... is your BMS system?
Our answer:
Our Valued Customers
Who/What is Masdar (…Ara. n. Source)

Background information
● New city to be located in Abu Dhabi – capital city of U.A.E
● $70 Billion investment
● 50,000 residents
● 6.5 sq. km area
● First Carbon-neutral city
● First Zero Waste city
● First Car-free city
● Will employ ground breaking patented global technologies
● 10MW; 1 sq. km Solar PV Farm
● Potential business with Schneider: €150M - €200M over 6 years
Next Steps

MIST
● Phase 1B
● Phases 2, 3, 4 (2009 – 2011)
  – 5M Euros
  – 12M Euros

Headquarter Building
● HQ (2009 – 2010)
  – 10M Euros

Metro Tunnel Solution
Total network of over 45km (2009 – ongoing)
● Phase 1
  – 2M Euros

District Cooling Plants
Around 10 – 20 in number (2009 – ongoing)
● Phase 1
  – 1M Euros

Data Centres
● 2no.s (2009 – ongoing)
  – 8M Euros

● Solar Renewables (2009 – ongoing)
● 500MWP
  – 100M Euros
Masdar – Schneider Electric Strategic Partnership

Solar Cooling Project

- Objective to harness solar energy to produce chilled water for cooling
- Utilises Schneider Electric’s building automation and metering expertise to measure effectiveness of initiative
- Energy dashboard
- Automated Energy Log data reports
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The Pragmatic steps ahead
The Overall Project Process

Select the Buildings

Connect to Remote Energy Monitoring

Collect, Measure and Validate Baseline Energy Consumption

Audit Every Building

Electricity

Cooling

Heating

Steam

Water

Gas

Power Factor

HVAC

LIGHTING

BMS

UPS

ALARMS

Sustainable Energy Consumption end Results

The 24 month cycle, the total investment will include the Implementation, audits, Hardware, Software and SLA, +

Statistical reduction in energy Consumption

Buildings owners reduce their Opex

Funding Managers Receives the Carbon credits

Schneider electric Delivers a Full Pragmatic Solution

Building Owners has a Corporate Platform With live updates
Remote Energy Management Solution

- Multi-utilities
  - Electricity
  - Cooling
  - Heating
  - Steam
  - Water
  - Gas

- Multi-sites
  - Industrial Sites
  - Office and R&D
  - Data center

- Multi-stakeholder
  - Corporate Dashboard
  - Site Dashboard
  - Technical Dashboard
Consolidated Views
Typical Dashboards
Energy Usage Intensity Metrics

YTD kWh/m²
- 38.09 kWh/m²: Electricity
- 1.20 kWh/m²: Electricity (Parking)
- 0.03 kWh/m²: [Electricité RGE Générale]

YTD m³ Gas/m²
- 1.75 m³/m²: Gas

YTD m³ Water/m²
- 0.0023 m³/m²: Water (Other)
- 0.0012 m³/m²: Water

YTD kWh/Person
- 631.59 kWh/Person: Electricity
- 19.49 kWh/Person: Electricity (Parking)
- 0.10 kWh/Person: [Electricité RGE Générale]

YTD m³ Gas/Person
- 28.28 m³/Person: Gas

YTD m³ Water/Person
- 0.047 m³/Person: Water (Other)
- 0.020 m³/Person: Water
Energy Analysis by Load & Type
Energy Analysis Views

Year Over Year Comparison - Last 30 Days

Lighting

HVAC

Plugs
Energy performance - Benchmark
Calculate equivalent

Water expenses

22 438 euros

Equivalent

7 Olympic pools
Benchmark against target

CO2 Equivalent

576 689 kg CO2
Analysis tools - KPI

- Integration of external data
- Expert energy calculations
- Calculation of influence factors
- Measurement of impact of actions
Integrated Building Solutions
Operation & Maintenance Benefits

● Single Source for service
  ● Improved response time
  ● Removes need for multiple service agreements and providers
● Maximum energy savings
  ● Energy management and control systems
  ● Demand controlled ventilation
  ● Lighting
  ● Access Controlled Operation
● Reduction of cabling
  ● One IT architecture for Data, VoIP, BMS
  ● Less time for implementation

Average Energy Use in US Commercial Buildings

<table>
<thead>
<tr>
<th>Category</th>
<th>Average Energy Use</th>
<th>Savings</th>
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<tbody>
<tr>
<td>Lighting</td>
<td>30%</td>
<td>Save 20–50%</td>
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<tr>
<td>Office Equipment</td>
<td>16%</td>
<td>Save 10–15%</td>
</tr>
<tr>
<td>Water Heating</td>
<td>9%</td>
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<tr>
<td>Space Heating</td>
<td>25%</td>
<td></td>
</tr>
<tr>
<td>Space Cooling</td>
<td>9%</td>
<td>Save 10–15%</td>
</tr>
<tr>
<td>Other</td>
<td>11%</td>
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</tbody>
</table>
Let your energy savings work for you

Remote Energy Management
Bringing Energy Efficiency to a modern world