Challenges in the Building Automation Industry

Jan Brissman
Technology Manager
TAC AB, Malmö, Sweden

t.a.c by Schneider Electric

Content

1. What we do
2. The Building Automation environment
3. The technology environment
4. Our challenges

TAC – A Company of Schneider Electric

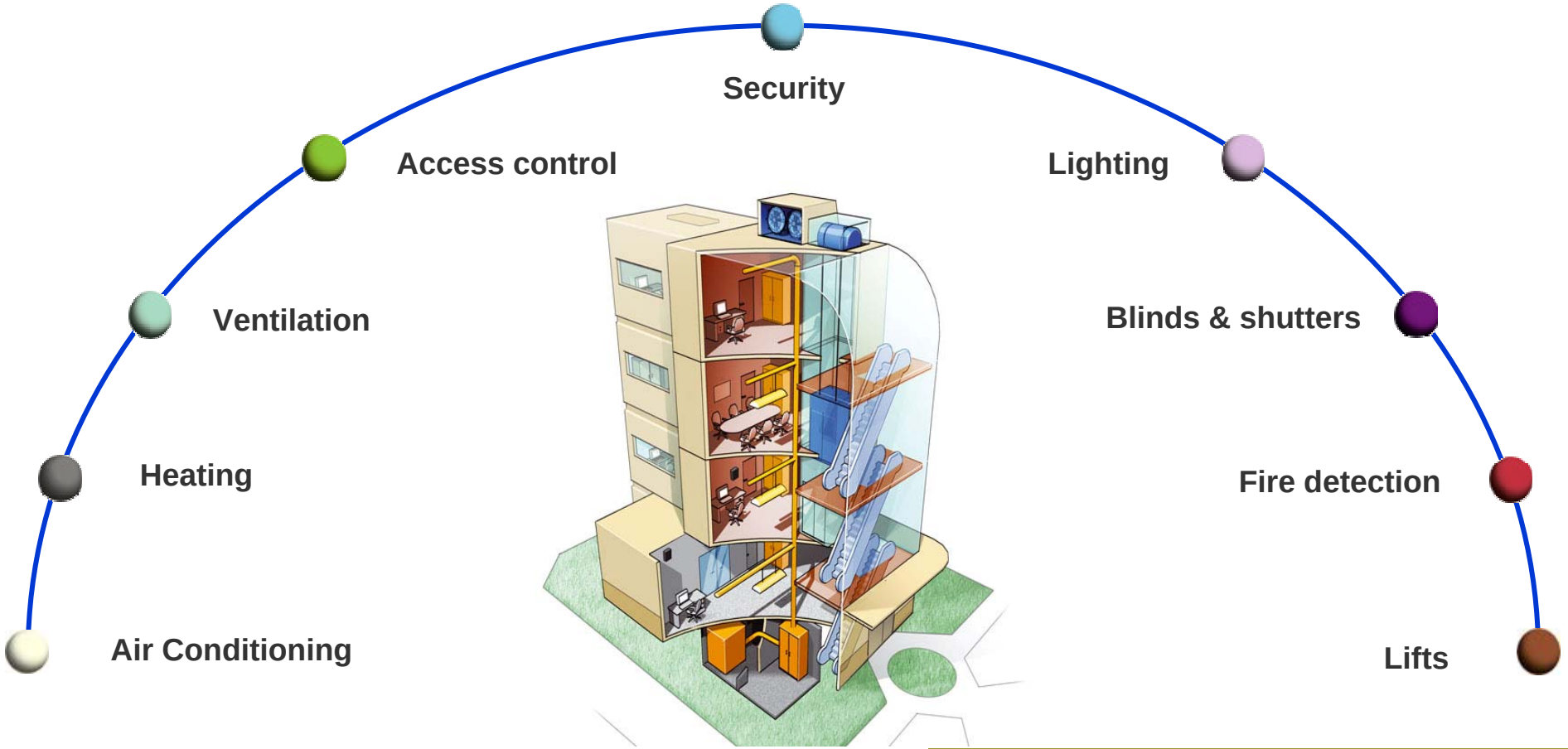
We help people make the most of their energy.

Energy & Infrastructures	Industry	Buildings → tac	Residential
availability, safety, cost-effective	*productivity, flexibility, safety, traceability*	*comfort, communication, safety, operating costs*	*safety, comfort, communication*

Comprehensive range of products, software and services.

