

# Request for Proposal Guidance

This document has been prepared to offer guidance for setting out the request for a proposal for a biomass heating system. This guidance has been presented in the following tables which indicate the information to be requested in a subsequent proposal:

**Table 1: General Scope of Works**

**Table 2: Specification for Boiler House**

**Table 3: Specification for Fuel Store**

**Table 4: Specification for Boiler**

**Table 5: Specification for Flues**

**Table 6: Specification for Fuel Extraction and Feed**

**Table 7: Specification of Installation and Commissioning**

**Table 8: Specification of Technical Support**

The information presented here is drawn from two key source documents, "Procurement Guidelines for Biomass Heating<sup>1</sup>" and "Planning and Installing Bio-energy Systems<sup>2</sup>".

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<sup>1</sup> Buro Happold and Mercia Energy Ltd (2007)

<sup>2</sup> Earthscan publications (2005)

A project specification should begin with some background details about the proposed site and the overall scope of works. The possible extent of this is given in Table 1 below:

General	Information to include / to be requested
<b>Description of Works</b> Building and area to be heated; Current Fuel Use	<ul style="list-style-type: none"> <li>Any energy consumption details;</li> <li>Energy use profile.</li> </ul>
<b>Scope of Works</b> General requirements for biomass system, e.g. the facilities that it is expected to heat.	Any site plans of buildings.
<b>The Extent of the Specification</b> – for example: <ul style="list-style-type: none"> <li>Installation of X kW boiler to provide X kWh per annum;</li> <li>Integration works with existing M&amp;E plant;</li> <li>Fuel extraction;</li> <li>Fuel store construction (if applicable);</li> <li>Boiler house construction (if applicable);</li> <li>District Heat Network (if applicable).</li> </ul>	Feasibility study outputs (if applicable) to inform the design process.
<b>Exclusions</b> What the installation does not cover, e.g.: <ul style="list-style-type: none"> <li>Installation of internal heat distribution system;</li> <li>Installation of DHN etc.;</li> <li>Fuel store construction (if applicable – e.g. installed by main contractor);</li> <li>Boiler house construction (if applicable – e.g. installed by main contractor).</li> <li>Vehicle access facilities (e.g. roadways, ramps etc.) if applicable.</li> </ul>	
<b>Power Supply</b> <ul style="list-style-type: none"> <li>State what power supply is available on site<sup>3</sup>;</li> <li>Request what the electricity consumption will be for the biomass boiler (fans, motors etc). e.g. The power rating of any electrical consumers must be specified by the installer.</li> </ul>	<ul style="list-style-type: none"> <li>3-phase 400V .... Amps;</li> <li>1-phase 240V .... Amps;</li> </ul> Power consumption of system.
<b>Water Supply</b> The quality of water supply on site may be important in terms of boiler operation and water treatment. If appropriate, details of water pressure and chemical analysis should be included and these details can be obtained from the water utility.	<ul style="list-style-type: none"> <li>Mains Supply or</li> <li>Self-Supply detail;</li> <li>Water pressure;</li> <li>Water quality.</li> </ul>

Table 1 General Scope of Works

<sup>3</sup> Most biomass systems require 3 phase supply and therefore installers need to know whether to account for an inverter.

Tables 2 – 8 outline the information to be requested from potential suppliers, as well as any information suppliers will need to provide an accurate proposal:

