

Can the operation of electrical office equipment be better organised?

The following check list leads to all relevant questions that are connected with the operation in an energy-saving manner of all electrical office equipment.

The energy consumption of electrical office equipment such as lifts, air-conditioning etc. can be barely influenced by individuals but a major part of the lighting and heating operations as well as jointly-used office and computer equipment can be only efficiently employed when the personnel use is organised.

For one type of organisational measure the time in which the piece of equipment is switched on must be reduced.

Other organisational measures direct themselves towards the fact that the major amount of office equipment must not be in use with full performance potential for the whole time.

Questions on the lighting, heating and for other electrical installations can be correctly answered by the caretaker. When he does not know answers to individual questions, he will probably know the person responsible or he can ask the maintenance company.

Additional information concerning office equipment can be found in the catalogue for non-investive measures.

Organisational Measure	Yes	No	Saving Potential (estimated)
1. Lighting			
<p><u>1.1 Three-tube fluorescent lights</u></p> <p>Are standard fluorescent lights in the building still in use?</p> <p><u>If yes:</u> With a similar brightness, tri-phosphor fluorescent lights save 25% power than the standard version. It could then be decided in the future to replace defective standard tubes with tri-phosphor fluorescent lights.</p>	<input type="checkbox"/> S!	<input type="checkbox"/>	<p>Replaced lights: _____</p> <p>Power of each light (in Watts): _____</p> <p>Daily hours of operation: _____</p> <p>Work days in year: 220</p> <p>These values must be multiplied together.</p> <p>If there is no concrete data available, calculate with an saveable power demand of 71 W for every light: this is made up of 58 W for the light and 13 W for the switch.</p>
<p><u>1.2 Electronic switches</u></p> <p>Are fluorescent lights still used with conventional switches?</p> <p><u>If yes:</u> Defective switches can be exchanged by an electrician for electronic switches. These are "leakage-poor" and also protect the lights when they are often switched on and off.</p>	<input type="checkbox"/> S!	<input type="checkbox"/>	<p>Number of exchanged switches: _____</p> <p>Saveable power for each light (in Watts): _____</p> <p>Daily hours of operation: _____</p> <p>Work days in year: 220</p> <p>These values must be multiplied together.</p> <p>If conventional switches of standard fluorescent lights are replaced with electronic switches, the power demand will be reduced by 16 W: from 71 W to 55 W.</p>
<p><u>1.3 Brightness</u></p> <p>Was it reviewed before whether the corridors with fewer lights would be still light enough?</p> <p><u>If no:</u> Leave the technician to reduce the number of lights step by step until the brightness is sufficient.</p>	<input type="checkbox"/>	<input type="checkbox"/> S!	<p>Number of economised lights: _____</p> <p>Power of each light (in Watts): _____</p> <p>Daily hours of operation: _____</p> <p>Work days in year: 220</p> <p>These values must be multiplied together.</p>
<p><u>1.4 Light bulbs</u></p> <p>Are the light bulbs kept clean?</p> <p><u>If no:</u> Go ahead with the cleaning. This can allow more brightness from the light bulb. Afterwards, check whether some of them can be switched off.</p>	<input type="checkbox"/>	<input type="checkbox"/> S!	<p>The savings achieved can only be detected by implementing this organisational measure.</p>

