

Tackling energy challenges through Energy Efficiency Solutions

February 2008

Committed to the energy dilemma... we are "Energy Optimists"



The energy dilemma



The energy and CO2 emission challenge

World consumption up 45% since 1980, 70% higher by 2030

Emerging markets
> 75% of new demand

Coal use continues to grow in emerging markets

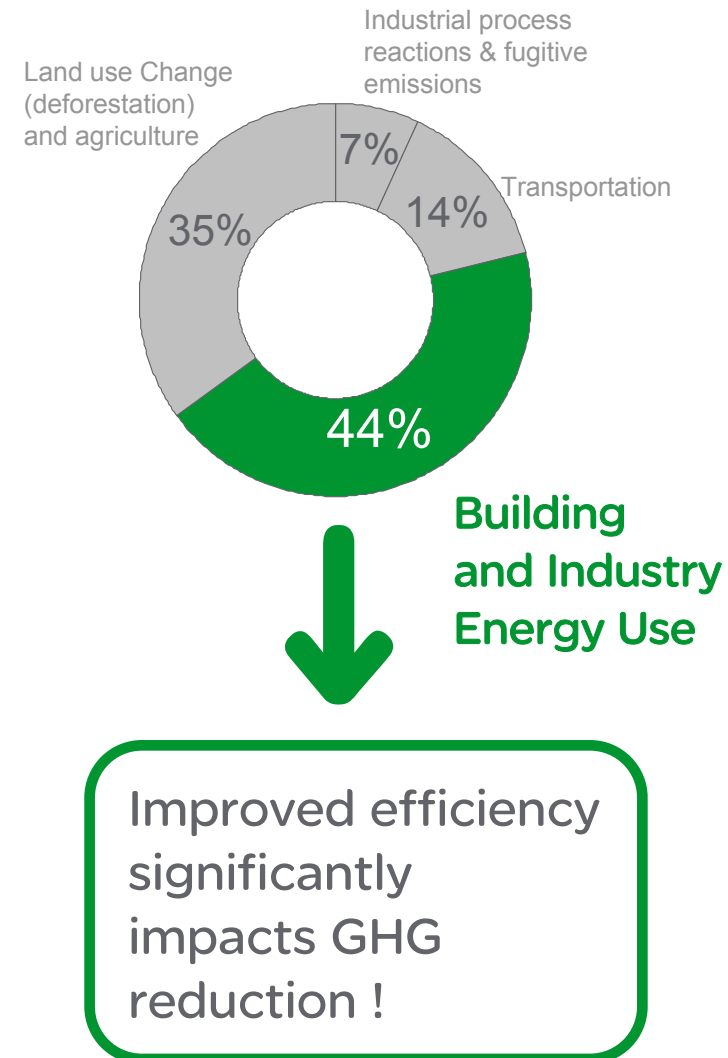
CO2 up 33% since industrial revolution, rising faster than ever

Resource competition & political instability **keep prices high**

These trends are here to last **unless we act !**

Buildings and Industry are the 1st GHG emission contributors...

- **≈ 44%** GHG come from non-transportation energy use
- **70%** of electricity is generated via coal or hydrocarbons
- **90%** of heat and process activities burn hydrocarbons



Data extracted from WRI: navigating the numbers 2005

...and also the first energy consumers !

- Energy use split



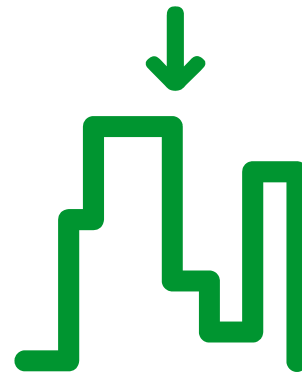
49%

Industry (incl
Industrial building)



