Rapid technological advancements plus falling costs of distributed energy resources (DERs) – which includes energy efficiency improvements plus distributed generation – is turning an increasing number of consumers into prosumers, eroding utility revenues and threatening the historical business model.

Equally important are rapid advances in energy storage, electric vehicles, microgrids, intelligent home energy management, demand aggregation, and demand response, all pointing to a different future with a different role for the incumbents.

Future of utilities: Utilities of the future, which includes contributions from experts with different perspectives from different parts of the globe, examines the implications of these developments on the electric power sector.

“The future of the utilities is not yet given, or written. Even those utilities having avoided the market revolution of the past decades won’t be able to avoid the 3 tsunamis of supply, demand and technology that are about to hit them. You – and they – can imitate the ostrich and stay blind a bit longer or... read the book!”

Professor Jean-Michel Glachant, Director Florence School of Regulation, European University Institute

“The electricity service of 2010 would be quite recognizable to a customer from 1910, but this is about to change. This book shows how technological innovation, economic forces and new business models could combine to produce radical changes over the coming decades.”

Professor Richard Green, Imperial College Business School

“This book brings together the thinking of some of the smartest minds from around the globe to bear on the quintessential question of this age: what will be the future of the electric utility industry?”

Dr. Ahmad Faruqui, The Brattle Group

“New technologies, consumers, and policies are challenging the organizational and operational paradigm of the utilities prevailing since the formative years of the sector. We need to better understand this transition. This book written by leading practitioners and scholars offers a valuable guide to the issues and options for creating the utilities of future.”

Professor Tooraj Jamab, Durham University
# Future of Utilities - Utilities of the Future

**Fereidoon Sioshansi**, Editor

## Table of Contents

**Foreword**
Michael Peevey, former president of California Public Utilities Commission

**Preface**
Peter Terium, CEO RWE AG

**Introduction**
Fereidoon Sioshansi, Menlo Energy Economics

**Part I. What is changing, what are the implications?**

1. What future for electric power sector?  
Fereidoon Sioshansi, Menlo Energy Economics

2. The value of an integrated grid  
Clark Gellings, EPRI

3. Microgrids: finally finding their place  
Chris Marnay, Microgrid Design of Mendocino LLC

4. A customer-centric view of electricity service  
Eric Gimon, Energy Innovation LLC.

5. The innovation platform enables the Internet of Things  
John Cooper, Siemens Business Transformation

6. The role of the utility and pricing in the transition  
Tim Nelson, AGL Energy and Judith McNeill, Univ. of New England

7. Intermittency: it’s the short-term that matters  
Daniel Rowe, Saad Sayeef and Glenn Platt, CSIRO Energy

**Part II. Competition, innovation, regulation, pricing**

8. Retail competition, advanced metering investments, and product differentiation: evidence from Texas  
Varun Rai, Univ. of Texas Austin and Jay Zarnikau, Univ. of Texas Austin & Frontier Associates

9. Rehabilitating retail electricity markets: pitfalls and opportunities  
Ralph Cavanagh and Amanda Levin, NRDC

10. Residential rate design and death spiral for electric utilities: efficiency and equity considerations  
Rasika Athawale and Frank Felder, Rutgers Univ.

11. Modeling the impacts of disruptive technologies and pricing on electricity consumption  
George Grozev, Stephen Garner, Zhengen Ren, Michelle Taylor, Andrew Higgins and Glenn Walden, CSIRO and Ergon Energy, Australia

12. Decentralized reliability options: Market based capacity arrangements  
Stephen Woodhouse, Pöyry Mgmt. Consulting

13. Network pricing for the prosumer future: Demand-based tariffs or locational marginal pricing?  
Darryl Biggar, Australian Competition and Consumer Commission and Andrew Reeves, former Chairman, Australian Energy Regulator

14. The evolution of smart grids begs disaggregated nodal pricing  
Günter Knieps, Univ. of Freiburg, Germany

**Part III. Utilities of the future – future of utilities**

15. Identifying value pools, building new business models  
Paul Nillesen, PwC and Michael Pollitt, Cambridge Univ.

16. European utilities – strategic choices and cultural prerequisites for the future  
Christoph Burger and Jens Weinmann, European School of Mgmt. and Technology

17. Thriving despite disruptive technologies: German utilities’ case study  
Sabine Löbbe, Reutlingen University and Gerhard Jochum, Büro Jochum

18. The future of utility customers and utility customers of the future  
Robert Smith, East Economics and Iain MacGill, Univ. of NSW

Luis Boscán, Copenhagen Business School and Rahmattallah Poudineh, Oxford Inst. for Energy Studies

20. The repurposed distribution utility: roadmaps to getting there  
Philip Hanser and Kai Van Horn, The Brattle Group

21. The distributed utility: conflicts and opportunities  
Kevin Jones, Taylor Curtis, Marc de Konkoly Thege, Daniel Sauer, and Matthew Roche, Vermont Law School

22. The fully integrated grid: wholesale and retail, transmission and distribution  
Susan Covino, Paul Sotkiewicz and Andrew Levitt, PJM Interconnection LLC