

**Impact of the new European standard
on building design**



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- Daylight provision
- View out
- Exposure to sunlight
- Protection from glare

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Reference case-study

Walls reflection

- Ceiling : 0.80
- Walls : 0.60
- Floor : 0.30

Openings

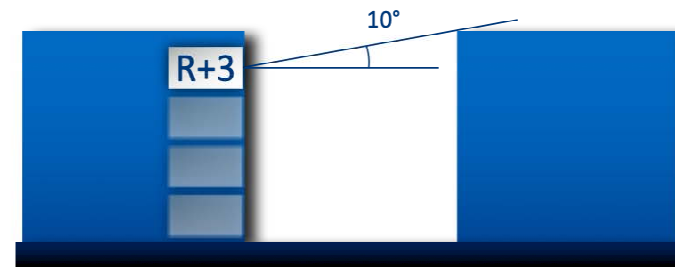
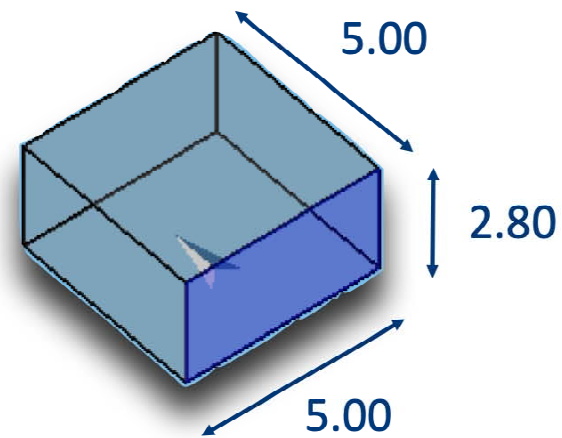
- TI : 0.80
- g : 0.62
- Frame : 25%

Orientation

- South

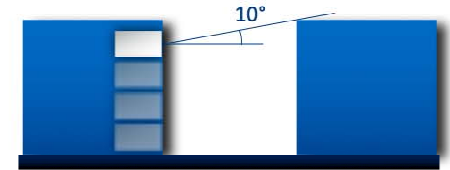
Localization

- Paris



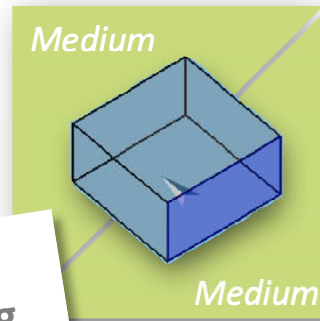
Global ranking - Upper floor ($\alpha = 10^\circ$)

(Maximum performance)



Ranking on Median value

(50% of opening hours
100% of the room)

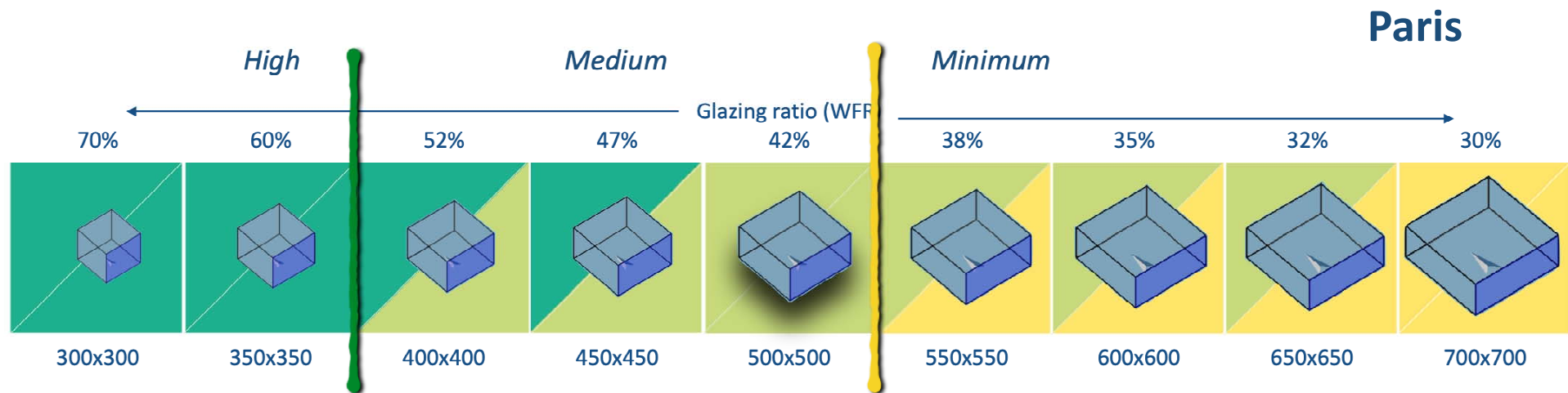
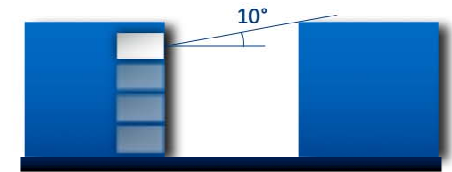


