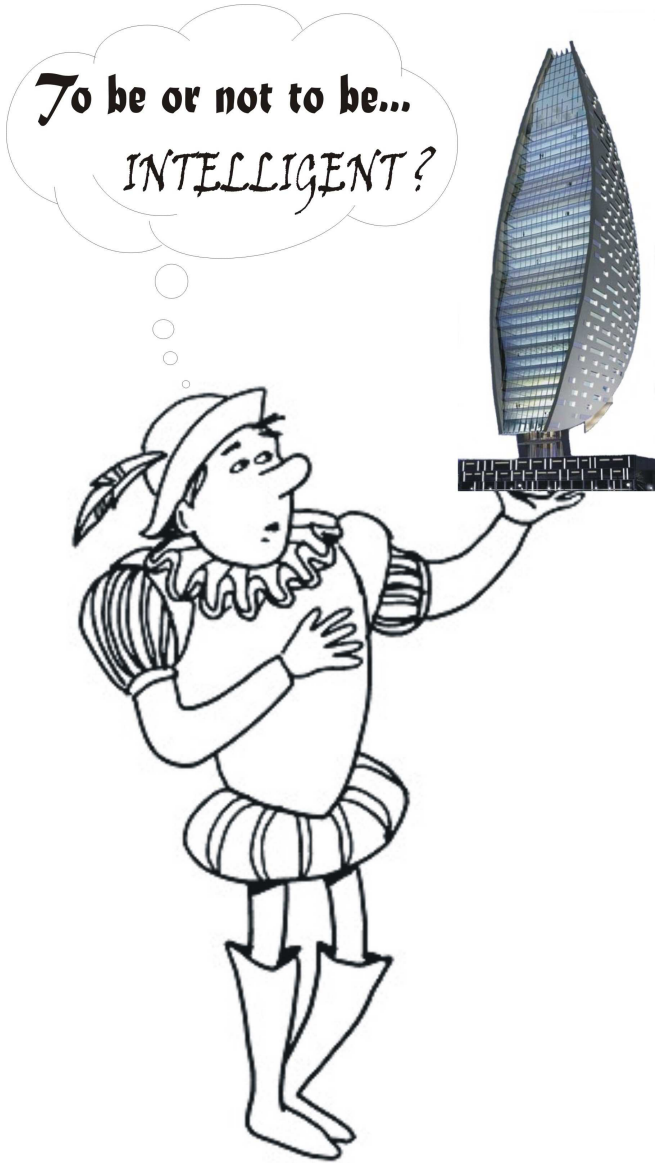
