

Odour Control for the Waste Industry



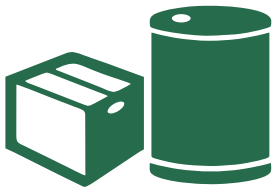
EXEON[®]
CLEAN AIR FOR INDUSTRY

ABOUT US

Exeon are specialists in Odour and Emission control. We have extensive experience in the Waste industry which has enabled us to support their requirements.

ODOUR PROBLEMS IN THE WASTE INDUSTRY

Odours and Emissions are released in the following processes, all common in the waste industry:



Storage

Storage of waste often causes waste to biologically decompose, and increases the levels of emissions.



Mechanical Handling

Mechanical movement of waste causes release of both odour and dust into the atmosphere.



Shredding / Conveying

Shredding and Conveying of waste causes agitation of the waste and as a result release odour and dust into the atmosphere.



Anaerobic digestion

The process of Anaerobic digestion uses decomposition of waste to create gas for energy. A by-product of this process is high levels of odour.

Ventilation systems are needed to provide *local* or *background* extraction of these emissions in the buildings where the waste is stored or processed. The ventilation systems provide **improved working conditions** for the operators and sufficient Odour and dust filtration to meet environmental requirements.

Exeon works with Clients to design bespoke extraction solutions tailored to the individual site requirements.

VENTILATION FOR THE WASTE INDUSTRY - WHY IS VENTILATION SO IMPORTANT?

Ventilation is important at Waste Sites for the below reasons:

Negative Pressure - to prevent odour release around the building

It is important to create negative pressure at Waste processing buildings. Negative Pressure ensures that the building is under suction and thus at the point of any doors opening, air will be drawn back into the building through this opening.

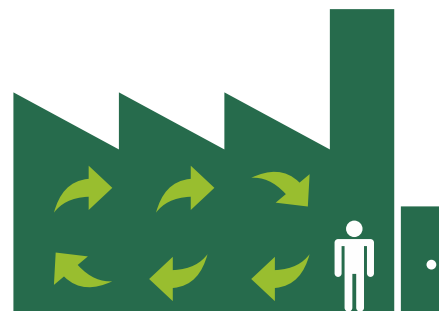
It is important to consider any openings when sizing a ventilation system to ensure sufficient control over these openings to minimize escape of odours.



Internal Air Quality - removal of vehicle fumes and odour control:

It is also important to maintain sufficient air quality inside the buildings. Not only are there potential harmful gases present within the waste, but there are usually vehicle fumes contributing to a background build-up of poor quality air which needs a high level of air changes to improve this.

Typically around approximately 2-5 air changes are applied to Waste processing sites to improve the internal air quality. An assessment would need to be made on the handling of the waste and vehicular throughput when assessing air change rates, in addition to considering negative pressure requirements.



Venting filtration

If the waste is enclosed and vented / channeled through a concentrated discharge, this requires emission control to ensure it does not dissipate into the wider environment.



ODOUR CONTROL FOR THE WASTE INDUSTRY

WHY IS ODOUR CONTROL NEEDED AT WASTE SITES?



Odours from waste treatment plants can become commonplace and accustomed to on site, but can be unpleasant for anyone who lives or works in the surrounding area. These plants contain various bacteria which release different gases. This includes ammonia, hydrogen sulphide and carbon dioxide, which can impact your health. Some of the symptoms of exposure to these gases include coughing, nausea, headaches and even memory issues and dizziness.

Persistent problems with odour from recycling or waste treatment plants can lead residents to complain and can even result in legal action. Odour discharge limits need to be met and residents can enforce changes in this limit if there are continued problems with odours.



WHAT ARE THE REGULATIONS:

The regulations for odour control for the waste industry are led by the following organisations:

Health & Safety Executive



Environmental Agency



Section 61 of the EA legislation usually requires Best Available Techniques (BAT) for Odour Control. The HSE controls the health of employees and ensuring internal air quality is sufficient. There are various air quality considerations around waste sites, but due to the wide variety of waste, the most prevalent, perhaps surprisingly, is vehicle fumes. It is vital that sufficient ventilation is provided to reduce the fume build-up.