Global
Ranking
Medium

Ranking on
Minimum value
(50% of opening hours
95% of the room)

Influence of window to floor ratio

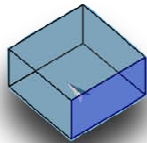
(fully glazed façades / simplified method)



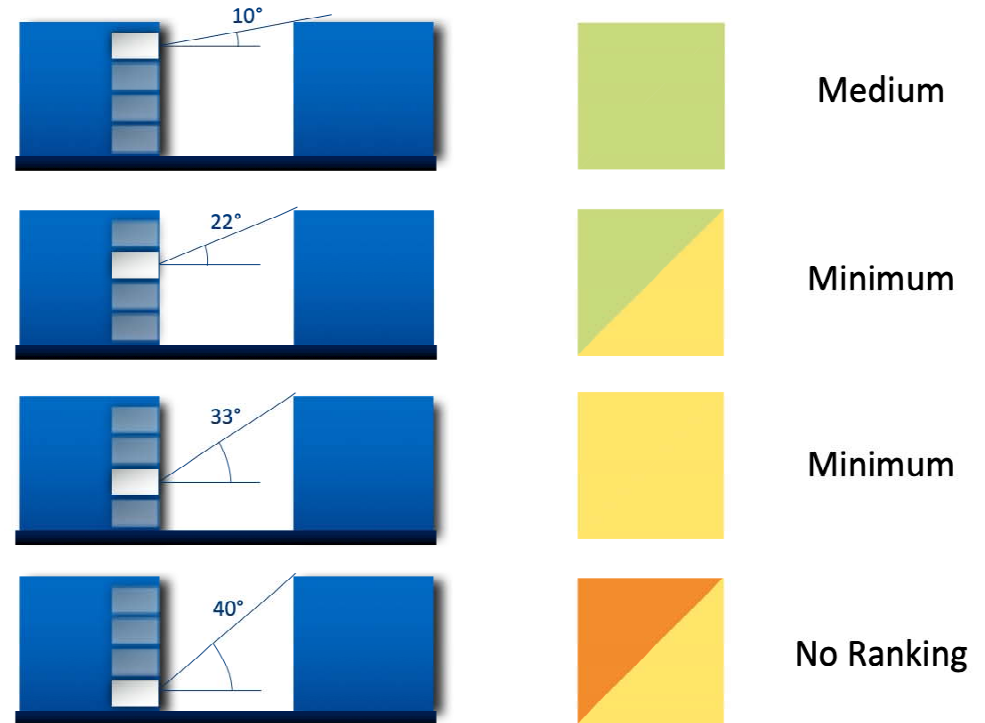
In an unobstructed environment (obstruction angle = 10°)

- The glazing ratio (WFR) should be over 55% to reach « *HIGH* » level
- A glazing ratio below 40%, leads to « *MINIMUM* » level

Influence of outdoor environment (fully glazed façades / simplified method)



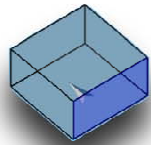
500x500



In a dense urban environment (obstruction angle = 40°)
▸ Even a fully glazed façade can lead to « NO RANKING »

Influence of Indoor photometry

(fully glazed façades / simplified method)



