

# Conclusions on BAT from the Energy Efficiency (EE) BAT Reference Document

## **READ ME:**

The *Energy Efficiency BAT Reference Document* February 2009 is a horizontal BREF which addresses energy efficiency techniques regardless of the sector or industry.

In this case, you are required to identify the Conclusions on BAT, set out in section 4.2 of this document (*'Best Available Techniques'*) relevant to your installation. Please use the '**Scope**' box to describe the relevant activities/processes that come within the scope of this BREF and clearly identify the Conclusions on BAT (sections and subsections) that are '**Not Applicable**'.

For each applicable BAT, in the following table, state the status; '**Yes**' or '**Will be**' as appropriate in the '**State whether it is in place or state schedule for implementation**' box. The use of each of these terms is described below.

Information on compliance in the '**Applicability Assessment**' box should include, where applicable, the following:

- (i) Identification of the relevant process/ activity or individual emission points that the BAT requirement applies to at your installation;
- (ii) Where BAT is to use one or a combination of listed techniques, specify the technique(s) implemented/proposed at your installation to achieve the BAT; and
- (iii) A comment on how the requirements are being met or will be met, e.g., a description of the technology/operational controls/management proposed to meet the requirements.

Use of terms:

- (a) '**Yes**' – To be entered where the installation is currently compliant with this BAT requirement.
- (b) '**Will be**' – To be entered where a further technique is required to be installed to achieve compliance with the BAT requirement. In this case you must also specify the date by which the installation will comply with the BAT Conclusion requirement.

## Conclusions on BAT from the Energy Efficiency BAT Reference Document (extracts)

The full and complete Energy Efficiency BAT reference document (February 2009) is available at the EIPPC Bureau website: <http://eippcb.jrc.ec.europa.eu/reference/>. You may need to refer to this document in completing the form below.

### SCOPE

*Identify here any particular processes and activities at the installation that may have particular relevance with regard to the scope of the conclusions on BAT from the Energy Efficiency reference document (BREF).*

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
<p><b>BAT 1.</b></p> <p>BAT is to implement and adhere to an energy efficiency management system (ENEMS) that incorporates, as appropriate to the local circumstances, all of the following features (see Section 2.1. The letters (a), ( b), etc. below, correspond those in Section 2.1):</p> <ul style="list-style-type: none"> <li>a. commitment of top management (commitment of the top management is regarded as a precondition for the successful application of energy efficiency management);</li> <li>b. definition of an energy efficiency policy for the installation by top management;</li> <li>c. planning and establishing objectives and targets (see BAT 2, 3 and 8) ;</li> <li>d. implementation and operation of procedures paying particular attention to:               <ul style="list-style-type: none"> <li>i) structure and responsibility</li> </ul> </li> </ul>	<p>Applicable</p>	<p>In Place</p>

<ul style="list-style-type: none"> <li>ii) training, awareness and competence (see BAT 13);</li> <li>iii) communication</li> <li>iv) employee involvement</li> <li>v) documentation</li> <li>vi) effective control of processes (see BAT 14)</li> <li>vii) maintenance (see BAT 15)</li> <li>viii) emergency preparedness and response</li> <li>ix) safeguarding compliance with energy efficiency-related legislation and agreements (where such agreements exist).</li> </ul> <p>e. benchmarking,</p>		
<p>f. checking performance and taking corrective active, g review of EMS</p>		
<p><b>BAT 2.</b> BAT is to continuously minimise the environmental impact of an installation by planning action &amp; investments on an integrated basis and for the short, medium and long term, considering the costs/benefits &amp; cross media effects.</p>	<p>Applicable</p>	<p>In Place</p>
<p><b>BAT 3.</b> BAT is to identify the aspects of an installation that influence EE by means of an audit.</p>	<p>Applicable</p>	<p>In place. Energy Audit completed</p>
<p><b>BAT 4.</b> When carrying out an audit, BAT is to ensure that the audit identifies the following aspects (See BREF Section 2.11) : This BATC lists the aspects to be considered (a) - (f):</p> <ul style="list-style-type: none"> <li>a. energy use and type in the installation and its component systems and processes;</li> </ul>	<p>Applicable</p>	<p>In place</p>

