

## **Small scale anaerobic digesters: application to the case study of Calabria, Southern Italy**

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We report a case study for a small scale anaerobic digester to be located in Calabria, Southern Italy. The research includes technical, economic and environmental analysis for the specific case study. The plant will be able to process food waste for 10,000-30,000 inhabitants, corresponding to a small town or a district of a city.

With 1555 operating plants and a total installed capacity of 1345,6 MW<sub>el</sub>, Italy is the second biogas market in Europe after Germany, and the third in the world after Germany and China. However, the fast development of biogas in Italy led to an asymmetric distribution. Indeed, 1255 plants are fed with agricultural biomass, 180 with landfills and 46 with municipal waste: thus, municipal waste is used for less than 20%, and most of food waste is composted without exploiting its energy potential. Furthermore, the development of the biogas sector has been characterised by a clear dominance of the Northern regions of Italy: in four regions of the North of Italy there are 73% of the total biogas plants in Italy.

In Calabria there is a big potential for biogas, and in particular from municipal solid waste (OFMSW). Nevertheless, there are only 19 plants installed to date. The organic fraction is generally collected and transported for kilometres towards the few regional treatment centres.

In this study we demonstrate that treating the OFMSW locally is perhaps the best solution in terms of environmental sustainability and economic benefits. To date, the price paid by small municipalities in Calabria for the transportation and the treatment of OFMSW is too expensive in relation to the quantity of biomass involved.

The research will demonstrate the technical feasibility and the environment and economic sustainability of a small-scale plant for the treatment of the OFMSW with production of biogas for energetic self-sufficiency and compost production rich in nutrients, as well as benefits for the environment, for the municipalities and for the citizens.