Lighting retrofit of an hypermarket
Energy is not the only driver

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Lighting power in supermarket (CH)

(Survey 62 supermarkets in Switzerland, 2005)

Target Value

Limit Value

Min. = 21 W/m²

Mean = 27 W/m²

Max. = 36 W/m²

Our Case-study (11 + 9W/m²)

1/4

3/4

Minergie®

Lighting power in supermarket (CH)

(Survey 62 supermarkets in Switzerland, 2005)
Different zones / Different lighting needs
Stock

Current status
- Global area: 1650 m²
- Openings: None
- Lamps: 78 x T5 54W
- Installed power (4500 W): < 3W/m²
- Horizontal Illum. (floor): 130 lux
- Horizontal Illum. (1m): 175 lux
- Vertical Illum. (1m): 60-90 lux
  - floor: 0.25
  - walls: 0.30
  - ceiling: 0.25

Potential for improvement
Reflection coefficients
Presence sensors
Non-Food

Current status
• Representative area: 72 m²
• Openings: None
• Lamps: 24 x T5 36W
• Installed power (915 W): 12.7 W/m²
• Horizontal Illum. (floor): 290-430 lux
• Horizontal Illum. (top): 500 lux
• Vertical Illum. (products): 280 lux
  • floor: ~0.40
  • walls: -
  • ceiling: ~0.50
Non-Food
Non-Food

The luminaires distribution is not appropriate
Non-Food

Illuminate the products rather than the floor

Potential for improvement
Adjust the luminaires position to the display shelvings.
Adjust the lighting direction to aim the products rather than the floor
Eventually add specific indirect luminaires on the top of the shelves
Fruits / Vegetables

Current status
• Representative area: 200 m²
• Openings: None
• Lamps: HQI 35W
• Installed power: 450 W per «block»
• Horiz. Illum. (product): 200-500 lux
  • floor: ~0.25
  • walls: ~0.50
  • ceiling: ~0.50
Fruits / Vegetables

Current status
• Glare effects are due to a wrong orientation of some of the light spots.
**Recommendation**
- Reduction of glare risk
- Reduction of self shadowing
- Improvement of illuminance on the products
Fresh displays
Fresh displays

Current status
• Lamps: T8: 28, 36 or 54W
• Tubes integrated into the furniture
• Vert. Illum. (products): 800-1300 lux
• Vert. Illum. (price tags): 200-600 lux
Fresh displays (meat)

The efficiency of the tubes is affected by low temperatures

Lmax: ~5000 cd/m²

Lmax: 13’000 cd/m²
Fresh display (fish)

The efficiency of the tubes is really affected by low temperatures

Current status
- Lamps: T5 & T8 (resp. 36 & 54W)
- 1 embedded T8 line
- 1 external T5 line
- Vert. Illum. (products): 800-1500 lux

Lighting power / 2!
Fresh display: Recommendation

Option 1
Extend the principle of fish shelving to all shelvings (External FL line)
Replace the embedded FL lines by LEDs

Option 2
Replace all the embedded FL lines by LEDs

- Luminous efficacy
- Heat release
- Cooling loads
Frozen products
Frozen products

Recommendation
- Replace T5 lines by LEDs
  (Luminous efficacy ★★★)
  (Heat release ★★★)

Current status
- Embedded luminaires : T5

luminance ~2500 cd/m²
HIFI / Appliances
HIFI / Appliances

Current status

• Fluorescent ceiling above a dark ground
• The light does not contribute to the development of products
Recommendation

1. Re-allocate the ceiling light to enhance the back walls illumination
2. Lighten the floor
Cosmetics

Current status
• Specific furniture, fluorescent backlight

Recommendation
• Front light with LEDs
• Regulation / Modulation

Cumulated load
Estia SA : Innovation et mise en œuvre des principes du Développement Durable dans l'environnement construit
Effects on lighting energy consumption

(Survey 62 supermarkets in Switzerland, 2005)
Conclusions

• In that exemple, the priority was to aim at improving the «global outcomes» of lighting.

• The value-chain of the lighting refurbishment should include the «glorification» the products.

• It is possible to improve the lighting even when consumption is already low.

Efficient lighting ≠ «bottom of the range»