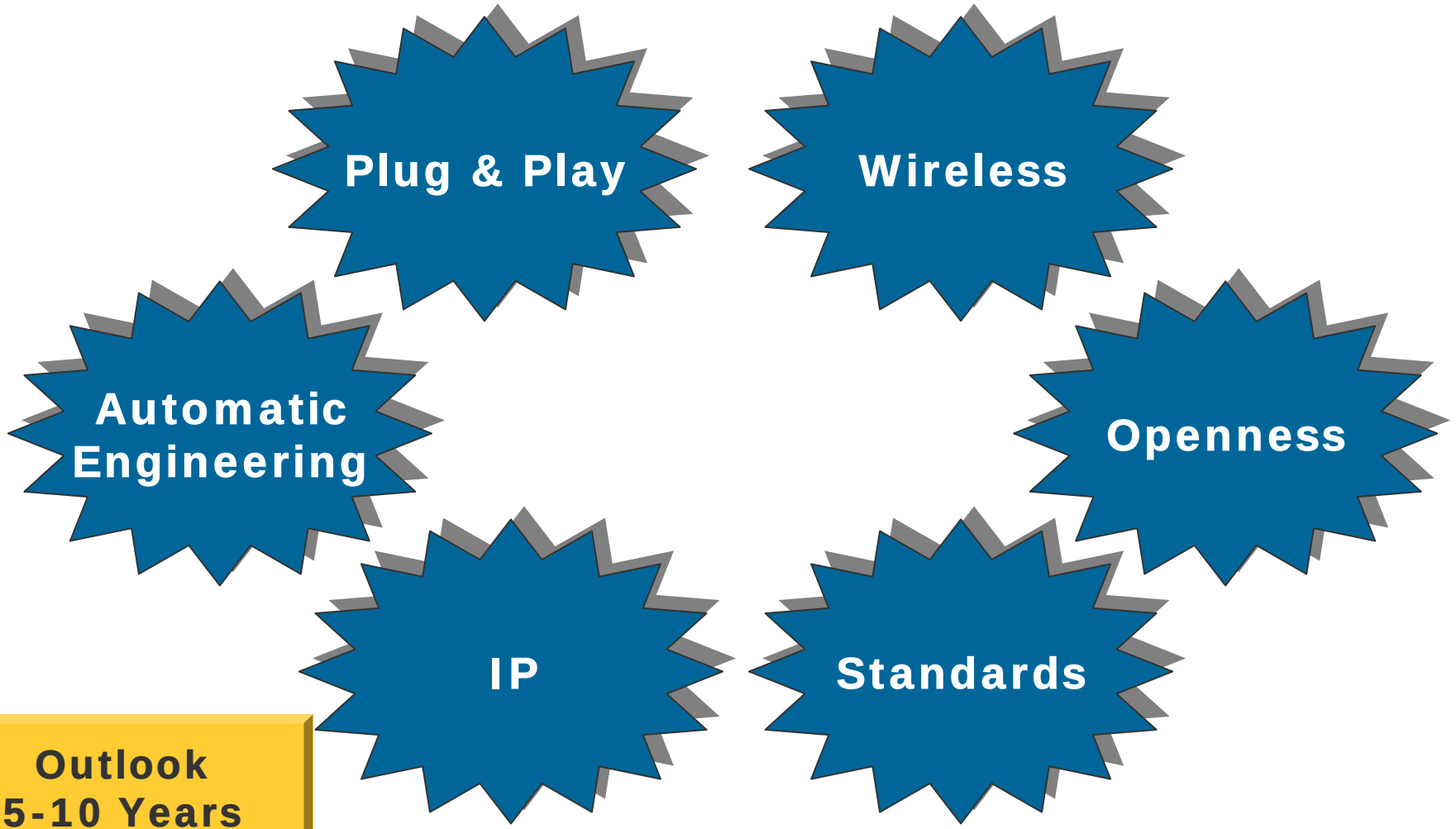
Building Automation

We deliver to the end-users – Totally Open & Integrated solutions



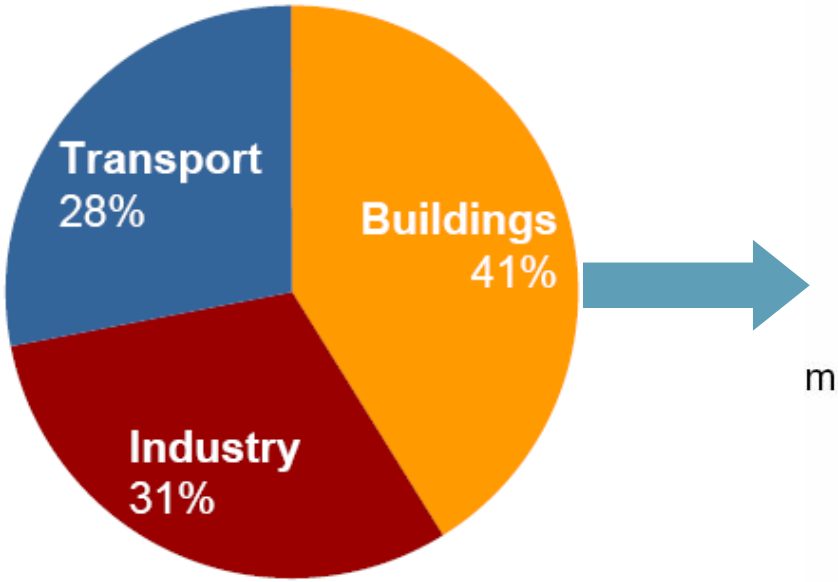
t.a.c by Schneider Electric

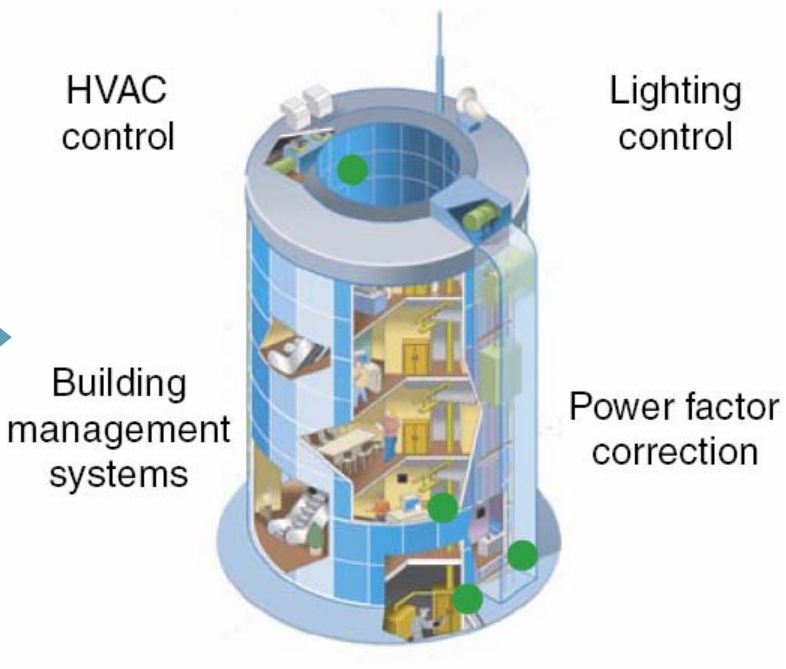
Our environment:
Summary of Technology Trends (Outlook from 2003)