500x500



863



Minimum



752



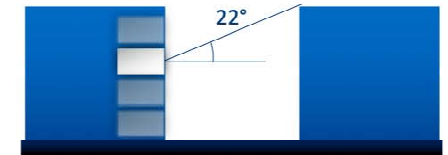
Minimum



641



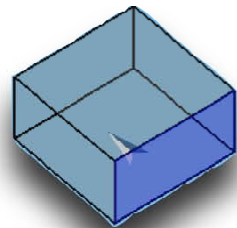
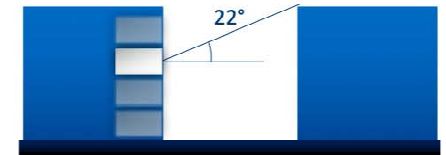
No Ranking



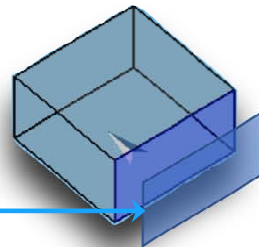
- In a moderately obstructed environment ($\alpha = 22^\circ$)
- ▶ A small decrease of the reflection coefficient leads to « No ranking ».

Influence of Additional Layer

(fully glazed façades / simplified method)



500x500



Double skin ($T_v = 0.7$)



Minimum



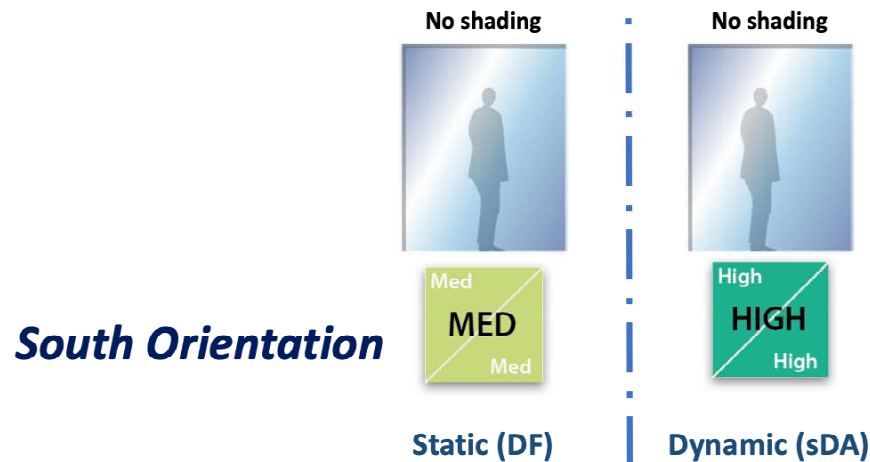
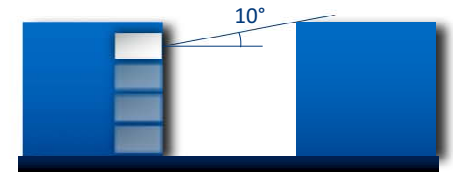
No Ranking

With a moderately obstructed environment ($\alpha = 22^\circ$)

▸ Any additional skin leads to « No Ranking »

Influence of calculation method

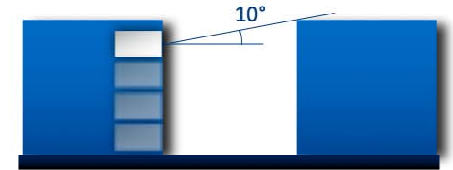
(fully glazed façades / Simplified & Detailed methods)



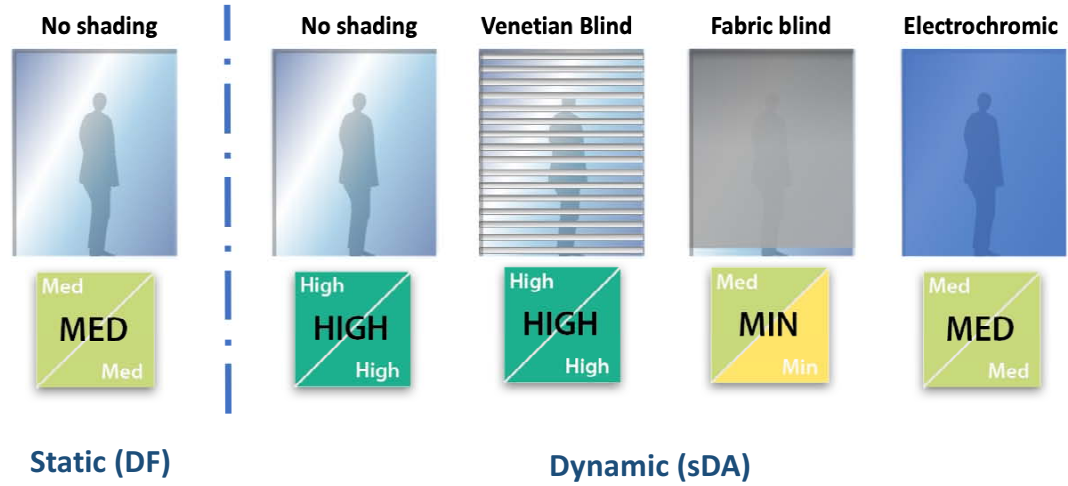
Without shading device, the detailed method (based on dynamic simulations) is more optimistic than the simplified one (based on Daylight Factor values).

