

Optimum Combination of Photovoltaics and Batteries to Substitute Diesel Generators

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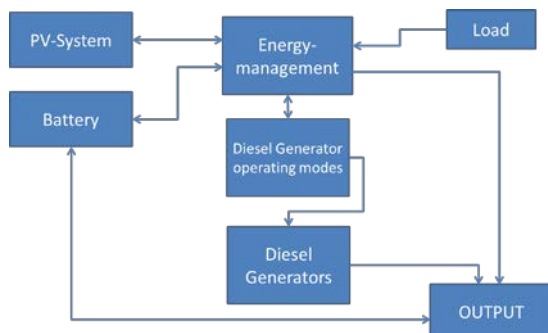
Submitted by: Prof. Thorsten Schneiders

More than 1 million diesel generator systems provide power for island systems and to cover the demand at frequent blackouts in developing countries. The tremendous decrease of the costs for solar power makes photovoltaics an attractive substitute for diesel generation in those systems, lowering power costs and environmental impact. In combination with batteries, photovoltaics may even fully substitute existing diesel generator systems

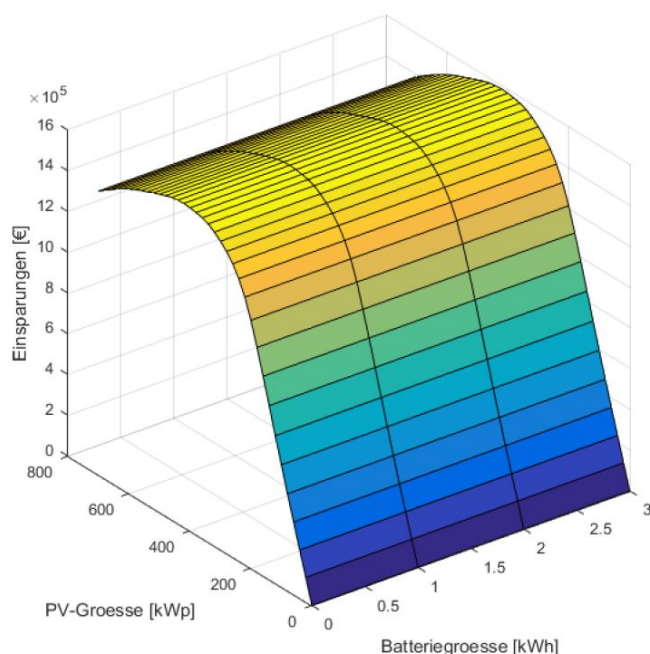
At the TH Cologne, a modelling tool has been developed to examine the possibilities and limits of integrating photovoltaics into existing diesel generator systems. It considers the setup and operating modes of the diesel generators (with aging and partial load effects), also taking into account the use of batteries (including different types of batteries and aging processes). As a result, optimum setup of the re-designed hybrid PV-diesel-battery system can be calculated.

This will be presented in the paper, in combination with the hands-on experience from a real project. A recently finished installation of a 90 kW PV hybrid system at the St. Dominic's Hospital in Akwatia/Ghana has yielded valuable experience of how such a project could be implemented - from the first evaluation of energy data to the final installation on the rooftops.

Setup of MatLab Modelling tool



Modelling output proves benefits



Installing a hybrid system in Ghana

