Technische Universität München
School of Management

**Prof. Dr. David Wozabal**
Arcisstraße 21
80333 München
+49 (0) 89-289-25479
david.wozabal@tum.de

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# Master Thesis

## Optimal Amount of Electricity Storage

## Background

The 2015 United Nations Climate Change Conference brought about a broad consensus reiterating the requirement to decarbonize the world's energy supply in order to decrease greenhouse gas emissions and keep global warming to a minimum. Apart from saving energy by efficient devices and well insulated buildings, the road-map to decarbonization involves electrification of heating and transport complemented by a transition to an electricity system dominated by renewable production.

However, since the two most promising sources of renewable energy production, wind power and photovoltaics (PV), are intermittent such an energy system will require large amounts of storage capacity to accommodate the fluctuating infeed patterns of the aforementioned technologies. Hence, the question on how to integrate energy storage in existing energy system is a central question in the transition to a new, more sustainable energy system.

## Research Questions

The aim of the thesis is to build a stylized cost minimization model as a linear optimization model to assess the optimal amount of storage capacity in a German electricity system which is mostly based on renewable production. Storage is divided into short-term storage balancing intermittent infeed from several hours to several days and long-term storage which balances seasonal infeed profiles.

Main work packages are the collection of data, the compilation of scenarios for renewable infeed and parameters of storage technology, setting up the optimization problem, and analyzing the model results for different sets of assumptions.

Qualified applicants are invited to send their electronic application to

**Prof. Dr. David Wozabal (david.wozabal@tum.de).**