



Best Practice	OPTIMIZING INDOOR CLIMATE AND COMFORT IN OFFICE BUILDING CONSIDERING ENERGY EFFICIENCY ASPECTS	OFFI-01
Application	Energy efficiency in offices	
SME sector	All	
SME Sub-sector	All	
Recommendation for optimisation	<p>The indoor microclimate and comfort not only increase energy efficiency but also affect the well-being and health of employees, which are key factors in increasing team productivity.</p> <p>To have greater energy efficiency it is possible to make changes and improvements in different fields:</p> <ul style="list-style-type: none"> <li>• <b>Lighting:</b> to obtain the correct lighting levels for appropriate applications, light meters (LUX meters) should be used. It is very important for the working condition with impact on working efficiency. 500 Lux is the required limit for lighting a working place in Germany. 150 Lux is required in floors and other location that are not used frequently.</li> </ul> <p>Old energy consuming fluorescent tubes should be replaced by more efficient ones or LED. If florescent tubes are installed, electronic ballast devices should be applied as they use less electricity.</p> <p>A lighting concept should also consider summer shading and use additional lamps for working places in case the lighting is not sufficient. In general, as much day light as possible should be used also considering using light guiding systems.</p> <p>For hallways, bathrooms and rooms that are not often frequented, lighting sensors should be used, and light switches should be replaced by motion or occupancy sensors. For night-time use, night photocell controls should be installed. Solar walkway and patio lights can be used for outdoor accent lights.</p> <p>Lighting reflectors and lampshades should be cleaned regularly to improve the clearance of the lighting. Daylighting sensors can also be installed which will illuminate area with appropriate lighting levels. This is particularly useful in areas with large glazing areas.</p> <ul style="list-style-type: none"> <li>• <b>Ventilation and air conditioning:</b> regular ventilation not only provides oxygen but is also important for keeping humidity constant inside the office. Proper employee awareness and the use of thermostats can increase energy efficiency by up to 10%.</li> <li>• <b>Heating:</b> correct heating 21°C in winter, staff freezing should be motivated to moving and stretching from time to time to increase circulation which is also</li> </ul>	



	<p>healthy for their spine. Use an indoor-thermometer and agree upon a temperature. Check temperature before regulating the heating.</p> <p>Radiators should not be obstructed by panels or furniture: the air must circulate, so the heat exchange can work correctly. To avoid warmth escaping, windows and doors should be sealed. As the sealing degrades after time, it should be replaced periodically. Where sealing cannot be installed expectable foam or silicon can be used to draught proofing. When radiators are installed on thin exterior walls a significant portion of heat may escape to the outside. To prevent this, a reflector film or an isolation layer of 2 cm polyurethane should be attached inside the wall. Thermostats should be used and checked regularly if they still react to temperature changes. Electronic programmable thermostats with remote control.</p> <ul style="list-style-type: none"> <li>• <b>Kitchenette and bathroom facilities:</b> other facilities like the kitchenette and food provided by the staff canteen should additionally be regarded. In the kitchenette, energy efficient appliances should be used, fridges and freezers should be defrosted regularly, jugs should be used instead of coffee machines. Coffee machines should be switched off after use. Refrigerators and freezers should be placed away from heat sources and opened as little as possible. Thermostat of refrigerators should be adjusted according to the outside temperature and the amount of food contained.</li> </ul>
Technical considerations	<b>Technical maintenance and improvements by professionals:</b> improving the heating system and building envelope
Economics	Investment costs include the purchase of timers for heating and lighting or the costs of raising awareness among employees about energy efficiency and office behaviour.
Energy savings	By putting most of the proposed guidelines into practice, energy savings of 20% can be achieved.
Economic savings	Lower costs due to reduced consumption of heat and electricity
Average Payback Time	Less than 3 years
Emissions	This measure does not involve further emissions.
Environmental benefits	Reduction of CO <sub>2</sub> emissions due to lower energy needs.
Main NEBs (Multiple benefits)	<input checked="" type="checkbox"/> Environmental benefits <input checked="" type="checkbox"/> Increased productivity



	<input checked="" type="checkbox"/> Work environment/Health/Safety <input type="checkbox"/> Increased competitiveness <input type="checkbox"/> Maintenance
Replicability	High
Related measures	<ul style="list-style-type: none"> <li>• <b>OFFI-02:</b> Green IT in offices</li> </ul>
Case study	<p>Replacement of lighting system at "Granderath Elektro GmbH" company (Germany, 2017)</p> <ul style="list-style-type: none"> <li>• <b>Initial Situation:</b> old lighting system.</li> <li>• <b>Description of the optimisation:</b> Granderath Elektro GmbH replaced about 900 old fluorescent neon lights in its offices and stores with LED lighting.</li> <li>• <b>Implementation costs:</b> 11,000 EUR</li> <li>• <b>Payback Time:</b> 3 years</li> </ul>
References	<p><a href="https://www.ecoserveis.net/">https://www.ecoserveis.net/</a></p> <p><a href="https://www.co2online.com/campaigns-projects/studies-and-advice/">https://www.co2online.com/campaigns-projects/studies-and-advice/</a></p>

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