

## BACK PANEL LIGHT COMPARISON IN OFFICE APPLICATION CASE STUDY

### VISUAL RESULTS OF COMPARISON CASE STUDY

**Luminaire 1:**

36W LED Back Panel light,  
595x595x46.5mm

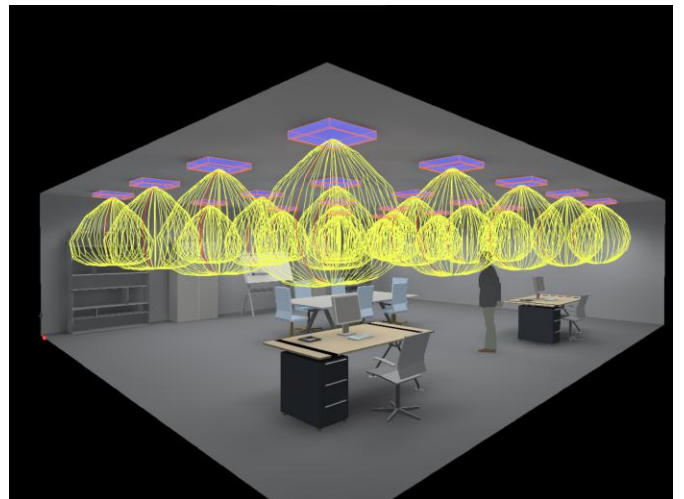
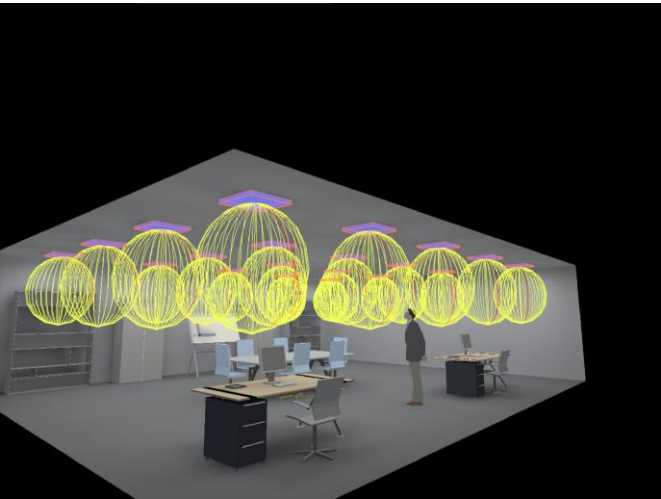


**Luminaire 2:**

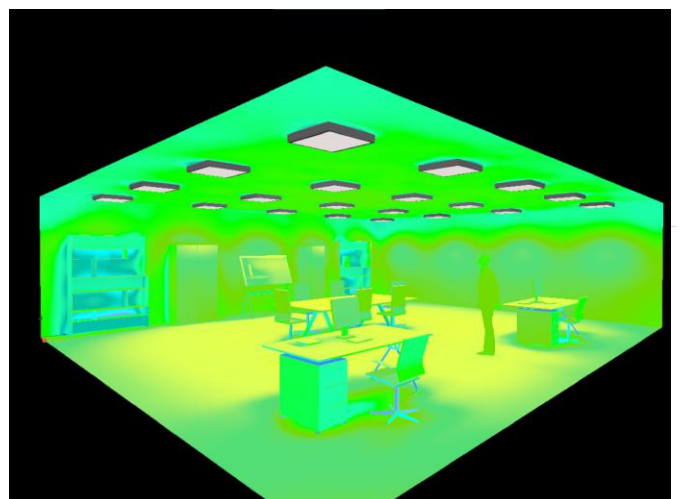
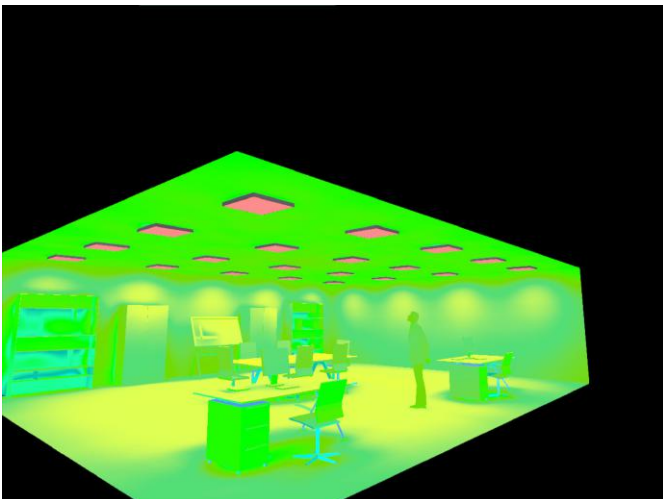
4x18W Fluorescent fixture with ballast,  
630x600x80mm