<p>b. energy-using equipment, and the type and quantity of energy used in the installation;</p> <p>c. possibilities to minimise energy use, such as:</p> <ul style="list-style-type: none"> <li>• controlling/reducing operating times, e.g. switching off when not in use (e.g. see Sections 3.6, 3.7, 3.8, 3.9, 3.11)</li> <li>• ensuring insulation is optimised, e.g. see Sections 3.1.7, 3.2.11 and 3.11.3.7</li> <li>• optimising utilities, associated systems, processes and equipment (see Chapter 3);</li> </ul> <p>d. possibilities to use alternative sources or use of energy that is more efficient, in particular energy surplus from other processes/ systems, see Section 3.3;</p> <p>e. possibilities to apply energy surplus to other processes and/or systems, see Section 3.3;</p> <p>f. possibilities to upgrade heat quality (see Section 3.3.).</p>		
<p><b>BAT 5.</b> BAT is to use appropriate tools/methods to identify/quantify energy optimisation, eg models databases &amp; balances; techniques such as pinch technology, thermoeconomics; estimates &amp; calculations.</p>	Applicable	In place
<p><b>BAT 6.</b> BAT is to Identify opportunities to optimise energy recovery within and between systems at the installation, including 3rd parties as per BREF 3.2-3.4</p>	Applicable	In place.
<p><b>BAT 7.</b> BAT is to Optimise EE through a systems approach to energy management.</p>	Applicable	In place.
<p><b>BAT 8.</b> BAT is to establish EE indicators by carrying out all of the following: to be developed as per section 4.2.2.4</p> <p>a. identifying suitable energy efficiency indicators for the installation, and where necessary, individual processes, systems and/or units, and measure their change over time or after the implementation of energy efficiency measures.</p> <p>b. identifying and recording appropriate boundaries associated with the indicators.</p>	Applicable	In Place The energy audit identified the existing indicators of energy efficiency. It will be an objective of the next audit to identify the boundaries associated with the indicators and installation

c. identifying and recording factors that can cause variation in the energy efficiency of the relevant process, systems and/or units.		specific causes of variation in efficiencies.
<b>BAT 9.</b> BAT is to carry out sectoral/regional/national benchmarking.	Applicable	<b>In place.</b>
<b>BAT 10.</b> BAT is to optimise EE when planning a new installation, unit, system or significant upgrade by considering the list in 4.2.3:  a. the energy efficient design (EED) should be initiated at the early stages of the conceptual design/basic design phase b. the development and/or selection of energy efficient technologies c. additional data collection may need to be carried out to supplement existing data or fill gaps in knowledge d. the EED work should be carried out by an energy expert e. the initial mapping of energy consumption should also address which parties in the project organisations influence the future energy consumption, and should optimise EED of the future plant with them.	Applicable	<b>In place.</b> EED is central to all new equipment procurement/upgrade.
<b>BAT 11.</b> Optimise EE/Energy recovery between systems/processes /parties at installations.	Not Applicable	Given the nature of the energy systems at the installation there is no opportunity to optimise the use of energy between systems or with third parties.
<b>BAT 12.</b> Maintain impetus of EE initiatives as per list	Applicable	<b>In Place</b>
<b>BAT 13.</b> Maintain expertise in EE/energy using systems through recruitment/training; use of specialist staff/systems/functions; resource sharing.	Applicable	<b>In Place</b>

<p><b>BAT 14.</b> Implement effective process control through: compliance with procedures; EE performance parameters identified &amp; optimised, and documented/recorded.</p> <ul style="list-style-type: none"> <li>a. having systems in place to ensure that procedures are known, understood and complied with.</li> <li>b. ensuring that the key performance parameters are identified, optimised for energy efficiency and monitored.</li> <li>c. documenting or recording these parameters</li> </ul>	<p>Applicable</p>	<p><b>In Place.</b> SEHL has a SCADA system that monitors key performance parameters and records these.</p>
<p><b>BAT 15.</b> Carry out maintenance to optimise EE through measures specified in 4.2.8.</p> <ul style="list-style-type: none"> <li>a. clearly allocating responsibility for the planning and execution of maintenance.</li> <li>b. establishing a structured programme for maintenance based on technical descriptions of the equipment, norms, etc. as well as any equipment failures and consequences. Some maintenance activities may be best scheduled for plant shutdown periods.</li> <li>c. supporting the maintenance programme by appropriate record keeping systems and diagnostic testing.</li> <li>d. identifying from routine maintenance, breakdowns and/or abnormalities possible losses in energy efficiency, or where energy efficiency could be improved.</li> <li>e. identifying leaks, broken equipment, worn bearings, etc. that affect or control energy usage, and rectifying them at the earliest opportunity.</li> </ul>	<p>Applicable</p>	<p><b>In Place.</b> SEHL has a preventative maintenance programme in place.</p>
<p><b>BAT 16.</b> Establish &amp; maintain documented procedures to measure characteristics of operations with a significant impact on EE.</p>	<p>Applicable</p>	<p><b>In Place/Proposed.</b> SEHL has a SCADA system that monitors key performance parameters and records these. SEHL will prepare an Energy and Resource Management Procedure, which will take into account the need to monitor and measure all of the key characteristics of the installation's activities that</p>