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<p><u>1.5 Lighting</u></p> <p>Is the lighting for corridors, toilets and similar rooms automatically controlled?</p> <p><u>If yes:</u> The technician should regularly check whether the control system functions as wished.</p> <p><u>If no:</u> At end of work somebody must check around the jointly used areas whether the lighting is also switched off. Corresponding notices from the Media Catalogue (link) can also be put up there.</p>	<input type="checkbox"/> S!	<input type="checkbox"/> S!	<p>Number of lights: _____</p> <p>Power of each light (in Watts): _____</p> <p>Avoided "on-time" per day: _____</p> <p>Work days in year: 220</p> <p>These values must be multiplied together.</p> <p>Estimate the avoided "on time" of the lights and determine the concrete power demand.</p>
<p><u>1.6 Energy saving lights instead of electric light bulbs</u></p> <p>Are many electric light bulbs still in use?</p> <p><u>If yes:</u> It is significant when defective electric light bulbs are replaced with energy saving bulbs. These save per bulb three quarters of the electricity consumed by the other as well as lasting much longer.</p>	<input type="checkbox"/> S!	<input type="checkbox"/>	<p>Number of exchanged lights: _____</p> <p>Power of each light (in Watts): _____</p> <p>"On time" per day: _____</p> <p>Work days in year: 220</p> <p>These values must be multiplied together.</p>
<p><u>1.7 Sunlight reflection</u></p> <p>Can the reflection of sunlight on monitors be avoided?</p> <p><u>If yes:</u> Sometimes direct sunlight can reflect on the monitors. This can annoy the employees. If curtains are used to block sunlight, and the lighting is switched on, energy consumption increases unnecessarily.</p>	<input type="checkbox"/> S!	<input type="checkbox"/>	<p>The savings achieved can only be detected by implementing this organisational measure.</p>

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<p><u>1.8 Windows</u></p> <p>Are the windows kept free of all objects that could reduce the amount of sunlight?</p> <p><u>If no:</u> Check whether these objects can be removed. This measure will provide more sunlight and therefore less artificial lighting will be required</p>	<input type="checkbox"/>	<input type="checkbox"/> S!	The savings achieved can only be detected by implementing this organisational measure.
<p><u>1.9 Position of office tables</u></p> <p>Are the tables located in front of the windows?</p> <p><u>If no:</u> Check whether it is possible to relocate them in order to use as much sunlight as possible.</p>	<input type="checkbox"/>	<input type="checkbox"/> S!	The savings achieved can only be detected by implementing this organisational measure.
2. Heating and Hot Water			
<p><u>2.1 Heating Control</u></p> <p>Will the pumps and controller of the heating plant be switched off at the end of the heating period?</p> <p><u>If yes:</u> Check whether really everything is switched off as intended.</p> <p><u>If no:</u> If the heating plant is not used to produce hot water, it can be switched off. If it is required for hot water, the technician can switch off the pumps required to circulate the heating.</p>	<input type="checkbox"/>	<input type="checkbox"/> S!	<p>Power of each pump (in Watts): _____</p> <p>Avoided hours of operation per day: 24</p> <p>Days in summer: 120</p> <p>These values must be multiplied together.</p> <p>The saving potential is given by the power demand of the individual pump and the avoided operational hours per year.</p>

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<p><u>2.2 Circulating Pumps (heating)</u></p> <p>Are controlled pumps in use?</p> <p><u>If no:</u> During a repair/maintenance phase, the conventional pumps can be exchanged with controllable pumps. The performance of these pumps are often over-estimated. One watt pump performance per radiator is sufficient for a correctly installed plant.</p>	<input type="checkbox"/>	<input type="checkbox"/> S!	<p>Power of one pump (in Watts): _____</p> <p>Hours of operation per day: 24</p> <p>Days in the period of heating: 240</p> <p>These values must be multiplied together. The result will be split in three.</p>
<p><u>2.3 Circulation Pumps (water)</u></p> <p>Is the circulation pump turned off at the end of the working day?</p> <p><u>If no:</u> These pumps are only necessary if water is still required. However, a simple time-switch can be installed or someone organised who can switch the pumps off and on again.</p>	<input type="checkbox"/>	<input type="checkbox"/> S!	<p>Power of one pump (in Watts): _____</p> <p>Avoided operational time per week: _____</p> <p>Weeks in year: 52</p> <p>These values must be multiplied together.</p> <p>The avoided weekly operational time is calculated as being 5 nights and the whole weekend: ca. 98 hours.</p>
<p><u>2.4 Electric Hot Water Boiler</u></p> <p>Are electric hot water boilers built in?</p> <p><u>If yes:</u> Hot water is only necessary for washing and cleaning. Cold water is sufficient for hand washing. This is why it is possible, mostly without considerable comfort loss, to take these pieces of equipment, or at least a part of it out of use.</p>	<input type="checkbox"/> S!	<input type="checkbox"/>	<p>Daily demand (in Watt hours): _____</p> <p>Days in year: 365</p> <p>These values must be multiplied together.</p>
<p><u>2.5 Working hours (heating)</u></p> <p>Is the heating system switched off a short time before the end of the working day?</p> <p><u>If no:</u> The remaining heat both in the radiators and in the room can save at least half an hour of heating every day.</p>	<input type="checkbox"/>	<input type="checkbox"/> S!	<p>Daily demand (in Watt hours): _____</p> <p>Avoided operational time per day (in hours): _____</p> <p>Days in the period of heating: 240</p> <p>These values must be multiplied together and divided into number of daily working hours for the heating system.</p>

