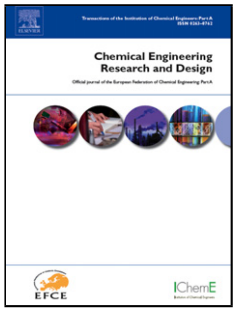

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PII: S0263-8762(18)30006-6
DOI: https://doi.org/doi:10.1016/j.cherd.2018.01.004
Reference: CHERD 2978

To appear in:

Received date: 7-5-2017
Revised date: 27-12-2017
Accepted date: 3-1-2018

Please cite this article as: Nikas, E., Sotiropoulos, A., Xydis, G.A.,Spatial Planning of Biogas Processing Facilities in Greece: The Sunflower's Capabilities and the Waste-to-Bioproducts Approach, *Chemical Engineering Research and Design* (2018), https://doi.org/10.1016/j.cherd.2018.01.004

Spatial Planning of Biogas Processing Facilities in Greece: The Sunflower's Capabilities and the Waste-to-Bioproducts Approach

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Abstract

This study examines the potential contribution to biogas national production, by cultivating sunflower, using modern techniques, in the plains of the prefecture of Karditsa, Greece. The main purpose of this study is to determine the potential quantity of biogas that could be eventually produced in the plains, by applying the latest methods to the cultivation, growth and harvesting of the sunflower. Using regional and national data, this study ranked the agricultural areas of the prefecture of Karditsa and created a suitability map on the needs of the sunflower. The illustrated results provide some support for the future investors or the present farmers in the area. The developed GIS maps may become a useful tool for the prediction of the income from the calculated quantity and quality of sunflower crops' seeds or biogas production. Spatial planning analysis for the determination of the installation of a biogas' facility centre, where sunflower's derivatives will be processed for ethanol production was also implemented. On the basis of the results of this research, it can be concluded that Karditsa's plains have a great potential for producing 3,818 ktoe of biogas and succeed Greece's 2020's goal on biofuel production (10% of total fuel consumption) by utilizing the maps and the techniques presented on this study. A supplementary study of converting waste (household bio-waste) to bioethanol and the future potentials of the process were illustrated and presented, based on the fact that bio-waste production is and will continue to increase.

Keywords: suitability map; sunflower; biogas; bioethanol

1. Introduction

Having in mind the finite nature of oil in contrast to the infinite resources that earth can provide, developing methods of employing renewable energy sources in everyday life, has become the goal for the energy industry and decision makers (Matthew, 2002). The energy crisis was the main reason that motivated the Brazilian government to lead the biofuel revolution and make it obligatory to blend anhydrous ethanol with gasoline on regular gasoline engines (Puerto Rico, 2008). Since 1976 Brazil has become the second greatest

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