Influence & Shading device

(fully glazed façades / Simplified & Detailed methods)

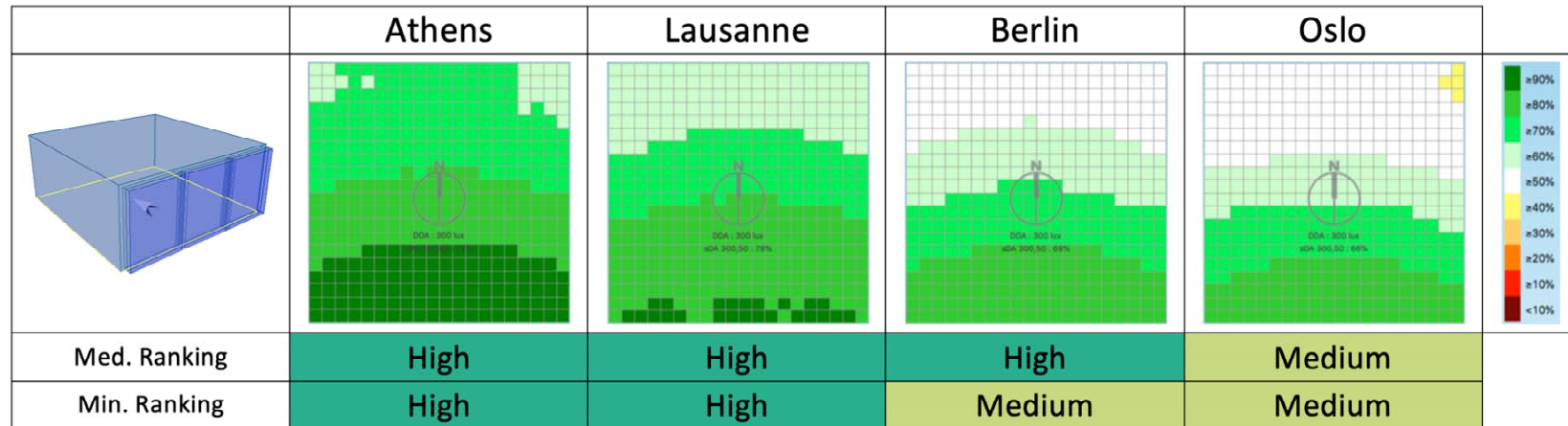


South Orientation



