



Lighting retrofit of an hypermarket

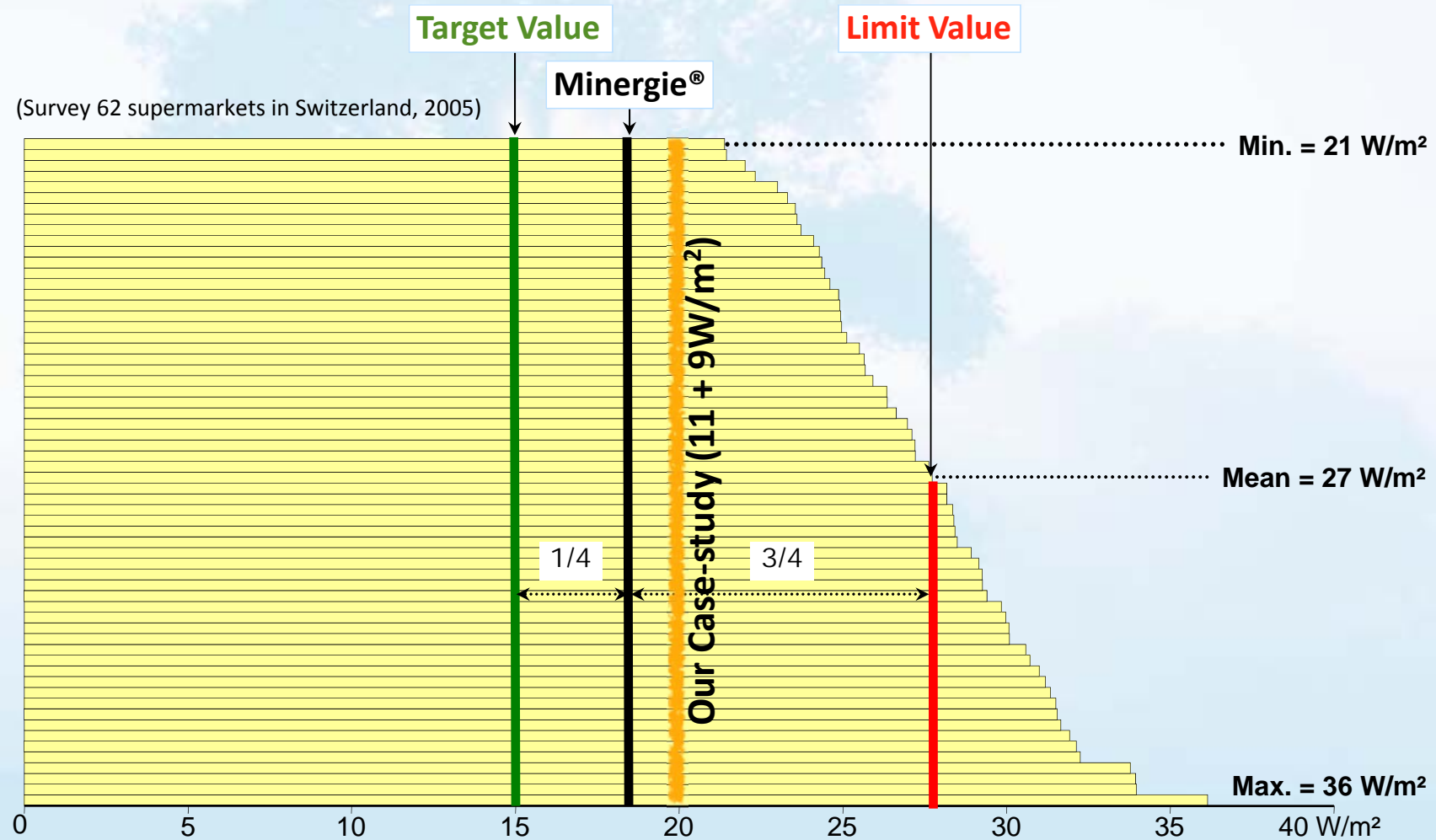
Energy is not the only driver

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Estia

Lighting power in supermarket (CH)



