



CLEAN AIR ACT 1993

BIOMASS AND AIR QUALITY

SUPPLEMENTARY INFORMATION FOR DEVELOPERS

V2.1 October 2014



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1. Scope of this Guidance

This guidance covers the burning of dry and unseasoned woody fuels only including wood chips, pellets and logs with up to 50% moisture content and the aim is to assist developers to comply with relevant air pollution control legislation. It is intended to supplement guidance¹ provided to assist developers in complying with the legislative requirements of the planning regime. Capacity of boilers dealt with by the Clean Air Act ranges from 16.12 kW thermal output to 20MW thermal input. It does not cover the burning of fuels derived from waste wood or other materials which would be covered by the Waste Incineration Directive (WID) or Pollution Prevention & Control (PPC) regime.

2. Air Quality Impacts of Biomass Plant

It is generally accepted that the combustion of biomass for energy production is environmentally beneficial due to its effect on the reduction in volume of greenhouse gases produced by the burning of non-renewable fossil fuels such as coal, gas and oil. However, there can be a detrimental effect on local air quality, particularly if the design of flues, abatement plant or fuel quality has not been fully considered at the design stage.

Nuisance can also be an issue from the burning of biomass with smoke and odour being the most likely problems. Both can be associated with poor fuel quality, inadequate combustion or poor plume dispersion.

3. Regulation of Biomass Combustion Plant > 16.12 kW output

Planning permission will often be required for a development that includes biomass combustion plant. Air quality is regarded as a material consideration in the planning system and advice will be provided to planning officers on the potential environmental impact of proposed biomass installations. Conditions may be added to a planning permission that require specific provisions to be included in plant design or how it is operated.

Even if planning permission is not required a further area of the regulatory system applies to biomass combustion plant and depends on its maximum rated heat input, its location and the type of fuel it burns. Large biomass plant (>20MW heat input) or plant using waste biomass as a fuel are regulated under the Pollution Prevention and Control Regulations² by SEPA and a permit will be required. It is essential that SEPA are consulted at an early design stage if the proposed development may be of this capacity. Figure 1 and Table 1 summarise the regulation of biomass combustion plant.

Medium sized boilers (less than 20 MW heat input) burning non-waste fuel are regulated under the Clean Air Act 1993³ by the local authority (LA). This legislation ensures that newly installed plant has adequate abatement equipment if necessary and it can also require that monitoring of emissions is undertaken. This category of plant is covered by this guidance note.