t.a.c by Schneider Electric

Our environment: Energy use in Europe





Impact of Building Automation

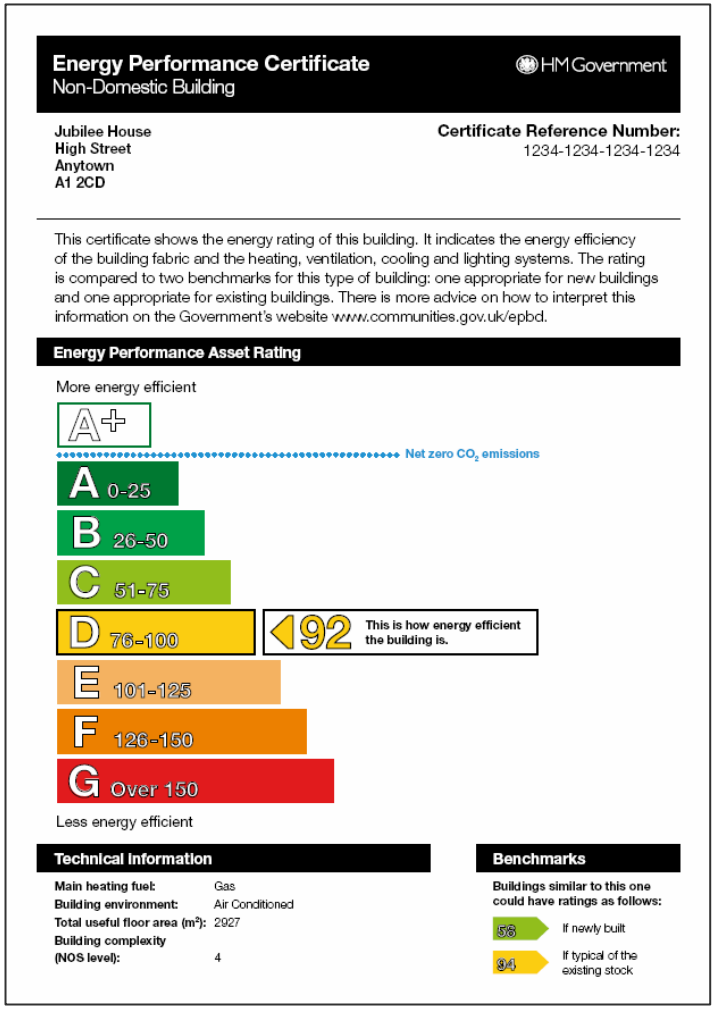
Efficiency improvement and modernization can save up to 30 percent

t.a.c by Schneider Electric

Our environment:
Energy Performance of Buildings Directive (EPBD)

Certification of buildings

- To be displayed in all “Public” buildings
- Compulsory as of 2009-04-01



Energy Performance Certificate
Non-Domestic Building

HM Government

Jubilee House
High Street
Anytown
A1 2CD

Certificate Reference Number:
1234-1234-1234-1234

This certificate shows the energy rating of this building. It indicates the energy efficiency of the building fabric and the heating, ventilation, cooling and lighting systems. The rating is compared to two benchmarks for this type of building: one appropriate for new buildings and one appropriate for existing buildings. There is more advice on how to interpret this information on the Government's website www.communities.gov.uk/epbd.

Energy Performance Asset Rating

More energy efficient

A+ — Net zero CO_2 emissions

A 0-25

B 26-50

C 51-75

D 76-100 — 92 This is how energy efficient the building is.

E 101-125

F 126-150

G Over 150

Less energy efficient

Technical information

Main heating fuel:	Gas
Building environment:	Air Conditioned
Total useful floor area (m^2):	2927
Building complexity (NOS level):	4

Benchmarks

Buildings similar to this one could have ratings as follows:

58 If newly built

94 If typical of the existing stock

t.a.c by Schneider Electric

How to improve energy efficiency?

Our primary efforts to achieve energy savings:

- Improved controls strategies
- Improved operator and end user behavior

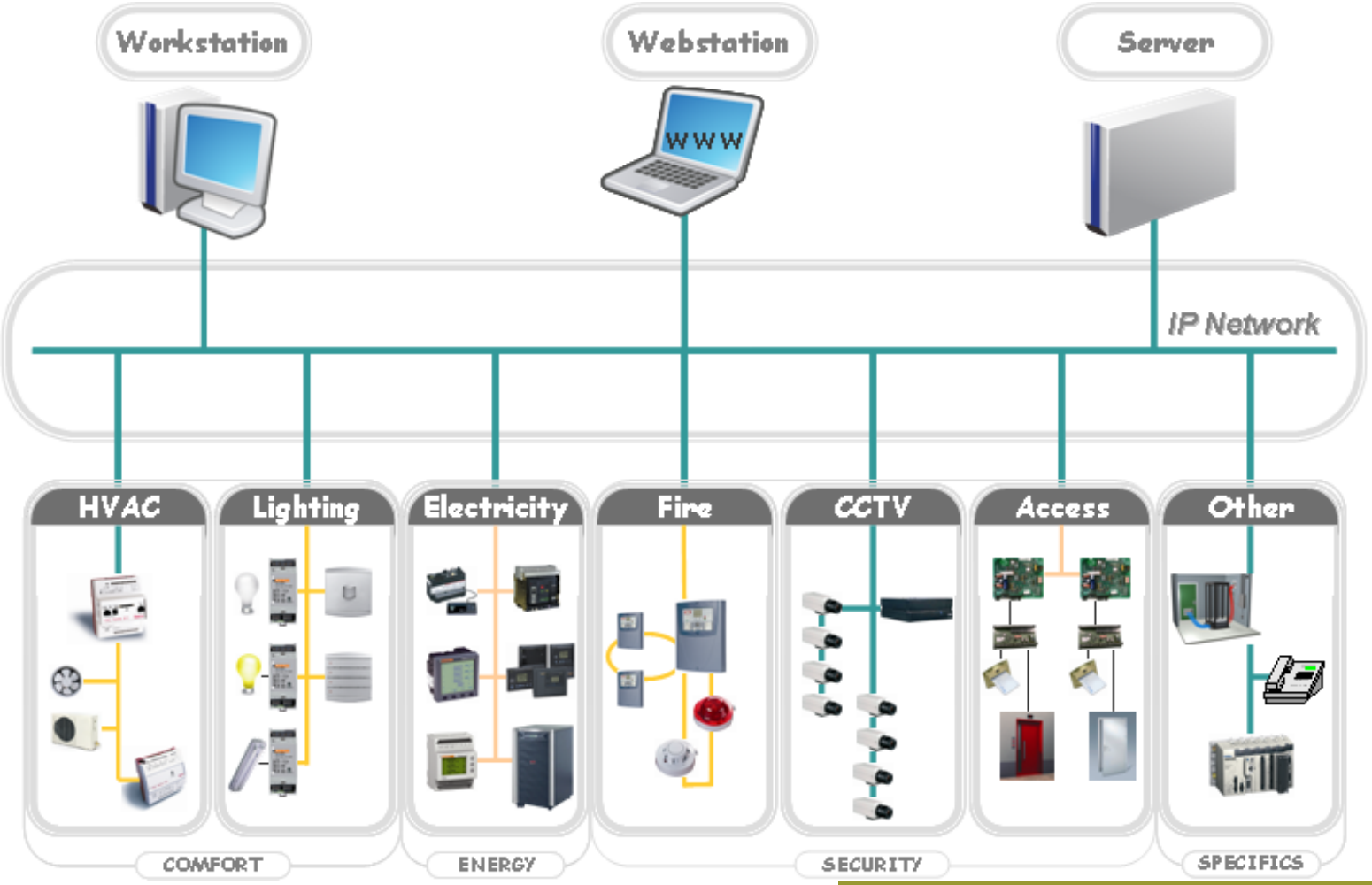
- Improvements to the building envelope (walls, windows, etc.) and technical equipment (air handling units, pumps, etc.) are most often not in our scope of supply

Our challenges – 1

Control

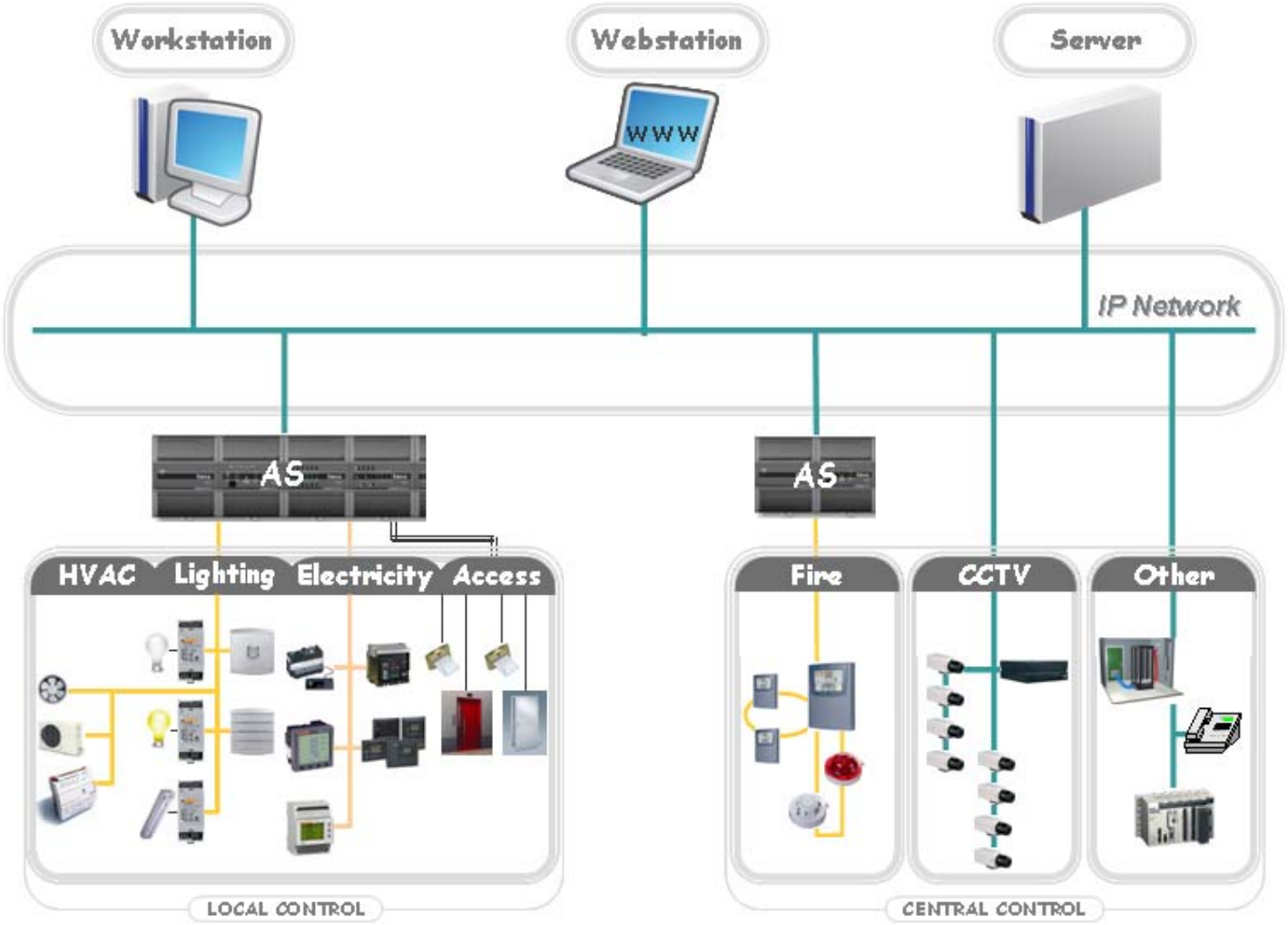
- Coordinated control of devices that traditionally have been part of different sub-systems, such as blinds, lighting and HVAC
  - This may require modeling of the impact the different subsystems have on energy use, and finding the best coordinated strategies to achieve the lowest energy use