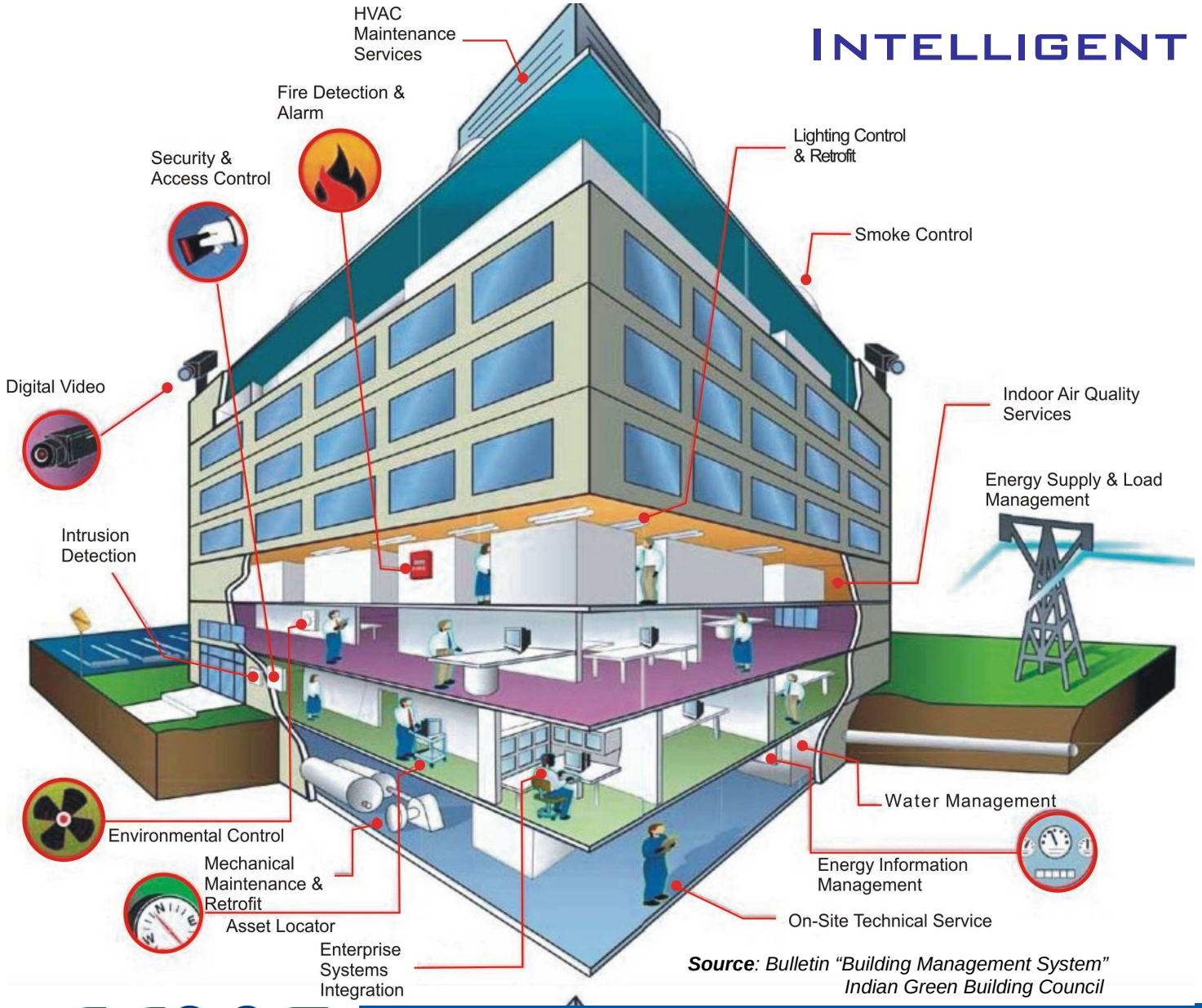