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

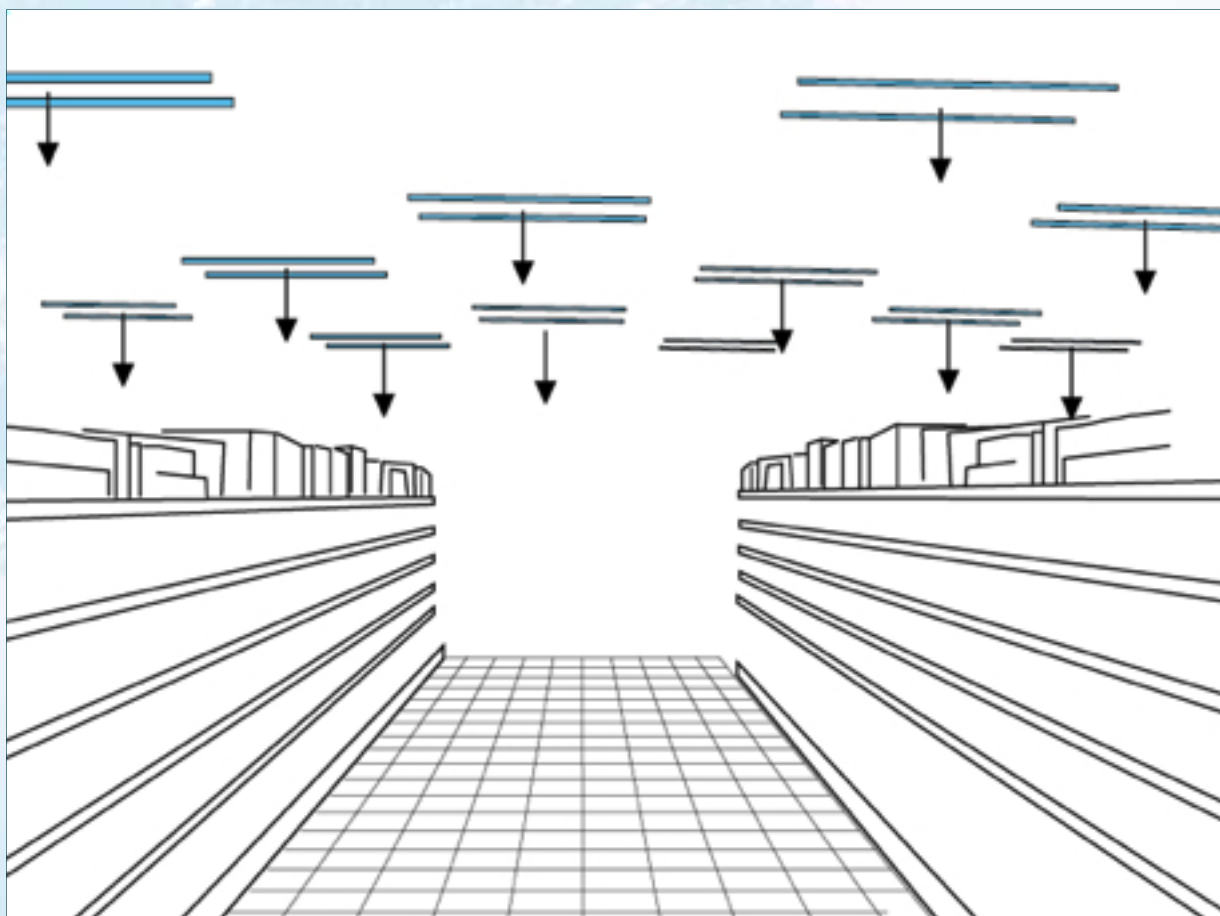


Non-Food