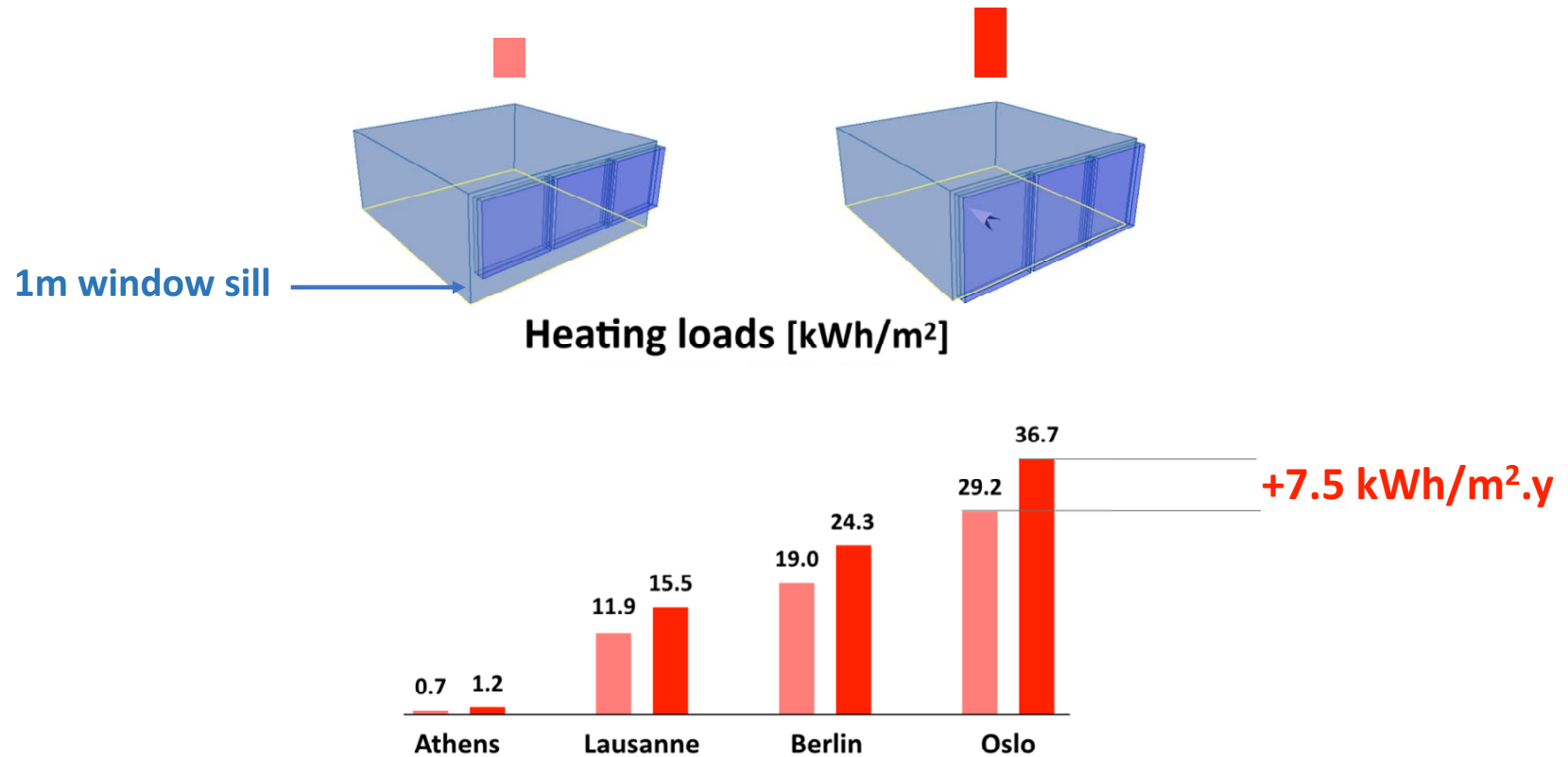
The type of shading devices significantly influences the final ranking (detailed method)

