BAIST User Guide

A Screening Tool for Air Quality Assessment of Biomass Boilers

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Irish Bioenergy Association

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Final

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Glossary

Term	Definition
GJ	Grams per gigajoule
g/GJ	Gigajoule
g/s	grams per second
km	kilometre
kWh	Kilowatt hour
m	metre
m/s	metres per second
m^2	square metres
m^3	cubic metres
m^3/s	cubic metres per second
m^3/hr	cubic metres per hour
mg/Nm^3	Milligrams per normalised cubic meter
MW	Megawatts
MWth	Megawatts (thermal)
$\mu g/m^3$	micrograms per cubic meter
Abbreviations	**Definition**
AG4	Air Guidance 4
BAT	Best available techniques
CAFE	Cleaner Air for Europe
EPA	Environment Protection Agency
EF	Emission factor
ELV	Emission Limit Value
IrBEA	Irish Bioenergy Association
MCP	Medium Combustion Plant
SEAI	Sustainable Energy Authority of Ireland
SSRH	Support Scheme for Renewable Heat
STP	Standard temperature and pressure

1. INTRODUCTION

The heating requirement for a typical intensive pig or poultry housing unit is generally provided by one or more boilers with total thermal input ranging from 250 kW to 1 MW, which is small relative to typical industrial installations. Consequently, these small boilers represent a low risk of adverse air quality impacts. However, in general such boilers cannot be installed without some form of regulatory approval, which requires the applicant to demonstrate that the biomass boiler can be operated without causing adverse air quality impacts.

Katestone, on behalf of the Irish BioEnergy Associate (IrBEA), has developed a series of documents that describe and present a stepwise approach (Screening Framework) that can be adopted to assess whether proposed biomass boilers that meet certain requirements can be operated without causing adverse air quality impacts and, therefore, can be approved for installation. The titles of the documents in the series include:

- Biomass Boiler Air Quality Assessment Framework - Technical Description (Technical Description)
- Screening Framework for Air Quality Assessment of a Single Biomass Boiler within a Site Boundary (Single Boiler Screening Framework)
- Screening Framework for Air Quality Assessment of Multiple Biomass Boilers within a Site Boundary (Multiple Boiler Screening Framework)

The Screening Framework has been developed into an online tool that allows for easier and more procedural approaches to:

- Make an application for a biomass boiler at an intensive agricultural installation
- Review the applications made by licensees

The web-based tool is called 'Boiler Air Impact Screening Tool', abbreviated to BAIST and can be accessed at www.baist.ie

This document presents the user guide for BAIST.

2. INFORMATION NEEDED TO COMPLETE THE SCREENING FRAMEWORK

To use BAIST go to www.baist.ie and enter either:

- The EPA Licence number if the site is licensed by EPA

or

- the name of the proposed licence holder and the address of the proposed site boundary, if there is no licence and the screening framework is being used as part of a Licence Application to EPA

To complete the stepwise procedure in BAIST, the following information must be entered regarding the proposed biomass boiler:

- The internal diameter of the boiler stack at the point of release
- The height of the biomass boiler stack (above ground level) at the point of release
- The minimum distance between the biomass boiler stack location and the closest point of the site boundary rounded down to the nearest 10 m (A site plan should be provided to confirm this distance)
- The location coordinates of the stack in UTM coordinates - If you know the coordinates in Irish Grid format they can be converted to UTM using the coordinate converter supplied by the Ordinance Survey of Ireland (https://gnss.osi.ie/new-converter/)
- If there is a back-up boiler within the site boundary
- The make and model of biomass boiler that is proposed to be installed

The following must also be confirmed in BAIST:

- That the stack is not capped (e.g., with a rain hat)
- If there is a back-up boiler within the site boundary, will it operate exclusively when the baseload boiler is offline?
- If back-up gas heaters (direct or indirect fired) are used within the site boundary, what is the total combined output capacity of these heaters?

3. USERGUIDE – SINGLE BOILER APPLICATION

3.1 Page 1

Go to 'https://baist.ie/' in your internet browser

Read the instructions on the webpage

At the bottom of this webpage click the 'Begin Application Here' button

3.2 Page 2

If the application involves the proposed installation of a single biomass boiler within the site boundary, click the 'Single Boiler Application' Button.

