Explanatory note

This note is intended to provide a non-technical explanation of engine operation and releases to air, levels of background pollutants, and to provide an analogy for the predicted quantity of emissions associated with operation of the Enviroparks Hirwaun proposal.

Engine releases

The releases into the stacks would arise from the use of reciprocating engines fuelled by renewable resources. The power generated should all be credited with Renewables Obligation Certificates.

For all engines the fuel is cleaned prior to combustion in order to reduce the releases of certain pollutants, particularly sulphur and the halogens. It is also essential to protect the engines from potentially devastating corrosion and to protect the possible future use of pollutant reducing catalysts in the exhaust system.

For planning purposes and modelling, the releases to air have been set at the limits set in the Waste Incineration Directive - not because these levels are currently applicable but because they are considered to be at or close to the Best Available Technology/Technique limits. It is important to note that the actual limits will not exceed these, but will be determined within the Environmental Permitting Regulations permit application.

There are additional reasons why these releases may be further reduced, including:

- Potential corrosion within the plant itself at these limits;
- Improved thermal efficiency of the plant resulting from lower boiler outlet temperatures, gained from reducing the dew point corrosion effects by reducing the exhaust pollutant levels.

To reduce these pollutant concentrations further cannot be regarded as a "no cost" option, either in terms of financial or environmental costs. Reducing these releases further is virtually guaranteed to increase the energy consumption of the clean-up plant, thereby increasing the carbon footprint. Similarly it will disproportionately increase the quantity of reagent used in the cleanup plant, with a corresponding increase in carbon footprint – a consequence of its manufacture and supply.

Enviroparks has engaged Beaver Power, a local company, to design, supply and maintain the engines. Beaver is an acknowledged expert in this field and specialise in new developments. Operation of the site will not be commenced as a single entity at the outset. Modules will successively come on-line and engines will be “fettled and settled” in turn. The releases will thus be optimised within the parameters set in the current scheme planning. Once optimised, the information and settings can be transferred to the next engine and so accelerate the process.
It is worth noting that this approach is only possible when the operating plant has a modular design – as it does in the case of Enviroparks. This is not possible in a mass burn incinerator when the plant has to be commissioned using a considerable percentage of the design throughput.

It is important to note that pollutants can be formed within an engine (as opposed to accompanying the fuel) and can include: oxides of nitrogen (NOx), Carbon monoxide (CO) and Volatile Organic Compounds (VOC). The operating conditions within the engines would be engineered so as to optimise the oxidation of CO and VOC, whilst minimising NOx formation.

These developments are currently regarded as commercially confidential but will be appropriately described in the Environmental Permitting application. The intention is to gain satisfactory exhaust emission releases by this combination of fuel quality and engine management alone. Discussions are underway and provision is being made to include further NOx reduction systems. These should not be used merely because they are feasible, as each incurs a negative benefit in that they use ammonia or urea, both of which have a not inconsiderable carbon footprint. Additionally, engine catalysts use a range of precious metals, which have a huge carbon and environmental footprint.

With each of these systems NOx can always be further reduced by adding additional ammonia, to the point ammonia is discharged in the exhaust and so thereafter to the environment. This may solve NOx releases, but not nitrogen deposition. Enviroparks is fully aware of these issues and the desirability of achieving the optimal compromise, rather than merely addressing a single issue.

The effect of the emissions from Enviroparks Hirwaun

The air quality modelling has predicted the emissions to air and analysed the potential effect on sensitive sites, including the potential impact of Nitrogen and acid deposition on sensitive ecological receptors. Unavoidably, the information is of a technical nature.

Enviroparks requested Enertech to provide an analogy that conveys what the quantities involved in acid deposition and nutrient deposition represent in everyday terms. The methodology used to deduce the information below is provided overleaf.

Acid deposition

The process contribution at the Blaen Cynon site can be compared to evenly distributing the equivalent volume of 3 soft drink cans (330 ml) of food grade vinegar (3 % acetic acid solution) over a rugby field each week: and at Bryncarnau Grasslands, 1 can each month.

Nutrient deposition

The nutrient deposition can be equated to that present within grass cuttings from a typical UK lawn. The contribution at the Blaen Cynon site is the equivalent of 2 full lawnmower grass boxes (7kg each) per year: and 1 every ten years at Bryncarnau Grasslands.

This non technical description of Acid and Nutrient Deposition was produced using information supplied by the Aberystwyth University Grasslands Centre and Envisage.
A technical explanation is available on request.