



ABERPERGWM COLLIERY

PLANNING APPLICATION FOR A VAM RTO INSTALLATION AT THE MINE SURFACE

NOVEMBER 2025

**Green Infrastructure Statement
(in accordance with Section 6.2.5 of PPW)**

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Introduction

This statement has been prepared by Energybuild Ltd. It is a simple statement *'proportionate to the scale and nature of the development proposed and will describe how green infrastructure has been incorporated into the proposal'*.

The Site

Energybuild Ltd. is based in the Neath Valley, South Wales. We produce, process, and sell high quality anthracite products which are used mainly as a water filtration medium and for high quality carbon products which are used for the manufacture of carbon electrodes and carbon paste for battery manufacture etc. The mine has been in operation for over 30 years. It currently employs 200 direct employees; this number will expand very shortly with the employment of a further 10 people. Of these number 28 are electrical and mechanical engineering apprentices. We also engage 10 full-time contractors on site. The site benefits from a full planning consent (P2014/0729) and full mining license until 2039.

The Anthracite product is mined from a deep drift mine, the entrance of which is situated on the Aberpergwm Mine site itself. Coal production is by means of a board and pillar mechanized techniques utilizing state-of-the-art mining equipment. We currently produce more than 2200 tons of products per week. This figure is again set to increase shortly with the onset of an extensive underground development/ expansion program.

Also contained on site is a 400 tons per hour capacity, dense medium Anthracite processing plant which has the sophistication to refine the very specialist grade of products that is required by the specialist markets which we serve. To accompany the processing plant the site holds all the ancillary equipment and services required to pursue the undertaking e.g., product loading facilities, weighbridges, grading, and screening equipment etc. Please refer to Plan Reference AC/EEWS-GL-1024-1

We produce Specialist anthracites for the following markets.

- Water Purification
- Activated Carbon
- Industrial Colorants
- Carbon Powders
- Carbon Electrodes

Proposed Development

Energybuild propose to construct a new VAM RTO. The development will be located on previously prepared but unutilized ground and replace an already existing area utilized for depositing scrap items. The development offered the opportunity to eradicate a substantial area of thick rhododendron infestation, an invasive species.

Energybuild Ltd is applying to Neath Port Talbot CBC for Planning Consent to assemble/construct and

operate on a trial basis of a VAM (Ventilated Air Methane) Thermal Oxidizer at its Aberpergwm Colliery site.

The VAM Oxidiser description, function and operation is described in the accompanying information and plans. We plan to achieve a state of total Carbon neutrality by 2035. The Vam Oxidiser project will play a major role in the company's de-carbon strategy.

The equipment and technology hail exclusively from the UK. We have engaged specialist engineers to assist with the design, construction and installation of the VAM Oxidiser unit.

The VAM Thermal Oxidiser is of a modular design and will be transported to the site for final assembly. Transportation will be by means of articulated trucks.

Assembly time for the unit will be approximately one week with a further week for commissioning.

Although the system is used widely throughout the world and indeed in manufacturing and waste recycling settings in the UK, its use in the Aberpergwm mine type of scenario is untried in the UK. Consequently the initial six months period is a trial where performance both operational and environmental is analyzed. If the trial is successful the VAM (RTO) unit will be retained on site. If not, the VAM (RTO) unit will be removed. A successful result will precipitate a planning application for a further three VAM (RTO) units.

The VAM RTO will be constructed within the existing site boundary as consented by Planning Consent P2004/0729. The area occupied by the development will be 186.475m² the maximum height be 8m. The structure will be Juniper green in colour to match the other site structures.

A total area of 645m² has been cleared for the purpose of, in the main, the clearance of Rhododendrons, this area is also included in the application. Should the project not be pursued, the VAM will be removed and the area restored.

Need for the development

Energybuild has a policy which is discussed and agreed with the Welsh Government to decarbonise the operation by 2035. The decarbonisation plan has many facets which range from the installation of solar panels on most roof structures, to ceasing any form of thermal fuel sales including the domestic market. As these markets are diminished the specialist markets such as water filtration and specialist carbons are expanded to fill the sales gap.