Global BMS Architecture – Sub-system View



t.a.c by Schneider Electric

Global BMS Architecture – Integrated View



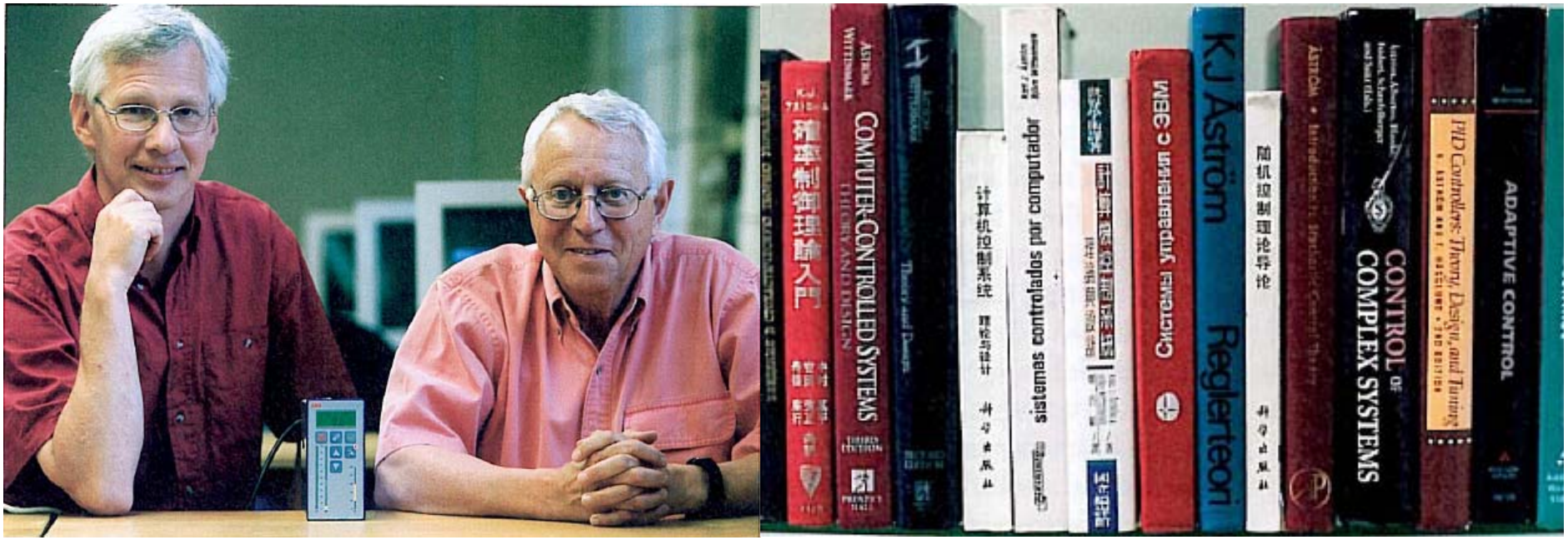
t.a.c by Schneider Electric

Our challenges – 2

Control

- Improved tuning of control loops
  - All control loops are initially set up using standard parameters and just checked to work ‘properly’
    - It is considered too time consuming to tune loops unless there is a visible problem
  - We believe that mechanisms to easily find the best control parameters may be accepted
    - PID is what our engineering community is familiar with

From knowledge to implementation .....