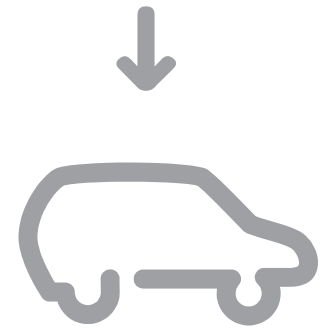
16%

Residential



8%

Tertiary Building

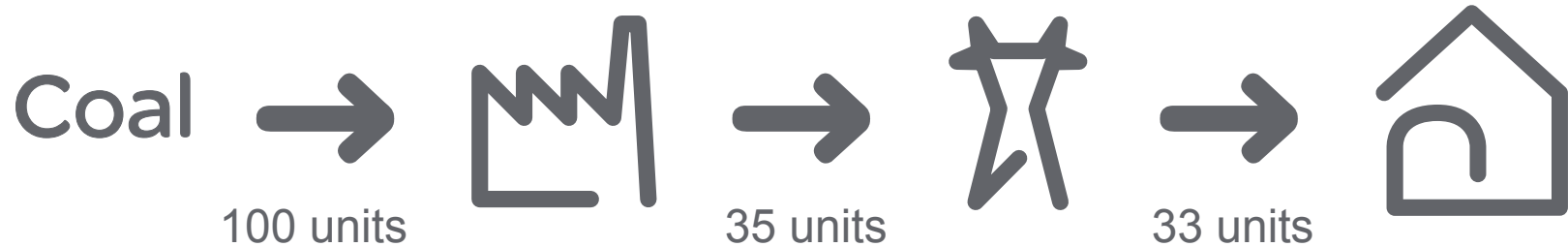


27%

Transportation

Main energy consumption is for heating, cooling, motors, lighting, electronics and appliances

Energy : a small save at home is a big save at the power plant !



100 units saved
at home



300 units saved at
the power plant

30% global energy saving

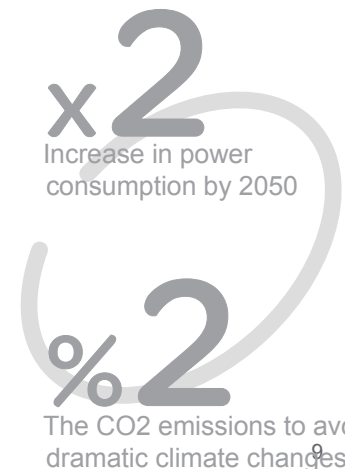


1 year of electricity delivered by
> 2000 coal-fired power plants

→ 800 million tons of CO₂

The challenge: ensuring energy availability and preserving the environment

- **Meeting** energy demand of a growing global population
- **Ensuring** stable and secure energy access for all nations
- **Bringing** electricity to the 1.6 billion people without access
- **Stabilizing** climate impact from energy emissions
- **Establishing** sensible legislation allowing business to grow in an effective and socially responsible manner



Energy challenges & opportunities are everywhere

Supply Side

More Efficient and
Cleaner Supply

Demand Side

More Efficient Use
Conservation & Management

Energy challenges & opportunities are everywhere

Supply Side

More Efficient and
Cleaner Supply

Cleaner supplies will take
time to implement

Demand Side

More Efficient Use
Conservation & Management

Current technologies allow
us to target 30% savings

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We must develop technologies and
business models to increase
renewable energies penetration

Mid term approach

Demand Side

More Efficient Use
Conservation & Management

Current technologies allow
us to target 30% savings



We must focus on Energy
Efficiency to solve our energy
dilemma

Short term action

Energy challenges & opportunities are everywhere

Supply Side

More Efficient and Cleaner Supply

Demand Supply Management
+
Metering & Analysis

Demand Side

More Efficient Use
Conservation & Management

Cleaner supplies will take time to implement



We must develop technologies and business models to increase renewable energies penetration

Mid term approach

Current technologies allow us to target 30% savings



We must focus on Energy Efficiency to solve our energy dilemma

Short term action

Because it is urgent...

... Energy Efficiency is a Must

•Cheaper

- Each kWh saved avoids about 3x the generation production
- Demand response programs cost about half of typical electricity costs

•Quicker

- Technology is available today with short term results

•Cleaner

- “Negawatt” produces no environmental footprint

•Enhanced Security

- EE is homegrown, it reduces dependence on imports

30% Savings are available today...

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... thanks to a combination of

- Efficient devices and efficient installation (10 to 15 %)
 - Low consumption devices, insulated building...
- Optimized usage of installation and devices (5 to 15%)
 - Turn off devices when not needed, regulate motors or heating at the optimized level...
- Permanent monitoring and improvement program (2 to 8%)
 - Rigorous maintenance program, measure and react in case of deviation

30% Savings are available today...

