

# Foreword

The liberalization of the energy sector and the rapid increase of electricity production by renewables has changed the business of utilities as well as their customers a lot. They both have an increasing interest in good stochastic models for load profiles for better risk management decisions. In retail pricing e.g. there is more and more a tendency of charging prices to customers with fixed-price contracts that depend on their volume risk and on the price-volume correlation risk. Utility companies have an interest in understanding these risks and charging risk premiums to the customers. Therefore the customers also have an interest in understanding these risks to develop methods to reducing these risks, as they are costly.

The master thesis of Kevin Berk develops a stochastic model for the electricity demand of small and medium sized companies that is flexible enough so that it can be used for various business sectors. This is a completely new field of research where there does not yet exist much scientific literature, partially due to the difficulty to get access to data. Here we had the advantage that some of our former students founded a start-up company called *statmath GmbH* situated here in Siegen that is doing statistical consulting for many small and medium sized enterprises. The thesis was written in cooperation with *statmath GmbH* who was so kind to give us access to the load data of several of their customers, who also agreed to use these data for scientific purposes in anonymized form.

Kevin Berk managed to write an outstanding thesis on this topic with many innovative ideas in an important new field of research. I am convinced that reading this thesis will be very helpful for other researchers in the field as well as for practitioners in utility companies and their customers.

I am very happy that I could convince Kevin Berk to continue his research on this topic as my Ph.D. student.

Prof. Dr. Alfred Müller  
University of Siegen, Germany

# Preface

The present master thesis was accepted by the Department of Mathematics at the University of Siegen in December 2013. Several people accompanied me on the way from the concept of the thesis to its completion, whom I want to express my deep gratitude and appreciation.

A special thanks goes to Prof. Dr. Alfred Müller who always supported me during my academic education and who gave me a chance to continue my research as a Ph.D. student at his chair.

I also want to thank Dr. Alexander Hoffmann and Christian Friedrich from *statmath GmbH*, where I started to work as a student assistant in early 2012. It was my first encounter with stochastic modeling of electricity markets and therefore shaped the field of research that I am working in sustainably. In particular, this work was done in cooperation with *statmath* who fortunately agreed to provide the database for the empirical part of the thesis. Furthermore, the basic load model on which my research was based was developed by *statmath* and Prof. Müller in the course of an industrial cooperation in 2010. I had a great benefit from their expertise in the field of electricity demand and price forecasting.

Finally, a sincere word of thanks is due to my family and my girlfriend for their permanent and unlimited support and patience.

Kevin Berk

Modeling and Forecasting Electricity Demand  
A Risk Management Perspective

Berk, K.

2015, XVI, 115 p. 39 illus., Softcover

ISBN: 978-3-658-08668-8