

| | |
|-------------------------|--|
| 1. Record Nr. | UNINA9910585782103321 |
| Autore | Yujian Ye |
| Titolo | Modelling and analysing the market integration of flexible demand and storage resources // Ye Yujian |
| Pubbl/distr/stampa | Gateway East, Singapore : , : Springer, , [2022] ©2022 |
| ISBN | 9789811919640 9789811919633 |
| Descrizione fisica | 1 online resource (188 pages) |
| Disciplina | 333.7932015118 |
| Soggetti | Demand-side management (Electric utilities) Electric power systems - Mathematical models Energy industries |
| Lingua di pubblicazione | Inglese |
| Formato | Materiale a stampa |
| Livello bibliografico | Monografia |
| Nota di bibliografia | Includes bibliographical references and index. |
| Nota di contenuto | Intro -- Preface -- Contents -- Abbreviations -- 1 Introduction -- 1.1 Monograph Context -- 1.2 Monograph Motivation -- 1.2.1 Role of Flexible Demand and Energy Storage in the Emerging Power System Setting -- 1.2.2 Market-Based Realization of Flexible Demand and Energy Storage Flexibility -- 1.3 Monograph Scope and Original Contributions -- 1.3.1 Monograph Scope -- 1.3.2 Monograph Original Contributions -- 1.4 Monograph Outline -- References -- 2 Current Trends on Market Integration of Flexible Demand and Energy Storage -- 2.1 Introduction -- 2.2 Modelling Approaches for Flexible Demand and Energy Storage -- 2.3 Market Arrangements for Flexible Demand and Energy Storage -- 2.3.1 Centralized Market Clearing Mechanism -- 2.3.2 Decentralized Dynamic Pricing-Based Mechanism -- 2.4 Participation of Flexible Demand and Energy Storage in Different Market Segments -- 2.5 Centralized Market Clearing Mechanism with Flexible Demand and Energy Storage Participation -- 2.5.1 Assumptions on Examined Electricity Market Model -- 2.5.2 Model of Centralized Market Clearing Mechanism -- References -- 3 Factoring Flexible Demand Non-convexities in Electricity Markets -- 3.1 Introduction -- 3.2 Literature Review -- 3.3 Centralized Market Clearing Under Flexible |

Demand Participation -- 3.3.1 Modelling Generation Participants -- 3.3.2 Modelling Flexible Demand Participants -- 3.3.3 Centralized Market Clearing Solutions -- 3.4 Surplus Sub-Optimality Effects and Their Relation to Participants' Non-convexities -- 3.4.1 Surplus Sub-Optimality -- 3.4.2 Generation Non-Convexities and Impact on Surplus Optimality -- 3.4.3 Flexible Demand Non-convexities and Impact on Surplus Optimality -- 3.5 Generalized Uplifts Under Flexible Demand Participation -- 3.5.1 Lump-Sum Uplifts -- 3.5.2 Generalized Uplifts -- 3.5.3 Formulation of Minimum Discrimination Problem. 3.5.4 Solution Techniques of the Minimum Discrimination Problem -- 3.6 Convex Hull Pricing Under Flexible Demand Participation -- 3.6.1 Concept of Convex Hull Pricing -- 3.6.2 Lagrangian Formulation of Convex Hull Pricing Problem -- 3.6.3 Solution Techniques of the Lagrangian Dual Problem -- 3.7 Case Studies -- 3.7.1 Test Data and Implementation -- 3.7.2 Impact of Flexible Demand Non-Convexities -- 3.7.3 Generalized Uplift Approach -- 3.7.4 Convex Hull Pricing Approach -- 3.8 Conclusions -- References -- 4 Investigating the Impact of Flexible Demand and Energy Storage on the Exercise of Market Power by Strategic Producers in Imperfect Electricity Markets -- 4.1 Introduction -- 4.2 Literature Review -- 4.2.1 Modelling Imperfect Markets with Strategic Electricity Producers -- 4.2.2 Generation Market Power Mitigation -- 4.3 Modelling Market Participants -- 4.3.1 Strategic Generation Participants -- 4.3.2 Demand Participants -- 4.3.3 Energy Storage -- 4.4 Theoretical Analysis of Impact of Demand Side and Energy Storage on Market Power -- 4.4.1 Impact of Demand Own-Price Elasticity -- 4.4.2 Impact of Demand Shifting and Energy Storage -- 4.5 Modelling Oligopolistic Electricity Markets with Demand Shifting and Energy Storage -- 4.5.1 Bi-Level Optimization Model -- 4.5.2 MPEC Formulation -- 4.5.3 MILP Formulation -- 4.5.4 Determining the Oligopolistic Market Equilibrium -- 4.6 Case Studies -- 4.6.1 Test Data and Implementation -- 4.6.2 Impact of Demand Shifting and Energy Storage: Uncongested Network -- 4.6.3 Impact of Demand Shifting and Energy Storage: Congested Network -- 4.7 Conclusions -- References -- 5 Investigating the Exercise of Market Power by Strategic Flexible Demand and Energy Storage in Imperfect Electricity Markets -- 5.1 Introduction -- 5.2 Literature Review -- 5.2.1 Modelling Strategic Behaviour of Demand Participants. 5.2.2 Modelling Strategic Behaviour of Energy Storage Participants -- 5.3 Modelling Market Participants -- 5.3.1 Generation Participants -- 5.3.2 Demand Participants -- 5.3.3 Strategic Energy Storage -- 5.4 Qualitative Analysis of Demand Side and Energy Storage Market Power Capability -- 5.4.1 Market Power Potential of the Demand Side -- 5.4.2 Market Power Potential of Energy Storage -- 5.5 Optimizing Capacity Withholding Strategies of Energy Storage -- 5.5.1 Bi-Level Optimization Model -- 5.5.2 MPEC Formulation -- 5.5.3 MILP Formulation -- 5.6 Case Studies -- 5.6.1 Test Data and Implementation -- 5.6.2 Quantifying the Optimal Extent of Capacity Withholding by Energy Storage -- 5.6.3 Impact of Storage Size -- 5.6.4 Impact of the Characteristics of the Demand Side -- 5.6.5 Impact of the Characteristics of Wind Generation -- 5.6.6 Impact of Storage Location -- 5.7 Conclusions -- References -- 6 Conclusions and Future Work -- 6.1 Conclusions -- 6.2 Further Work -- 6.2.1 Modelling and Pricing Flexible Demand Non-convexities -- 6.2.2 Modelling and Analysing the Role of Flexible Demand and Energy Storage in Imperfect Markets -- References -- Appendix A Convexity Principles -- Appendix B Lagrangian Formulation of Convex Hull Pricing Problem

-- References.