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<p><u>2.6 Radiators</u></p> <p>Are the radiators located with no piece of furniture in front of them?</p> <p><u>If no:</u> All the surfaces around the radiators interfere in the heat transfer and therefore, the heating efficiency decreases.</p>	<input type="checkbox"/>	<input type="checkbox"/> S!	The savings achieved can only be detected by implementing this organisational measure.
<p><u>2.7 Radiators</u></p> <p>Are the radiator surfaces kept clean?</p> <p><u>If no:</u> The dust covering the radiator reduces the heat transfer capacity.</p>	<input type="checkbox"/>	<input type="checkbox"/> S!	The savings achieved can only be detected by implementing this organisational measure.
<p><u>2.8 Maintenance</u></p> <p>Is the heating installation regularly maintained?</p> <p><u>If yes:</u> The maintenance report should be looked through and indicated faults rectified.</p> <p><u>If no:</u> You should immediately appoint a company to carry it out.</p>	<input type="checkbox"/> S!	<input type="checkbox"/> S!	The saving potential is only determined by measurement before and after the maintenance.
3. Ventilation and Air Conditioning			
<p><u>3.1 Additional Ventilation</u></p> <p>Is ventilation equipment in use in the building?</p> <p><u>If yes:</u> The technician should check whether a natural air exchange makes unnecessary the existing ventilation plant. Perhaps simply turn off the plant and observe whether the room air becomes too unpleasant. If that is the case, the ventilation equipment is fully needed.</p>	<input type="checkbox"/> S!	<input type="checkbox"/>	<p>Power of one ventilation motor (in Watts): _____</p> <p>Avoided operational time per day: _____</p> <p>Work days in year: 220</p> <p>These values must be multiplied together.</p>

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<p><u>3.2 Operation time</u></p> <p>Is the ventilation or air conditioning automatically switched on and off?</p> <p><input type="checkbox"/> S!</p> <p><u>If yes:</u> Check whether the running time is optimally adjusted.</p> <p><u>If no:</u> It must be organised that the plant can be manually switched on and off with requirement to allow the operation time to be kept to a minimum.</p>			<p>Power of one ventilation plant (in Watts): _____</p> <p>Avoidance of the operational time per day: _____</p> <p>Work days in year: 220</p> <p>These values must be multiplied together.</p> <p>The power demand of a ventilation plant lies in the Kilowatt region. Therefore it is very worthwhile to check the operation time.</p>
<p><u>3.3 Air stream</u></p> <p>Can the air performance be adjusted?</p> <p><input type="checkbox"/> S!</p> <p><u>If yes:</u> A technician should optimise the stream of air in order to fit requirements. You should arrange the operation times and types for the rooms so that he can fit the plant performance to the real requirements.</p>			<p>Reduced amount of ventilation power (in Watts): _____</p> <p>Operational time per day with reduced power: _____</p> <p>Work days in year: 220</p> <p>These value must be multiplied together.</p> <p>The saving potential is here difficult to calculate as the saved power is only determined through measurement.</p>
<p><u>3.4 Maintenance</u></p> <p>Is the ventilation unit regularly maintained?</p> <p><input type="checkbox"/> S!</p> <p><u>If yes:</u> The maintenance report should be looked through and indicated faults rectified.</p> <p><u>If no:</u> You should immediately appoint a company to carry it out.</p>			<p>The saving potential is only determined by measurement before and after the maintenance.</p>

