

Landfill gas

Snapshot: Scotland's [Zero Waste Plan \(ZWP\)](#) brings in measures aimed at reducing dependency on landfill. Landfill capacity requirements are set out in the Zero Waste Plan [Annex B](#) and will be updated annually by Scottish Environment Protection Agency (SEPA). Planning authorities are likely to retain a role in dealing with new and existing landfill sites and landfill gas proposals for some time.

The Zero Waste Plan supports the Waste Hierarchy which identifies the prevention of waste as the highest priority, followed by reuse, recycling, and recovery of other value), with disposal as the least desirable option. Disposal in landfill is only suitable for wastes from which no value can be recovered. (up to a maximum of 5% of Scotland's total waste arisings post-2025).

Planning authorities are expected to protect existing sites and support applications designed to make operations more efficient and less environmentally damaging. One such measure is capturing landfill gas, which can be used as energy source, and which would otherwise be lost to the environment with detrimental effects.

[The Scottish Government intends to bring forward new legislation (to drive separate collection, restrict materials to Energy from Waste and to introduce landfill bans) to influence the way the waste management sector operates and ensure that the Zero Waste Plan targets and objectives are met.]

Suggested areas of focus for planning authorities:

- Determine the state of landfill operations within the planning authority area and whether or not landfill gas facilities have been installed;
- Involve key consultees in policy making, pre-application work and applications for landfill gas operations;
- Consider the potential environmental effects of this type of development within the Strategic Environmental Assessment of the development plan as appropriate;
- Detail criteria to be applied in assessing landfill gas applications;
- As part of Strategic Development Plan /Local Development Plan action programme, establish dialogue with landfill operators in area who do not have landfill gas operations, together with infrastructure providers, to consider scope for more installation;
- Identify proportionate levels of information to service pre-application discussions and to assess applications on landfill gas operations;
- Ensure planning conditions and agreements for landfill gas operations are reasonable and proportionate

Opportunities within Planning Processes for Planning Authorities:

Stage in Planning Process	Actions for Landfill Gas
Monitoring and Evidence Base	<ul style="list-style-type: none"> • Collate up to date map-based records of landfill operations in area and whether or not they have landfill gas capture facilities • Secure information from SEPA on current volume of waste, current landfill gas operations and future projections • For Strategic Development Plan Authorities, consider if a strategic response to managing landfill waste and landfill gas

	operations is required
Drafting Development Plan Policy	<ul style="list-style-type: none"> • Ensure that landfill gas policies cover design, transport, grid and landscape integration, economic benefits, cumulative impacts and decommissioning • For Strategic Development Plan Authorities, ensure that strategic guidance is provided on the most efficient means of managing landfill waste and landfill gas operations within the constituent areas • Consult SEPA at an early stage on the drafting of landfill gas energy policies
Pre-Application Stage	<ul style="list-style-type: none"> • Provide guidance on typical information needs for pre-application discussion and planning applications for landfill gas proposals. A planning application for a landfill gas recovery facility could usefully include the following information: <ul style="list-style-type: none"> ○ The location and design of plant and machinery including the height of the flare stack(s) ○ Provisions for landscaping ○ Provisions for dealing with noise and odours ○ Security fencing and lighting ○ Details of vehicular access and vehicular movements • Ensure that SEPA and other relevant infrastructure providers are given the opportunity to be involved in pre-application meetings / site visits • Ensure that early advice is given on whether schemes require an Environmental Impact Assessment (EIA)
Determining Planning Applications	<ul style="list-style-type: none"> • Ensure that SEPA and other relevant infrastructure providers are involved in meetings and site visits on the application to help ensure that constraints are overcome where possible • Technical information and guidance on typical issues associated with landfill gas and sewage treatment plant gas are provided below which planning authorities should draw upon to determine applications and design appropriate local solutions

Technical information for Landfill Gas and Sewage Treatment Plant Gas

Use of Landfill Gas: When biodegradable organic matter is disposed of in landfill sites a complex process of microbial decomposition will occur, resulting in landfill gas. If the gas is allowed to vent to the atmosphere or is flared off, this will produce potent and damaging greenhouse gas emissions. An alternative response has been developed to use landfill gas as a source of renewable energy, producing power and heat.