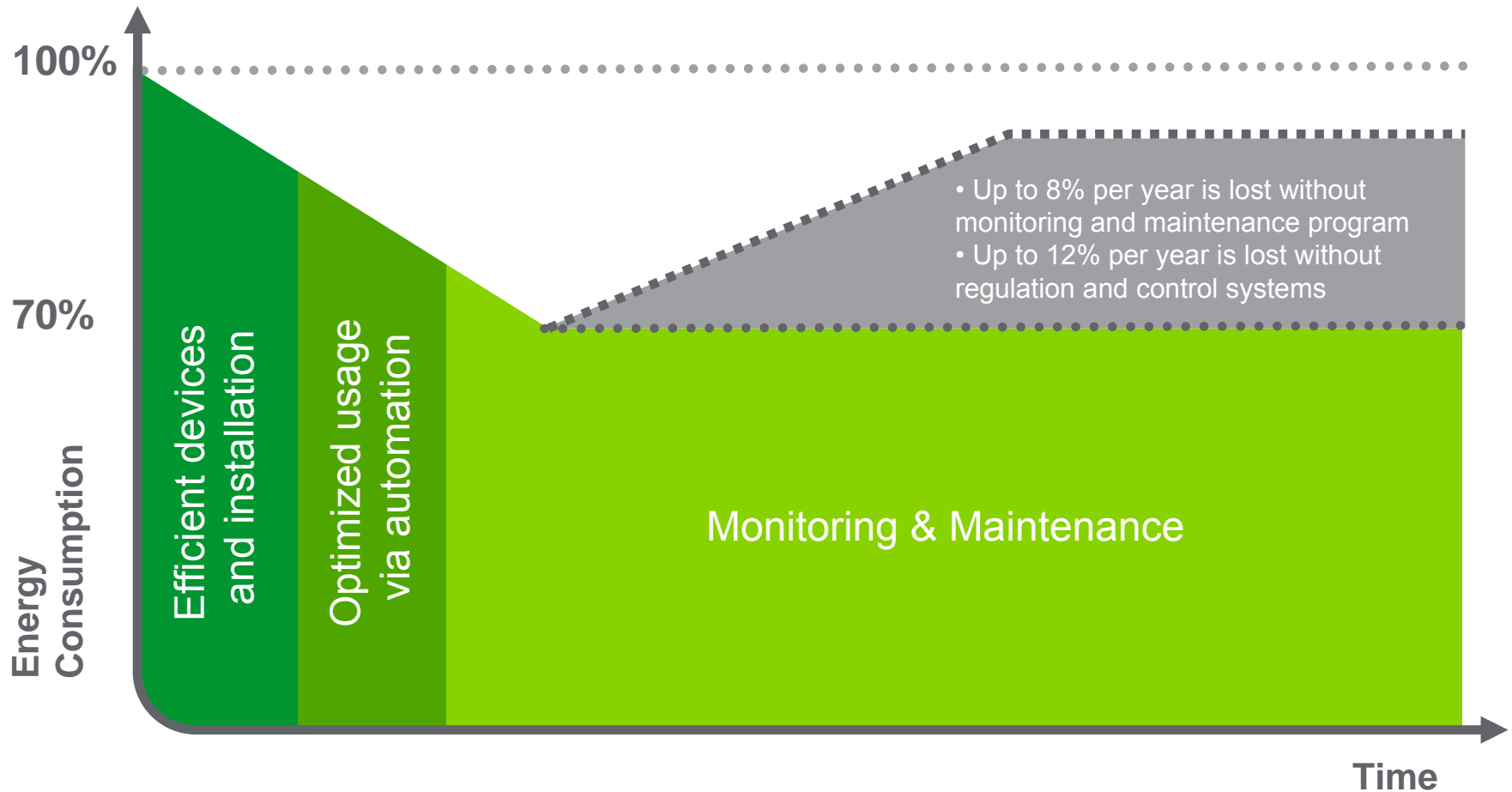
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... but savings can be lost quickly...

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

Control and monitoring technologies will sustain the savings



Energy Efficiency : it's easy, just follow the 4 sustainability steps

1 Measure

2 Fix the basics

3 Automate

4 Monitor and Improve

Energy Efficiency : it's easy, just follow the 4 sustainability steps

> 1 Measure

- Energy meters
- Power quality meters

2 Fix the basics

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Energy Efficiency : it's easy, just follow the 4 sustainability steps

1 Measure

> 2 Fix the basics

- Low consumption devices
- Insulation material
- Power quality
- Power reliability

3 Automate

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Energy Efficiency : it's easy, just follow the 4 sustainability steps

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4 Monitor and Improve

- Building Management Systems
- Lighting Control Systems
- Motor control systems
- Home control systems
- Variable speed drive

Energy Efficiency : it's easy, just follow the 4 sustainability steps

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2 Fix the basics

3 Automate

> 4 Monitor and Improve.

