

Challenges of a 100% renewable energy supply in the Java-Bali grid

Matthias Guenther, author

Deskripsi Lengkap: <https://lib.ui.ac.id/detail?id=9999920522095&lokasi=lokal>

Abstrak

Renewable energy resources are increasingly being used to cover the demand in the electricity grids in many countries. A question that is currently for most grids rather theoretical, although interesting in introducing a long-term perspective, pertains to what an energy supply from exclusively renewable energy resources could look like. This question has to be answered individually for each grid. The objective of the present paper is to scrutinize the specific challenges that a 100% renewable energy scenario brings for the Java-Bali grid. This objective is achieved by designing power generation time series such that they match a given load time series. An important challenge for a 100% renewable energy supply is the very high dependency on solar energy, which generates an enormous primary power generation fluctuation on both a daily and an annual timescale. In particular the seasonal fluctuations come along with high storage demand, which is the greatest challenge involved in a 100% renewable energy supply. There are strategies that may be used to considerably reduce the storage demand: the installed photovoltaic (PV) capacity can be increased, bioenergy can be used for seasonal balancing, and special long-term storage can be added. These options are considered in the present paper.