



Best Practice	REDUCTION OF FAN RUNNING TIME	HVAC-01
Application	Optimisation of HVAC systems	
SME sector	All	
SME Sub-sector	All	
Technical description	<p>Many plants run all year long (24 hours a day, 7 days a week) while production or usage times may be different. When optimizing the HVAC, the first question should be which areas should be supplied and at what times. The resulting energy savings are among the simplest and most effective measures.</p> <p>The reduction of the running time not only saves power for the fan, but also energy for air conditioning (heating, cooling, humidifying and dehumidifying). Further advantages which result from the reduction of the running time are:</p> <ul style="list-style-type: none"> • Reduced maintenance intervals: As many systems need to be serviced after certain hours of operation (for example, periodic inspection, etc.), the maintenance interval can be extended. • Reduced filter replacement: Filters are usually changed after a certain pressure difference or after a certain running time. Reducing the runtime reduces both the level of contamination and the filter's operating time. 	
Recommendation for optimisation	<p>The operating time reduction does not require any elaborate planning and can be implemented very quickly and easily. By consulting the operating personnel, a demand survey of the plant can be carried out. If available, it is also possible to inspect the planning documents. Consultation with the manufacturer or planner of the system may result in additional benefits.</p> <p>The reduction of operating times can usually be done manually by qualified personal of the company. In order to guarantee the maximum savings potential, automated systems are worthwhile and can often be realized via simple and cost-effective time controls. If a building management system is already in place it allows the reduction of operating time can be adjusted accordingly.</p> <p>In order to determine the saving potential of this measure, the following information must be collected:</p> <ul style="list-style-type: none"> • Specific costs for electricity, heat, cold and maintenance • Operating times of the system • Working hours of the company • Nominal flow • Investment costs (for example, timer) 	



<p>Relevant technical considerations</p>	<p>The operating time reduction does not require any elaborate planning and can be implemented very quickly and easily. By consulting the operating personnel, a demand survey of the plant can be carried out. If available, it is also possible to inspect the planning documents. Consultation with the manufacturer or planner of the system may result in additional benefits.</p>														
<p>Schemes and diagrams</p>	<table border="1"> <caption>Energy consumption of HVAC systems</caption> <thead> <tr> <th>System Component</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>exhaust fan</td> <td>12%</td> </tr> <tr> <td>supply air fan</td> <td>23%</td> </tr> <tr> <td>humidifier</td> <td>40%</td> </tr> <tr> <td>refrigeration plant</td> <td>8%</td> </tr> <tr> <td>heat generation</td> <td>16%</td> </tr> <tr> <td>auxiliary energy</td> <td>1%</td> </tr> </tbody> </table>	System Component	Percentage	exhaust fan	12%	supply air fan	23%	humidifier	40%	refrigeration plant	8%	heat generation	16%	auxiliary energy	1%
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<p>Economics</p>	<p>Unit cost of time relays is approximately 150-200 EUR</p>														
<p>Energy savings</p>	<p>Energy savings are the result of:</p> <ul style="list-style-type: none"> • Electricity supply to power the HVAC system (10-15%) • Reduction of refrigerant gas to power the cold battery of the system 														
<p>Economic savings</p>	<p>Between 15% and 30% of the costs for the energy consumed</p>														
<p>Average Payback Time</p>	<p>Less than 3 years</p>														
<p>Emissions</p>	<p>Emissions depend on the characteristics of the refrigerant gas</p>														
<p>Environmental benefits</p>	<p>Depending on the system configuration, the energy consumption of ventilation systems consists of electricity (for fan, air heating and humidification), gas (air heating, humidification) or solar thermal energy (heating, recuperation/moisture recovery) which can be reduced by the measure.</p> <p>Reduction in CO₂ emissions due to a reduction in electricity needs for cooling</p>														



<p>Main NEBs (Multiple benefits)</p>	<input checked="" type="checkbox"/> Environmental benefits <input type="checkbox"/> Increased productivity <input checked="" type="checkbox"/> Work environment/ Health/Safety <input type="checkbox"/> Increased competitiveness <input type="checkbox"/> Maintenance	<p>Optimized air conditioning not only reduces operating costs for electrical and thermal energy, but also creates working conditions that increase the comfort and health of employees.</p>
<p>Replicability</p>	<p>High</p>	
<p>Related measures</p>	<ul style="list-style-type: none"> • HVAC-02: Flow rate reduction through variable speed variation (VSD) • HVAC-03: Replacement of fan • HVAC-04: Replacement of transmission system • HVAC-05: Heat and moisture recovery • HVAC-06: Reduction of pressure loss • HVAC-07: Leakage reduction of pipes • HVAC-08: Replacement of motor 	
<p>Case study</p>	<p>CO₂ sensor installation, company "Flughafen Wien" (Austria, 2012)</p> <ul style="list-style-type: none"> • Initial Situation: the air exchange of Vienna Airport has been designed as usual for maximum occupancy of buildings. Measurements have shown that this maximum occupancy is not constantly achieved and therefore, at certain times, ventilation systems can sometimes operate with reduced power. • Description of the optimisation: it has been shown that in some buildings the ventilation capacity can be reduced (temporarily in periods when the building is not occupied up to 70%). A CO₂ sensor has been placed in the exhaust air flow. The control of the supply and exhaust fans has been optimized with frequency converters. As a result, the demand for heating and cooling power has also decreased significantly and, occasionally, investment in substitution could be avoided with these measures. • Implementation costs: around 200 EUR • Payback Time: about 4 years 	
<p>References</p>	<p>Gerstbauer, Ch., Kulterer, K., Gorbach, Ch., Brunner, W.,.: Leitfaden für Energieaudits von Lüftungsanlagen, klimaaktiv energieeffiziente betriebe, Wien 2013</p>	

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