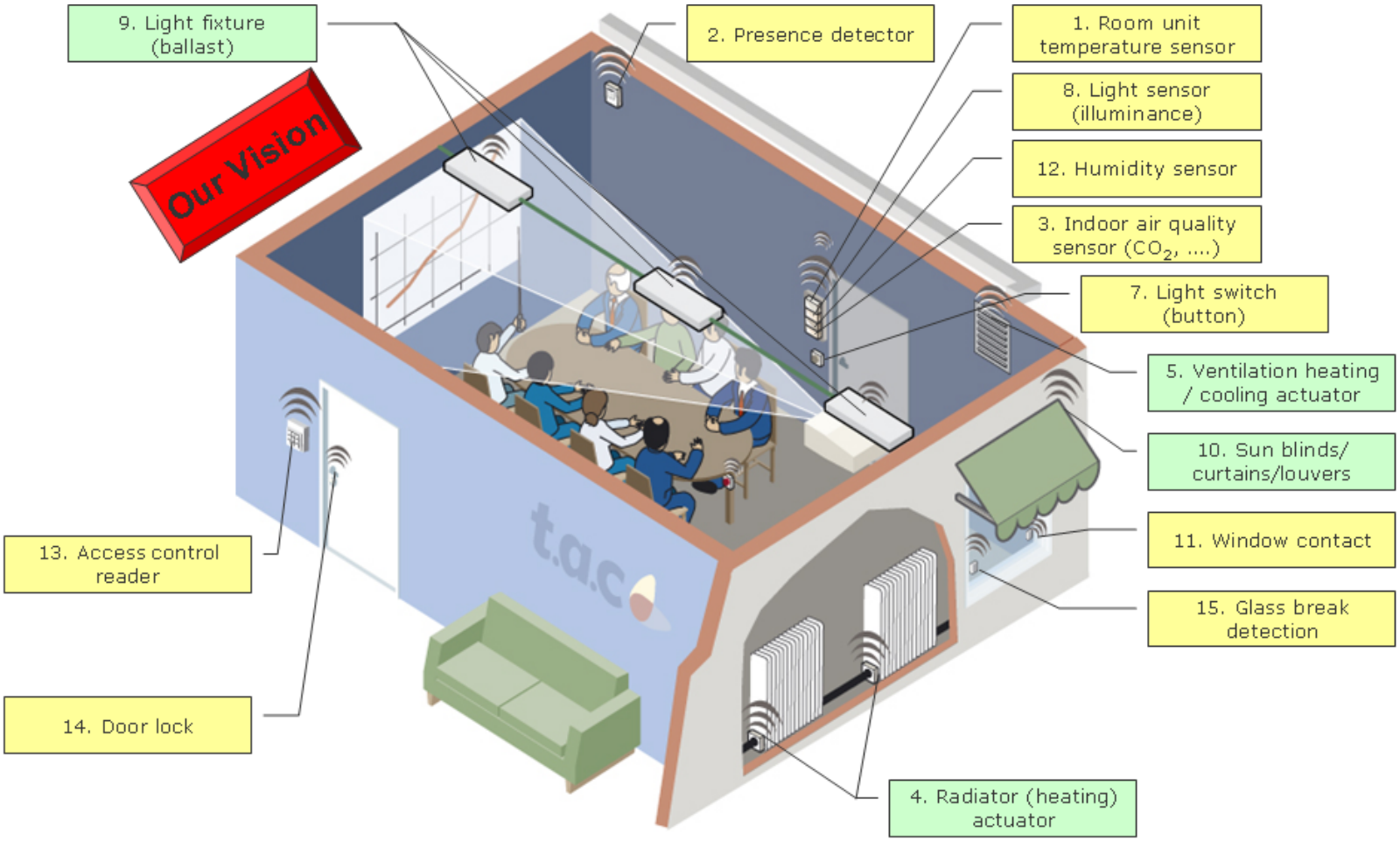
t.a.c by Schneider Electric

Our challenges – 3

Control

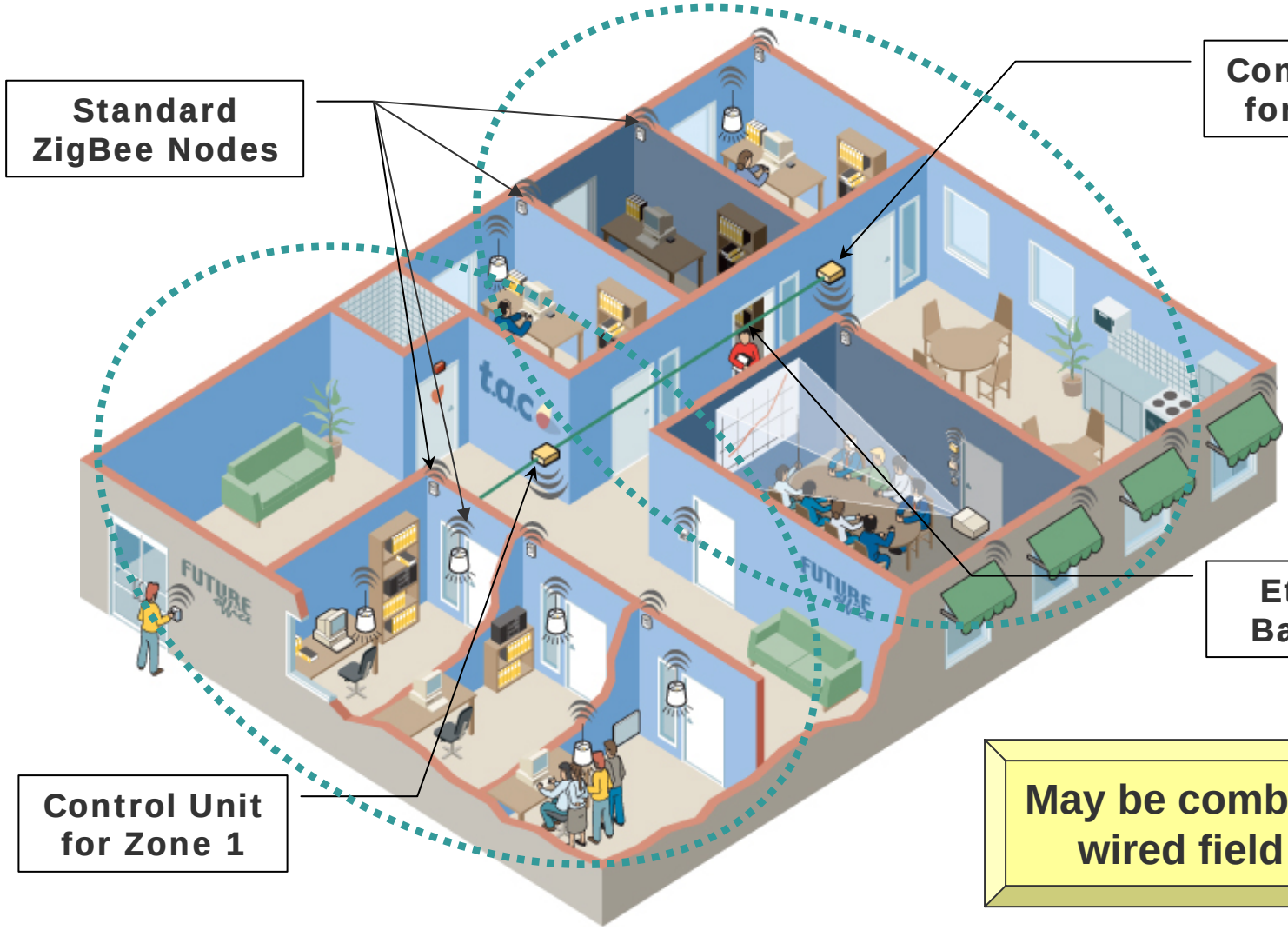
- Control using sensing devices that are wireless and battery or self-powered
  - What is the impact on control when sensors are sleeping most of the time?
  - This may impact the best strategies for sensors to read values versus sending the information, assuming that sensing makes use of much less power than sending a message