Boiler House	Information to include / to be requested
<p><b>Boiler house</b></p> <ul style="list-style-type: none"> <li>• If the boilerhouse is an existing facility, then it must conform to Building Regulations;</li> <li>• If a boilerhouse is new build it must comply with both Building Regulations and local planning policies;</li> <li>• Any boilerhouse must be able to safely accommodate the weight and size of the proposed boiler and ancilliary plant (heat accumulation tank, pipework, expansion vessels etc) if applicable.</li> </ul>	<ul style="list-style-type: none"> <li>• Confirmation that an existing/new boiler house conforms to Building Regulations and local planning policies;</li> <li>• Supplier to provide details of boiler weight and dimensions.</li> </ul>
<p><b>Ventilation</b></p> <ul style="list-style-type: none"> <li>• Biomass boilers require more excess air than oil or gas boilers and so greater permanent ventilation is necessary;</li> <li>• The supplier/installer should provide details of the level of ventilation required<sup>4</sup>.</li> </ul>	<ul style="list-style-type: none"> <li>• Permanent air vent of X mm<sup>2</sup> to be installed in the boiler house.</li> </ul>
<p><b>Access for cleaning</b></p> <ul style="list-style-type: none"> <li>• Provision must be made to ensure there is sufficient space to clean the boiler tubes either above the boiler (in the case of vertical tubes) or in front of the boiler (in the case of horizontal tubes);</li> <li>• Provide boiler room dimensions and, if available, a drawing or sketch with the specification.</li> </ul>	<p>Boiler house size:</p> <ul style="list-style-type: none"> <li>• Length;</li> <li>• Width;</li> <li>• Height;</li> </ul> <ul style="list-style-type: none"> <li>• Boiler house drawing included.</li> </ul>
<p><b>Access for installing the boiler (and Heat accumulation tank if applicable)</b></p> <ul style="list-style-type: none"> <li>• Due to the large size of the boilers, provision for easy access must be made. This may include larger doorways or a removable roof.</li> </ul>	<ul style="list-style-type: none"> <li>• Access details in the specification giving all pertinent dimensions.</li> </ul>

Table 2 Specification for Boiler House

<sup>4</sup> If this is not available then the following rule of thumb can be applied: A permanent air vent of 550mm<sup>2</sup> per kW of appliance.

Fuel Store	Information to include / to be requested
<p><b>Woodchip Bunker</b></p> <ul style="list-style-type: none"> <li>• There are no standard designs for woodchip bunkers and therefore guiding principles should be included (e.g. description of size, site constraints, and any recommendations from the preferred fuel supplier.</li> <li>• The end user's provisional design may be submitted in the tender specification with a caveat that it is subject to adaptation in consultation with the biomass boiler supplier.</li> </ul>	<ul style="list-style-type: none"> <li>• Provisional fuel bunker design; or</li> <li>• Supplier/installer to provide specification for bunker/silo.</li> </ul>
<p><b>Woodpellet Bunker</b></p> <ul style="list-style-type: none"> <li>• As above.</li> <li>• Austrian standard Önorm M7137 (Pellet storage at the customers premises) defines quality criteria for wood pellet storage rooms and bunkers. Önorm M7137 could be referred to when specifying the bunker/silo for pellets.</li> </ul>	<ul style="list-style-type: none"> <li>• Provisional fuel bunker design; or</li> <li>• Supplier/installer to provide specification for bunker/silo</li> </ul>
<p><b>Store Size</b></p> <p>As store size will depend on a number of factors (size of plant, heat load being serviced, number of day's storage required, size of delivery vehicle(s) etc.). The end user's provisional design may be submitted in the tender specification with a caveat that it is subject to adaptation in consultation with the biomass boiler supplier and/or fuel supplier(s).</p>	<p>Provide site plans showing:</p> <ul style="list-style-type: none"> <li>• location of boiler house;</li> <li>• fuel store position;</li> <li>• access roads; and turning areas</li> <li>• vehicle turning radius</li> <li>• Preferred delivery frequency (i.e. 2 weeks, 1 month etc).</li> </ul>

