

Preface

This volume on *Advances in Energy System Optimization* contains a selection of peer-reviewed papers related to the presentations given at the first *International Symposium on Energy System Optimization (ISESO 2015)*. The symposium was held on November 9 and 10, 2015 at the Heidelberg Institute for Theoretical Studies (HITS) and was organized by HITS, Heidelberg University (Engineering Mathematics and Computing Lab, EMCL) and Karlsruhe Institute of Technology (Institute for Industrial Production, IIP, and Institute of Electric Energy Systems and High-Voltage Technology, IEH). The organizing institutes are working together within a research project funded by the DFG (Deutsche Forschungsgemeinschaft), in the context of which the symposium was initiated. Under the title “New Approaches to Integrated Energy Systems and Grid Modeling”, the respective research groups from mathematics, energy economics and electrical engineering develop new algorithms designed to efficiently solve real-world energy problems. More than 50 international participants attended 21 international presentations from both, industry and academia, including 3 keynote presentations and 18 contributed papers in 7 sessions. The sessions focused on diverse challenges in energy systems, ranging from operational to investment planning problems, from market economics to technical and environmental considerations, from distribution grids to transmission grids and from theoretical considerations to data provision concerns and applied case studies. The papers in this volume are structured according to the order of the sessions within the symposium as outlined below:

- Demand Response and Distribution Grids
- Optimizing Transmission Grid Operation
- Flexibility, Storage and Uncertainty Quantification
- Challenges in Microgrids
- Renewable Energy and Power Grid Expansion Planning
- Data Provision for Power Grid Modeling
- Convex versus Nonconvex Approaches for Power Flow Analysis

ISESO was designed to bring together experts from different disciplines, such as mathematics, electrical engineering, economics and operations research with the

objective of fostering interdisciplinary discussions on how to tackle the many challenges facing today's and tomorrow's energy systems. Beyond the presentations, the symposium offered ample time for discussion and reflection, which was perceived very positively by all participants.

The editors of this volume served as the organizing committee. We wish to thank all reviewers as well as all individuals and institutions who worked hard, often invisibly, for their tremendous support. In particular, we thank Philipp Gerstner for the coordination of the local organization. Finally, we also wish to thank all participants and speakers for their contributions to making ISESO a success.

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