Integrated Pollution Prevention and Control Reference Document on Best Available Techniques for Energy Efficiency February 2009 (ENE BREF).

Section	How the BAT requirements will be met at the O'Toole Composting Facility		
	Aspect	**BAT**	**How the BAT Requirements will be met at the O'Toole Composting Facility.**
4.2 Best available techniques for achieving energy efficiency at an installation level	4.2.1 Energy efficiency management	A number of energy efficiency management techniques are determined as BAT. The scope (e.g. level of detail) and nature of the energy efficiency management system (ENEMS) (e.g. standardised or non- standardised) will generally be related to the nature, scale and complexity of the installation, as w ell as the energy requirements of the component processes and systems (see Section 2.1): 1. 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): A. Commitment of top management (commitment of the top management is regarded as a precondition for the successful application of energy efficiency management) B. Definition of an energy efficiency policy for the installation by top management C. Planning and establishing objectives and targets (see bat 2, 3 and 8) D. Implementation and operation of procedures paying particular attention to: • Structure and responsibility • Training, awareness and competence (see bat 13) • Communication • Employee involvement v) documentation • Effective control of processes (see bat 14) • Maintenance (see bat 15) • Emergency preparedness and response • Safeguarding compliance with energy efficiency-related • Legislation and agreements (where such agreements exist). E. Benchmarking: the identification and assessment of	This will be implemented on an ongoing basis over the next 2 – 3 years. Senior management commitment will be guaranteed. A policy statement will be produced Objectives and targets will be set. Implementation and operation of procedures as detailed over will be carried out. Benchmarking to be carried out in line with BAT 8 and

		energy efficiency indicators over time (see BAT 8), and the systematic and regular comparisons with sector, national or regional benchmarks f or energy efficiency, where verified data are available (see Sections 2.1(e), 2.16 and BAT 9)	BAT 9.
		F. Checking performance and taking corrective action paying particular attention to: • Monitoring and measurement (see BAT 16) • Corrective and preventive action iii) maintenance of records • Independent (where practicable) internal auditing in order to determine whether or not the energy efficiency management system conforms to planned arrangements and has been properly implemented and maintained (see BAT 4 and 5)	Performance will be checked and corrective action taken as follows: Monitoring and measurement Corrective and preventative action (including record keeping) Independent auditing (both internal and external)
		G. review of the ENEMS and its continuing suitability, adequacy and effectiveness by top management	Ongoing review by Senior Management.
		For (H) and (I), see further features on an energy efficiency statement and external verification, below	
		2. When designing a new unit, taking into account the Environmental impact from the eventual decommissioning of the unit	All new units will be designed with the Environmental impact from the eventual decommissioning being considered.
		3. Development of energy efficient technologies, and to follow developments in energy efficiency techniques. The enems may be achieved by ensuring these elements form part of existing management systems (such as an EMS) or by implementing a separate energy efficiency management system.	As a minimum energy efficient technologies will be incorporated into the existing EMS.
		Three further features are considered as supporting measures. Although these features have advantages, systems without them can be BAT. These three additional steps are:	
		• (see Section 2.1(h)) preparation and publication (and possibly external validation) of a regular energy efficiency statement describing all the significant environmental aspects of the installation, allowing for year-by-year comparison against environmental objectives and targets as well as with sector benchmarks as appropriate	An energy consumption report will be produced and this will be updated and reviewed on a regular basis. This will allow comparisons on a year by year basis against objectives and targets and sector benchmarks.

