

## **An overview of the feedstock supply for biomethane production in EU**

Christos Zafiris, Loukas Gavriil, Myrsini Christou

CRES, Center for Renewable Energy Sources and Saving, 19<sup>th</sup> km Marathonos Avenue, 19009  
Pikermi, Greece, email: mchrist@cres.gr

A wide range of feedstocks with different methane yields can be used for biogas production: livestock manure, energy crops, food wastes, industrial and sewage sludge and MSW, agricultural residues, etc.

Feedstock type choices highly depend on the local availabilities as well as on the applied technologies. According to the European Biogas Association, in several countries, there is one dominant feedstock type for biogas production, like industrial waste (industrial wastewater and/or industrial solid waste in Belgium (Wallonia), Sweden and Ukraine, manure in Cyprus, Denmark, Greece, Luxembourg and Poland. In Germany energy crops (energy Maize) and manure together make up the vast majority of the feedstocks used.

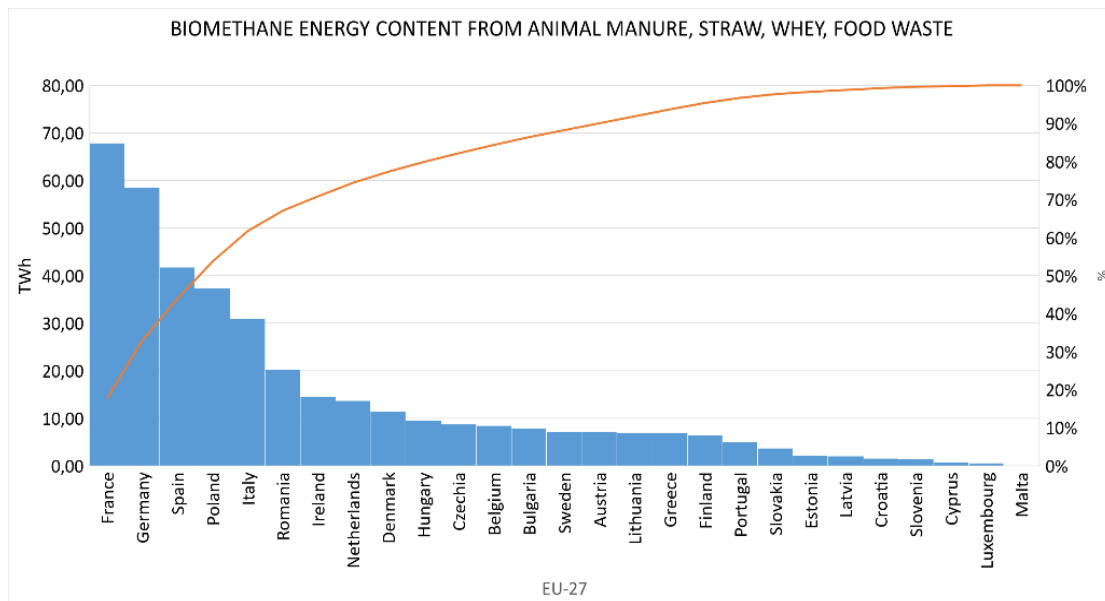
In **GreenMeUp** project we carried out an analysis on the use of livestock manure (cattle, pigs, and sheep/goats), food waste in general, milk by-products and straw from cereal cultivation as the main types of feedstock that would support biomethane production in European Union by 2030. Our target was to provide an estimation of the potential of this type of feedstock for biomethane production. The results are to be used to support and justify EU policies related to the use of various type of organic waste as source of renewable energy and AD-biomethane in particular. The reference point of the study is the estimation of the theoretical biomass potential in the EU27, and the subsequent estimation of the biogas produced through Anaerobic Digestion (AD) and the biomethane after biogas upgrading.

The analysis shown that if all the available feedstock consisting from livestock manure, food waste and whey reaching about 1.83 billion tons, is utilised, then 23.14 bcm of biomethane can be produced. This quantity approaches the target set by EU and foresees delivering 35 bcm of biomethane in the natural gas network by 2030.

Considerable contributions may be given by the available quantities of cereal straw that is not used for animal feeding. Biomass quantities are estimated at 168 million tons and the potential biomethane production can reach 16bcm. Straw demonstrates some technical challenges when it has to be used as feedstock for AD. This is the reason that its utilisation is not that widespread till now. Those challenges though can be tackled successfully and its utilisation becomes more popular. According to the analysis performed in this report, there are enough quantities of straw in EU for complementing the rest AD feedstock sources in order to achieve the biomethane target for 2030.

Allocated to EU-27, the theoretical biomass potential from livestock manure, grain straw, agro-industrial waste and food waste amounts to 1,39 billion tons/year, with a biomethane energy content of 382,89 TWh/year or 39,71 bcm/year. The availability of biomass production throughout the year in the wider area of EU is guaranteed by at least 40% if it is accompanied by contract farming conditions.

France is leading the way with 247 million tons per year of biomass, followed by Germany (228 Mt/y), Spain (135 Mt/y), Poland (123 Mt/y) and Italy with 118Mt/year.



Another type of feedstock that has to be considered is the sewage sludge derived primarily from municipal wastewater treatment plants. This sludge has considerable biogas generation potential and there are no other competitive uses that compete the valorisation as AD feedstock.

Competitive uses in general are something that has to be considered when we are talking about waste valorisation. This is the case also with the whey, which is used as ingredient in the production of food supplements and animal feed. Policy measures may help to make the use of whey or similar wastes as AD feedstock more feasible offering an alternative for the other markets.

Finally, there is great potential of woody biomass, which are not considered as feedstock for AD plants since it cannot be decomposed by the microorganisms. This type of biomass can produce biomethane following other technology pathways like gasification and methanation. Those pathways are technologically mature and may assist in the achieving the 2030 target.

**Acknowledgment:** The work is carried out in the frame of the GreenMeUp project that has received funding from the European Union's Horizon Europe Research and Innovation Programme under Grant Agreement No. 101075676.