Influence of Room localization

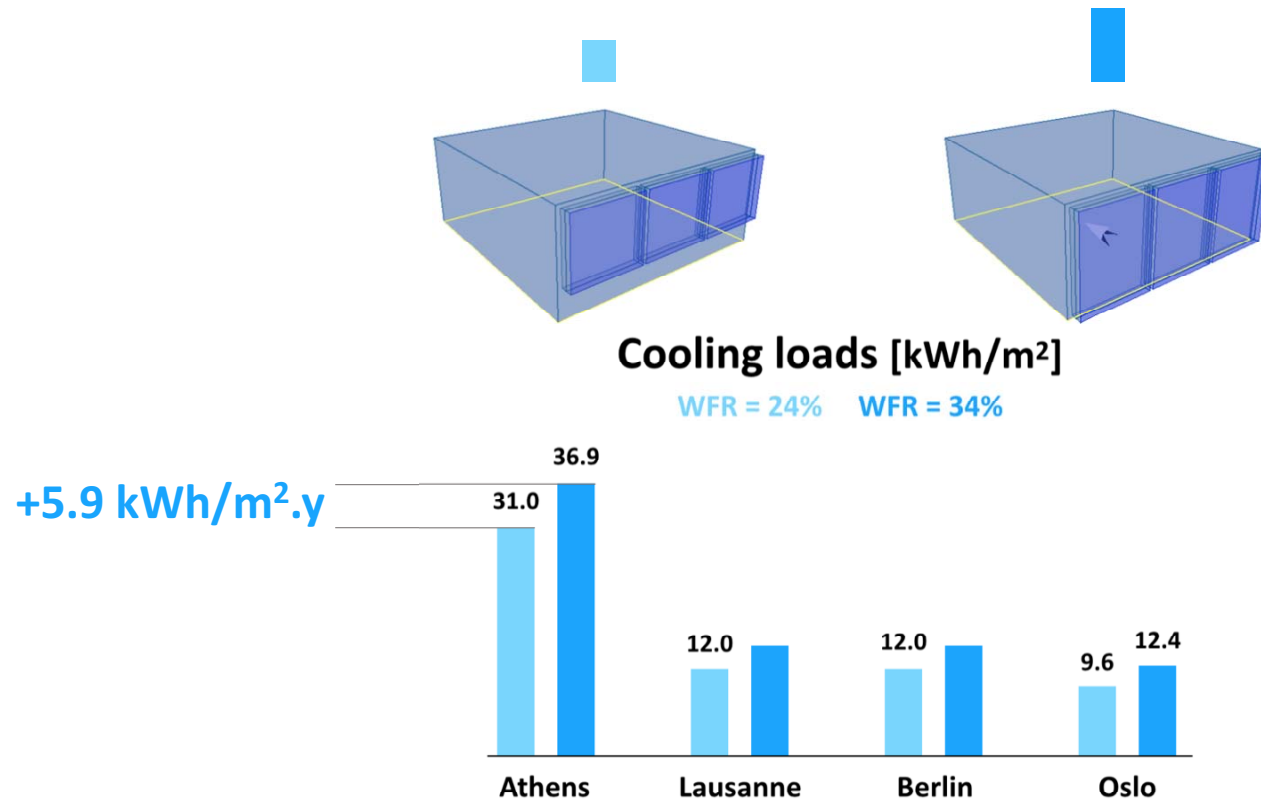


The final classification strongly depends on the building location.

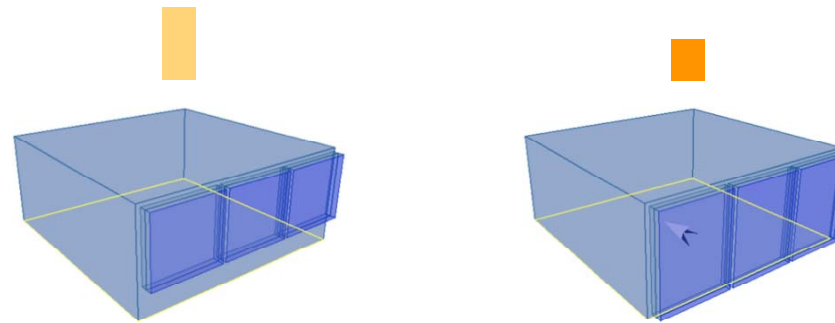
Impact on Heating loads



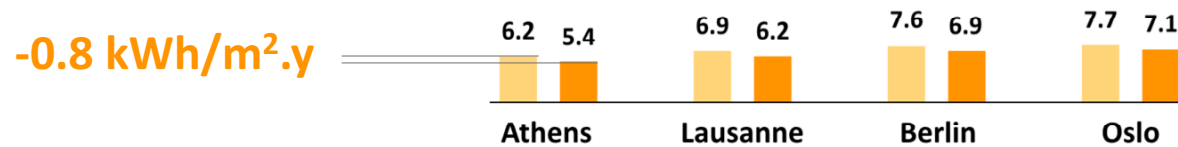
Impact on Cooling loads



Impact on Electric Lighting Loads



Electric lighting loads [kWh/m²]



General feeling

- ▶ EN-17037 addresses a very broad scope of issues 😊
- ▶ The requirements are extremely demanding 😬
- ▶ It encourages the realization of facade entirely glazed 😡
- ▶ It is not really suitable for urban environments 🤔
- ▶ It eliminates rooms with a Depth / Height ratio > 2 😏
- ▶ It eliminates buildings with double skin 😊
- ▶ It could result in an overall increase of energy consumption 😬



Daylight Symposium / Paris 2019