Why and for what purpose is the following data collected?

Page 1 - Construction and operation of the biogas plant

1. number of engines in the CHPU

Data on existing engines in the Combined Heat and Power Unit (CHPU) is specified in the following steps.

2. automatic flare

An automatic flare prevents the emission of methane from overpressure events.

3. open/closed storage of digested residues

At the open storage of digested residues emissions of methane and ammonia can occure because of a slow continuation of the fermentation process.

4. Has the residual methane potential been determined?

The residual methane potential can vary depending on input materials, plant configuration and plant management. As default value a residual methane potential of 1,5 % is used, referring to the achieved methane yield from input materials. The specific value of the biogas plant can only be determined by a residual methane potential.

5. Does a floating layer exist (>= 10 cm thickness)?

Emissions of ammonia from the storage of digested residues have an indirect effect on the climate and create a loss of nitrogen for fertilization. These emissions can be prevented by a natural or artificial floating layer.

6. Is the plant inspected with a gas detector on a regular basis?

With a regular inspection of the biogas plant with a gas detector, methane losses due to leakages and assembling errors can be detect and removed.

Page 2 – Information about the farm

1. county

Different climate and soil types lead to different, fertilizer-induced emissions depending on the location. In the Web tool county specific emission factors are used to calculate these emissions.

2. management

Information about the management of the farm supplies information about the use of mineral fertilizers and pesticides.

3. tillage

To assess the demand of fuel for energy crop production, tillage is distinguished in turning and no turning for conventional farms.

4. average distance of fields from farm
5. average field size (ha)

The average distances of fields from farm as well as the average field size influence the length of routes, which have to be travelled for substrate logistics.

Page 3 – Information on substrates

1. number of substrates

The statement of single substrates is specified in the following steps.

2. type of substrates

Substrates/input materials are divided into different categories. For single substrates data is deposited in a database in order to calculate greenhouse gas emissions (DM content, organic DM content, methane yield, N-P-K content, yields, amount of seeds, pesticides, losses, N-fixing capacity of legumes).

3. amount and recording of the substrates

The place where substrate amounts are acquired is important to assess losses along the harvest chain (field + transport losses, losses during admission into storage + drying, silo + storage losses). How amounts are acquired is especially focussing on the degree of the results uncertainty.

4. properties of substrates

Own information on yield level, DM content, cultivation period and cutting frequency allows the calculation of a more accurate result than when using default values from the database.

Page 4 – Further information on substrate provision

1. purchased substrates
2. transport distance

To estimate fuel consumption for transportation of harvest products and digested residues the share of purchased substrates as well as the related average transport distance can be stated.

3. silage losses

Dry matter losses are associated with losses of energy and can be estimated for the calculation of the balance.

4. mineral fertilizer

The production of mineral fertilizers is energy consuming and therefore goes hand in hand with high greenhouse gas emissions. Using own data on applied fertilizer amounts the balance result is more accurate. Without information the (optimum) demand of mineral fertilizers is calculated.

5. properties of digested residues

Laboratory tests on the entire nitrogen content and the content of ammoniacal nitrogen in digested residues help assessing the fertilizer-induced ghg emissions. Is no data available, the nitrogen content is calculated from the substrates and a content of 65 % ammoniacal nitrogen is assumed.

6. Application of digested residues

Ammonia emissions vary depending on the technique used for the application of digested residues.

Page 5 – Information about biogas utilization

1. Data on CHP-engines

The electrical efficiency of the engine is correlated to the declared electrical capacity installed.

2. Amount of electricity and + distribution losses

The electricity fed into the grid is used as a reference value to evaluate ghg emission results (functional unit). Via the electricity fed into the grid, the produced methane is counted back.

3. Origin of electricity purchased
4. Electricity demand

The electricity demand for the biogas process and the source of electricity purchased determine the ghg emissions from electricity production and provision.

5. Heat utilization
6. Heat demand
7. Utilization of heat output for electricity production

The utilized heat for external customers, the heat demand for the heating of the biogas plant and the electricity production from surplus heat determine the efficiency of the combined heat and power generation.