GREEN / INTELLIGENT

BUILDINGS

CEMS technologies

Intelligent buildings

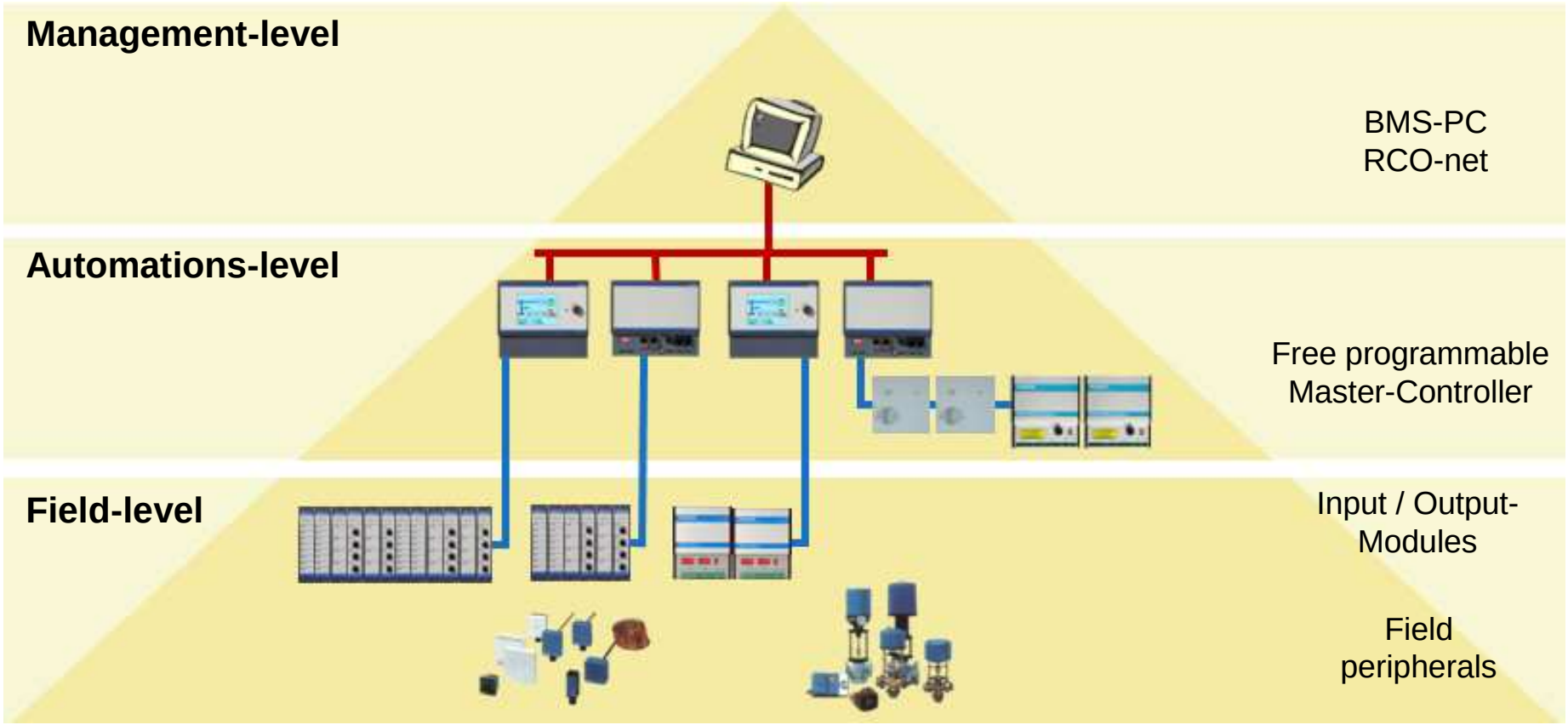


What are they thinking of?

***Source**: Bulletin "Building Management System"*
Indian Green Building Council

CEMS technologies

A Basic System Architecture



***Source**: Elesta, RCO D Systems*

BMS – a “must have” for green buildings

Few reasons

- “Green starts with energy”