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<p><u>3.5 Heat Specifications</u></p> <p>Are there pieces of equipment with higher heat emissions which stand in rooms on the south side of the building?</p> <p><u>If yes:</u> Irradiation results in additional cooling expenditure. This equipment should be put in the shadier rooms in the building. However, this cooling may be superfluous if a concentration of heat-producing apparatus is avoided. For computer system this is possible, for example, by decentralising the computers.</p>	<input type="checkbox"/> S!	<input type="checkbox"/>	<p>Saving effects are yielded either from a power reduction of the cooling equipment or from the (temporary) switching off. The calculation follows thereafter as 3.3 or as 3.2.</p>
<p><u>3.6 Thermostat position</u></p> <p>Are the thermostats located far enough away from the focus of heat (for example: rays of sunlight)?</p> <p><u>If no:</u> The measured temperature can be higher than the actual value. For this reason the cooling device can automatically switch on without necessity.</p>	<input type="checkbox"/>	<input type="checkbox"/> S!	<p>The savings achieved can only be detected by implementing this organisational measure.</p>
<p><u>3.7 Working hours (cooling)</u></p> <p>Is the air conditioning switched off a short time before the end of the working day?</p> <p><u>If no:</u> The remaining heat both in the radiators and in the room can save at least half an hour of cooling every day.</p>	<input type="checkbox"/>	<input type="checkbox"/> S!	<p>Daily demand (in Watt hours): _____</p> <p>Avoided operational time per day (in hours): _____</p> <p>Days in the period of cooling: _____</p> <p>These values must be multiplied together and divided into number of daily working hours for the heating system.</p>

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4. Lifts			
<p>4.1 Lifts</p> <p>Are existing lifts during the night and at weekends unnecessarily standing by?</p> <p><u>If yes:</u> It is worth finding out whether lifts can be switched off at night and during the weekend. As well as the compartment lighting, the control equipment for the lift should also be switched off.</p>	<input type="checkbox"/> S!	<input type="checkbox"/>	<p>Power of the compartment lighting (in Watts): _____</p> <p>Power demands of the control plant: _____</p> <p>Avoided weekly operational time: _____</p> <p>Weeks in year: 52</p> <p>These values must be multiplied together.</p> <p>If you have no exact values, you can calculate using 98 hours for the weekly avoided operational time (weekend plus 5 nights at 10 hours per night).</p>
<p>4.2 Hydraulic Lifts</p> <p>As well as a cable lift, are hydraulic lifts also used for personal transport?</p> <p><u>If yes:</u> If energy is to be saved, it should be agreed that hydraulic lifts should only be called, if possible, for good transportation.</p>	<input type="checkbox"/> S!	<input type="checkbox"/>	<p>Journeys with cable lift instead of hydraulic lift per day: _____</p> <p>Energy saving per journey: _____</p> <p>Work days in year: 220</p> <p>These values must be multiplied together.</p> <p>If you cannot determine exact numbers, calculate for every replace journey a saving of 60Wh.</p>
<p>4.3 More than one lift</p> <p>Is there more than one lift installed?</p> <p><u>If yes:</u> Make sure that only one is requested. Otherwise the energy used for the other lifts to come up to the required level will be used unnecessarily.</p>	<input type="checkbox"/> S!	<input type="checkbox"/>	<p>Lift demand to go from the first floor to the upper floor (in Watt hours): _____</p> <p>Number of lifts minus one: _____</p> <p>Coefficient to correct, that not always the lift runs all the way up: 0.6</p> <p>Working days per year: _____</p> <p>These values must be multiplied together</p>