Table 3 Specification for Fuel Store

Proposed Boiler	Information to include / to be requested
<p><b>Boiler output</b></p> <ul style="list-style-type: none"> <li>The boiler output required should be stated in kW in the specification (if known). This information should be evaluated in the feasibility stage. Alternatively, site owners may request the supplier to specify size based on heat demand data that the site owner supplies.</li> </ul>	<ul style="list-style-type: none"> <li>kW.</li> </ul>
<p><b>CE marked</b></p> <ul style="list-style-type: none"> <li>CE marking is a declaration by the manufacturer that the product meets all the appropriate provisions of the relevant legislation implementing certain European Directives. The directives covering automatic wood fuelled boilers include<sup>5</sup>:             <ul style="list-style-type: none"> <li>The Low Voltage Directive – 73/23/EEC</li> <li>The Machinery Directive - 98/37/EC</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>The boiler must be CE marked; or</li> <li>The boiler does not need to be CE marked</li> </ul>
<p><b>Grate system</b></p> <ul style="list-style-type: none"> <li>A number of different grate systems are available and they are able to tolerate a variety of differing fuels. The specification should highlight what the proposed fuel is and therefore a preferred grate system.</li> </ul>	<ul style="list-style-type: none"> <li>Grate system must be capable for use with a feedstock moisture content of XX% (wet basis) or (dry basis); or</li> <li>Supplier/installer to provide details of grate system.</li> </ul>
<p><b>Boiler efficiency</b></p> <ul style="list-style-type: none"> <li>Biomass boiler efficiencies are typically between 80 and 90%. The manufacturer should have efficiency independently verified in accordance with EN303-5 or another recognised national standard.</li> </ul>	<ul style="list-style-type: none"> <li>Request independent verification of efficiency to a recognised standard such as EN303-5.</li> </ul>
<p><b>Turndown</b></p> <ul style="list-style-type: none"> <li>Most modern biomass boilers can turn down to between 20 and 30% of the MCR (maximum capacity rating). The site owner should give the range of outputs over which the boiler is likely to operate (i.e. summer and winter loads) and request details of whether the boiler can operate over this range using the fuel specification recommended by the manufacturer, and the effect on boiler performance of operating below</li> </ul>	<ul style="list-style-type: none"> <li>Provide details of range of outputs required in accordance with energy profile presented previously;</li> </ul> <p>Request manufacturers' information on effects of operating below MCR and</p>

<sup>5</sup> A full list of Directives where the CE market is applicable is published in the 'Blue Guide' (Guide to the Implementation of Directives Based on the New Approach and Global Approach) which is available for download from the Commission's website: <http://europa.eu.int/comm/enterprise/newapproach/legislation/guide/legislation.htm>

MCR for long periods.	maximum turndown.
<p><b>Burn-back protection</b></p> <ul style="list-style-type: none"> <li>• Burn-back protection is an essential requirement to minimise the potential for the fuel to burn back along the fuel-feed system and into the fuel store.</li> <li>• A three stage system comprising of a drop-cell fitted with rotary valve, a water dousing system, and a flame detection or thermal cut-out device is the safest system, and is essential for boilers located in or adjacent to occupied buildings.</li> <li>• A more basic two-stage protection comprising of a water dousing system and a sealed airtight fuel store may be acceptable for boilers located in a boilerhouse set some distance from occupied buildings.</li> </ul> <p>Note: some organisations/ insurance companies also require a sprinkler system to be fitted in the fuel store if it is sited within occupied buildings</p>	<ul style="list-style-type: none"> <li>• Three stage burn-back protection must include a drop cell with rotary valve and water dousing system; or</li> <li>• Request information on three stage protection provided.</li> </ul> <p>Or:</p> <ul style="list-style-type: none"> <li>• Two stage burn-back protection including water-dousing system required; or</li> <li>• Request information on two stage protection provided.</li> </ul>
<p><b>Force draught (FD) fans</b></p> <ul style="list-style-type: none"> <li>• Modern automatic biomass boilers are fitted with FD fans as standard. The more basic models use a single fan that provides both primary and secondary air.</li> <li>• The number of FD fans fitted is a function of the design, controllability, grate system used, and combustion efficiency of the boiler, and does not therefore have to be specified.</li> <li>• Electrical requirements of the fans should, however, be provided.</li> </ul>	<ul style="list-style-type: none"> <li>• Request details of electrical consumption of fans and power supply required (i.e single phase, or 3-phase, voltage and amperage etc).</li> </ul>
<p><b>Flue gas induced draught (ID) gas fans</b></p> <ul style="list-style-type: none"> <li>• As a general rule, ID fans are usually required on boilers over 100kW<sub>th</sub></li> <li>• As a rule of thumb all boilers below 100kW<sub>th</sub> with a stack height of less than 8m should be fitted with a flue gas ID</li> <li>• ID fans may also be needed if the flue run has significant horizontal and/or has numerous bends</li> </ul>	<ul style="list-style-type: none"> <li>• Flue gas ID fan required; or</li> <li>• Request information on height of flue required for system.</li> </ul> <p>Seek advice from a flue engineer/ designer</p>
<p><b>De-ashing</b></p> <ul style="list-style-type: none"> <li>• Automatic de-ashing reduces the amount of manual intervention required, helps to maintain high levels of efficiency, and is essential for a situation where regular attendance is not available.</li> <li>• Most, but not all, manufacturers offer automatic de-ashing and some fit it as standard. Therefore the specification will need to state whether it is required or not.</li> </ul>	<p>Automatic de-ashing required for:</p> <ul style="list-style-type: none"> <li>• Grate;</li> <li>• Heat exchanger tubes.</li> </ul> <p>Or:</p> <p>Automatic de-ashing not</p>

