

Contents

1	Introduction	1
	References	7
Part I General Aspects		
2	Setting the Scene	11
2.1	General Remarks	11
2.2	Electricity Markets	11
2.2.1	General Remarks	11
2.2.2	The Wholesale Market	12
2.2.3	Participants in the Physical Wholesale Market	18
2.2.4	The Financial Market and the Emission Allowances Market	21
2.3	Business Models	23
2.3.1	General Remarks	23
2.3.2	Large Consumers and Retailers	23
2.3.3	Brokers and Portfolio Managers	24
2.3.4	Energy Merchants	25
2.3.5	Electricity Producers and Integrated Firms	27
2.4	The Physical Characteristics of Electrical Energy	38
2.5	Characteristic Issues	41
2.5.1	General Remarks	41
2.5.2	Grid Access, Delivery Point and Voltage Level	42
2.5.3	Volume	45
2.5.4	Transmission and Distribution Capacity	45
2.5.5	Balance	46
2.5.6	Measurement	51
2.5.7	The Separation of Physical Rights, Service Rights and Financial Rights	52

2.5.8	Core and Ancillary Services from the Perspective of an End Consumer or a Retailer	59
2.5.9	Price Volatility	62
2.6	Competition Models in the Physical Market	62
2.6.1	General Remarks	62
2.6.2	Choice of a Competition Model	63
2.6.3	Classification of Competition Models	66
2.7	Classification of Electricity Supply Contracts	69
2.7.1	General Remarks	69
2.7.2	Classification as Provision of Services or Sale of Goods in Contract Law	70
2.7.3	Result or Work, Supply for a Particular Purpose	79
2.7.4	Product Liability	81
2.7.5	Distance Contracts	85
	References	86
3	Introduction to the Regulation of Electricity Markets	91
3.1	General Remarks	91
3.2	Liberalisation	92
3.3	Regulatory Sectors	95
3.4	Brief History of Electricity Regulation	98
3.5	The Electricity Directives	101
3.5.1	The First Electricity Directive: Construction of Generation Capacity	101
3.5.2	The Second Electricity Directive: Retail Competition	103
3.5.3	The Directive on Security of Supply	105
3.5.4	The Third Electricity Directive: Effective Unbundling	105
3.5.5	Effective Unbundling	112
3.5.6	Network Codes	121
3.6	Competition Law	122
3.6.1	General Remarks	122
3.6.2	Structural Remedies	127
3.6.3	Foreclosure	130
3.7	Environmental Aspects and the Preferential Treatment of RES-E	139
3.7.1	General Remarks	139
3.7.2	Environmental Assessment	140
3.7.3	Prohibitions	142
3.7.4	Authorisations and Permits	142
3.7.5	TSO's Responsibilities	144
3.7.6	Emissions	145
3.7.7	RES-E and Conflicts Between Different Policy Objectives	149
3.7.8	State Aid	152

- 3.8 The Regulation of Marketplaces and Financial Markets 156
 - 3.8.1 General Remarks 156
 - 3.8.2 Similarities and Differences Between Financial Regulation and Electricity Regulation 156
 - 3.8.3 The Regulation of Marketplaces 159
- References 162