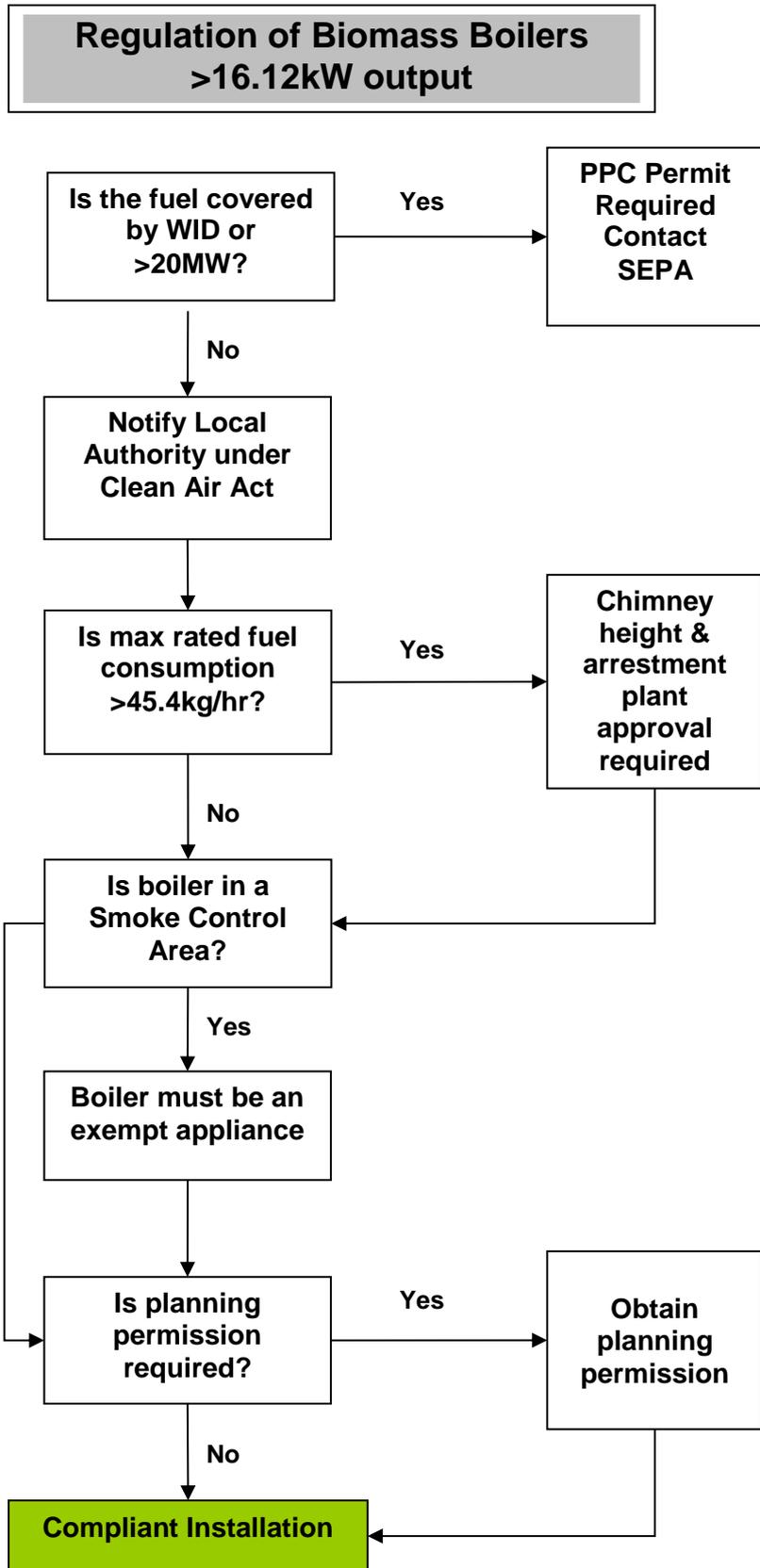


Figure 1

Table 1

Fuel Type	Plant capacity (Input)	Regulation regime	Regulator
Biomass fuels or residues from their manufacture	<20 MW	Clean Air Act	Local Authority
	20 – 50 MW	Part B PPC	SEPA
	> 50 MW	Part A PPC	SEPA
Waste or waste derived biomass fuels exempted from WID* including residues from their manufacture	<0.4 MW & <50 kg/hr	Clean Air Act	Local Authority
	0.4 – 3 MW or 50-1000kg/hr	Part B PPC	SEPA
	>3 MW &/or 1000kg/hr	Part A PPC	SEPA
	> 50 MW	Part A PPC	SEPA
Waste or waste derived biomass to which WID ¹ applies	< 3MW	WID Applies Part A PPC	SEPA
	> 3MW	WID Applies Part A PPC	SEPA
* WID = Waste Incineration Directive Bold type indicates plant covered by this note			

4. Requirements of the Clean Air Act 1993

The Clean Air Act 1993 (CAA) was designed to control emissions from coal fuelled boilers following serious smog episodes in the 1950s. It does not directly control emissions of smaller particles (PM₁₀ and PM_{2.5}) that are the subject of modern ambient air quality legislation. The broad requirements of the Act in relation to biomass boilers are listed in Table 2.

Table 2

Section	Requirement
1	Dark smoke shall not be emitted from the chimney
4(1)	Boilers should not be installed without giving notice to the local authority (LA)
4(2)	Boilers shall be capable of operating continuously without emitting smoke
5(2)	Refers to the Regulations ⁴ that limit the emission of dust and grit from a boiler
6(1)	A boiler burning biomass at a rate > 45.4 kg/hr shall be fitted with arrestment plant unless the LA is satisfied emissions will not be prejudicial to health or a nuisance
7(2)	An operator may apply to the LA for an exemption from the requirement to fit arrestment plant.
10(1)	The LA may require the operator to measure dust from a boiler burning biomass at a rate > than 45.4 kg/hr

11(2)	An operator may ask the LA to carry out the monitoring at its own expense if the boiler burns < 1.02 tonnes/hr
12(1)	The LA may require an operator to provide information about the boiler or fuel
14(2)	The height of the chimney that serves a boiler burning biomass at a rate > than 45.4 kg/hr must be approved by the LA
18	Creation of smoke control areas

4.1 Notification of Installation for Boilers >16.12kW Output

It is a requirement of Section 4 of CAA that proposals to install new biomass boilers must be notified to the local authority before installation. Where possible it is recommended that a notification should be made at the design stage and includes the details relating to arrestment plant and chimney height described below.

