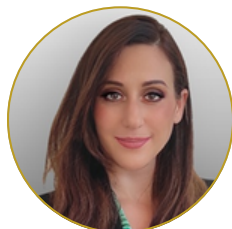


3rd Global Summit on Climate Changes and Sustainability

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A Techno-Economic Study of Biomass Gasification in Microgrids for Small Islands Energy Supply using HOMER

Bioenergy can be a strategic asset for developing areas to achieve a low-carbon energy security, clean energy access and promoting rural development. The present research study aims to assess the potential of biomass gasification microgrids in the deployment of rural areas with a special focus on small islands. As a matter of fact, bioenergy can be potentially used as a complementary energy source in grid-connected or non-interconnected areas to meet the peak energy demand. Among bioenergy sources, biomass gasification is one of the promising technologies for distributed power generation. However, logistics and technological challenges related to the lack of a reliable biomass supply chain, absence of technology specific policy and the high-energy demand for biomass pretreatments still act as the main barriers preventing the successful deployment of gasification. In this framework, the potential use of biomass-based technologies in small islands for energy supply has been assessed. The adoption of harvesting and transportation technologies and effective strategies such as the use of short-rotation plantations in unused land, early stakeholder engagement and attractive energy export tariffs can help to develop the biomass-based power sector. A techno-economic study of a biomass gasification plant has been carried out using HOMER Energy Simulator. Consequently, a biomass-based microgrid has been modeled and different scenarios have been simulated, considering both grid-connected and isolated configurations. Following, a techno-economic study of a gasification power plant fueled by lignocellulosic biomass has been performed taking into account such driven parameters as biomass feedstock availability and cost. Moreover, a sensitivity analysis has been done by comparing this green resource with conventional energy resources. This sensitivity analysis reveals as electricity export tariffs, availability of power plants, and feedstock costs are critical parameters affecting the net present cost of the biomass-based microgrid. The achieved results shown the feasibility and higher potential for biomass power production as a stand-alone system at short distance from production site. Moreover, the most favorable price of biomass resources for application isolated areas has been evaluated.

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Biography

Lina Montuori obtained her Ph.D. in Industrial Engineering at the Polytechnic University of Valencia (UPV) in Spain. Previously, she received B.Sc. and M.Sc. degrees in Industrial Engineering at the University of Naples “Federico II” in Italy. Moreover, she holds an MBA by UPV and an Executive Master in Digital Marketing, Analytics and UX by the Catholic University of Avila (Spain). She is a dedicated professional with about than 15 years of experience in the energy sector with a demonstrated track of successful projects lead as Development Manager at international top brand companies such as Toshiba Mitsubishi-Electric Industrial Corporation, Solaer Group and ENEL Rete Gas. Moreover, she served as Guest Researcher at the Power Center for Utility Explorations at the State University of New York at Buffalo (USA). At present, she is a Professor at the Department of Applied Thermodynamics of the Polytechnic University of Valencia (Spain), where she is also a researcher at the Institute for Energy Engineering Institute (IIE). Moreover, she is an editor, reviewer and author of multiple and relevant publications in prestigious Q1 journals.