3.3 Page 3

If the site holds an EPA licence, click the 'Yes we have a licence number' button. If the site has not been issued with an EPA licence, then click the 'No licence number available' button.

Sites with a licence number:

- Enter your licence number and then click the "Verify" button
- Tick the box if the person filling in the form is the site owner
- Click 'Next Page'

Sites that have not been issued with an EPA licence number:

- Enter the name of the person/company that owns the site as it appears on the EPA application form
- Enter the address of the site as it appears on the EPA application form
- Tick the box of the person filling in the form is the site owner
- Click 'Next Page'

3.4 Page 4

Page 4 - Step 1

Answer the first three questions in the first box on this page.

Page 4 - Step 2

Answer the fourth question in the box

For assistance in answering the fourth question, click ”here” in the text underneath the table. This will open a new tab in your internet browser with a procedure for determining the distance from the boiler stack to the boundary of any other intensive agricultural facility or commercial activity (e.g. hotel or nursing home) that requires a boiler for non-domestic purposes

Page 4 – Step 3

Locate the stack by either:

- Entering the stack coordinates in UTM. This can be provided by the person completing the site plan or if the coordinates of the stack in Irish Grid Coordinates (IGC) is known then it can be converted to UTM coordinated using the coordinate converter supplied by the Ordinance Survey of Ireland (https://gnss.osi.ie/new-converter/)
- Drop a point on the satellite map to locate the stack (this must correspond with the location on the site plan provided with the application)

Once the stack has been located on the map, the location can be "locked in" by clicking the 'Set/Lock this location as the permanent stack location' button.

Page 4 – Step 4

If the stack location needs to be changed, use the 'Choose new stack location' button.

Page 4 – Step 5

Once complete, proceed to the next page, by clicking the 'Next Page' button.

3.5 Page 5

Choose the boiler make and model that will be installed at the site and proceed to the next page by clicking the 'Next Page' button.

3.6 Page 6

Answer the questions and proceed to the next page by clicking the 'Next Page' button.

3.7 Page 7

Run the screening element of BAIST by clicking the 'screen the boiler' button underneath the first table.

Once this button is clicked the following happens:

- A pop-up message indicates if the boiler passes the screening requirements of BAIST based on the information provided
- The results of the screening process are presented in the second table on the page

If the boiler has passed the screening thresholds of BAIST, then the following should be done:

- Click the 'Save to File' button to save the Screening Tool input file.
- Click the 'Save as PDF file' to save a pdf version of the tables on Page 7

Include these files with your application to EPA.

4. USERGUIDE – MULTIPLE BOILER APPLICATION

4.1 Page 1

Go to 'https://baist.ie/' in your internet browser

Read the instructions on the webpage

At the bottom of this webpage click the 'Begin Application Here' button

4.2 Page 2

If the application involves the proposed installation of a single biomass boiler within the site boundary, click the ‘Multiple Boiler Application' Button.

4.3 Page 3

If the site holds an EPA licence, click the 'Yes we have a licence number' button. If the site has not been issued with an EPA licence, then click the 'No licence number available' button.

Sites with a licence number:

- Enter your licence number and then click the "Verify" button
- Tick the box if the person filling in the form is the site owner
- Click 'Next Page'

Sites that have not been issued with an EPA licence number:

- Enter the name of the person/company that owns the site as it appears on the EPA application form
- Enter the address of the site as it appears on the EPA application form
- Enter the county in which the boiler stack will be located
- Tick the box of the person filling in the form is the site owner
- Click 'Next Page'

4.4 Page 4

Page 4 - Step 1

Answer the first three questions in the first box on this page.

Page 4 – Step 2

Answer the fourth question in the box

For assistance in answering the fourth question, click ”here” in the text underneath the table. This will open a new tab in your internet browser with a procedure for determining the distance from the boiler stack to the boundary of any other intensive agricultural facility or commercial activity (e.g. hotel or nursing home) that requires a boiler for non-domestic purposes

Page 4 – Step 3

Locate the closest stack to the site boundary by either:

- Entering the stack coordinates in UTM (this can be provided by the person completing the site plan or if the coordinates of the stack in Irish Grid Coordinates (IGC) is known then it can be converted to UTM coordinated using the coordinate converter supplied by the Ordinance Survey of Ireland (https://gnss.osi.ie/new-converter/)
- Drop a point on the satellite map to locate the stack (this must correspond with the location on the site plan provided with the application)

Once the stack has been located on the map, the location can be "locked in" by clicking the 'Set/Lock this location as the permanent stack location' button.

