

Biogas plants: what impact on my local community?



Living in an area that hosts a biogas plant can raise concerns about: 1) safety; 2) noise; 3) odour; 4) local transport, but here is why these are not to be worried about.

First and foremost, biogas plants are often large-scale plants that are obliged to comply with safety requirements and environmental risk aspects, and minimise the impact on the local community.

1. Safety is a must!

Biogas plant operators are obliged to implement standard precautionary measures – such as good work practices, gas sensors, safety walk-throughs, protective equipment for the staff, adequate ventilation – in order to identify potential hazards and minimise the risks associated with biogas (a mixture of different gases produced by the breakdown of organic matter in the absence of oxygen).

For maximum safety, biogas is always stored under low pressure and the excess biogas is burnt off to remain below authorised capacity.

2. Noise can be efficiently prevented!

Plants operators can take measures to do an appropriate layout of the ‘noise sources’ on the plant and soundproof those. Moreover, strict noise standards

are applied in agricultural areas. The average noise level outside buildings or containers is only around 30 dB. By comparison, the sound of a computer is about 40 dB.

3. Odour nuisance can be avoided!

Odours originate mainly from the transport and storage of the incoming and outgoing material. A closed reception hall, equipped with extraction and air treatment units, prevents odours from spreading.

In addition, different solutions are used for different types of raw materials (feedstock) to minimise odour spreading, including closed storage tanks or silos, manure cellars and bunkers with air scrubbing.

The biological process used in biogas plants – Anaerobic Digestion – greatly

reduces unpleasant odours, has a sanitation effect on feedstock, and the heat it generates reduces the germination power of weed seeds present in the feedstock.

4. Local transport is not disrupted!

The delivery of biomass (plant or animal material used for energy production) to the biogas plant will cause more locally concentrated transport, depending on the size of the biogas plant. However, the traffic plan, usually part of the environmental license application, imposes strict routes to transporters. Moreover, biomass transport is only allowed during working days.



What do biogas plants do?

Biogas plants collect biowaste – such as manure, sewage sludge, food and plant waste – and put it through a process called anaerobic digestion. This is a natural process during which micro-organisms break down organic matter in the absence of oxygen, resulting in:

1) renewable energy (biogas) and 2) high-quality biofertiliser (digestate).

1. The **biogas** can be used to generate heat or electricity. It can also be upgraded (purified from CO₂) to

biomethane for injection into the gas grid.

2. The **digestate** contains valuable soil nutrients. However, its composition often does not directly meet the crop requirements and the use of additional synthetic mineral fertilisers is needed to compensate this discrepancy.

To substitute the use of synthetic mineral fertilisers, biogas plants can apply additional innovative technologies to the anaerobic digestion process in order to achieve nutrient

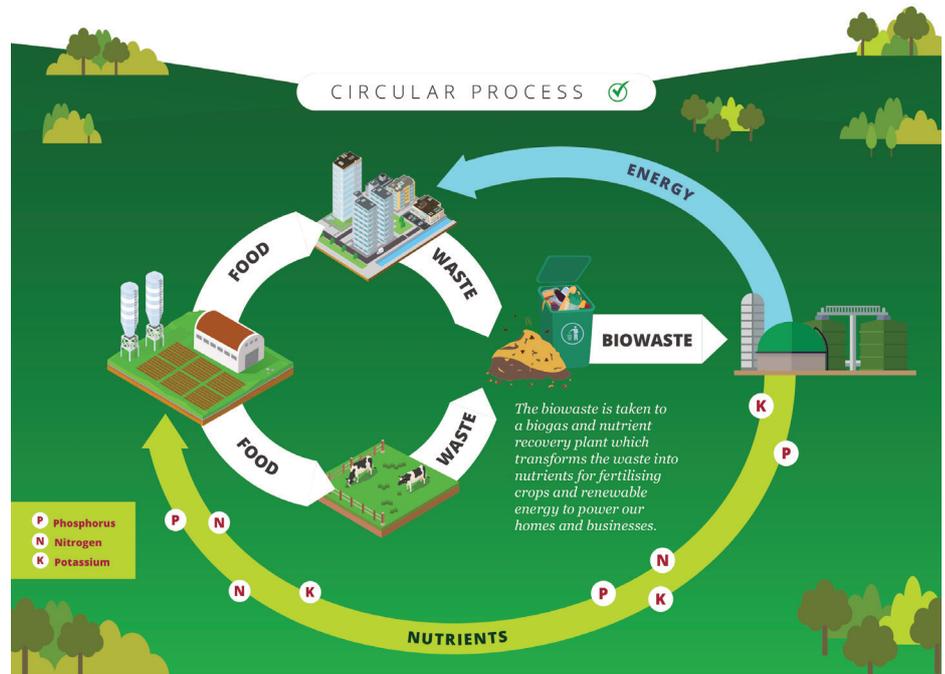
recovery. This involves the abstraction of (a part of) the nutrients – mainly phosphorus, nitrogen and potassium – from the digestate. These nutrients can then be used by farmers as a fertiliser and to improve soil quality in terms of water retention and drainage, soil biodiversity, and plant root structure.



Why recover nutrients?

Crops need nutrients, such as phosphorus and nitrogen, to grow. Half of the phosphorus and nitrogen applied every year to croplands in the EU comes from non-renewable sources. These nutrients are taken up by the crops, harvested and consumed by livestock and humans, only to end up as waste: sewage, animal manure and food waste.

If not processed and recovered from biowaste, a high percentage of these valuable nutrients will be lost, leaching into soils and groundwater and polluting the environment. The recovery of nutrients to re-use as fertiliser in agriculture can close this wasteful agricultural loop and reduce pollution and greenhouse gas emissions.



What are the benefits of biogas production and nutrient recovery?

- **Greenhouse gas (GHG) mitigation**
When manure, food waste and sewage sludge are digested, greenhouse gases are trapped in the digester and are therefore not released into the atmosphere (as would be the case with a pile of manure or an open landfill, for example). Biogas and biomethane are renewable energy carriers which can reduce the use of natural fossil fuels.
- **Efficient use of resources**
Different biomass waste streams – sludge from wastewater treatment

plants, municipal waste, crop residues, animal waste, kitchen waste – that are processed by biogas plants result in organic-rich digestate products. These can be used to improve the soil structure, fertility and microbial conditions. The recovered nutrients – nitrogen, phosphorus and potassium – provide an excellent alternative to fossil fuel-dependent, synthetic fertilisers which are derived from non-renewable sources. The recovery of nutrients will contribute to the implementation of a Circular Economy in Europe and reduce

- its dependence on external sources.
- **Versatility and security of energy supply**
Anaerobic digestion provides a reliable and regular source of energy – biogas – compared to solar and wind energy since it uses a constant stream of biowaste. In addition, biogas can be stored easily and can be used to produce electricity 'on demand'.



A European partnership

The European Union project SYSTEMIC is working to encourage more nutrient recovery from biowaste across Europe. The project brings together 15 universities, biogas plants, businesses and organisations to support five biogas plants in producing high-quality, calibrated mineral fertilisers and developing a market for this process to become financially viable.



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