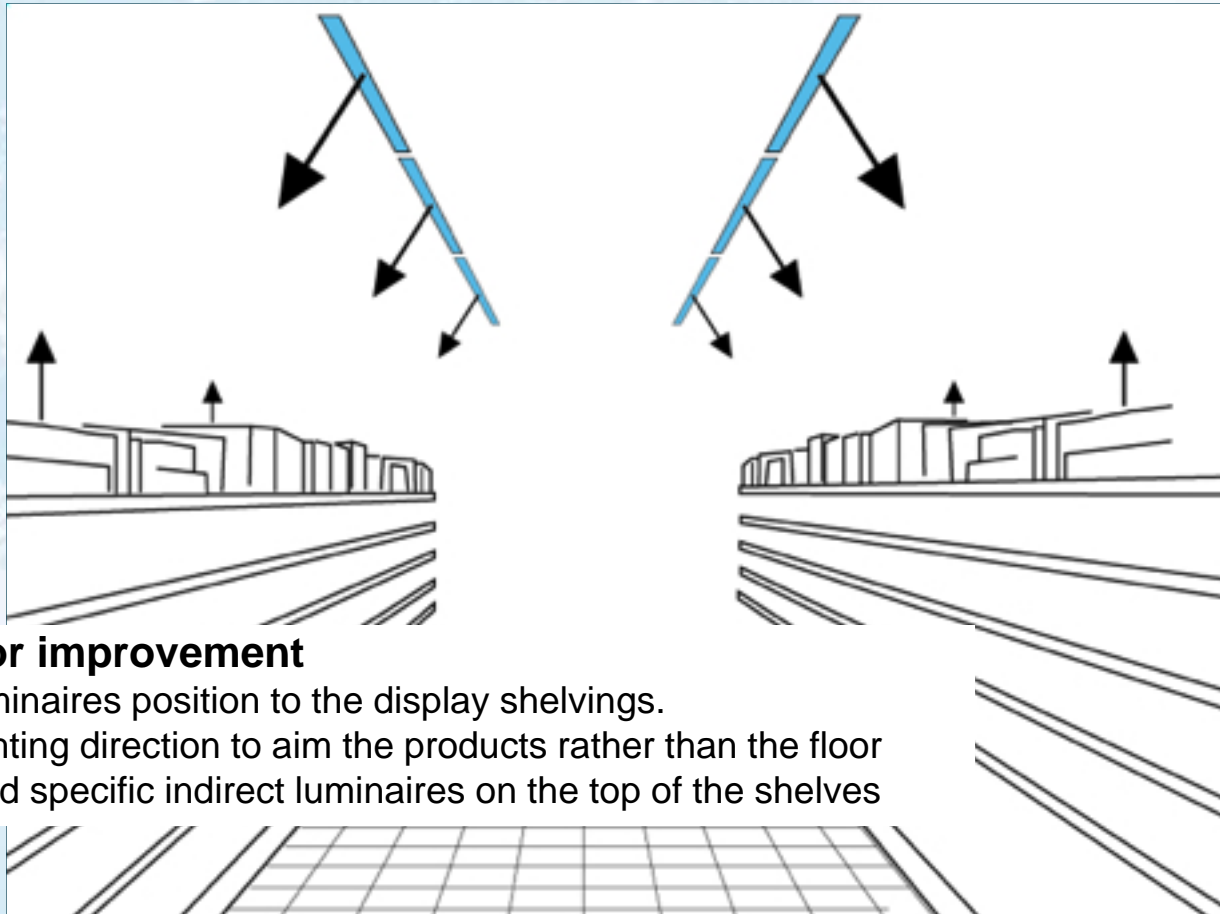
Non-Food

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 shelving.