Page 4 – Step 4

If the stack location needs to be changed, use the 'Choose new stack location' button.

Page 4 – Step 5

Once complete, proceed to the next page by clicking the 'Next Page' button.

4.5 Page 5

Choose:

- The number of boilers that are proposed for the site
- The make and model that will be installed at the site

Proceed to the next page by clicking the 'Next Page' button.

4.6 Page 6

Answer the questions and proceed to the next page by clicking the 'Next Page' button.

4.7 Page 7

Run the screening element of BAIST by clicking the 'screen the boiler' button underneath the first table.

Once this button is clicked the following happens:

- A pop-up message indicates if the boilers have passed the screening requirements of BAIST based on the information provided
- The results of the screening process are presented in the second table on the page

If the boilers have passed the screening thresholds of BAIST, then the following should be done:

- Click the 'Save to File' button to save the BAIST input file.
- Click the 'Save as PDF file' to save a pdf version of the tables on Page 7

Include these files with your application to EPA.

5. PRECEDURE - DETERMINATION OF DISTANCE TO NEARBY COMMERCIAL ACTIVITIES WITH A NON-DOMESTIC BOILER

5.1 Overview

Aim of this Procedure: Develop a systematic approach to determine the distance from the boiler stack to the boundary of any other intensive agricultural facility or commercial activity (e.g. hotel or nursing home) that requires a boiler for non-domestic purposes

This procedure will be followed by the regulator when reviewing an application made for the installation of the biomass boiler using BAIST.

This procedure can be used to identify the vast majority of operations that are require a boiler for non-domestic purposes that are within 500 m of the proposed stack. Although this procedure is not exhaustive, it is considered if this stepwise procedure is adopted that sufficient robust checks have been undertaken to identify any commercial activity with a boiler within 500 m of the proposed boiler stack.

BAIST produces a circle with a 500 m radius around the proposed location of the biomass boiler stack. If this circle overlaps with the boundary of any other intensive agricultural facility or commercial activity (e.g. hotel or nursing home) that requires a boiler for non-domestic purposes, then BAIST is not applicable to the boiler stack location at the applicant's site and more detailed dispersion modelling is required. BAIST is not applicable if the boiler stack is located within 500m of facilities that have planning approval but that have not yet been built that require a boiler for non-domestic purposes.

The stepwise procedure to identify commercial and intensive agricultural activities that require a boiler for non-domestic purposes the procedure relies on:

- Satellite Imagery including:
  - Google Maps
  - Bing Maps
  - Other satellite imagery
- County Council Web-based Planning Map published by each County Council in Ireland

5.2 Stepwise Procedure

Enter the proposed stack location on Page 3 of BAIST to produce a blue circle that identifies the area within 500m of the proposed stack location. This area must be searched for other commercial activities.

5.2.1 Review of satellite imagery - Google Maps

Click the 'Copy stack coordinates to clipboard button below to copy the coordinates that can be pasted into the Google Maps (https://maps.google.com/) search function to take the user to the location of the boiler stack.

Change from a map-based image to a satellite-based image by clicking the 'Satellite' button.

Conduct a visual search of the area within 500 m of the stack (based on the area identified in BAIST). Use the Satellite Imagery Inspection Framework (Section 5.3) described below to determine the presence or absence of any other intensive agricultural facility or commercial activity (e.g., hotel or nursing home) that requires a boiler for non-domestic purposes.

5.2.2 Review of satellite imagery - Bing Maps

Click the 'Copy stack coordinates to clipboard button below to copy the coordinates that can be pasted into the Bing Maps (https://www.bing.com/maps) search function to take the user to the location of the boiler stack.

Change from a map-based image to a satellite-based image by clicking the 'Satellite' button.

Conduct a visual search of the area within 500 m of the stack (based on the area identified in BAIST). Use the Satellite Imagery Inspection Framework (Section 5.3) described below to determine the presence or absence of any other intensive agricultural facility or commercial activity (e.g., hotel or nursing home) that requires a boiler for non-domestic purposes.