Aberpergwm Mine is an Underground Anthracite mine and as such emits volumes of methane gas. To achieve carbon neutrality it is crucial that the methane emissions must be neutralised, hence the provision of the VAM Regenerative Thermal Oxidiser. As mentioned earlier the single VAM installation is a trial and experimental basis during which its performance will be monitored. The project provides great benefits for the company, the locality and worldwide carbon reduction.

Hence on terms of the mining operation's business security and longevity it is crucial that Energy are allowed to adopt the VAM development policy.

Methane and Ventilation

How Coal Formation Generates Methane

Methane gas in coal formations was generated at the same time the coal was formed approximately 250 million years ago. When plant debris (such as that found in swamps e.g. the Everglades in America) slowly decomposes it generates large volumes of methane gas. This rotting material could have been many tens of meters thick when it was laid. Due to changes in the sea level caused by tectonic and geological activity, the rotting material was covered by water and subsequently sediments which transform into sedimentary rocks over time. The rock covering the coal seams served to seal them off and trap the methane gas within the seam and the surrounding rock. Over millions of years of buildup of rock the material was compressed to a fraction of its original dimension and via the compression and the heat generated, the material was transformed by a process known as coalification. This process involves the transformation of organic material, reducing the oxygen and hydrogen content and increasing the carbon content, resulting in the formation of methane.

Methane Release During Mining

Underground mining, especially through methods like longwall and board mining, disrupts the coal seam by breaking it down and causing the surrounding rock to relax causing the trapped methane to be released into the ambient environment. Methane is primarily bonded to coal in a coal seam through adsorption, where gas molecules adhere to the surfaces of the coal. This process is influenced by factors like coal rank, reservoir pressure, and temperature. The methane molecules are held within the coal matrix, lining the inside of pores and within fractures called cleats. The in-situ coal seam intrinsic gas content at Aberpergwm Mine is 22m³ per tonne. As the in-situ coal is cut by machine the coal is broken down into various size fractions to be loaded out of mine by belt conveyor. Because the coal is not ground to dust during the cutting operation only a proportion of the total gas content is released, by experience only approx. 8m³ of the total gas content is released during cutting. The liberated gas mixes with the ambient air flow within the tunnel which is being worked and then flushed out by that airflow to the mine surface where it is discharged to the atmosphere.

Mine Ventilation

Underground mining, especially through methods like longwall mining, disrupts the coal seam and surrounding rock, causing the trapped methane to be released. In order to ensure the safety of the mining operations this methane must be flushed out and any residual must be kept below 1.25% in the general atmosphere of the underground mine. This is achieved by circulating large volumes of uncontaminated air throughout the mine workings. The air quantity required to dilute the methane gas is generated by two large ventilating fans which draw the stale air out of the mine, by means of a tunnel which is referred to as the Return Drift. The fresh air required to dilute the gasses etc is drawn down through the Intake Drift. Once it has circulated through the working areas it is discharged into the ambient atmosphere at the mine surface. Methane is a potent greenhouse gas, significantly more effective at trapping heat than carbon dioxide, contributing to global warming.

What is a VAM (Ventilated Air Methane) regenerative thermal oxidizer project

The Aberpergwm Mine in South Wales is the UK's only production source of anthracite, a very high carbon content (~95%) form of coal that can be used in high end environmental applications that are critical to Net Zero industries in South Wales by 2040 and industrial innovation and economic growth within the region. Example applications include for the production of water filters by Welsh Water (and other water utilities across the UK), the recycling of lead from car batteries with EnviroWales and potential critical reductant for the production of low carbon steel at the newly approved electric arc furnace facility proposed at Port Talbot.

Approximately 90% of Scope 1 emissions from the Aberpergwm mine come from fugitive methane emissions contained in the mine's ventilation air (~280kt CO₂e per year) called Ventilation Air Methane (VAM). These ventilation air systems collect the methane generated from mining and maintain methane concentrations at low levels (<1% CH₄) to keep the mine safe. The total volume of methane emitted to atmosphere is very significant and has a powerful effect on climate change, with methane having an equivalent Global Warming Potential of 84 times that of CO₂ on a 20 year basis.