Office view with applying luminaires and their light distribution around the room.



Office view with light distribution curves



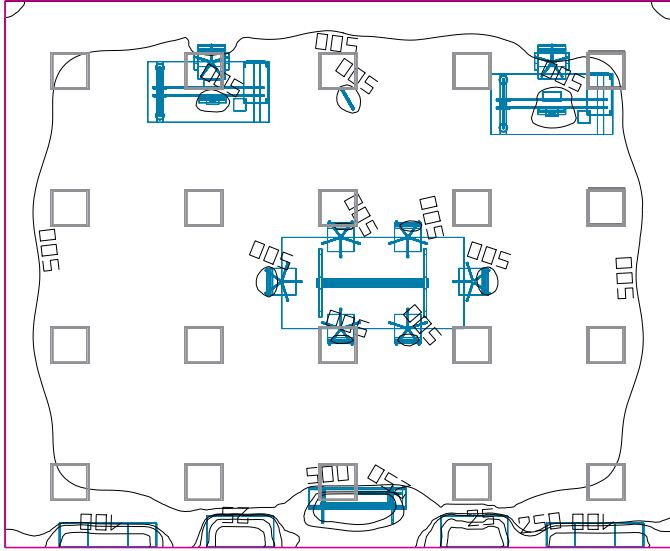
Office view with isothermal indication of lux

## BACK PANEL LIGHT COMPARISON IN OFFICE APPLICATION CASE STUDY

### TECHNICAL ANALYSIS OF COMPARISON CASE STUDY

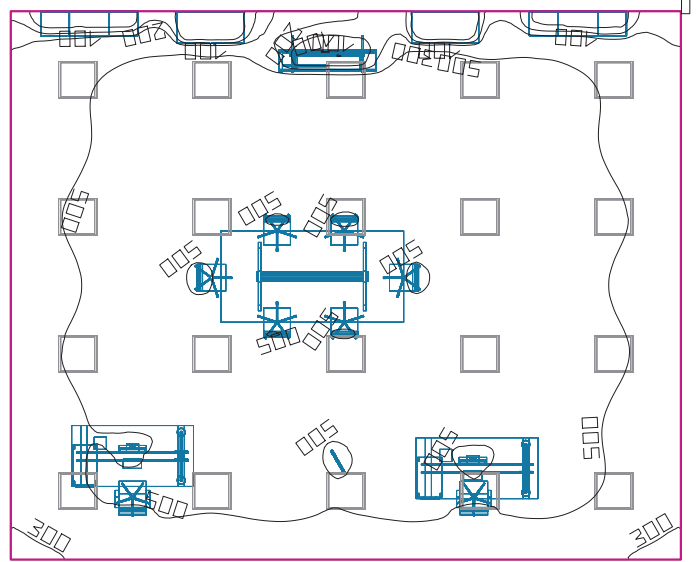
**Luminaire 1:**

36W LED Back Panel light,  
595x595x46.5mm



**Luminaire 2:**

4x18W Fluorescent fixture with ballast,  
630x600x80mm



Height of room: 3.000 m, Reflection factors: Ceiling 70.0%, Walls 50.0%, Floor 20.0%, Light loss factor: 0.80

**Workplane**

Surface	Result
1 Workplane	Perpendicular illuminance [lx] Height: 0.800 m, Wall zone: 0.000 m
	Average (Target) Min Max Min/average Min/max
	534 (500) 1.21 677 0.00 0.00

