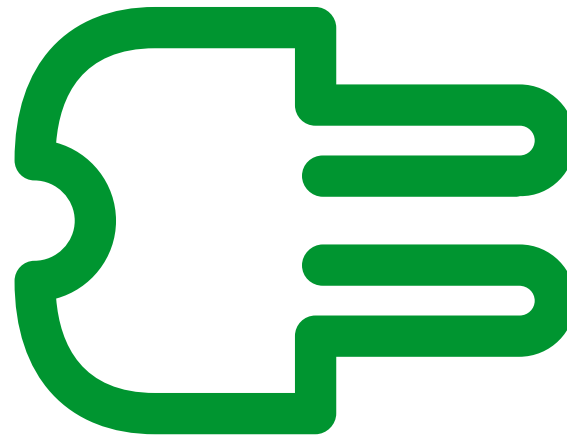


Wireless Sensors Networks

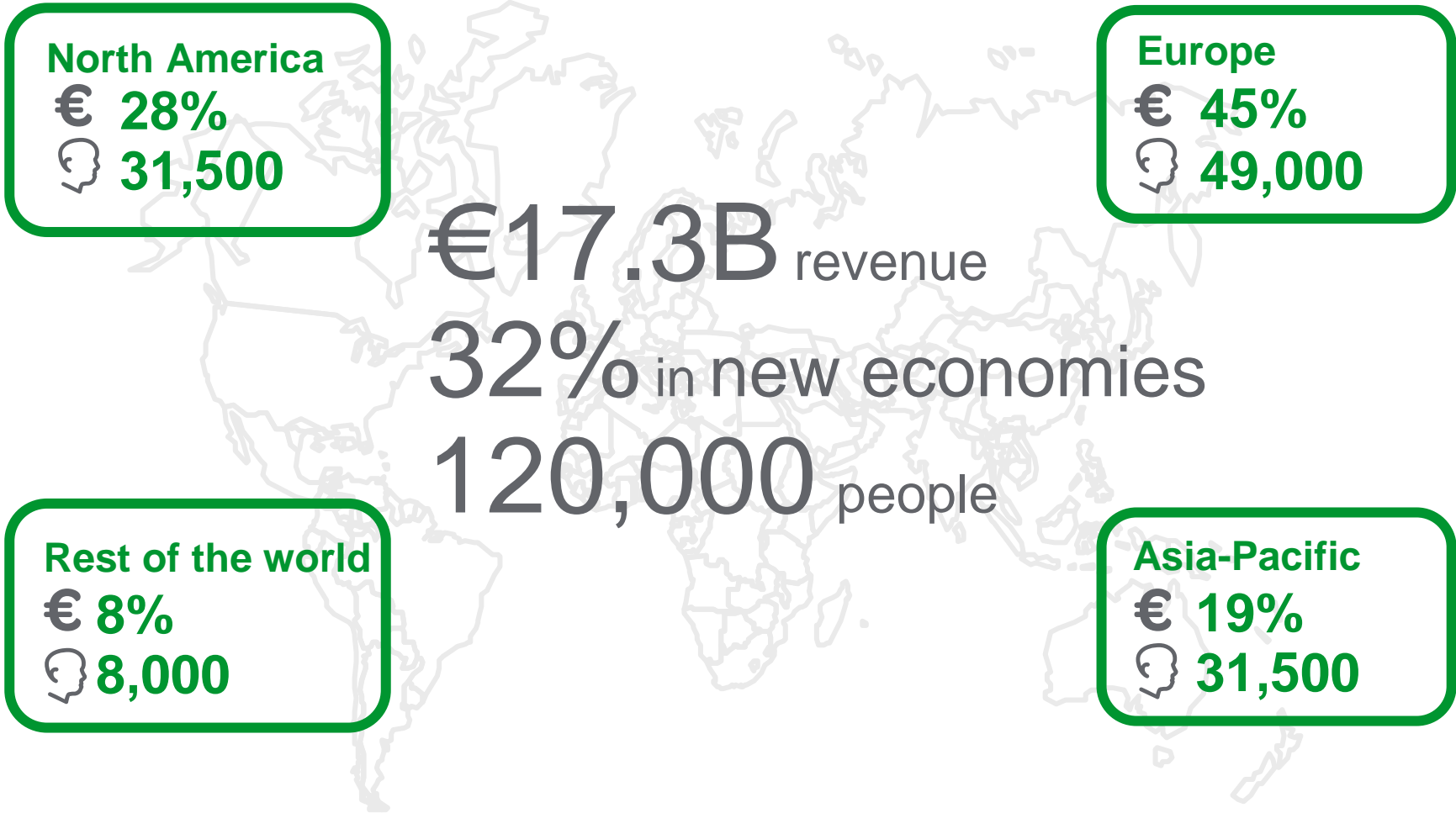
Are they ready for industrial applications ?