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5. Computer Systems			
<p><u>5.1 Monitor-Automatic</u></p> <p>Are computers to the most part provided with automatic monitor switches?</p> <p><u>If no:</u></p> <p>External monitor switches switch off the screen when the keyboard and mouse have not been touched for a while. It should be decided to obtain these automatic switches for older monitors that have much use.</p>	<input type="checkbox"/> S!	<input type="checkbox"/>	<p>Number of Computers: _____</p> <p>Power of each monitor: _____</p> <p>Avoided operational time per day: _____</p> <p>Work days in year: 220</p> <p>These values must be multiplied together.</p> <p>If concrete demand values cannot be determined, use a power demand for each monitor of 50 W and a saveable operational time of a third of the actual work time.</p>
<p><u>5.2 Night-time energy requirements</u></p> <p>Do computers and printers also in a switched-off condition require energy?</p> <p><u>If yes:</u></p> <p>If every PC-work station obtains a multi-socket for plugs with a switch, the employee can then every evening completely remove their computer and components from the mains supply.</p>	<input type="checkbox"/> S!	<input type="checkbox"/>	<p>Number of the computer work-stations: _____</p> <p>Power of each computer and printer when mains connected: _____</p> <p>Time for mains uncoupling per week: _____</p> <p>Weeks in year: 52</p> <p>These values must be multiplied together.</p> <p>If concrete demand values cannot be determined, use a power demand of 5 W in the switched off condition. For the time of mains uncoupling per week, a value of 128 hours per week is realistic which is made up of a weekend and 5 nights per week at 16 hours per night.</p>

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<p><u>5.3 Operating Times for the Computer Network</u></p> <p>Are the computers networked?</p> <p><u>If yes:</u></p> <p>With the installation of a computer network system, most do not take the energy saving aspects into consideration. However, it is worthwhile to check the operating times of the computer system as not all apparatus will be permanently required. Networked printers or computers for data transmission can, for example at night and over the weekend, be easily switched off using a timer switch. Clear any questions with the computer support operator.</p>	<input type="checkbox"/> S!	<input type="checkbox"/>	<p>Power for each networked printer (in Watts): _____</p> <p>Avoided operational time per week: _____</p> <p>Weeks in year: 52</p> <p>These values must be multiplied together.</p> <p>If you have no exact values, you can calculate using a total avoided operational time of 98 hours per week (a weekend plus 5 nights at 10 hours per night).</p>
<p><u>5.4 "Disconnection-proof Power Supplies"</u></p> <p>Do you use such apparatus for the computer system?</p> <p><u>If yes:</u></p> <p>Power cuts occur so seldom that they could cause serious damage to the system. Operational and software errors bring systems more often to a complete stand still. Clear with the responsible authority whether it is possible to work without disconnection-proof power supplies. It is to be weighed up between the (modest) probability of power failure and the level of the related data loss.</p>	<input type="checkbox"/> S!	<input type="checkbox"/>	<p>Power demand for the apparatus (in Watts): _____</p> <p>Work hours in year: 8760</p> <p>These values must be multiplied together.</p>

Organisational Measure	Yes	No	Saving Potential (estimated)
6. Other Office Equipment			
<p><u>6.1 Photocopiers</u></p> <p>Are the photocopiers also in operation at the end of the working day?</p> <p><u>If yes:</u> Either appoint somebody who can switch the copier off at the end of day and, if necessary pull out the plug, or install a timer-switch.</p>	<input type="checkbox"/> S!	<input type="checkbox"/>	<p>Power demand on stand-by mode (in Watts): _____</p> <p>Avoided operational hours per week: _____</p> <p>Weeks in year: 52</p> <p>These value must be multiplied together.</p> <p>If you have exact values, you can calculate using a total of 98 avoided hours per week (a weekend and 5 nights at 10 hours per night).</p>
<p><u>6.2 High Performance Photocopiers</u></p> <p>Have you a high performance machine amongst your normal photocopiers?</p> <p><u>If yes:</u> Check the operation time of these machines. Why must they be standing-by for the whole day? Agree that these machines are only switched on for extremely large tasks.</p>	<input type="checkbox"/> S!	<input type="checkbox"/>	<p>Power demand in stand-by mode (in Watts): _____</p> <p>Avoided operational time per week: _____</p> <p>Weeks in year: 52</p> <p>These value must be multiplied together.</p> <p>The power demand of a normal and a high performance machine can differ by about 300 W hours.</p>
<p><u>6.3 Fax Machines</u></p> <p>Must the fax be permanently in operation?</p> <p><u>If no:</u> Check whether the machine can be assured for stand-by mode during the night and at weekends.</p>	<input type="checkbox"/>	<input type="checkbox"/> S!	<p>Power demand in stand-by mode (in Watts): _____</p> <p>Avoided operational time per week: _____</p> <p>Weeks in year: 52</p> <p>These value must be multiplied together.</p>