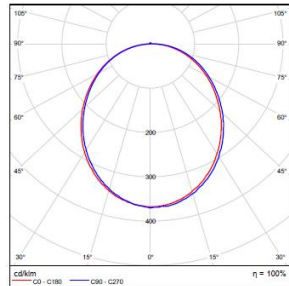
**Workplane**

Surface	Result
2 Workplane	Perpendicular illuminance [lx] Height: 0.800 m, Wall zone: 0.000 m
	Average (Target) Min Max Min/average Min/max
	510 (500) 0.23 660 0.00 0.00

No. 1 Quantity 20

36W LED Back Panel light  
Light output ratio: 100%  
Lamp luminous flux: 3944 lm  
Luminaire luminous flux: 3944 lm  
Power: 35.4 W  
Luminous efficacy: 111.4 lm/W

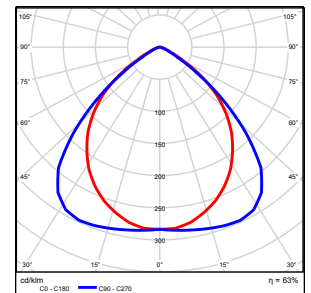
Colorimetric data 36W  
LED Back Panel light:  
CCT 4000 K, CRI 80



No. 2 Quantity 20

Fluorescent fixture 4x18W  
Light output ratio: 62.90%  
Lamp luminous flux: 5400 lm  
Luminaire luminous flux: 3396 lm  
Power: 69.5 W  
Luminous efficacy: 48.9 lm/W

Colorimetric data  
Fluorescent fixture 4x18W:  
CCT 4000 K, CRI 80



Total lamp luminous flux: 78880 lm,  
Total luminaire luminous flux: 78880 lm, Total Load: 708.0 W,  
Luminous efficacy: 111.4 lm/W  
Lighting power density:  $7.15 \text{ W/m}^2 = 1.34 \text{ W/m}^2/100 \text{ lx}$   
(Ground area 99.00 m<sup>2</sup>)  
Consumption: 1950 kWh/a of maximum 3500 kWh/a