- Energy management software
- Remote monitoring systems

Lifecycle solutions for Energy Efficiency

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Energy Audit
& Measure
building, industrial
process...

Lifecycle solutions for Energy Efficiency

**Energy Audit
& Measure**
building, industrial
process...



Fix the basics
Low consumption
devices,
Insulation material
Power factor
correction...



**Passive
Energy Efficiency**

Lifecycle solutions for Energy Efficiency

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building, industrial
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Low consumption
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Insulation material
Power factor
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Optimize through Automation and regulation

HVAC control,
lighting control,
variable speed
drives...



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Lifecycle solutions for Energy Efficiency

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Monitor, maintain, improve

Meters installation
Monitoring services
EE analysis software



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HVAC control,
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EE analysis software

**Control
Improve**

Active
Energy Efficiency

Lifecycle solutions for Energy Efficiency

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Energy Efficiency

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Active
Energy Efficiency

Monitor, maintain,
improve
Meters installation
Monitoring services
EE analysis software

Control
Improve

What we can do
for you?



Schneider Electric is involved in
**73% of end user energy
consumption**

> We can help you make savings !

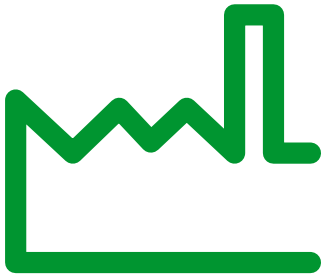
Where are the savings ?

A 30% opportunity is in our hands

Industry & infrastructure

Average facility can reduce consumption by 10 to 20%

Electric Motor Systems,
Power metering,
Energy management systems,
Automation solutions

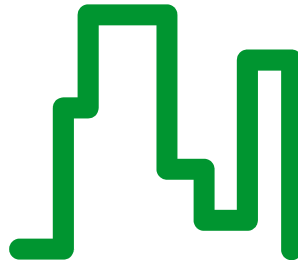


- 25% savings would save 7% of the world's electricity
- The largest consumer, motors, account for over 60% of electricity usage

Buildings

Renovation can yield up to 30% of energy savings

HVAC and climate control,
Lighting control,
Building management systems,
Power factor correction



- Consume 20% of total energy
- 3 key areas: HVAC, lighting & integrated building solutions
- Motors consume 35%+ of electricity