EFFECTIVE ODOUR CONTROL TREATMENTS FOR WASTE

Activated Carbon

Activated Carbon is the most effective form of Odour abatement technology when designed and installed correctly, with the correct type. It is extremely effective against odour and emissions of all types, and would typically reach odour reduction of over 98%. Activated carbon is typically manufactured as granules or pellets, it naturally has a huge surface area and adsorbs contaminant from the air.

Designed correctly, Activated Carbon filters are effective against the typical ammonia and hydrogen sulphide odours from Waste, amongst many other VOCs.

(See below comments on correct Activated Carbon system design.)

Wet Scrubbers

Wet Scrubbers are a form of technology where a water wash system is used to cleanse the odorous elements from the airstream. They can also be used for small amounts of product within the airstream.

Scrubbers are filled with a packing material which is soaked with water or acid, the contaminant air is then forced through this, which washes the contaminant from the airstream.

They are effective against water soluble odours, and useful for high levels of odours.

Bio Filters

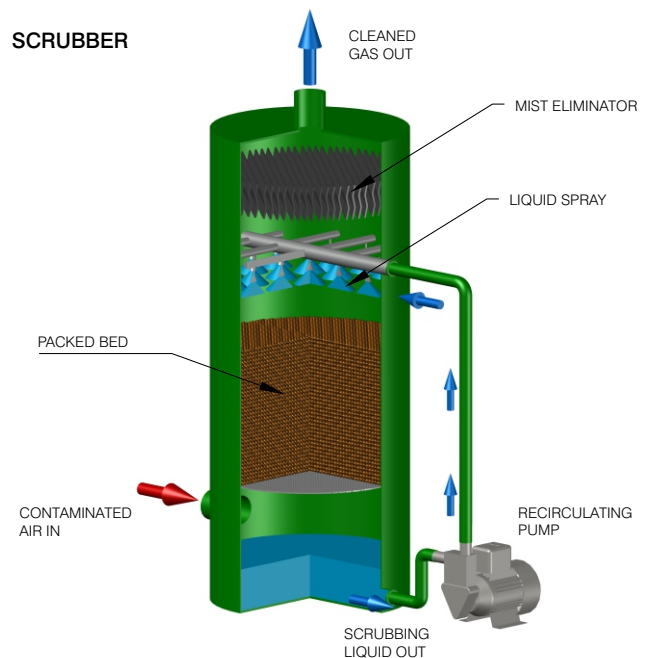
Bio filters are created where a large moist bed of organic biodegradable media is used to host microorganisms, fungi and bacteria. These degrade the odorous compounds, significantly reducing their level in the exhausted airstream.

They are effective if the odorous compound is organic. In some waste applications, this is the case, but not all.

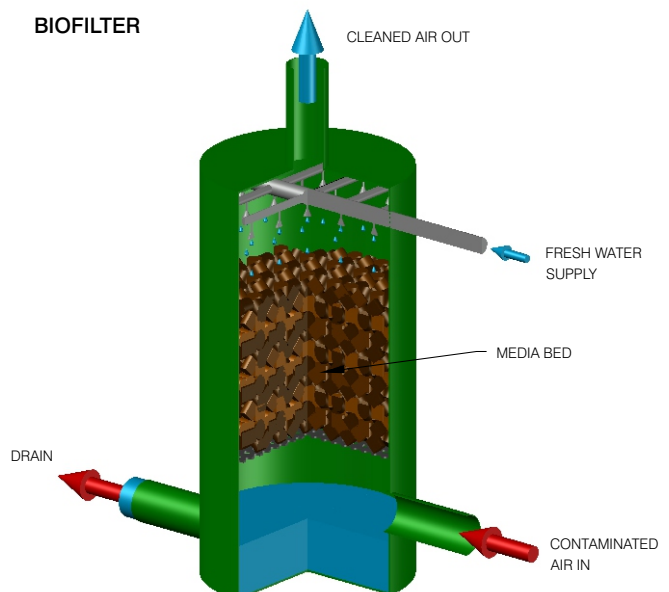
They require very large plant areas, typically around 20 times more than Carbon filters / Wet Scrubbers.