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

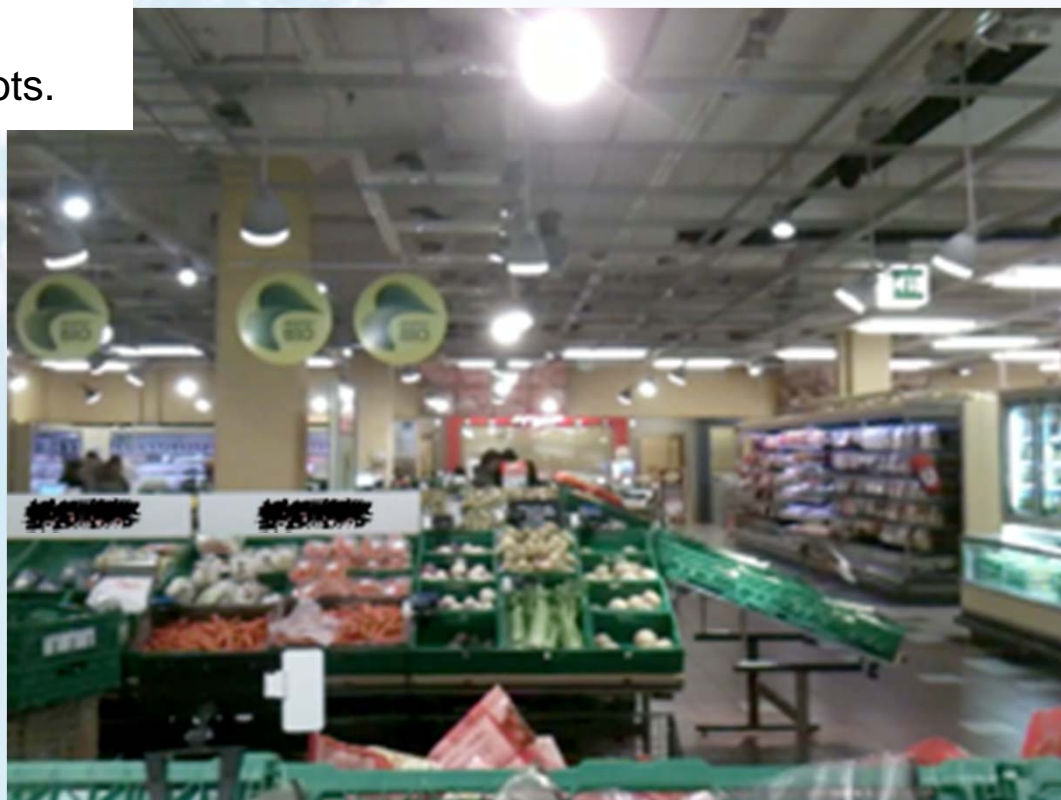
- Representative area : 200 m²
- Openings : None
- Lamps : HQI 35W
- Installed power: 450 W per «block»
- Horiz. Illum. (product) : 200-500 lux
- > floor : ~0.25
- > walls : ~0.50
- > ceiling : ~0.50