Residential

EE products may save 10% to 40% in electricity

Lighting control,
Climate control,
Heating monitoring,
Shutter control

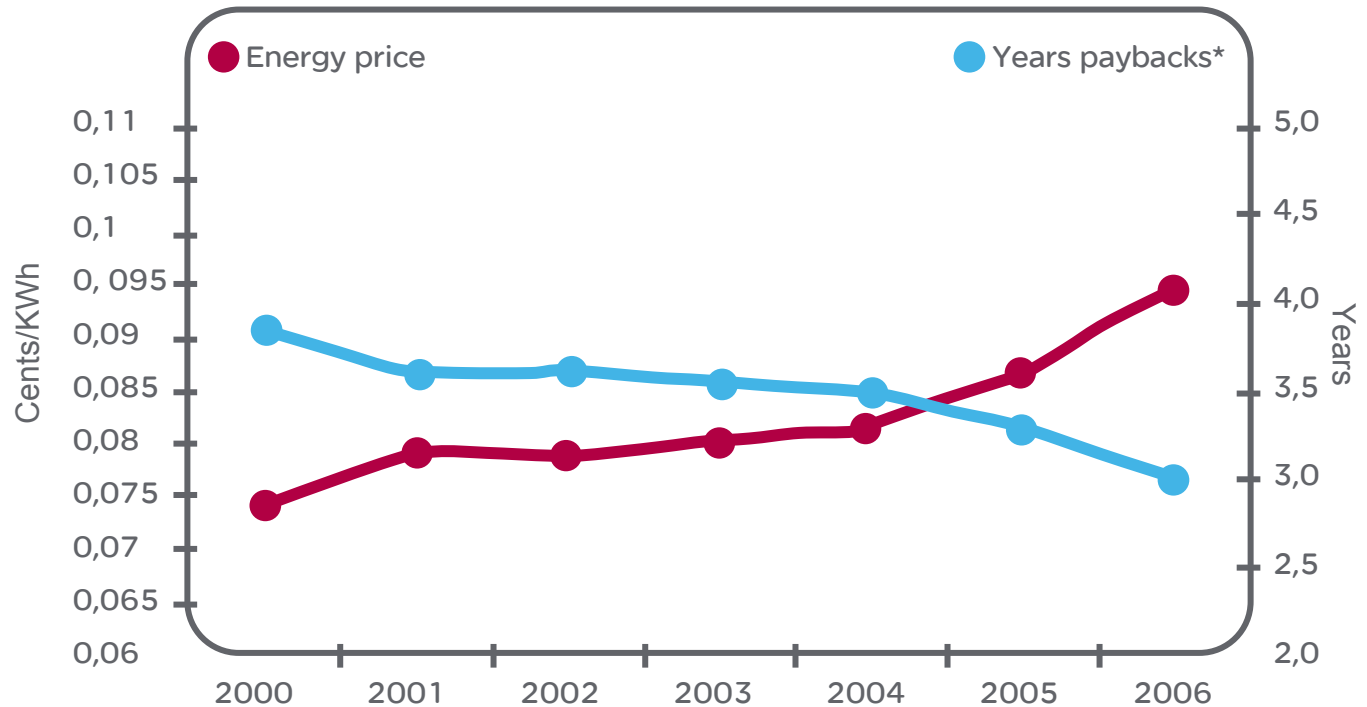


- 20% to 25 % of consumed energy (EU & US)
- Heating is 30% of energy usage.
- Lighting & appliances over 40%

Energy saving project ROI improved as energy prices raise

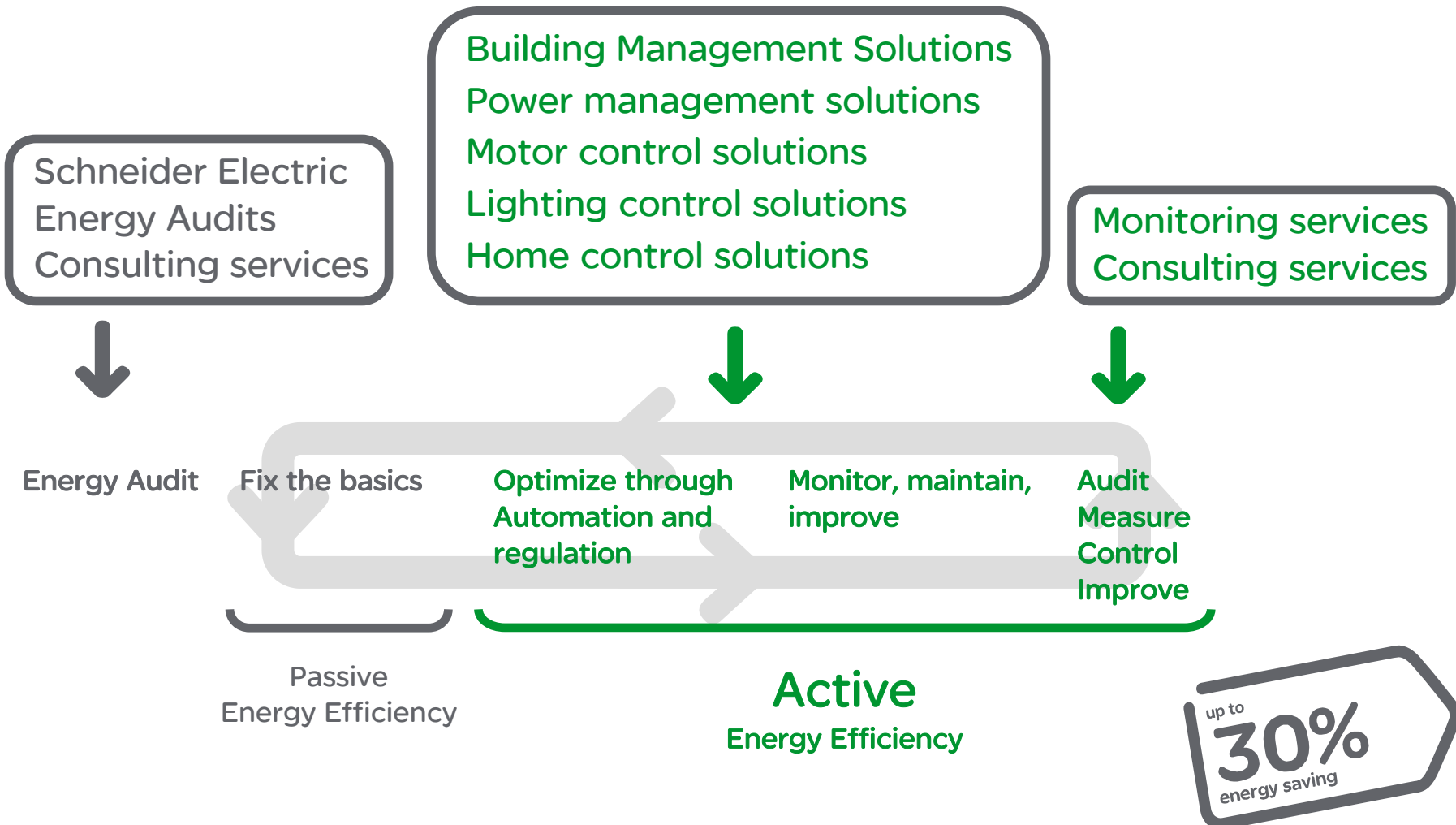
Based on an actual commercial building.