SCRUBBER



BIOFILTER



APPLICATION CONSIDERATIONS FOR ODOUR CONTROL TECHNOLOGIES

It is vital that you correctly apply the right technology to your application. The following issues can occur when the technology is incorrectly supplied, or not correctly specified.

Activated Carbon

Issues can occur when:

- The concentration of the contaminant is very high, which can cause frequent changeover requirements for the Activated Carbon beds
- The airstream is very moist, which can saturate and blind the carbon, this can be solved by dehumidification or humidity resistant carbon
- There is a lack of prefiltration and the bed becomes blinded with dust

Wet Scrubbers

Issues can occur when:

- A stringent control of odours or emissions is placed on the process. It should be born in mind that scrubbers are suited for high volumes of odourous contaminant, but are less efficient than Activated Carbon, so there will be a low level of Odour / emission carried over. This can require additional control via an Activated carbon 'Polishing' filter.
- The contaminant is not water soluble
- There is an issue with disposal of contaminated water
- There is too much dust / product within the airstream, this can cause scrubber blockage
- There is a requirement for lower maintenance systems – scrubbers do need significant amounts of maintenance to ensure they are working correctly

Bio Filters

Issues can occur when:

- A stringent control of odours or emissions is placed on the process. It should be born in mind that Bio filters are suited for high volumes of organic odourous contaminant, but are less efficient than Activated Carbon, so there will be a low level of Odour / emission carried over. This can require additional control via an Activated carbon 'Polishing' filter.
- The contaminant product is not organic, in which case the microorganisms are killed and there is no odour treatment at all
- Incorrect type of organic media is used, which can cause bed collapse
- The Bio filter media also gives off a certain odour which can also require additional treatment.



THESE ODOUR CONTROL TECHNOLOGIES POTENTIALLY DO NOT WORK FOR WASTE, FOR THE FOLLOWING REASONS:

- **OZONE** - this has little effect in reducing odour concentration.
- **ODOUR SUPPRESSION / ODOURISERS** - the smell is only temporarily masked and often increased by other odours.
- **UV** - UV is suitable for some living organisms in clean air applications (such as Covid 19) but for the high volumes of chemicals in the waste industry, it does not have any effect at all.
- **ELECTROSTATIC** - Electrostatic filters are proven to be completely ineffective in the waste industry, apart from removal of aerosols.

Odour control technologies are expensive, so don't try DIY! Please get in touch with us before making your final decision.

CASE STUDY

ODOUR REDUCTION FOR ANAEROBIC DIGESTION (AD) FOOD PROCESSING PLANT



ISSUE

The facility processes food waste to create renewable biogas and electricity. The Depack facility has a high odour level from the processing of this waste and was causing local complaints, as well as odours spreading within the offices. An existing ionisation system was not providing any benefit.

SOLUTION

Following detailed analysis of the existing plant and operations, odour modelling and surveying, a twin dual - bed activated carbon unit was designed and installed complete with 90KW fan and 18M stack and access gantry. A high-efficiency particulate prefilter section ensured protection and maximum life of the 2-stage carbon bed.

The resulting odour tests were very successful, having reduced odours from around 6000 ouE/m³ at inlet to around 200 ouE/m³ at the outlet. Tests taken again after 6 months showed this being maintained.

Ref: 146553

CASE STUDY

LARGE NORTH LONDON WASTE FACILITY



Exeon have been chosen as the emissions control partner in the development a very large North London Heat and Power project. This is a new facility which will create low carbon energy from non-recyclable household waste for seven North London boroughs.