4.2 Arrestment Plant for Boilers > 45.4 kg/hour Capacity

Section 6(1) requires biomass boilers to be equipped with particulate arrestment plant unless an application for exemption is made and approved under Section 7(2). An application for exemption should include technical details relating to capacity, specification of fuel, rate of fuel consumption and the design and control of the combustion system. It is likely that smaller boilers will not require abatement equipment but sufficient information should be provided to allow the local authority to reach a decision.

4.3 Chimney Height for Boilers > 45.4 kg/hour Capacity

The correct height of a chimney is critical in ensuring that fumes from combustion plant are adequately diluted and dispersed so that ground level concentrations of pollutants are limited to a maximum level. Other considerations that need to be taken into account include the characteristics of the boiler and fuel, proximity of nearby buildings and possibly local topography.

It is recommended that chimney height approval is obtained at an early stage **before** any planning permission is sought as the visual impact of the chimney or abatement plant are material considerations in the determination of a planning application.

4.4 Smoke Control Areas

The Clean Air Act allows local authorities to create smoke control areas in which smoke emission is prohibited unless arising from the burning of an authorised fuel or use of an exempt appliance. Biomass is not classed as an authorised fuel and therefore any biomass boiler operated in a smoke control area **must** be an exempt appliance. Details of exempt appliances and related issues can be found at <http://www.uksmokecontrolareas.co.uk/index.php>

There are no smoke control areas in Argyll and Bute. In other areas the local authority will be able to tell you whether the proposed boiler will be sited in a designated smoke control area.

5. Assessing the Impact of Biomass Boilers.

Whether the local authority receives notification that a biomass boiler is proposed either through submission of a planning application or Clean Air Act application a number of steps need to be followed to assess whether the air quality impacts may be significant. The first step is to collect basic information about the proposed boiler to allow an initial screening assessment to be made. This may allow a basic calculation of chimney height or the need for abatement plant to be determined as required by the Clean Air Act. However, this screening assessment may reveal that the installation of the boiler may pose a risk to air quality. In this case it may be necessary to undertake a dispersion modelling exercise or a more detailed assessment of environmental impact, particularly if the boiler is to be installed in an area with uneven terrain, amongst taller buildings or with current air quality problems.

A form to collate the required information is included at Appendix 1 and whilst it may not be possible to complete all parts of the form at an early design stage the boiler manufacturer or installer should be able to provide most technical details. A comprehensive submission at this stage will help environmental health officers in providing a response when consulted on a related planning application. If a planning application has already been submitted it is likely that a condition will be added to the planning permission requiring the submission and approval of an assessment before development commences.

6. Further Guidance

- (1) Biomass and Air Quality Guidance for Scottish Local Authorities <http://iaqm.co.uk/guidance/>
- (2) Pollution Prevention and Control (Scotland) Regulations as amended see http://www.sepa.org.uk/air/process_industry_regulation/pollution_prevention_control.aspx
- (3) Clean Air Act 1993, Chapter 11 available from http://www.opsi.gov.uk/acts/acts1993/pdf/ukpga_19930011_en.pdf
- (4) The Clean Air (Emissions of Grit and Dust to Furnaces)(Scotland) Regulations 1971 No 0625
- (5) Biomass Heating <http://www.cibse.org/AM15> (free registration required)
- (6) Biomass heating: a practical guide for potential users http://www.carbontrust.com/media/31667/ctg012_biomass_heating.pdf

Appendix 1

**Clean Air Act 1993
Notification of Biomass Boiler Installation and Provision of
Technical Data**

In common with other types of combustion appliances, biomass boilers are potentially a source of air pollution. Pollutants associated with biomass combustion include particulate matter (PM₁₀/PM_{2.5}) and nitrogen oxides (NO_x) emissions. These pollution emissions can have an impact on local air quality and affect human health. It is essential that any new biomass boilers installed in Argyll and Bute meet certain emission control requirements in order to protect local air quality.

To support a notification under CAA or to support a planning application associated with a biomass boiler, the following information below must be supplied to the local authority.

This template is adapted from a version produced by EPUK & London Borough of Camden.