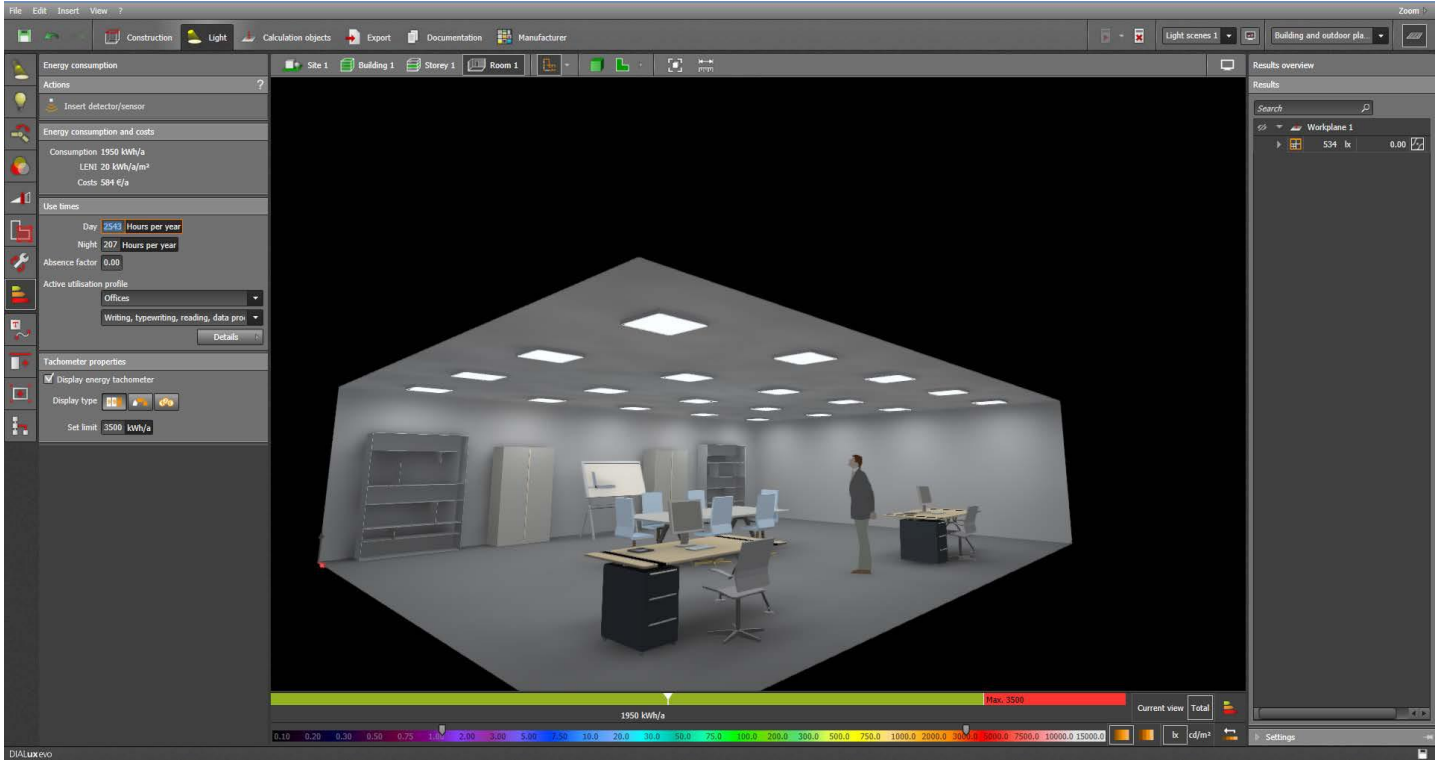
Total lamp luminous flux: 108000 lm,  
Total luminaire luminous flux: 67920 lm, Total Load: 1390.0 W,  
Luminous efficacy: 48.9 lm/W  
Lighting power density:  $14.04 \text{ W/m}^2 = 2.75 \text{ W/m}^2/100 \text{ lx}$   
(Ground area 99.00 m<sup>2</sup>)  
Consumption: 3800 kWh/a of maximum 3500 kWh/a