Regenerative Thermal Oxidiser (RTO) technology has been used since 1971 to reduce emissions in industry, but has only had a limited number of applications at mines for VAM mitigation, where methane concentrations are above 0.5%. However, as per the UNECE's Best Practice Guidance on VAM mitigation, only around 10% of international VAM emissions are above 0.5% CH₄ concentration, compared to 60% (or 300mtCO₂e per annum) in the 0.2-0.5% range.

Energybuild therefore plan to build and test an innovative version of RTO technology at Aberpergwm Mine that can destroy low concentration methane (~0.2%) before it escapes to air. If successful this would unlock cost effective mitigation of VAM at mines around the world equivalent to 300 million tCO₂e emissions reduction/yr.

What Will the Project Achieve

- Prove innovative design of RTO technology can work safely and effectively at 0.2% CH₄ at a mining site.
- Reduce Aberpergwm mine emissions.
- Creating skilled jobs (25 x Construction Phase High Skill Jobs Ongoing supervision, 6 x Permanent Operational Positions 8x Technology Innovation Jobs (as a result of the demonstration of the Technology)
- Supporting local manufacturing and service providers, and generating economic value through the potential commercialization of the technology.
- Collaborating with local Industry in Wales and other innovation-driven organizations in the cluster to share knowledge, align on goals, and support the growth of a thriving Decarbonisation ecosystem.

Impact of Project

- Climate Impact: This project will prevent ~1.46mtCO₂e of methane from reaching the atmosphere over 20 years
- Local Scale-up: scope for fourfold scale up of emissions reductions at Aberpergwm mine and supply of power/heat/cooling to local community/industry

- Global Scale-up: first-of-its-kind UK cleantech innovation that could be used in mines all over the world to reduce up to 300mtCO₂e per year
- Cleaner Industries: essential for industries critical to South Wales, such as waste water treatment and steel production, to meet the region's 2040 net zero industry target.

Outcomes

- A fully operational unit capable of sustained VAM destruction at 0.2% CH₄
- Performance validation reports suitable for regulatory submission.
- A demonstration site for other prospective users of the technology

GI Baseline & GI Strategy

The green infrastructure baseline and ongoing strategy must be considered on a site wide basis and on the nature of the operation. All considerations must be viewed in the context of the extant planning consent which governs the wider site and operations. Planning Consent, P2004/097 was approved in October 2018, together with its associated Conditions, Section 106 agreement and guidance in general fulfills GI requirements.

Green Infrastructure (GI) is defined by the Town and Country Planning Association as follows:

Green infrastructure is a network of multi-functional green space and other green features, urban and rural, which can deliver quality of life and environmental benefits for communities.

Green infrastructure is not simply an alternative description for conventional open space. It includes parks, open spaces, playing fields, woodlands – and also street trees, allotments, private gardens, green roofs and walls, sustainable drainage systems (SuDS) and soils. It includes rivers, streams, canals and other water bodies, sometimes called ‘blue infrastructure’.

Key features:

The key features of green infrastructure are that it is a network of integrated spaces and features, not just individual elements; and that it is ‘multi-functional’ – it provides multiple benefits simultaneously.

These can be to:

- *support people’s mental and physical health*
- *encourage active travel*
- *cool urban areas during heat waves*
- *attract investment*
- *reduce water run-off during flash flooding*
- *carbon storage*
- *provide sustainable drainage*

Conclusion

The proposed development will ultimately produce a wide and varied landscape tapestry throughout our operational areas. It will introduce new habitats associated, biodiversity enhancements by protecting identified GI features of value, the scheme will also improve links with the surrounding landscape. The new VAM RTO development will form a very small aspect of the

existing site infrastructure and will ultimately be engulfed within the final enhanced restoration of the site. Ongoing site operations will be monitored and controlled by virtue of the Site Ecological Management and Monitoring Plan. The consultant ecologist will also supervise a watching brief throughout the construction and trial operational phase.

Green Infrastructure connectivity and enhanced landscape and ecological features will be ultimately produced as a result.

The project is essential for industries critical to South Wales, such as waste water treatment and steel production, to meet the region's 2040 net zero industry target. Energybuild is proactively perusing its environmental responsibilities.

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APPENDIX 3 – RESTORATION PLAN.... ABERPERGWM SITE