5.2.3 Review of satellite imagery - Google Earth (if the BAIST user has it installed on their computer)

Click the 'Copy stack coordinates to clipboard button below to copy the coordinates into the Google Earth search function to take the user to the location of the boiler stack.

Conduct a visual search of the area within 500 m of the stack (based on the area identified in BAIST). Use the Satellite Imagery Inspection Framework (Section 5.3) described below to determine the presence or absence of any other intensive agricultural facility or commercial activity (e.g., hotel or nursing home) that requires a boiler for non-domestic purposes.

5.3 Satellite Imagery Inspection Framework

Conduct a visual search of the area within 500 m of the stack (based on the area identified in BAIST).

In general, to make a decision on whether a boiler that would be larger than that typically used for domestic purposes would be present, the following is relevant:

- Domestic developmental are easily identifiable (typical shape of a house, driveway, garden, presence or absence of one or two cars) and can be ruled out as requiring non-domestic type heating systems
- It is generally relatively easy to identify large scale agricultural activities by the development of large-scale sheds:
    - Poultry Farms are generally identifiable as the sheds are elongated and typically 15m to 20 m wide and would generally require a non-domestic boiler for heating requirements
    - Pig Farms are generally identifiable as the sheds are clustered and would generally require a non-domestic boiler for heating requirements
    - Cattle and dairy operations are often large sheds accompanied by silage pits or large scale collection of silage bales wrapped in black plastic and can be ruled out as requiring non-domestic type heating systems
- Commercial operations can generally be distinguished from domestic locations due to aspects evident on the satellite image such as:
    - Size of buildings
    - Presence of car parks

Any development that requires more attention should be noted. For any location noted the following can be undertaken:

- 'Streetview' may be used to determine the nature of the agricultural or commercial development

- The applicant farm would be within 500m of the noted development - the farmer should be aware of the nature of this development

5.4 County Council Web-based Planning Map Search

5.4.1 Overview

A search of the County Council web-based planning map which can be used to identify the nature of the development based on previous/current planning applications that have been made at the site of that development.

Any planning applications for locations within 500m of the boiler stack can be found by utilising the county council planning map search utility on the local authority's website. This utility is available on the website of every County Council in Ireland. It can be used to identify planning applications and associated planning boundaries. It can inform:

- If there are proposed development
- The nature and size of any development that has been through the planning application process

5.5 County Council Web-based Planning Map Search Framework

Click the button 'Go to County Council Planning Website' in BAIST.

Undertake the following procedure:

- Navigate to the Interactive Planning Map of the County Council
- Zoom to the location of the biomass boiler stack
- Examine any planning applications (which are indicated by polygon shapes) associated developments noted during the review of satellite imagery to:
    - Identify the nature of the development
    - Make a decision on whether a boiler that would be larger than that typically used for domestic purposes would be present (using the same principles as specified in the Satellite Imagery Inspection Framework – Section 5.3)
- Examine any new planning applications (any polygon shapes that are located where there is no current development visible) within 500m of the boiler stack to:
    - Identify the nature of the development
    - Make a decision on whether a boiler that would be larger than that typically used for domestic purposes would be present (using the same principles as specified in the Satellite Imagery Inspection Framework – Section 5.3)

6. APPLICATION CHECKLIST

If BAIST indicates that the proposed boiler will not result in adverse air quality impacts, an application can be made to EPA seeking approval to install and operate the biomass boiler.

The following needs to be provided to make an application to EPA for the installation of a biomass boiler using BAIST:

- A site plan needs to be provided illustrating:
    - The site boundary
    - The location of the stack
    - The location of the building that holds the biomass boiler
    - A measure of the distance between stack and to closest point to the stack on the site boundary.
- A cover letter that provides an overview of the application that includes:
    - The EPA licence number for the site or the applicants name and address of the site if no EPA licence number has been issued
    - A statement indicating that the licensee is seeking approval to install a biomass boiler
    - A statement that BAIST has been used to determine that the proposed biomass boiler will not result in adverse air quality impacts
    - Any other relevant information
- The Screening report (PDF version of the tables downloaded from Page 7 of the screening framework)
- The BAIST input file (A text file of the BAIST inputs that can be downloaded from Page 7 of BAIST

The above documentation should be submitted to EPA through the Licensee's Eden Portal on the EPA website or as supporting documentation as part of an EPA licence application.