Gas Production: The period of time over which landfill gas is actively produced varies relative to the proportion and nature of the organic material in the waste, moisture content, temperature, acidity and the design and management of the site. Under favourable conditions, substantial gas generation from a large landfill site would probably be completed in 25-30 years.

Gas Collection, Management and Electricity Production: Many landfill sites are equipped with landfill gas collection and control systems to turn the landfill gas (methane) into renewable energy / heat. Gas is drawn from the waste from vertical and/or horizontal wells, each of which is monitored and regulated. The gas is piped to an extraction plant on the edge of the landfill site and on to an electricity generation plant.

Specification of Works: The extraction plant is normally built on a concrete slab in a fenced compound, bunded to ensure that there is no uncontrolled leakage of liquid effluent to ground or surface waters. The extraction plant will typically comprise gas conditioning equipment, extraction pumps, a flare stack; pipework and valves; control and monitoring equipment. Transformers, switchgear, control panels and instrumentation are housed away from any gas handling plant in separate rooms or buildings. Electricity generation plants tend to be located at or near the landfill site to minimise the need to pipe the gas across country. The generation equipment is usually integral with the gas extraction plant. The degree of shelter required depends on the type of equipment installed. The gas extraction pumps and conditioning equipment might be in the open air, under an open-sided roof, or in a building along with the generator. Some generators are supplied in weatherproof prefabricated containers

Direct End-Use Systems: The gas can be pumped direct to a nearby end user, mainly to provide heat in industrial processes such as firing and drying, as in brick and cement manufacture, stove drying and asphalt coating; or boiler firing - to raise steam and heat water for the drying and bleaching of textiles and paper, the heating of commercial greenhouses, and for food processing. Direct end use systems usually comprise a pressure booster station, a pumping main and the utilisation equipment, the latter varying greatly depending on the process. The booster station will normally be integrated with the extraction plant. Pumping mains will be placed underground, and tend not to exceed 5 km in length because of the high cost of installation.

Typical Planning Considerations in Determining Planning Applications for Landfill Gas

Siting Considerations: Whilst the planning authority is likely to have fewer options in controlling the siting of landfill gas operations relative to an established site in comparison with a new site, there will still be opportunities at pre-application and planning assessment stages to discuss options to help ensure that landfill gas infrastructure achieves adequate separation from housing and other sensitive land uses and achieves the least prominent fit within the landscape.

- *Safety and Amenity Considerations:* Planning authorities, in consultation with the Health and Safety Executive and SEPA, should seek to control safety matters associated with the handling, transporting and burning of gas, noise from the mechanical equipment (see [PAN on noise](#)); exhaust emissions to the atmosphere; effluent, odour and residue control. Other planning considerations include provision for storage, lighting, vehicular access and movements
- *Landscape Considerations:* Planning authorities should seek to ensure that landfill gas infrastructure is properly integrated into the setting, consideration is given to the design of plant and machinery and there is appropriate landscape treatment. A flare stack will be required to control the gas at the landfill site even if there is no energy recovery and this is likely to be the most prominent feature

Determining the Merits of Landfill Gas Proposals: Planning authorities, in considering landfill gas proposals, need to balance environmental benefits of reduced emissions, direct and indirect economic and employment opportunities, and an improved source of electricity within the community, against more localised environmental impacts, any potential health, amenity and safety concerns and impacts on tourism.

Useful References:

The [SEPA website](#) contains a range of data, information and guidance on waste flows, waste management, waste infrastructure and capacity. This includes:-

- [Zero Waste Plan](#) (as amended)
- [Strategic Waste Management Review](#) Report
- [National Capacity Reports](#)
- [SEPA Waste Infrastructure Maps](#):

SEPA's [Landfill Capacity Reports](#) also contain information on the number and types of landfills in Scotland, the tonnage of waste they landfill in a given year, their licensed/permitted capacities and an estimate of remaining capacity.