



The Offices Sector and climate change mitigation



The Tertiary sector development, the use of new technologies and the spread of air conditioning units that improve the working comfort are some of the direct or indirect greenhouse gas emissions caused by the offices activity, which are increasing exponentially. This greenhouse gas emissions increase, along with the possibility of introducing many easy measures with high reduction potential, focusing in energy efficiency, makes it necessary to mitigate the sector emissions generated.

Some of theses measures are: maintaining a comfortable temperature between 20 and 21 °C in winter and between 25 and 26 °C in summer, both controlling and regulating the installation or through an appropriate external thermal insulation or using more efficient equipment. A light regulation to avoid unnecessary consumption, a good building design or efficient bulbs use.

The use, management and control of more efficient facilities are some of the measures that we can implement to reduce office's greenhouse gas emissions.

Strategies for reducing emissions

- Reducing energy demand
- Improving energy efficiency
- Increasing the renewable energy us

Proposal of mitigation alternatives of gas emissions with greenhouse effect in the offices sector

AIR CONDITIONING MEASURES

It can represent almost the 50% of the energy consumption of an office. The comfort temperature is between 20 and 21 °C in winter and between 25 and 26 °C in summer. Up one degree in winter or drop it in summer can represent about 7% additional energy consumption.

- Facilities control and regulation:
 - Climatic zoned system to switch-off the non occupied zones.
 - Zone segmentation of the heating/cooling power.
 - Switching-on the climatic systems only when necessary (not before 25 minutes before using the room).
 - Install detectors on doors and windows to prevent heat losses.
 - Automatic climatic switch-off system.
 - Place the temperature sensors correctly.
 - Installing interior air quality and exterior temperature sensors to control the air entrance and exit.
- Improving the external thermal insulation:
 - Double pane window.
 - Wood doors.
 - Cavity walls.
- Using more efficient equipments:
 - Incorporation of air recovery systems.
 - Replacement of boilers for heat pumps.
 - Identifying and repairing the air leaks.
 - Avoiding furniture that obstructs the air flow.

LIGHTING MEASURES

- Lighting control and regulation:
 - Installing presence detectors in the low occupied places.
 - Automatic lightning deactivation.
 - Lightning intensity illumination.
 - Installing timers in the short stay places.
 - Installing photocells to control the switch on-off of the lights according to daylight.
- Good bioclimatic building design:
 - Appropriate building orientation to make the most of the sunlight.
 - Using translucent materials in the luminaries.
 - Avoid the presence of obstacles between the spotlight and the room.
 - Placing the desks near the windows.
 - Replacing the bad located switches.
- Using low energy light bulbs.
- Using compact fluorescents.
- Avoiding excessive lighting.
- Installing photovoltaic solar panels.

OFFICE AUTOMATION MEASURES

- Management and control of the office automation:
 - Programming automatic switch-off.
 - Using black screen-savers.
 - Switching-off the computer screen when not in use.
 - Switching-off the computer if not used after one hour.
- Using more efficient office automation:
 - Using "Energy Star" or "Powersave" equipments.
 - Using laptops.

OTHER EQUIPMENTS MEASURES

- Revolving or double doors.
- Elevators:
 - Installing more efficient elevators.
 - Do not oversize the elevator.
 - Programming to optimize elevator loads (bus mode).

CROSS-SECTIONAL MEASURES

- Periodic maintenance
- Periodic cleaning
- Staff training
- Personal awareness
- Incorporating an energy manager to the staff.



Case study: Head Office MAPFRE, Majadahonda (Spain)

(Source: Enercom)

MAPFRE has shown goodwill to not to damage the environment and to promote sustainable development in all areas where it is possible.

With the will to reduce their centre's energy consumption, they have done energy audits in 8 of their buildings. The aim is to increase their office's energy efficiency, setting the Technical Building Code guidelines as reference.

GENERAL MEASURES TO REDUCE EMISSIONS

- Umbrellas Installation in the facade to control the daylight entrance.
- Use of photoelectric sensors of solar radiation to illuminate the exterior of the building.
- Installation of lamps that allow a light intensity regulation according to the natural light available.
- Implementation of electronic ballasts in fluorescents.
- Central control of the light's switch on-off.
- Installation of motion sensors.
- Installation of sunlight window-filters.
- Installation of Freecooling intelligent Systems.
- Installation of hot and cold air recovers.
- Use of natural gas tricogeneration plants to generate cold and heat.
- Using tricogeneration plants to heat the sanitary hot water

RESULTS

The energy consumption obtained from the implemented measures is 520.7 tonnes of CO₂, a figure lower than in previous years. These measures led to an economical reduction of the energy and water cost about 13.8%.

INVESTMENT COST AND AMORTIZATION

Estimation results	
Annual electricity savings	1,206,712 kWh
Annual fuel savings	6.24 tep
Annual water saving	887 m ³
Annual economic savings	€ 96,014
Investment	€ 431,900
Payback	4.5 years
Total cost savings on energy and water	13.81%
Reducing CO ₂ emissions	520.7 tons / year

