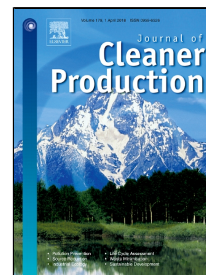


Accepted Manuscript

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PII: S0959-6526(18)30575-4
DOI: 10.1016/j.jclepro.2018.02.243
Reference: JCLP 12190
To appear in: *Journal of Cleaner Production*

Received Date: 11 October 2017
Revised Date: 20 January 2018
Accepted Date: 22 February 2018

Please cite this article as: Federica Cucchiella, Idiano D'Adamo, Massimo Gastaldi, Michela Miliacca, A profitability analysis of small-scale plants for biomethane injection into the gas grid, *Journal of Cleaner Production* (2018), doi: 10.1016/j.jclepro.2018.02.243

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A profitability analysis of small-scale plants for biomethane injection into the gas grid

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Abstract

Biomethane is a promising renewable energy carrier with the potential to diversify and decarbonise natural gas. It is produced from a range of waste sources and can be distributed into the natural gas grid or used as a vehicle fuel or converted into cogeneration units. The economic evaluation of small plants for biomethane injection into the gas grid is not well defined in literature. This paper proposes a mathematical and economic model useful to evaluate the profitability of these plants in according to Discounted Cash Flow (DCF) method. The indicators used are Net Present Value (NPV), Discounted Payback Time (DPBT), Internal Rate of Return (IRR) and Profitability Index (PI). The baseline case studies analyse three different small-scale sizes (50 m³/h, 100 m³/h and 150 m³/h) concerning two typologies of substrates (organic fraction of municipal solid waste (ofmsw) and a mixture of maize and manure residues). Results define that the profitability is verified only for 150 m³/h ofmsw plant in baseline case study (NPV is 615,694 €, DPBT is 3 y, IRR is 33% and PI is 0.18). Furthermore, alternative case studies are conducted on the main critical variables (subsidies, investment costs of biogas production, transport costs of substrates and percentage of

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