- Project Cost \$1M,
- Electricity saving 3500MWh
- Project cost and energy savings fixed.



➔ Payback time has decreased **30% over 5 years** due to increase in energy prices

We contribute through our solutions !



Solutions for residential and small commercial markets

- Enabling products

- **Lighting control:**
dimmers, timers, movement and presence detectors, specific switches, light sensitive switches
- **Temperature control:**
thermostat, floor heating control

- Management systems

- Shutter control systems
- Lighting Control systems
- Home control systems



Solutions for medium and large commercial markets

● Enabling products

- Dimmers, timers, movement and presence detectors, switches
- Thermostat, floor heating control
- Variable speed drives for HVAC, pumps, fans, motors
- Power compensation and filtering products

● Management systems

- Building management systems
- Power monitoring and analysis

● Added value services

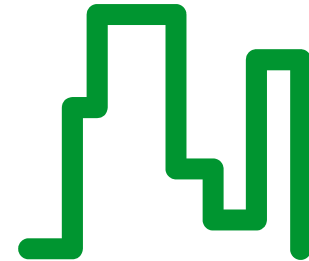
- Site audits
- Data Collection and Analysis
- Financial Analysis & ROI Validation,
- Planning of Improvement plan
- Remote monitoring and optimization

Buildings

Renovation can yield up to 30% of energy savings

Building management systems

Power factor correction



HVAC control

Climate control

Lighting control

Solutions for industry and infrastructure markets

● Enabling products

- Variable speed drives for motors
- PLC for production throughput optimization and machine "mute" mode management
- Power compensation and filtering products

● Management systems

- Power monitoring and analysis
- Process supervisory systems

● Added value services

- Site audits
- Data Collection and Analysis
- Financial Analysis & ROI Validation,
- Planning of Improvement plan
- Remote monitoring and optimization

Industry & infrastructure
Average facility can reduce consumption by 10 to 20%

Electric Motor
Systems

Power
metering



Energy
management
systems

Automation
solutions

Customer references

- **US National Carwash company** : **33%** energy savings thanks to motion, drives and electrical distribution solution
- Amiens, France, reduces its lighting bill by **30% thanks to Lubio™** optimised lighting solution
- Delhi, India **cut its power consumption** by 40% thanks to equivalent systems
- Eco-building Technopolis : **30% energy savings** thanks to T.A.C Vista® through continuous monitoring of water treatment, HVAC, lifts and key functions of the building

Schneider Electric has integrated the best companies for Energy Management

Power & Cooling Management, MGE
UPS Systems, Power Measurement Inc.,
American Power Conversion, **Installation &
Control Systems,** Clipsal, Juno Lighting,
Merten in Germany and OVA in Italy,
Building Automation and Security,
TAC, Abacus Engineered Systems, ABS
EMEA and IBS in the US, **Industrial
Automation,** Citect, Kavlico Corporation in
the US, Elau AG in Germany and BEI
Technologies Inc.



Schneider Electric : your energy specialist for significant and sustainable savings

- Your **energy manager** ... improving business via metering, monitoring, control solutions and cost optimization services
- Your **energy expert** ... improving business via consultative services, technical and behavioral energy action plans and implementation services
- Your **green partner** improving business via environmentally friendly and energy reducing products



Make the most
of your energy