1. Installation Details

a) Planning Application Reference (if applicable)	
b) Name of Site	
c) Address where boiler(s) will be located	
d) Person completing form	
e) Contact details including phone & email	

2. Particulars of the Boiler

This information on the basic design of the system will help us assess the emissions performance. Biomass boilers often produce relatively high emissions when lightly loaded, hence the question regarding an accumulation tank (heat store). The boiler manufacturer and/or installer should be able to help you provide this information. Use additional sheets if necessary

f)	Describe the proposed biomass boiler including make, model, manufacturer, thermal capacity (MW), efficiency, maximum rate of fuel consumption (kg/hr)
g)	Describe the boiler combustion system and how combustion will be optimised and controlled.
h)	Describe the fuel feed system.
i)	Provide details of the abatement equipment in place for controlling particulate matter emissions including capacity and rated emission limit.

j) How does the biomass boiler deal with variable heat loads - is the boiler linked to an accumulation tank?

k) Is the biomass boiler an exempt appliance in accordance with the Clean Air Act 1993? If yes provide evidence to demonstrate the biomass boiler has been tested and certified as an exempt appliance (for example a link to the appliance on the UK Smoke Control Areas website
<http://www.uksmokecontrolareas.co.uk/appliances.php>)

This section is not applicable in Argyll and Bute

3. Boiler Operation and Maintenance

System efficiency and emissions performance very much depend upon regular maintenance. Your installer should be able to recommend a suitable maintenance schedule.

l) Describe arrangements for cleaning and de-ashing the boiler.

m) Provide details of the maintenance schedule associated with boiler, abatement equipment and flue. This should include frequency of boiler inspection and servicing by a trained boiler engineer.

n) Describe how incidences of boiler or abatement system failure are identified & mitigated.

4. Boiler Flue Details

The design of the flue greatly affects how pollutants produced in the boiler disperse over the surrounding area. Where the area is heavily built up, or has existing air quality issues, dispersion becomes more complicated and a computer modelling technique known as dispersion modelling may be required. Your installer should be able to provide most of the details and make a calculation on flue height and design. When dispersion modelling is required you or your installer may need to engage a specialist consultant.

o)	Identify the height of the boiler exhaust flue above ground. Details should be provided of the method used to calculate flue height. Evidence should be attached to demonstrate that predicted emission concentrations associated with the calculated flue height do not have a significant impact on the air quality objectives for NO ₂ and PM ₁₀ .
p)	Identify flue internal diameter (m).
q)	Provide maximum particulate matter and nitrogen dioxide emission rates (mg/m ³ or g/hr) including reference conditions .
r)	Identify the exhaust gas efflux velocity (m/s) and temperature (°c).
s)	Provide the grid reference of boiler exhaust flue.

5. Fuel Details

Emissions from a biomass boiler depend greatly on the type and quality of the fuel used. Reasonable guarantees are therefore needed that the fuel is compatible with the boiler, is of a high quality and that quality will be assured for a reasonable period of time. Your fuel supplier and installer should be able to provide this information.

t)	Describe the fuel specification including origin, type of wood (chips, pellet, briquettes), nitrogen, moisture, ash content (%).
u)	Does the fuel comply with European or equivalent fuel quality standards such as CEN/TS 335 or ONORM?
v)	Describe what fuel quality control procedures will be adopted to guarantee constant fuel quality from your supplier.
w)	Provide evidence to demonstrate that the biomass boiler combustion system is applicable to the fuel specification.
x)	Identify where and how fuel will be stored on site (e.g. bunker or silo).

y)	Describe how fuel will be unloaded from the delivery vehicle into the storage facility and what control measures will be in place to reduce particulate matter emissions to atmosphere.

6. Building Details

The height, width and distance of neighbouring buildings will determine their effect on the discharge of emissions from the biomass boiler, and therefore the height of the flue needed. Your architect should be able to provide this information.

z)	Record the distance of adjacent buildings from boiler exhaust flue.
aa)	Record the height of adjacent buildings from boiler exhaust flue.
bb)	Record the dimensions of building to which the boiler exhaust flue is attached.

cc) Indicate the distance from the boiler flue to the nearest fan assisted intakes and openable windows.

7. Plans

Please attach the following to this form:

- A site plan showing the location of the boiler room, fuel storage area and the access and exit route for fuel delivery vehicles, and
- A site plan showing the position of the boiler flue, fan assisted intake air vents and nearest openable windows. Elevations should be included to show building and flue heights.

8. Returning this form

Please direct any enquiries or return this form to:

Malcolm Chattwood
Environmental Protection Officer
Argyll & Bute Council
Kilmory
Lochgilphead
PA31 8QA

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