Jean-Pierre DESBENOIT
ICT 2008 Nov, 26th

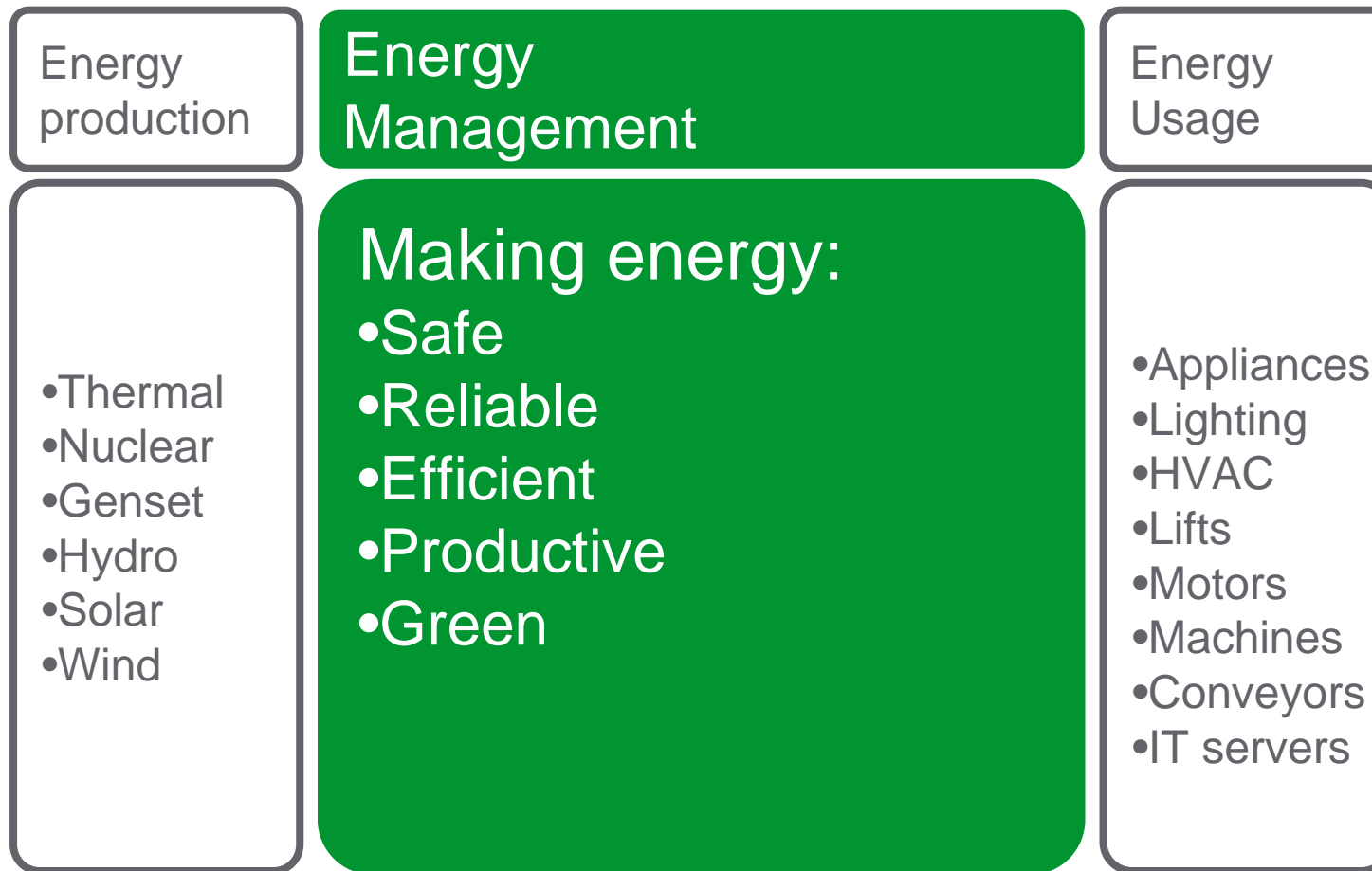
The global specialist in energy management