		• (see Section 2.1(i)) having the management system and audit procedure examined and validated by an accredited certification body or an external ENEMS verifier • (See Section 1, Applicability, 2) implementation and adherence to a nationally or internationally accepted voluntary system such as: DS2403, IS 393, SS627750, VDI Richtlinie No. 46, etc. (when including energy efficiency management and EN ISO 14001:1996. This voluntary step could give higher credibility to the ENEMS. However, non -standardised systems can be equally effective provided that they are properly designed and implemented.	
4.2.2 Planning and establishing objectives and targets	4.2.2.1 Continuous environmental improvement	BAT is to continuously minimise the environmental impact of an installation by planning actions and investments on an integrated basis and for the short, medium and long-term, considering the cost- benefits and cross-media effects.	This will be carried out on an ongoing basis at the O'Toole Composting Ltd facility
	4.2.2.2 Identification of energy efficiency aspects of an installation and opportunities for energy savings	3. BAT is to identify the aspects of an installation that influence energy efficiency by carrying out an audit. It is important that an audit is coherent with a systems approach (see BAT 7).	This will be carried out on an ongoing basis at the O'Toole Composting Ltd facility
		4. When carrying out an audit, BAT is to ensure that the audit identifies the following aspects (see Section 2.11): a. Energy use and type in the installation and its component systems and processes b. Energy-using equipment, and the type and quantity of energy used in the installation c. Possibilities to minimise energy use, such as: 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) d. Ensuring insulation is optimised, e.g. See sections 3.1.7, 3.2.11 and 3.11.3.7 e. Optimising utilities, associated systems, processes and equipment (see chapter 3) f. Possibilities to use alternative sources or use of energy that is more efficient, in particular energy surplus from other processes and/or systems, see section 3.3	Audits will be carried out in line with the aspects detailed over.

		g. Possibilities to apply energy surplus to other processes and/or systems, see section 3.3 h. Possibilities to upgrade heat quality (see section 3.3.2).	
		5. BAT is to use appropriate tools or methodologies to assist with identifying and quantifying energy optimisation, such as: energy models, databases and balances (see Section 2.15) a technique such as pinch methodology (see Section 2.12) exergy or enthalpy analysis (see Section 2.13), or thermo economics (see Section 2.14) estimates and calculations (see Sections 1.5 and 2.10.2).	Tools and methodologies as detailed will be employed to assist with energy optimization.
		6. BAT is to identify opportunities to optimise energy recovery within the installation, between systems within the installation (see BAT 7) and/or with a third party (or parties), such as those described in Sections 3.2, 3.3 and 3.4.	This will be carried out on an ongoing basis.
	4.2.2.3 A systems approach to energy management	7. BAT is to optimise energy efficiency by taking a systems approach to energy management in the installation. Systems to be considered for optimising as a whole are, for example: • Process units (see sector BREFs) • Heating systems such as: steam (see Section 3.2) hot water cooling and vacuum (see the ICS BREF) motor driven systems such as: compressed air (see Section 3.7) pumping (see Section 3.8) lighting (see Section 3.10) drying, separation and concentration (see Section 3.11).	A systems approach to energy management will be employed in line with 4.2.2.3
	4.2.2.4 Establishing and reviewing energy efficiency objectives and indicators	a) 8. BAT is to establish energy efficiency indicators by carrying out all of the following: 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 (see Sections 1.3 and 1.3.4) b) identifying and recording appropriate boundaries associated with the indicators (see Sections 1.3.5 and 1.5.1) identifying and recording factors that can cause variation in the energy efficiency of the relevant process, systems and/or units (see Sections 1.3.6 and 1.5.2).	Energy efficiency objectives and indicators will be established in line with 4.2.2.4.a and b.
	4.2.2.5 Benchmarking	9. BAT is to carry out systematic and regular comparisons with sector, national or regional benchmarks, where validated data are available.	Systematic and regular comparisons with sectoral or national benchmarks will be carried out by the management.
	4.2.3 Energy	10. BAT is to optimise energy efficiency when planning a new installation, unit or system or a significant upgrade (see Section	All new installations, units, and systems will be planned in such a way as to optimise energy efficiency in line