The project accommodates a large resource recovery facility which is designed to sort waste ahead of the combustion process to allow optimal combustion. The RRF (resource recovery facility) includes an integrated ventilation and odour control system for ventilation and removal of odours from the extracted air.

ISSUES

- Requirement for investigation and report into Best Available Technologies (BAT) for odour control.
- Proof of internal ventilation distribution via Computational Fluid Dynamics (CFD)
- Shortage of plant space requiring specialist bespoke design
- Availability of resource for a substantial project, installed within a very tight timeframe

SOLUTIONS

Exeon were able to demonstrate a range of key skills and experience that led to them being selected for the project:

- Extensive technical knowledge – Exeon provided technical support right throughout the project, including investigating different odour control technologies and their suitability, and research into the typical and predominant waste streams caused by transfer of municipal waste.
- Experience – Exeon used the team's wealth of experience in Waste Transfer stations, and their methodologies.
- Airflow distribution investigation – carefully distributing the extract points to ensure they will not clash with moving machinery, but at the same time carrying out CFD modelling to ensure internal airflow distribution to meet the high standards of the Client.
- Flexibility and availability – Exeon worked on the design for many months alongside the architects and consultants, in order to achieve the best available technique and a satisfactory outcome. This included extensive concept tested design on the plant area to ensure that no site shutdown will be required to maintain the plant.
- Speed – Exeon provided the installation package within very tight time constraints.
- Cost – Working with the site team to value engineer the proposal.

TECHNICAL

The plant design includes the following:

- Dual systems each with 4 fans including 1 offline
- Total system volume 581,200 m³/hr (290,600 m³/hr per system) giving 4 air changes per hour in the serviced space
- Each system has an offline 2-stage dust filter housing so change can be carried out without plant shutdown or reduced speed
- Automatic dampers throughout the plant to rotate fans
- Setback speeds with inverter-controlled fans
- Annular bed adsorbers with over 180 tons of activated carbon for odour removal
- Stainless steel used throughout for maximum design life
- 40M high twin 3.0m diameter stacks

Ref: 1467

CASE STUDY

Odour Control

ODOUR CONTROL AT ANAEROBIC DIGESTION FACILITY

ISSUE

Exeon were approached to quote for odour control at a Anaerobic Digestion facility processing food waste. The storage and processing of the waste created heat, odour and fume, creating an uncomfortable working environment for staff and raises environmental issues due to lack of extraction and emission control.

SOLUTION

Exeon design and installed a Nodour deep-bed extraction system handling 32,000m³/hr. We also incorporated a dust prefilter section, galvanised steel ducting and grilles, fan, and a tethered stack.

PROJECT VALUE

£200,000



ISSUE

Exeon were asked to provide an odour control system handling 54,000m³/hr for a Biogas facility for Warren Emerald, in Newton Aycliffe.

The site had a new building for additional processing activities, but the original building was to be retained and original ductwork utilised if possible.

Odour threshold was 1,000 odour units.

Additional monitoring requirements were temperature, humidity and live airflow read-outs.

The site was in a sensitive area so acoustic treatment had to be considered for the Extract fans.

SOLUTION

Exeon supplied and installed a Hi-Flo™ Odour control system with integral fans for acoustic control, and ducted discharge stack.

The Extract ductwork was designed in a way which utilised the original ductwork.

The project was instructed late but system was installed within 16 weeks of order so met the original programme.