	required
<p><b>Boiler Emissions</b></p> <ul style="list-style-type: none"> <li>• The specification must state whether the boiler is located within a smoke control area (SCA) or air quality management area (AQMA). Compliant boilers can then be specified.</li> <li>• For larger projects where environmental consents are needed, the relevant details should included in the specification</li> <li>• Data on boiler equipment and pump noise emissions may be required in some instances</li> </ul>	<p>Supplier/manufacturer to provide copy of independently verified test results and certificate, stating how the proposed system complies with relevant legislation.</p>

Table 4 Specification for Boiler

Specification for flues and chimneys	Information to include / to be requested
<p><b>Independent flue</b></p> <ul style="list-style-type: none"> <li>The flue should be twin walled insulated stainless steel. The inner should be grade 316 and the outer 306 or better.</li> <li>Insulation can be either mineral wool or loose fill. The flue should be certified as suitable for use with wood-fuels.</li> <li>The boiler manufacturer/supplier will have to provide details of flue diameter.</li> </ul> <p>Note: Securing/ support for flues must comply with Building Regs.</p>	<p>Stainless steel twined wall-insulated flue. Inner flue SS grade 316 and outer 304 or better.</p> <p>Must be certified by the manufacturer as suitable for use with wood-fuels.</p>
<p><b>Existing or new masonry chimney</b></p> <ul style="list-style-type: none"> <li>If an existing, or a new, masonry chimney is to be used it may have to be lined and backfilled with insulation. It is also important to make sure that the cross section and the height of the chimney is sufficient for use with the boiler to be installed.</li> <li>Building regulations will need to be consulted and the boiler supplier will need to provide details of the flue cross section and height required.</li> <li>For boilers over 45kW refer directly to the local planning authority.</li> </ul>	<ul style="list-style-type: none"> <li>Existing masonry chimney to be used;</li> <li>New masonry chimney to be used.</li> </ul> <p>Provide details of chimney dimensions (area, height) and requirements of local regulations concerning lining and insulation.</p>
<p><b>Access for cleaning and dust removal</b></p> <ul style="list-style-type: none"> <li>The flue will require cleaning at least twice a year.</li> </ul>	<p>Manufacturer/supplier to provide details of cleaning method recommended, access, and frequency.</p>
<p><b>Flue pipes and transition pieces.</b></p> <ul style="list-style-type: none"> <li>All transition pieces and flue pipes for connecting the boiler to the flue should be made from stainless steel grade 316 or better and be certified suitable for use with wood-fuels.</li> </ul>	<p>Flue pipes to be insulated.</p>
<p><b>Draught stabiliser</b></p> <ul style="list-style-type: none"> <li>For boilers without ID fans it may be necessary to fit a draft stabiliser especially if a tall flue is required.</li> </ul>	<p>Request supplier/installer to specify.</p>

