

# Preface and Acknowledgements

Decision making in energy systems is a complex task at best. Complexity stems primarily from the nonlinear nature of energy–economy–environment interactions. Given the global trend of focusing on low carbon economies, energy policy design and assessment has become a dynamic problem. Uncertainties such as the dynamics of energy supply and demand, the price of fossil fuels, various regulatory regimes, the advances and challenges of energy production and consumption-related technologies, and impact of energy related emissions abound. Therefore, the use of model-based analysis and scenarios in energy policy design and assessment has seen phenomenal growth during the past several decades.

The primary aim of this book is to disseminate the roles and applications of various modeling approaches aimed at improving the usefulness of energy policy models in public decision making. The key focus is on the development, validation, and applications of system dynamics and agent-based models in service of energy policy design and assessment in the twenty-first century. Invitations were sent all around the globe. Several renowned authors were also specially invited to contribute. Each prospective contributor was initially asked to prepare a two to three page proposal. These proposals were reviewed by the editor and suggestions were made to prepare the full papers. The submitted papers were then reviewed by independent reviewer panels. Each panel consisted of three members—the editor and two independent experts in the field. The final acceptance/rejection decisions were made by the editor based on the revised papers submitted by the contributors.

The book contains three parts. Part I, “Energy Policy Modeling for the 21st Century: An Introduction” has one chapter. It introduces key aspects of major modeling approaches and presents an overview of all the chapters of this book. Part II of the book, “Modeling Approaches and Energy Policy Decisions”, consists of six chapters and deals with the range of tools, methods, and technologies that support decision making in complex, dynamic energy systems including Thinking about the Future: System Dynamics and the Process of Electricity Deregulation, Fuzzy System Dynamics: A Framework for Modeling Renewable Energy Policies, The Diffusion of Eco-Technologies: A Model-Based Theory, Managing the Energy Basket in the Face of Limits, Power Plant Relocation Policy versus Investments in Transmission Network Infrastructure: a Study on the Italian Energy Market, and Simulation

of Greenhouse Gas Cap-and-Trade Systems with ENERGY 2020. Part III of the book, “System Dynamics and Agent-Based Models in Actions”, has six chapters and provides the empirical evidence to the application of both system dynamics and agent-based modeling approaches to energy policy design and assessment issues including Energy Policy Planning for Climate Resilient Low-Carbon Development, Understanding the Dynamics of Electricity Supply and Demand in Ontario, Adoption of Renewable Energy Technologies: A Fuzzy System Dynamics Perspective, Resurrecting a Forgotten Model: Updating Mashayekhi’s Model of Iranian Economic Development, Making Progress Towards Emissions Mitigation: Modeling Low-carbon Power Generation Policy, and Exploring Energy and Economic Futures using Agent-based Modeling and Scenario Discovery.

We are grateful to the authors of the various chapters for their contributions. It had been a bit long process from the initial outlines to developing the full chapters and then revising them in the light of reviewers’ comments. We sincerely acknowledge the authors’ willingness to go through this process. We also acknowledge the work and knowledge of the members of our review panels, many of which had to be done at short notice.

Thanks to all the people at Springer, USA especially Christopher, HoYing, and Brian with whom we corresponded for their advice and facilitation in the production of this book.

Mrs. Puja Kumari, Crest Premedia Solutions (P) Ltd. prepared a camera-ready copy of the manuscript with her usual professionalism and cooperation and we wish to record our thanks to her.

Finally, I am grateful to my family, Tahira (for her incredible and selfless support all the time), Anam (for her professional proofreading and spiritual perspective on things around us), Ali (for sparing time from his kingdom), Umer (for his occasional smiles on my work and his work too), Umael (for bearing with me on Writing Assignments, and rollerblades stuff), and my father, Safdar Khan and my mother, Fazeelat Begum (for their sacrifice, support, and prayers all along)—all the very source of my inspiration and desire to embark on this journey. It would be unfair not to acknowledge the constant and consistent prayers and cares she extends to me, Saira Bano, my mother-in-law.

Toronto, Canada  
July, 2013

Hassan Quadrat-Ullah

Energy Policy Modeling in the 21st Century

Qudrat-Ullah, H. (Ed.)

2013, XIII, 273 p. 107 illus., 77 illus. in color., Hardcover

ISBN: 978-1-4614-8605-3