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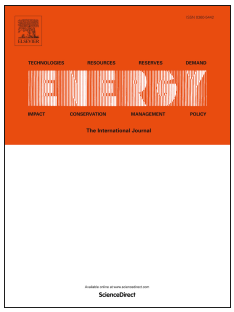

Modeling and optimization of a biogas plant for a demand-driven energy supply

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Modeling and optimization of a biogas plant for a demand-driven energy supply

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Abstract

Due to the Renewable Energy Act, in Germany it is planned to increase the amount of renewable energy carriers up to 60%. One of the main problems is the fluctuating supply of wind and solar energy. Here biogas plants provide a solution, because a demand-driven supply is possible. Before running such a plant, it is necessary to simulate and optimize the process. This paper provides a new model of a biogas plant, which is as accurate as the standard ADM1 model. The advantage compared to ADM1 is that it is based on only four parameters compared to 28. Applying this model, an optimization was installed, which allows a demand-driven supply by biogas plants. Finally the results are confirmed by several experiments and measurements with a real test plant.

Keywords: **9.030 Biogas**, 20.050 Mathematical Modeling, 20.080 Optimization Models, 21.050 Pricing of Energy

1. Introduction

In the future, the restructuring of the energy sector as a result of the European climate targets will play a critical role. The main purpose of the

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