



RISKS ASSOCIATED WITH THE DESIGN AND OPERATION OF BIOGAS SYSTEMS

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INTRODUCTION

BiogasWorld is a business generation network and online marketplace, connecting product and services suppliers with project developers. We accelerate the biogas and RNG/biomethane industry worldwide. We specialize in:

- Industry knowledge to generate business leads efficiently
- Project support to find solutions
- Reliable network to find partners and build relations
- Market intelligence to support our clients' growth

GOALS OF THIS REPORT

The goals of this report are:

- Present the main risks associated with design and operation of biogas systems;
- Present the accidents that occurred at biogas plants.

LIMITATIONS OF THIS REPORT

This report is based on information gathered in good faith and is believed to be correct. BiogasWorld has taken all reasonable care to ensure that the information presented in this report is fair and accurate. Considered that this report is based on the information provided by different industry stakeholders, BiogasWorld cannot guarantee its accuracy. Any decisions you make based upon any information contained in this document are your sole responsibility.

RISKS

Biogas (anaerobic digestion) plants are complex systems that process organic materials. These facilities have many interconnected and interdependent security and control features to make them safer and to ensure trouble-free operation to avoid property damage and personal injury, among other things. It is essential that all

Each risk is discussed below.

FIRE/EXPLOSION

The main hazards of a biogas plant for human health are associated with fires and explosions that result mainly because of inappropriate design or operation.

One of the particularities of an anaerobic digestion unit is the presence and production of biogas. Biogas is a gas saturated

The main risk remains the formation of an explosive atmosphere (ATEX). The level of explosiveness is showed in Table 1.

RISKS ASSOCIATED WITH COMMISSIONING, OPERATION AND MAINTENANCE

Commissioning and maintenance of a biogas production plant are particularly dangerous steps. Before the draining the tanks, digesters and storage tanks, it is essential that the air inlet openings are open to prevent

RISK PREVENTION

DESIGN

The plant must be designed and built in accordance with current codes, guidelines, and best practices in order to be as safe as possible. For example, it is important to pay attention to requirements to safe distances, safety elements, etc. It is es well necessary to make sure that any outside pipeline or equipment is adapted to the climate (e.g., heating wires for cold climate).

The following plan, prepared by the German Biogas Association, shows the risks associated with different sections of a biogas plant.



OPERATION

Ideally, the designer of the plant works with the future operator to minimize risks. When scaling up (commissioning), the procedures to be followed should be written by the operator, the designer, and the suppliers.

The operator should also have his individual protective equipment (IPE) including safety shoes, hearing protection, masks and a H₂S detector.

PROTECTION AND SAFETY MEASURES

Biogas plants are complex systems of process engineering. The following section focuses on the specific requirements of the different elements of biogas plants operation it is important to meet to prevent risks. Please note that this section contains general requirements and is not an exhaustive list of all possible security measures.

ORGANICS TRANSPORTATION

INSTALLATION ROOMS FOR GAS STORAGE TANKS

GAS STORAGE TANK



SUBSTRATE-CARRYING WITHIN THE BIOGAS PLANT



GAS-CARRYING PARTS IN THE BIOGAS PLANT



PROTECTIVE DEVICES AGAINST UNDERPRESSURE AND OVERPRESSURES



GAS PURIFICATION



FLARES



PAST ACCIDENTS

With over [REDACTED] biogas facilities in Europe, just under [REDACTED]% will experience some form of accident within their lifespan. Only a handful of these accidents will have permanent consequences on human life.

There are several databases that provide information on past accidents, some of them are mentioned in thisre:





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