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### ENERGY CONSUMPTION AND COST ANALYSIS OF COMPARISON CASE STUDY

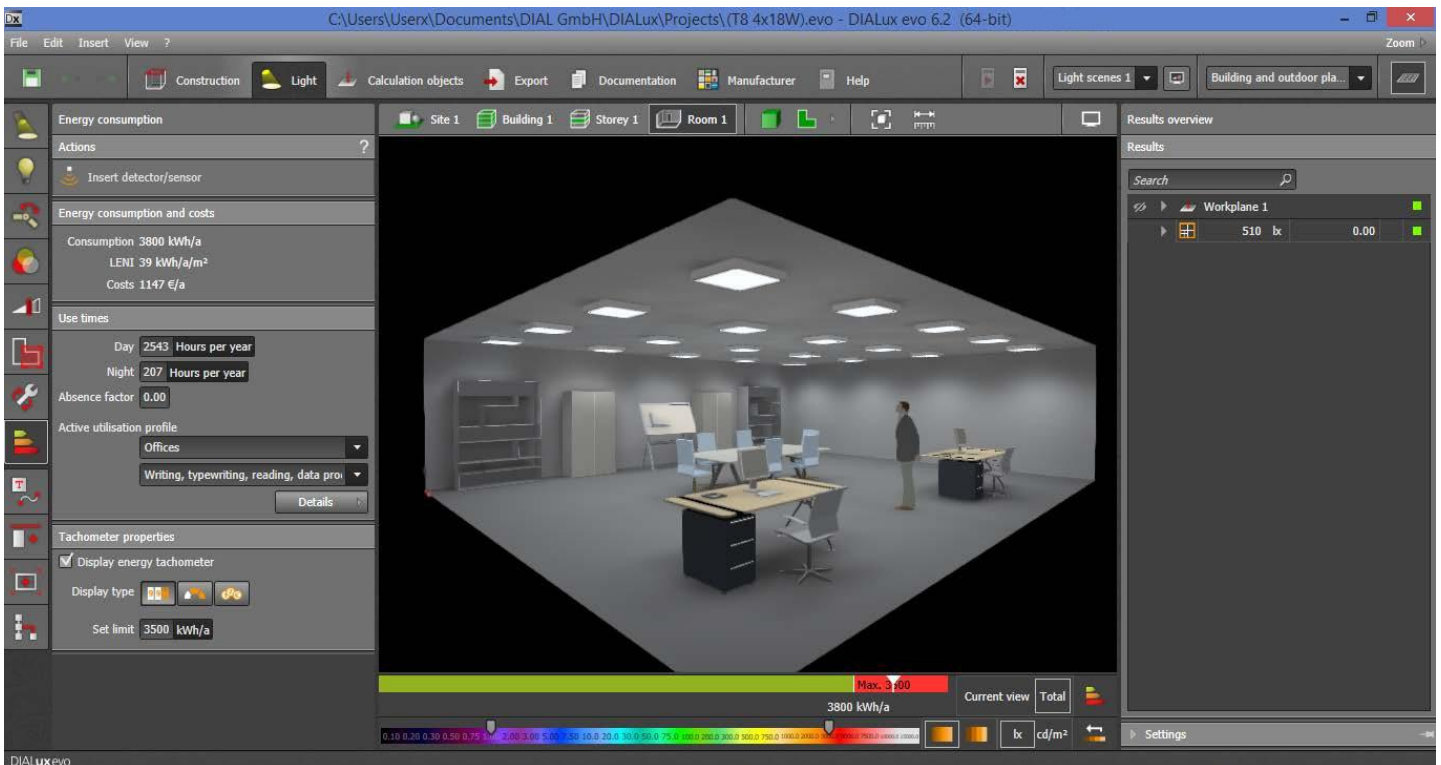
**Luminaire 1:**

36W LED Back Panel light,  
595x595x46.5mm



**Luminaire 2:**

4x18W Fluorescent fixture with ballast,  
630x600x80mm



## BACK PANEL LIGHT COMPARISON IN OFFICE APPLICATION CASE STUDY

TABLE OF RESULTS FOR COMPARISON CASE STUDYLuminaire 1:36W LED Back Panel light,  
595x595x46.5mmLuminaire 2:4x18W Fluorescent fixture with ballast,  
630x600x80mm

<b>POWER</b>	35.4 W	69.5 W
<b>LAMP LUMINOUS FLUX</b>	3944 lm	5400 lm
<b>LUMINAIRE LUMINOUS FLUX</b>	3944 lm	3396 lm
<b>LUMINOUS EFFICACY</b>	111.4 lm/W	48.9 lm/W
<b>LIGHT OUTPUT RATIO</b>	100 %	62.90 %
<b>TOTAL LAMP LUMINOUS FLUX</b>	78880 lm	108000 lm
<b>TOTAL LUMINAIRE LUMINOUS FLUX</b>	78880 lm	67920 lm
<b>TOTAL LOAD</b>	708.0 W	1390.0 W
<b>ENERGY CONSUMPTION</b>	1950 kWh/a	3800 kWh/a
<b>COSTS</b>	584 €/a	1147 €/a
<b>LUX MEAN VALUE (TARGET FOR OFFICE REQUIREMENT=500lx)</b>	534 lx	510 lx

COMPARISON CONCLUSION:

The case study of the first luminaire (36W LED Back Panel light), presents severe advantages over that of the second case study's luminaire (4x18W Fluorescent fixture). This first case provides a more efficient solution, which leads to lower energy consumption and thus lower cost at an annual basis.

The unit and total lamp luminous flux values of the first case may be lower compared to that of the second case but the unit and total luminaire values of the first one show a more efficient solution. The LED technology ensures lower consumption in principle, but the technical analysis provided is the clear proof that the first case study is leading to a more sustainable solution for the investment's finance as well as the environmental impact.

The costs are calculated by considering the operating time to be 2453 hours per annum for daily use and 207 hours per annum for nightly use. The first case's cost is almost half of that of the second case thus providing a more cost-efficient solution.