Fruits / Vegetables

Current status

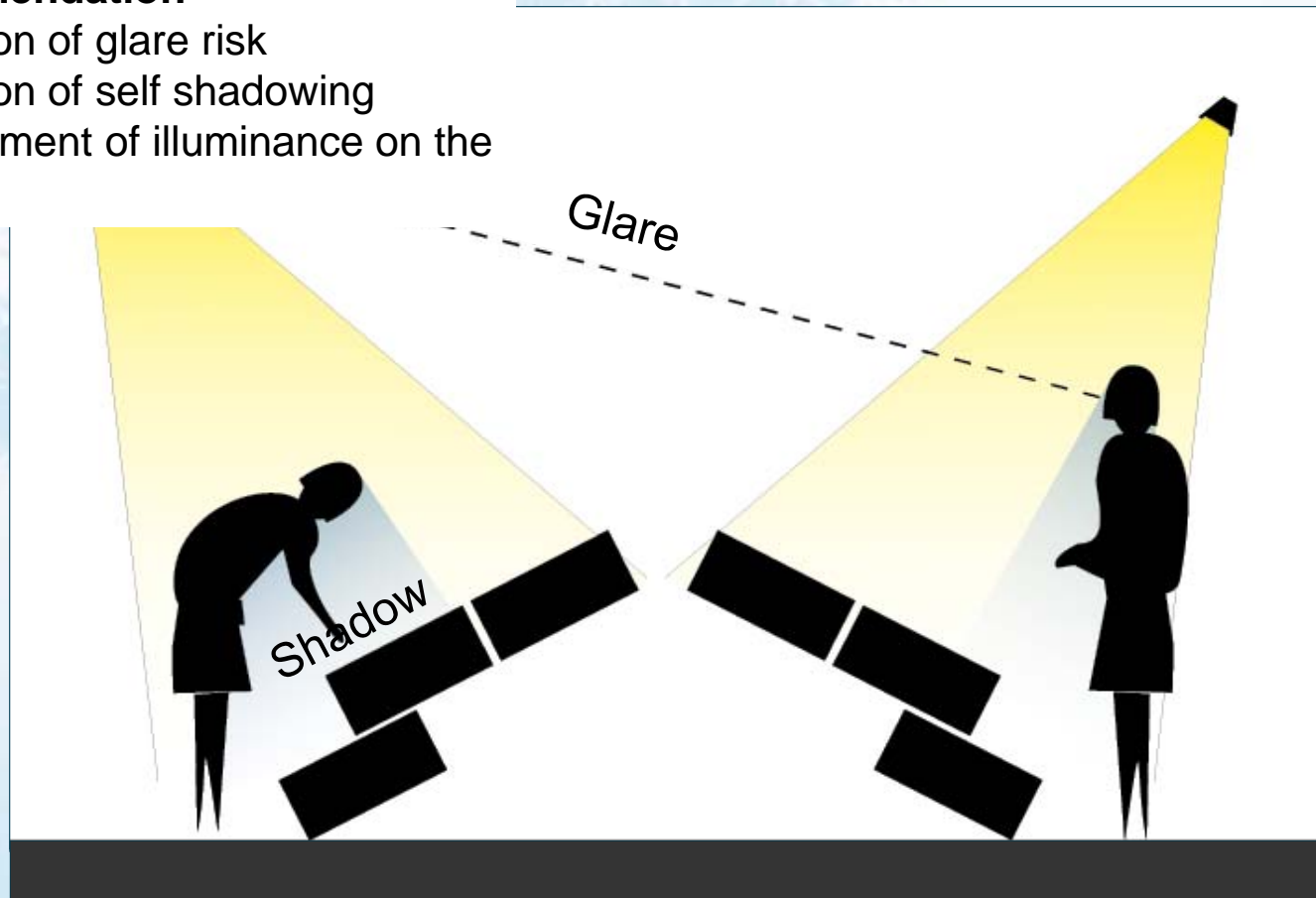
- Glare effects are due to a wrong orientation of some of the light spots.



Fruits / Vegetables

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



$L_{max}: 13'000 \text{ cd/m}^2$

$L_{max}: \sim 5000 \text{ cd/m}^2$

Fresh display (fish)

The efficiency of the tubes is really affected by low temperatures



Current status

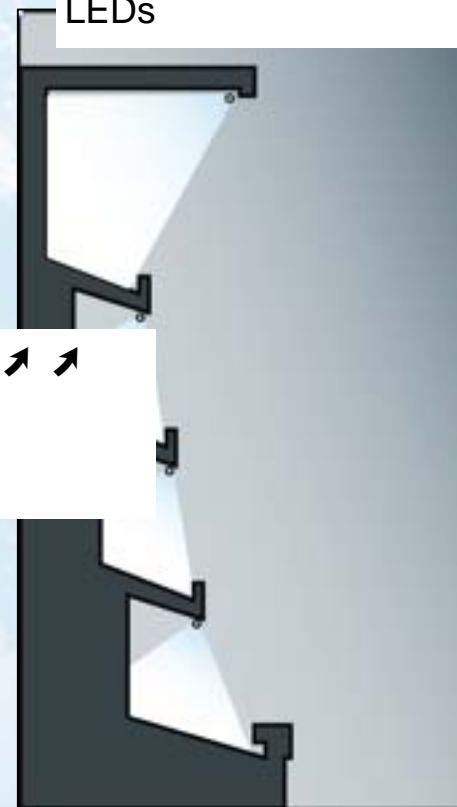
- Lamps : T5 & T8 (resp. 36 & 54W)
- 1 embeded T8 line
- 1 external T5 line
- Vert. Illum. (products) : 800-1500 lux