A global company



Helping people make the most of their energy



Operating in five markets

% of revenue 2007



WSN : can be applied everywhere

Energy & infrastructures

*availability, safety,
operating costs*



**Process
monitoring
Traceability**

Industry

*productivity,
flexibility, safety,
traceability*



Process monitoring

Buildings

*comfort,
communication safety,
operating costs*



**HVAC, Lighting,
Energy
management**

Residential

*safety, comfort,
communication*



**Home automation
Security
Energy
management**

WSN Adoption (1/2)

- WSN is well suited for monitoring and control (soft real time)
 - Response time above 10ms
- Many opportunities
 - Increasing demand for monitoring and control
 - Energy management and conservation is a strong driver
 - Regulation about traceability or energy efficiency
 - Technology exists and is affordable (e.g. 802.15.4 radio)
- And some weakness that prevent rapid adoption
 - Fuzzy Technology landscape
 - Lack of leading standard
 - Feeling that it is not yet stable and mature
 - Battery management for battery powered devices
 - Fears about reliability, security, interferences, impact on health

WSN Adoption (2/2)

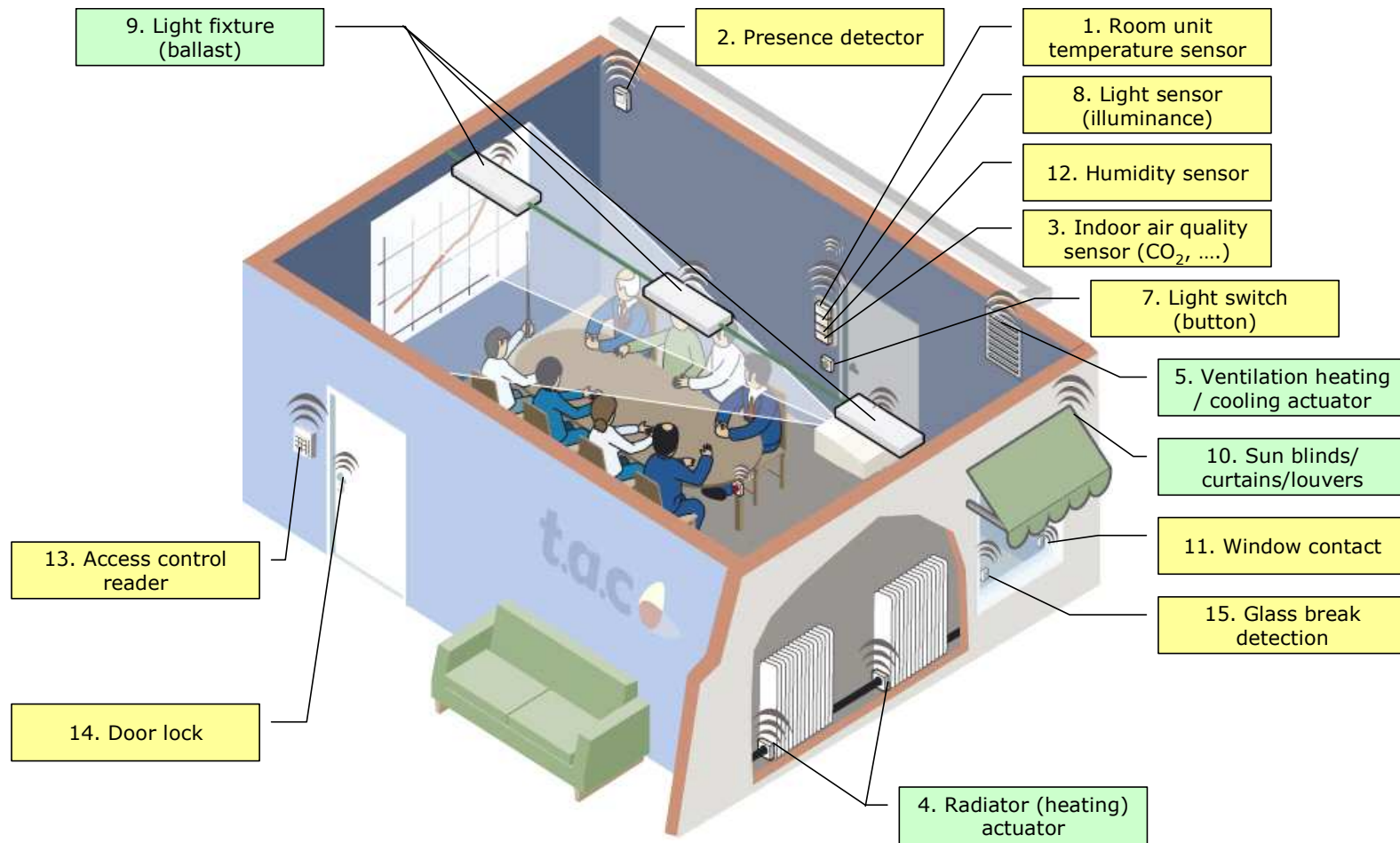
- Adoption will be slow in the factory
 - Importance of legacy
 - High expectations
 - Conservative market, reluctant to wireless
- Great opportunities in Building and Residential market
 - Growing demand for comfort and security at home
 - Awareness about Energy consumption
 - Strong needs for better energy management
 - Evolution of regulation
 - Demand/response programs

Building Automation example

- Residential & tertiary buildings
 - 40% of global energy consumption
 - 25% of CO2 emission
- Old buildings (built before 75)
