

Eco-design of station offices RET (Rotterdam)

CONCEPT

The project consisted of an integrated approach aimed at reducing the energy consumption of underground station offices by replacing the lighting by LEDs and equipping the rooms with occupancy sensors that switch off the lights when no one is inside and simultaneously reduces the heating.

SUPPLIER

Installation works : **Breijer**

Lighting : **Initiale LED products**

Infrared heating panels :

Magnum Heating Systems

Control system hardware:

N.R. Koeling

OBJECTIVES

- Design station offices with an energy-efficient intelligent heating, ventilation and cooling system;
- Improve the comfort level for staff.

INVESTMENT DESCRIPTION

RET carried out a pilot project in the Stadhuis metro service area (station office), a space with a small counter for customer service and where metro staff can work, rest and have lunch. For safety reasons the underground station offices are not heated by gas but by electric heating installations (dry convectors). These offices were lit with energy-consuming fluorescent lamps. The project consisted of an integrated approach aimed at reducing the energy consumption of the room. The original lighting was replaced by LEDs because they are more energy efficient, generate fewer disposals and require less maintenance. The room is also equipped with occupancy sensors that switch off the lights when no one is inside and simultaneously reduces the heating. The heating system consists of infrared radiant ceiling panels that are able to quickly warm up a room to a comfortable temperature (21-25°C). The radiant heating system acts swiftly so the system needs less power. It also modulates the heating requirements:

- when the room is empty, the heating switches down to a minimum of 16 °C in a part-load-mode thus halving the power used;
- if a door is left open, heating is switched down after 5 minutes. Closing the door reactivates the heating;
- the cooling system cannot operate simultaneously with the heating, which prevents energy waste.

COST AND FUNDING

The costs of the integrated system are:

LED lighting	€3,700
Infrared panels	€2,100
Control system	€9,000
Implementation costs (external)	€8,400
Total	€23,200



Results	
Investment costs (€)	€15,000
Energy savings (%)	75%
Annual energy savings (kWh)	<ul style="list-style-type: none"> ■ 3,300 kWh (lighting) ■ 26,000 kWh (heating)
Annual CO ₂ savings (TCO ₂)	0,44 TCO ₂
Annual cost savings (€)	€2,500
Payback time (years)	5 years

CONTACT

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RESULTS

The new system saves about 75% of the energy use compared to the old installations. The maintenance costs are expected to be much lower because the lighting has a longer life expectancy than the old TL8 light sources and the heating/cooling system only operates at full power when needed. There is no fire hazard to the furniture as the heating is integrated in the ceiling and no more heating stains on the walls.

LESSONS LEARNED

Heating, cooling and lighting integrated in one system is innovative for underground station offices. The system saves energy thanks to intelligent heating, cooling and LED lighting. It also saves installation components because of the multifunctional character of the components. Additional advantages of the system are a decrease in maintenance costs and an increase in fire safety.

Following the successful pilot project at Stadhuis metro station, RET intends to renovate the other station offices on its network.



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