

THE FUTURE ROLE OF BIOMETHANE IN THE ITALIAN DECARBONIZATION PROCESS: AN ESTIMATE OF FUTURE PRODUCTION FROM EXISTING AGRICULTURAL BIOGAS PLANTS

Susanna Dorigoni, GREEN-Bocconi University¹, 00393286292601, susanna.dorigoni@unibocconi.it

Overview

Year 2022 was characterized by a general rise in the prices of raw materials and, in particular, of energy. The war in Ukraine, the consequent sanctions against Russia and the decrease in gas exports to Europe have in particular led to an unprecedented increase in the price of gas, which has already been underway since the second half of 2021, giving rise to a dangerous inflationary spiral.

In such a context, the problem of security of supply, which had been put in the background for many years with respect to the issues of competition and environment, has emerged overwhelmingly in its entirety.

The answer to the aforementioned problem, in addition to an increase in energy efficiency and to the identification of alternative sources of supply, consisted in a further push by the European Commission towards de-carbonization through the promotion of renewable sources, both electrical and thermal, such as biomethane.

The RepowerEU Plan² recently increased the renewable methane production target contemplated in the Fit for 55 Package from 18 to 35 Bcm by 2030.

In February 2022 the European Commission presented the Complementary Climate Delegated Act³ introducing certain gas and nuclear activities into the EU Taxonomy under stringent conditions encompassing particularly low maximum emission thresholds for natural gas power generation which effectively establish the need to mix fossil gas with non-fossil gas.

Gas activities were included as “transitional” and, as such, have to be replaced by renewable energy sources by 2035.

On 15th September 2022, the Italian Government adopted a new Decree⁴ aimed at promoting biomethane production and consumption. The introduced incentive scheme is completely different from the previous one insofar as it regards the use of biomethane in all economic sectors in the belief that it could significantly contribute to the greening of natural gas networks, and with the aim of giving a new acceleration to the national market development. Despite a certain increase in the number of plants operating at the national level, the production of biomethane is in fact still far from the 1.1 Bcm target set in 2018.

In this article, after a brief description of the evolution of the market in terms of number of plants and production and the illustration of the new incentive system and its main criticalities, an estimation of the amount of biomethane that can be obtained by the revamping of existing agricultural biogas plants will be presented with the aim of concretely assessing the role of biomethane in the Italian energy transition.

Methods

In order to quantify the aforementioned production, a database (DIBI⁵) containing all the biogas plants existing on the national territory was created starting from the data made available by the GSE⁶ in 2017.

For each plant, information about the size and the raw material used for biogas production was collected.

The reconversion costs, subject to considerable economies of scale, were compared with the capital grants envisaged by the incentive Decree in order to establish the plants for which the revamping is economically feasible.

Among the latter, only those whose feedstocks allow compliance with the GHG emissions abatement criteria established by the second Directive on Renewable energy Sources, which constitute a precondition for access to the incentives, were subsequently chosen.

Making appropriate assumptions on the plants load factor and on the composition of biogas, the amount of producible biomethane was calculated.

¹ <https://green.unibocconi.eu>

² <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52022DC0230&from=EN>

³ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32022R1214&from=EN>

⁴ <https://www.gazzettaufficiale.it/eli/id/2022/10/26/22A06066/sg>

⁵ Database of existing Italian Biogas plants.

⁶ Gestore dei Servizi Energetici is a company fully owned by the Italian Ministry of Economy and Finance.

Results

The analysis revealed that the plants for which the conversion would be possible both from an economic and an environmental point of view represent less than 60% of the total.

In particular, it would be possible to produce at best about 800 Mcm of biomethane per year.

The latter would represent about one third of the production target of 2.5 Bcm set by the 2022 Decree.

Conclusions

The bulk of the biomethane Italian target production should come from greenfield plants.

The huge necessary investments will be conditioned by the obtainable incentives but will also depend on the future general economic situation, made uncertain by the current geopolitical context, and on the price of fossil gas.

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