Among other advantages: around 30% reduction in energy consume

- Optimum integration of renewable energy sources

- Monitoring of water treatment process and waste

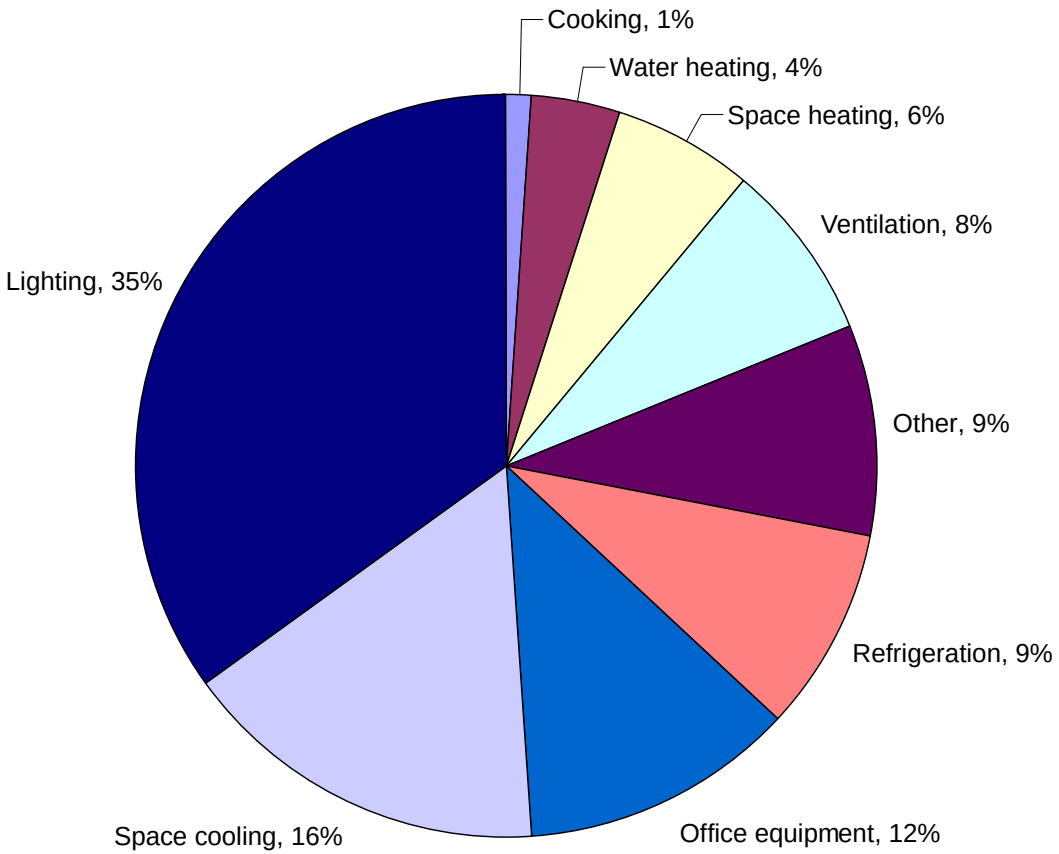
- Control of indoor air quality

Intelligent buildings

Study case

Lighting control

Lighting share of commercial building electricity use



***Source**: 2005 Buildings Energy Data Book*

Lighting Control

The general control strategies used by lighting designers include:

- ***Occupancy sensing*** **-** lights are turned on and off or dimmed according to occupancy;
- ***Scheduling*** **-** lights are turned on and off according to a schedule;
- ***Tuning*****-** light output is reduced to meet current user needs;
- ***Daylight harvesting*** **-** electric lights are dimmed or turned off in response to the presence of daylight;
- ***Demand response*** **-** power to electric lights is reduced in response to utility curtailment signals or to reduce peak power charges at a facility;
- ***Adaptive compensation*** **-** light levels are lowered at night to take advantage of the fact that people need and prefer less light at night than they do during the day.

Lighting Control – retrofit options

Indicator	Base case	Retrofit
Average maintained (lx)	270	270
Power/fixture (W)	156	49
Annual energy use (kWh)	7507	1275
Energy savings (%)	NA	83
Annual operating cost (USD)	826	175
Upgrade cost (USD)	NA	2150
Simple pay-back (years)	NA	3.3

Energy costs: demand = $10 per kilowatt per month (all 12 months of the year); consumption = 7¢ per kWh (all times of day).

Base case:

Energy-saving T12 lamps with magnetic ballasts

Retrofit:

- High performance T8 lamps with electronic ballasts
- Specular reflector+lens
- 50% delamping
- Occupancy sensing
- Daylight dimming

Source: Lighting Technology Atlas, 2005

BMS Implementation Tips

For lower implementation costs and better results:

- Consider a BMS from the early stages of the project
- Identify synergies between power panels and automations for BMS or contract them with the same designer
- For which type of building you can implement BMS?
  * large or small, including residential units
  * new or retrofit projects
  * with some stand alone automated installations
- When choosing a BMS solution make sure it is the right one for your needs
  * Does it cover all the necessary applications?
  * Is it possible to extend the system, if necessary?
  * Which communication protocols is it using?
  * Can you transfer data to a FM application?
- Use all your creativity when writing the design specifications

Financials

Average Payback Period and ROI of Single-Technology Projects

Technology	Average Payback Period	Average ROI
Meters & Monitors	0.5	200%
Lighting	2.2	45%
Controls	2.3	43%
Motors & Drives	2.4	42%
HVAC	3.6	28%
On-site Power	4.3	23%
Building Automation	5.9	17%

Source: ECSC – study on 1000 retrofit projects

The above figures are based only on energy savings. A BMS is expected to generate another 25% decrease in labor costs with maintenance.