 - Responsible of 70% of total energy consumption
- EU objectives
 - 20% energy saving by 2020
 - Directive on building energy performance



Building Automation example



Industry requirements

- Open technology enabling real multisourcing
- Low cost
- Low power
- Ease of installation and configuration
- Stability and maturity
- Reliability and robustness
- Capability to connect easily to IP backbones

Challenges (1/2)

- At build time: designing the right system

- Radio engineering: How many nodes ?
 - Do I need additional routers or repeaters in my system ?
 - Network planning
- ⇒ Need for tools supporting radio design

- During installation (How to mask intrinsic complexity of RF)

- Is my radio link working fine with enough margin ?
 - How configuring my network : Network ID, encryption keys, addresses, ...
 - How binding the devices together
- ⇒ Installers or electricians must be able to install and commission the system

Challenges (2/2)

- In operation

- Extend or modify the system
 - Add new devices
 - Change associations
 - Merge networks
- Detect and diagnose a problem without being RF expert

- Advanced features

- Manage mobile nodes while ensuring correct response time
- Enable batteryless devices powered by energy harvesting technology
- Low power routers
- Indoor localization


- Combine with IP networks

- IP down to the end device without Gateways

Summary

- Energy efficiency is strong driver for deploying Wireless Sensors Networks
- WSN are likely to be used first in Building and Residential applications
- Ease of installation and ease of use is key
- An open, standard and stable technology is required
- Many technical challenges remain and have to be worked

THANK YOU !

Schneider
 Electric