Table 5 Specification for Flues

Proposed Fuel Extraction and Feed	Information to include / to be requested
<p><b>Fuel feed mechanism</b></p> <ul style="list-style-type: none"> <li>Fuel is fed from the bunker/silo to the boiler via an auger. This may consist of a single or a double feed auger system.</li> <li>The single feed auger tends to be used on smaller systems using two-stage burn-back protection.</li> <li>Double feed auger systems are used where a drop-cell and rotary valve is specified, with one auger transporting fuel from the bunker/silo to the top of the drop cell and the other transporting fuel from the bottom of the drop cell to the grate.</li> </ul>	<ul style="list-style-type: none"> <li>Single feed auger;</li> <li>Double feed auger.</li> </ul>
<p><b>Multistage burn-back protection</b> See Table 5</p>	<ul style="list-style-type: none"> <li>Supplier/installer to specify the burn-back protection Included.</li> </ul>
<p><b>Fuel silo agitator (woodchip only)</b></p> <ul style="list-style-type: none"> <li>There are four basic types of fuel extraction as covered in section x.</li> <li>Provide details of proposed solution from feasibility study.</li> </ul>	<ul style="list-style-type: none"> <li>Spring/articulated arm;</li> <li>Auger;</li> <li>Walking floors.</li> <li>Supplier/installer to specify with reference to the details of proposed solution from feasibility study.</li> </ul>
<p><b>Changes in direction</b></p> <ul style="list-style-type: none"> <li>Due to limited space or access issues it may be necessary for the feed augers to change direction. The number of changes should be minimised, as each auger will require a drive motor and each change of direction some kind of coupling.</li> <li>In such circumstances, the supplier/installer should be asked to design the feed system.</li> </ul>	<ul style="list-style-type: none"> <li>Provide a floor plan showing the relative position of the fuel store and boiler house.</li> </ul> <p>Request supplier/installer to specify.</p>

Table 6 Specification for Fuel Extraction and Feed

Installation and commissioning of the boiler and ancillary equipment is primarily a responsibility of the supplier/installer. However, for the purposes of planning and co-ordinating the installation the site owner will need information from the supplier/installer.

Proposed Installation and Commissioning	Information to include / to be requested
<p><b>Location of boiler</b></p> <ul style="list-style-type: none"> <li>Provide details of the location of the boiler house, fuel store etc.</li> </ul>	<p>Include site plan from general scope of works.</p>
<p><b>Installation schedule</b></p> <ul style="list-style-type: none"> <li>The supplier/installer is to provide details of the lead-time for the supply of all material and equipment to site as these can sometimes be quite lengthy.</li> <li>State proposed retention post commissioning to ensure expedient troubleshooting.</li> </ul>	<p>Project timescale; Request boiler lead times.</p>
<p><b>Boiler installation</b></p> <ul style="list-style-type: none"> <li>The supplier/installer is to provide a method statement for the installation of the boiler and all ancillary equipment (such as agitator, flue etc.) and is required to complete the installation in accordance with the quotation.</li> </ul>	<p>The supplier/installer should also provide details of any services (electricity, water etc) or personnel required to be supplied by the client during the installation period.</p>
<p><b>Commissioning</b></p> <ul style="list-style-type: none"> <li>Supplier/installer to provide a commissioning protocol and copies of hand over documentation. The supplier /installer should also provide details of any services (electricity, water etc) or personnel required to be supplied by the client during the commissioning period.</li> </ul>	<p>Supplier/installer to provide copies of commissioning protocol.</p>

Table 7 Specification of Installation and Commissioning

Proposed Technical Support	Information to include / to be requested
<p><b>Operator training</b></p> <ul style="list-style-type: none"> <li>• It is normal for operator training to be conducted on site during or at the end of the commissioning phase.</li> <li>• Training should be included in the specification and should be provided to all relevant personnel</li> </ul>	<p>Supplier/installer to provide operator training.</p>
<p><b>Operating manuals</b></p> <ul style="list-style-type: none"> <li>• The supplier/installer should supply at least two copies of all manuals (in clear English), one of which should always be available in the boilerhouse.</li> </ul>	<p>Supplier/installer to provide two physical copies of all manuals required + 1 electronic copy to ensure the safe and reliable operation of the boiler and ancillary equipment.</p>

Table 8 Specification of Technical Support