Fresh display: Recommendation



Option 1

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

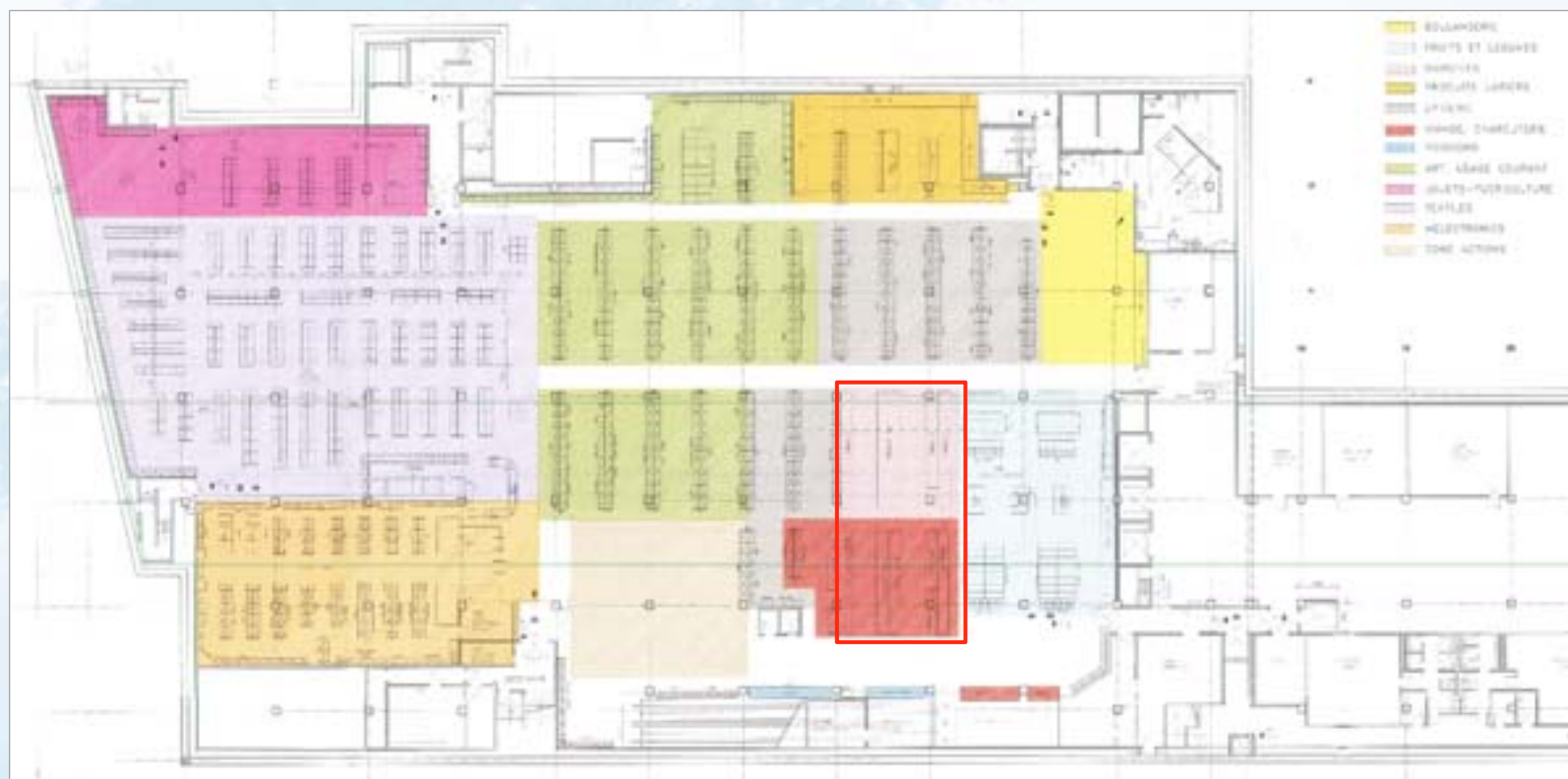


Option 2

Replace all the embedded FL lines by LEDs

- Luminous efficacy ↗ ↗
- Heat release ↘
- Cooling loads ↘

Frozen products



Frozen products

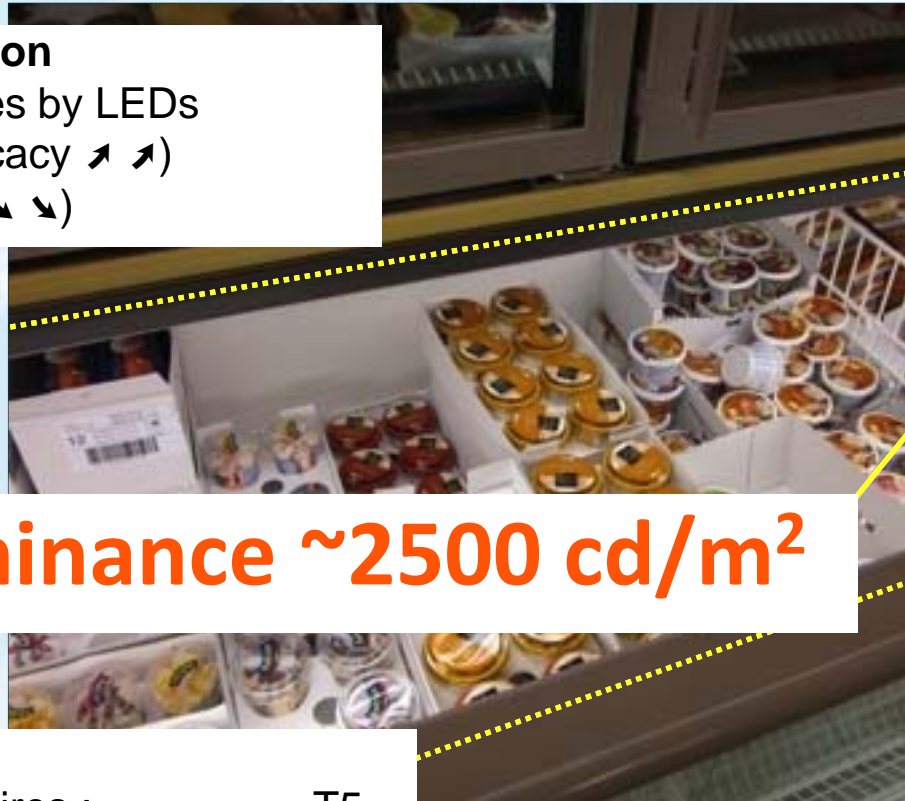
Recommendation

- Replace T5 lines by LEDs
 - ▮ (Luminous efficacy ↗ ↗)
 - ▮ (Heat release ↘ ↘)

luminance $\sim 2500 \text{ cd/m}^2$

Current status

- Embedded luminaires : T5



HIFI / Appliances



HIFI / Appliances



Current status

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

HIFI / Appliances



Recommendation

- 📄 Re-allocate the ceiling light to enhance the back walls illumination
- 📄 Lighten the floor