		have a significant impact on energy efficiency. These characteristics will be identified in the report on the next energy audit (Ref BAT 3).
<p><b>BAT 17.</b>  <b>BAT is to optimise EE of combustion by related techniques such as:</b></p> <ul style="list-style-type: none"> <li>i) Advanced computer control of combustion conditions.</li> <li>ii) reduced excess air.</li> <li>iii) pre-heating of fuel gas.</li> <li>iv) pre-heating of combustion air.</li> </ul>	Applicable	<b>In Place</b>
<p><b>BAT 18.</b>  BAT for steam systems is to optimise EE by using techniques such as: those measures listed in 4.2 in regard to design, operation/control, generation and distribution, recovery of condensate.</p>	Not Applicable	No steam systems at the installation.
<p><b>BAT 19.</b>  Maintain heat exchanger efficiency by monitoring efficiency &amp; preventing/removing fouling.</p>	Not Applicable	No heat recovery systems at the installation
<p><b>BAT 20.</b>  BAT is to seek possibilities for cogeneration inside and /or outside the installation (with a third party).</p>	Not Applicable	No cogeneration systems at the installation
<p><b>BAT 21.</b>  <b>Increase power factor according to local power distributor requirements:</b></p> <ul style="list-style-type: none"> <li>a. Installing capacitors in the AC circuits to decrease the magnitude of reactive power. or lightly loaded motors.</li> <li>b. Minimising the operation of idling.</li> <li>c. Avoiding the operation of equipment above its rated voltage.</li> </ul>	Applicable	<b>In Place</b> Power factor correction has been applied at the existing plant.

d. When replacing motors, using energy efficient motors.		
<b>BAT 22.</b> Check for harmonics & apply filters if required.	Applicable	<b>Proposed.</b> SEHL will engage an electrical engineer to review energy management systems at the installation, which will address the efficiency of electric motors.
<b>BAT 23.</b> Optimise various power supply efficiency measures. a. Ensure power cables have the correct dimensions for the power demand. b. Keep online transformer(s) operating at a load above 40 50 % of the rated power. c. Use high efficiency/low loss transformers.	Applicable	<b>Proposed.</b> SEHL will engage an electrical engineer to review energy management systems at the installation, which will address the efficiency of electric motors.
<b>BAT 24.</b> <b>Optimise electric motors as per section 4.3.6a.</b> a. Using energy efficient motors (EEM). b. Proper motor sizing c. Installing variable speed drives (VSD) d. Installing high efficiency transmission/reducers e. Use direct coupling where possible, synchronous belts or cogged V-belts in place of V belts and helical gears in place of worm gears. f. Energy efficient motor repair (EEMR) or replacement with an EEM. g. Rewinding: avoid rewinding and replace with an EEM, or use a certified rewinding contractor (EEMR). h. Power quality control i. Integrate lubrication, adjustments and tuning into system operation and maintenance.	Applicable	<b>Proposed.</b> SEHL will engage an electrical engineer to review energy management systems at the installation, which will address the efficiency of electric motors.
<b>BAT 25.</b> Optimise compressed air systems (CAS) as per table 4.6.	Not Applicable	
<b>BAT 26.</b> Optimise pumping systems as per 4.3.8	Not Applicable	



<p><b>BAT 27.</b> Optimise HVAC systems as per 4.3.9</p>	<p>Not Applicable</p>	<p>No HVAC system at the installation.</p>
<p><b>BAT 28.</b> Optimise lighting systems as per 4.3.10.</p>	<p>Applicable</p>	<p><b>In place.</b> The energy audit assessed energy usage in the lighting system.</p>
<p><b>BAT 29.</b> BAT is to optimise drying, separation and concentration processes by using techniques such as those in Table 4.10 according to applicability, and to seek opportunities to use mechanical separation in conjunction with thermal processes.</p>	<p>Not Applicable</p>	<p>No drying and concentration processes.</p>