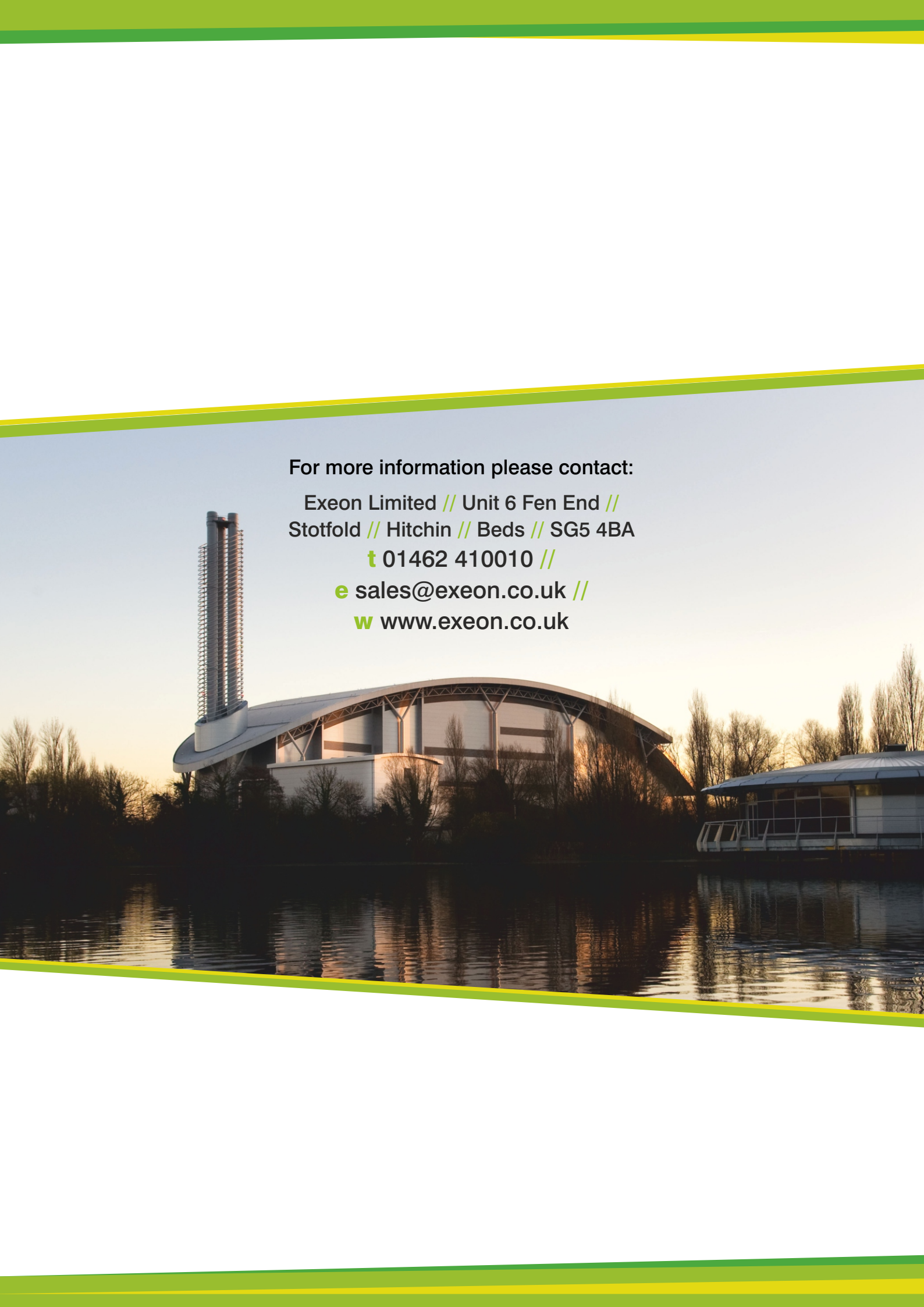
Noise levels were within limits.

Odour has not been live tested yet but initial chemical trials suggested this certainly will not be a problem.

PROJECT VALUE

£380,000





For more information please contact:

Exeon Limited // Unit 6 Fen End //
Stotfold // Hitchin // Beds // SG5 4BA

t 01462 410010 //

e sales@exeon.co.uk //

w www.exeon.co.uk