Wireless Room Automation

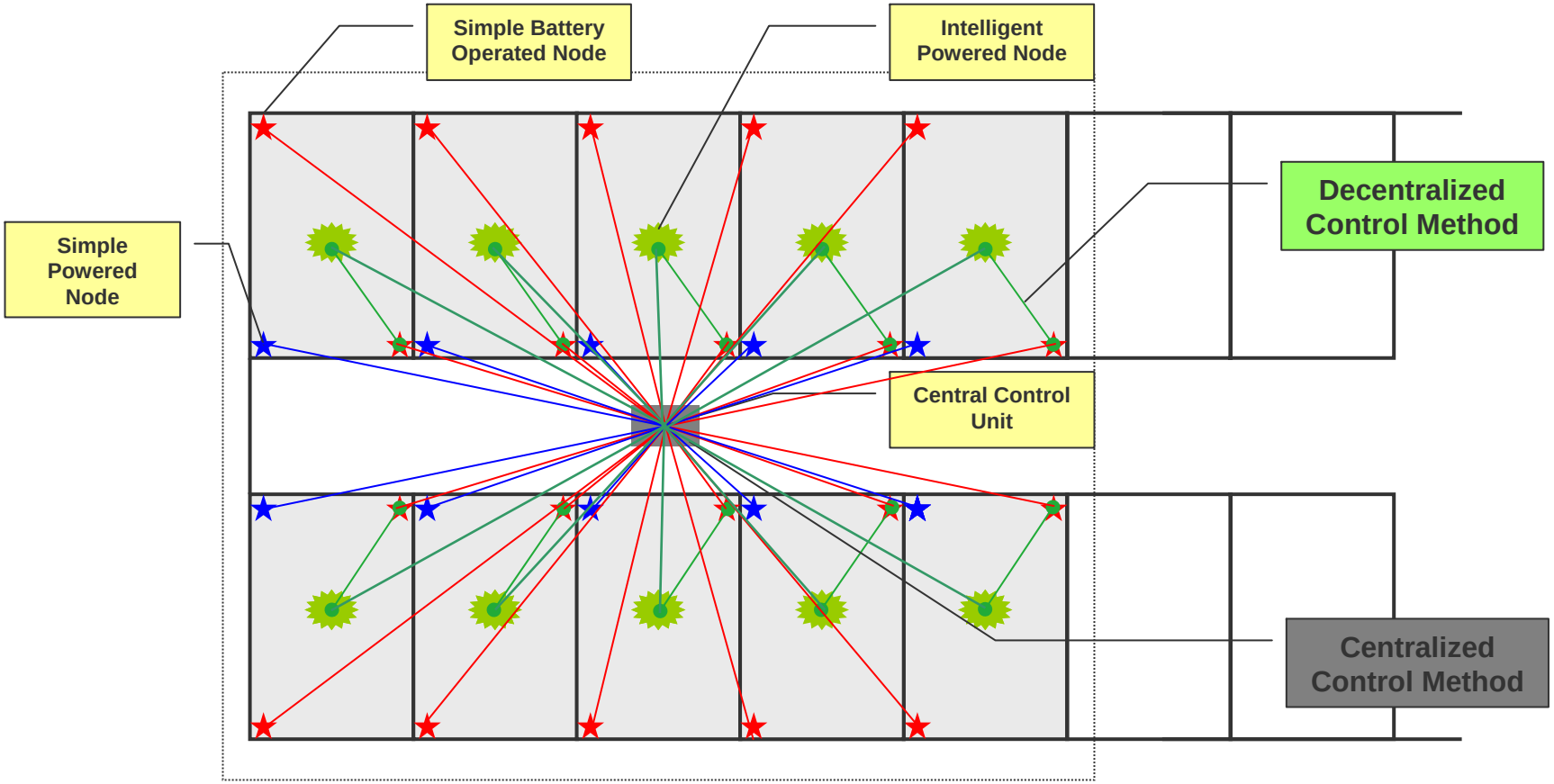


t.a.c by Schneider Electric

Control Zones



Wireless Zone



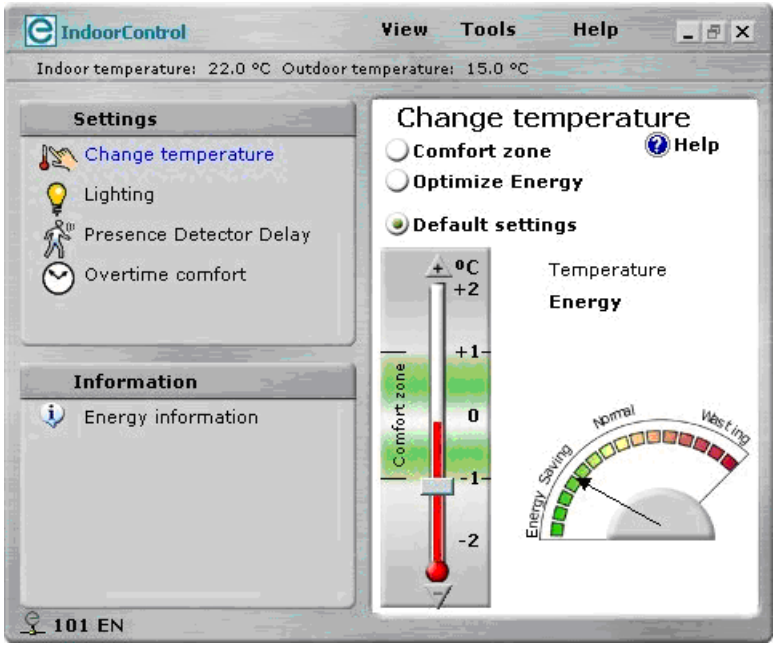
t.a.c by Schneider Electric

Our challenges – 4

How operators and end users interact with the system:

- How can we make operators and end users better aware of the consequences of changes in operation of the system?
  - On-line simulation presented in an easy-to-understand way?

Example: Interactive User Interface



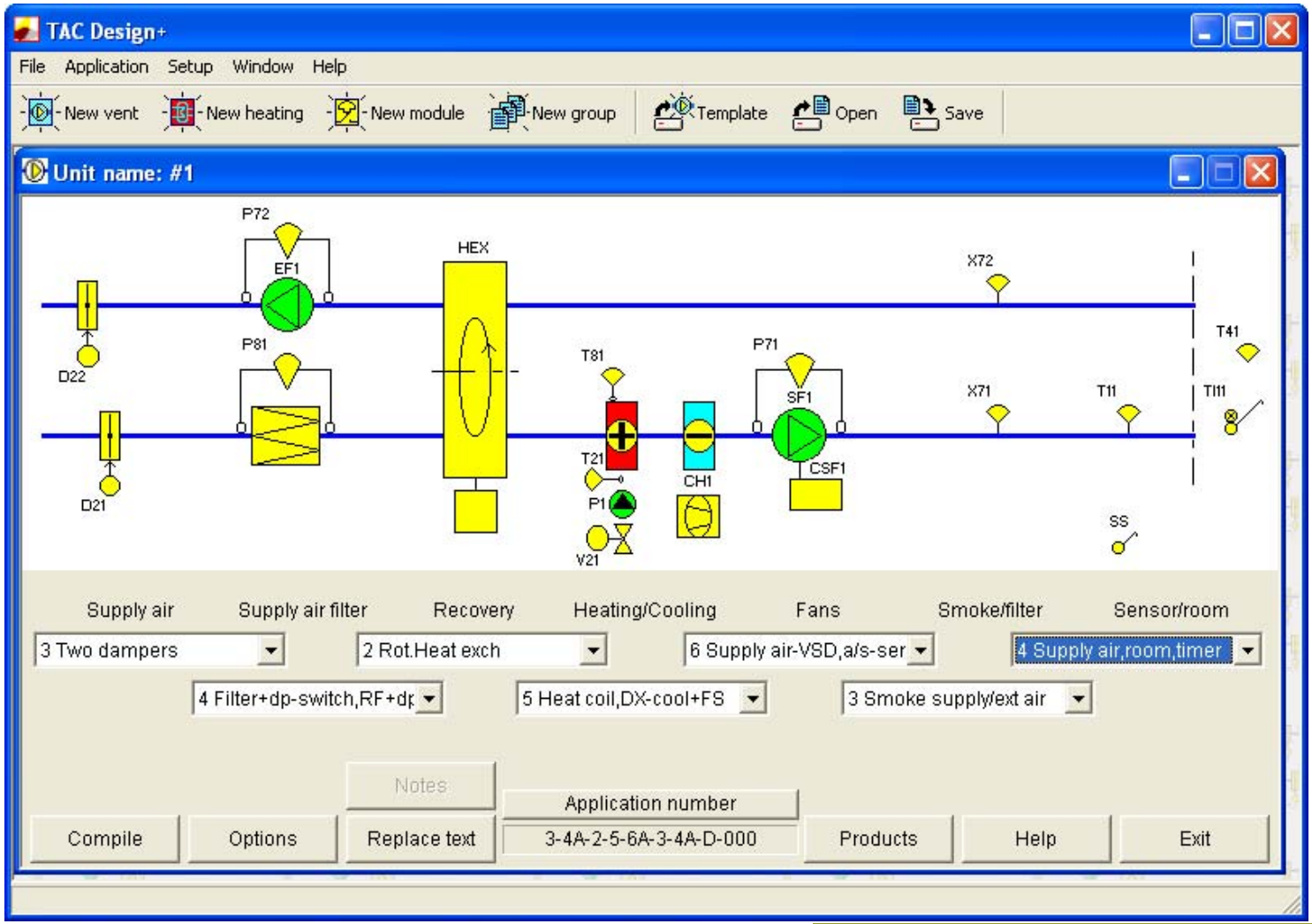
t.a.c by Schneider Electric

Our challenges – 5

How operators and end users interact with the system:

- How can we assist operators (and perhaps end users) in understanding how they can improve the performance of the system from the current situation?
  - Tools that help predict energy use applying different control strategies?

Interactive Design Tool



t.a.c by Schneider Electric

Summary

Building Automation

- Normally contains well behaved processes
- Presents some new challenges:
  - Control
    - Coordinated control of devices in different sub-systems
    - Improved tuning of control loops
    - Control in the wireless environment
  - How operators and end users interact with the system
    - Make operators and end users better aware of the consequences of changes in operation of the system
    - Assist operators (and perhaps end users) in understanding how they can improve the performance of the system

Thank You !

Contact:
jan.brissman@tac.com
Technology Manager
TAC AB
Jägershillgatan 18
213 75 Malmö, Sweden