	efficient design (EED)	2.3) by considering all of the following: a. The energy efficient design (EED) should be initiated at the early stages of the conceptual design/basic design phase, even though the planned investments may not be well-defined. The EED should also be taken into account in the tendering process. b. The development and/or selection of energy efficient technologies (see Sections 2.1(k) and 2.3.1). c. Additional data collection may need to be carried out as part of the design project or separately to supplement existing data or fill gaps in knowledge. d. The EED work should be carried out by an energy expert the initial mapping of energy consumption should also address which parties in the project organisations influence the future energy consumption, and should optimise the energy efficiency design of the future plant with them. For example, the staff in the (existing) installation who may be responsible for specifying design parameters.	with 4.2.3
	4.2.4 Increased Process integration	11. BAT is to seek to optimise the use of energy between more than one process or system (see Section 2.4), within the installation or with a third party.	Where possible O'Toole Composting Ltd. will optimise the use of energy between processes and systems.
	4.2.5 Maintaining the impetus of energy efficiency initiatives	12. BAT is to maintain the impetus of the energy efficiency programme by using a variety of techniques, such as: a) Implementing a specific energy efficiency management system (see Section 2.1 and BAT 1) b) Accounting for energy usage based on real (metered) values, which places both the obligation and credit for energy efficiency on the user/bill payer (see Sections 2.5, 2.10.3 and 2.15.2) c) The creation of financial profit centres for energy efficiency (see Section 2.5) d) Benchmarking (see Section 2.16 and BAT 9) e) A fresh look at existing management systems, such as using operational excellence (see Section 2.5) f) Using change management techniques (also a feature of operational excellence, see Section 2.5).	O'Toole Composting Ltd will maintain the impetus of the energy efficiency programme by using some or all of the techniques as described over.
	4.2.6 Maintaining expertise	13. BAT is to maintain expertise in energy efficiency and energy-using systems by using techniques such as: a) Recruitment of skilled staff and/or training of staff. Training can be delivered by in-house staff, by external	O'Toole Composting Ltd will maintain expertise in energy efficiency and energy using systems as follows: Recruitment and training (both internal and external)

		experts, by formal courses or by self- study/development (see section 2.6) b) Taking staff off-line periodically to perform fixed term/specific investigations (in their original installation or in others, see section 2.5) c) Sharing in-house resources between sites (see section 2.5) d) Use of appropriately skilled consultants for fixed term investigations (e.g. See section 2.11) outsourcing specialist systems and/or functions (e.g. See annex 7.12)	Using staff to perform investigations. N/A Use of appropriate consultants to carry out specific investigations.
	4.2.7 Effective control of processes	14. BAT is to ensure that the effective control of processes is implemented by techniques such as: a) Having systems in place to ensure that procedures are known, understood and complied with (see Sections 2.1(d)(vi) and 2.5) b) Ensuring that the key performance parameters are identified, optimised for energy efficiency and monitored (see Sections 2.8 and 2.10) c) Documenting or recording these parameters (see Sections 2.1(d)(vi), 2.5, 2.10 and 2.15).	Control of the process will be maintained by having systems in place to ensure that procedures are understood and complied with. Ensuring that KPI's will be identified, optimized for energy efficiency and monitored. These parameters will be documented and recorded.
	4.2.8 Maintenance	15. BAT is to carry out maintenance at installations to optimise energy efficiency by applying all of the following: a) Clearly allocating responsibility for the planning and execution of maintenance b) Establishing a structured programme for maintenance based on technical descriptions of the equipment, norms, etc. As well as any equipment failures and consequences. c) Some maintenance activities may be best scheduled for plant shutdown periods d) Supporting the maintenance programme by appropriate record keeping systems and e) Diagnostic testing f) Identifying from routine maintenance, breakdowns and/or abnormalities possible losses in energy efficiency, or where energy efficiency could be improved g) Identifying leaks, broken equipment, worn bearings, etc. that affect or control energy usage, and rectifying them at the earliest opportunity.	Maintenance will be carried out to optimize energy efficiency in accordance with the points detailed over, where appropriate.
	4.2.9	BAT is to establish and maintain documented procedures to	Documented procedures will be established to

	Monitoring and measurement	monitor and measure, on a regular basis, the key characteristics of operations and activities that can have a significant impact on energy efficiency. Some suitable techniques are given in Section 2.10.	monitor and measure on a regular basis the key characteristics of operations and activities that can have an impact on energy efficiency.
4.3 Best available techniques for achieving energy efficiency in energy-using systems, processes, activities or equipment	4.3.1 Combustion	17. BAT is to optimise the energy efficiency of combustion by relevant techniques such as: those specific to sectors given in vertical BREFs those given in Table 4.1 –	N/A

4.3.10 Lighting

28. BAT is to optimise artificial lighting systems by using the techniques such as those in Table 4.9 according to applicability (see Section 3.10):
Table 4.9 Lighting System Techniques to improve Energy Efficiency – table reproduced below, with a commentary on how BAT requirements will be met at the O'Toole Composting Facility.

