

Ariadni Gemenetzi

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Personal information:

Ariadni received her diploma in Chemical Engineering from Aristotle University of Thessaloniki in 2011 and earned her Erasmus Mundus MSc degree in Industrial Ecology at the Delft University of Technology, Leiden University, University of Graz and Graz University of Technology in 2013, being one of the very first graduates of the programme. Her final thesis projects were respectively: 1) the assessment of alternative pellets for domestic use and industrial applications and 2) the design of an industrial complex for biogas production from local resources and heat & energy production. The results of the latter project resulted in a conference publication at the 6th Dubrovnik conference on sustainable development of energy, water and environmental systems.

Moreover Ariadni was actively involved with the International Association for the Exchange of Students for Technical Experience (IAESTE), being for 2.5 years a volunteer member of the local committee of IASTE Thessaloniki. Her overall vision is to work towards and achieve sustainable development through chemical engineering projects in the industrial sector. She is a visionary, dreaming about a world where people have equal opportunities, abundance of information, equal access to goods and the wisdom to use them properly.

Title of thesis: Economic Optimization for Heat & Energy Production using Renewable Energies from Local Resources

Abstract:

The objective of this work is to assess the feasibility of creating an industrial complex that would deliver: 1) biogas production using locally acquired manure, meadow grass, farmland grass and municipal waste, and 2) electricity and heat production using biogas fueled technologies and biomass gasifiers. Three locations, within the 'Weiz-Gleisdorf' area have been investigated as potentially situating the complex. Moreover, ELIN was also considered for biogas and/or high temperature heat provision. The energy system was optimized using the Process Network Synthesis tool and 22 scenarios were carried out, responding to various limitations.

All optimal solutions are economically viable, i.e. average gross profit of ~224,000 €/y. Anaerobic digesters appear to all three locations, but more prominently at Thannhausen North and South. No resource shortage appears to be imminent, except for municipal waste. The main revenue derives from electricity and heat generation, stressing out the significance of the respective tariffs. Heat utilization is anticipated to become a great debate, since considerable amounts of heat are wasted. Overall it can be concluded that biogas production from local resources doesn't appear to be cost effective, thus, the interplay of various stakeholders will be decisive regarding the future implementation of the current and similar projects.