Cosmetics

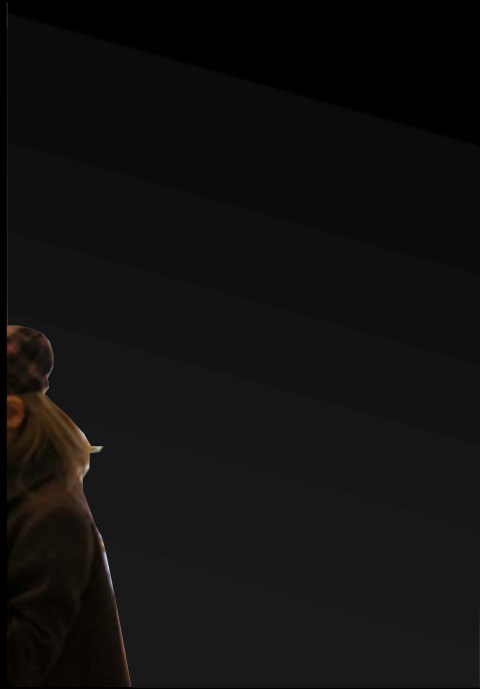
Recommendation

- Front light with LEDs
- Regulation / Modulation
 - cumulated load ↘

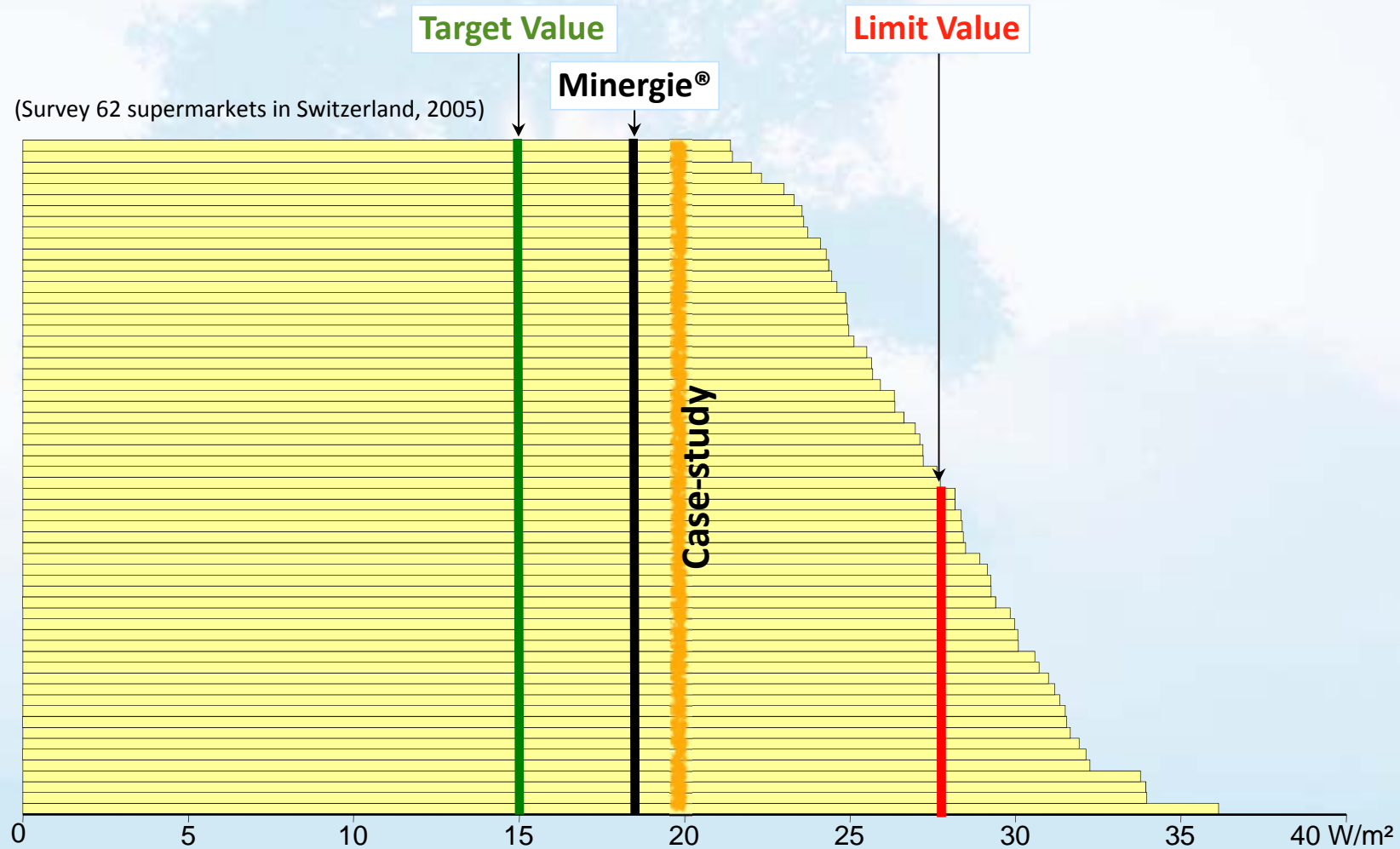


Current status

- Specific furniture, fluorescent backlight



Effects on lighting energy consumption



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»