Technique	Applicability	How The BAT Requirements will be met at the O'Toole Composting Ltd. Facility
ANALYSIS AND DESIGN OF LIGHTING REQUIREMENTS		
Identify illumination requirements in terms of both intensity and spectral content required for the intended task	Composting building, offices, outdoor yard area.	This is carried out at the facility.
Plan space and activities in order to optimise the use of natural light		Optimisation of natural light will be considered for future planning of space and activities.
Selection of fixtures and lamps according to specific requirements for the intended use	All areas	All future installation and replacements will be selected according to specific requirements for the intended use.
OPERATION, CONTROL, AND MAINTENANCE		
Use of lighting management control systems including occupancy sensors, timers, etc.	All cases	Timers are in use at the facility
Train building occupants to utilise lighting equipment in the most efficient manner	All cases	This is carried out at the facility

Design and Control

Energy Savings Measure	Applicability	Section In This Document	How The BAT Requirements will be met at the O'Toole Composting Ltd. Facility
Overall system design. Identify and equip areas separately for: • General ventilation • Specific ventilation • Process ventilation	New or significant upgrade. Consider for retrofit on lifetime cost benefit	3.9.1 3.9.2.1	This will be considered in any future design or upgrade.
Optimise the number, shape and size of intakes	New or upgrade	3.9.2.1	This will be considered in any future design or upgrade.
Use fans: • Of high efficiency • Designed to operate at optimal rate	Cost effective in all cases	3.9.2.1 3.9.2.2	This will be considered in any future design or upgrade. The possibility of retro-fit will be examined.
Manage airflow, including considering dual flow ventilation	New or significant upgrade	3.9.2.1	This will be considered in any future design or upgrade.
Air system design: • Ducts are of a sufficient size • Circular ducts • Avoid long runs and obstacles such as bends, narrow sections	New or significant upgrade	3.9.2.1	This will be considered in any future design or upgrade.
Optimise electric motors, and consider installing a VSD	All cases. Cost effective retrofit	3.9.2.1, 3.9.2.2, 3.6, 3.6.3, 3.6.7 BAT 24	This will be considered in any future design or upgrade.
Use automatic control systems. Integrate with centralised technical management systems	All new and significant upgrades. Cost effective and easy upgrade in all cases	3.9.2.1 3.9.2.2	Automatic control systems are in use at the facility.
Integration of air filters into air duct system and heat recovery from exhaust air (heat exchangers)	New or significant upgrade. Consider for retrofit on lifetime cost benefit. The following issues need to be taken into account: the thermal efficiency, the pressure loss, and the need for regular cleaning	3.9.2.1 3.9.2.2	This will be considered in any future design or upgrade.
Reduce heating/cooling needs by: • Building insulation • Efficient glazing	Consider in all cases and implement according to cost benefit	3.9.1	This will be considered in any future design or upgrade.

• Air infiltration reduction • Automatic closure of doors • Destratification • Lowering of temperature set point during non-production period (programmable regulation) • Reduction of the set point for heating and raising it for cooling			Building insulation will be carried out as part of the next upgrade.
Improve the efficiency of heating systems through: • Recovery or use of wasted heat (Section 3.3.1) • Heat pumps • Radiative and local heating systems coupled with reduced temperature set points in the non occupied areas of the buildings	Consider in all cases and implement according to cost benefit	3.9.1	N/A
Improve the efficiency of cooling systems through the use of free cooling	Applicable in specific circumstances	3.9.3	N/A

Maintenance

Energy Savings Measure	Applicability	Section In This Document	How The BAT Requirements will be met at the O'Toole Composting Ltd. Facility
Stop or reduce ventilation where possible	All cases	3.9.2.2	This will be considered in the design of any future upgrade of the facility or systems.
Ensure system is airtight, check joints	All cases	3.9.2.2	This will be considered in the design of any future upgrade of the facility or systems.
Check system is balanced	All cases	3.9.2.2	This will be considered in the design of any future upgrade of the facility or systems.
Manage airflow: optimise	All cases	3.9.2.2	This will be considered in the design of any future upgrade of the facility or systems.

Air filtering, optimise: • Recycling efficiency • Pressure loss • Regular filter cleaning/replacement • Regular cleaning of system	All cases	3.9.2.2	This will be considered in the design of any future upgrade of the facility or systems. Regular maintenance and cleaning is carried out.