Part II Marketplaces

- 4 Electricity Marketplaces 169**
 - 4.1 General Remarks 169
 - 4.2 Introduction to European Electricity Exchanges 170
 - 4.3 Variation of Electricity Marketplaces 171
 - 4.4 The Organisation of Financial Electricity Exchanges in the EU . . . 175
 - 4.4.1 General Remarks 175
 - 4.4.2 The Operator 178
 - 4.4.3 Access to Trading 182
 - 4.4.4 The Central Counterparty, Clearing and Settlement . . . 189
 - 4.4.5 Margining, Daily Settlement and Netting 195
 - 4.5 The Organisation of Spot Exchanges in the EU 198
 - 4.5.1 General Remarks 198
 - 4.5.2 The Operator 201
 - 4.5.3 Access to Trading 202
 - 4.5.4 The Matching of Bids 204
 - 4.5.5 Excursion: Unbundled or Integrated Post-trading Systems 212
 - 4.5.6 The Central Counterparty 214
 - 4.5.7 Clearing 217
 - 4.5.8 Excursion: Clearing of Physical Flows in the N2EX Market 222
 - 4.5.9 Settlement 225
 - 4.6 Reduction of Counterparty Risk and Systemic Risk 234
 - 4.6.1 General Remarks 234
 - 4.6.2 Collateral Calls and Margin Requirements 235
 - 4.6.3 Set-Off and Netting 244
 - 4.7 Market Conduct, Market Abuse and Money Laundering 247
 - 4.7.1 General Remarks 247
 - 4.7.2 Open Ethical Standards, Good Business Conduct, Fairness 252
 - 4.7.3 Market Integrity and Transparency 260
 - 4.7.4 Prohibition of Insider Trading 280
 - 4.7.5 Prohibition of Market Manipulation 283
 - 4.7.6 Excursion: Market Manipulation Cases in the US 290
 - 4.7.7 Money Laundering 295

- 4.8 Particular Obligations and Regulatory Compliance 296
 - 4.8.1 General Remarks 296
 - 4.8.2 Scope 297
 - 4.8.3 Authorisation 304
 - 4.8.4 Capital Adequacy 306
 - 4.8.5 Mandatory Clearing 307
- 4.9 Market Surveillance 309
- 4.10 The Balancing Market 312
 - 4.10.1 General Remarks 312
 - 4.10.2 Introduction to the Mechanisms of Balancing 315
 - 4.10.3 Mechanisms Used by the System Operator 321
 - 4.10.4 Synchronous Areas, Coordinated Balancing Areas 326
 - 4.10.5 Balancing Marketplaces 330
- References 343
- 5 Transmission Marketplaces 347**
 - 5.1 General Remarks 347
 - 5.2 Long-Term Contracts 352
 - 5.3 Mechanisms for Capacity Allocation Between Market Participants 353
 - 5.4 Models for the Allocation of Transmission Capacity Between Designated Flows 356
 - 5.5 Congestion Alleviation Methods 360
 - 5.5.1 General Remarks 360
 - 5.5.2 Financial Methods 361
 - 5.5.3 Physical Methods 362
 - 5.6 Models for Capacity Allocation in the EU 365
 - 5.6.1 General Remarks 365
 - 5.6.2 Access to Intra-Zonal Transmission Capacity in the EU 368
 - 5.6.3 Allocation of Cross-Zonal Transmission Capacity in the EU 370
 - 5.6.4 Allocation of Cross-Border Transmission Capacity in the EU 373
 - 5.6.5 Summary of Regulation in the Light of EFET Key Principles 375
 - 5.7 Pricing Models 382
 - 5.7.1 General Remarks 382
 - 5.7.2 Costs 385
 - 5.7.3 Classification of Pricing Models 388
 - 5.7.4 Pricing Models: Approach to Flow 390
 - 5.7.5 Pricing Models: Distance Sensitivity 393
 - 5.7.6 Pricing Models: Approach to Geographical Electricity Price Differentiation 396

5.8	Transmission Pricing Models in the EU	400
5.8.1	General Remarks	400
5.8.2	Allocation of Costs Between Generation and Load . . .	401
5.8.3	Models for the Pricing of Transmission Services: Main Rules	406
5.8.4	Particular Models for the Pricing of Transmission Services	409
	References	414
6	Market Coupling	419
6.1	General Remarks	419
6.2	Models for Market Coupling	424
6.3	EU Law	426
6.4	Examples of Market Coupling	429
6.4.1	European Initiatives	429
6.4.2	CWE	432
6.4.3	CWE-Nordic (ITVC)	433
6.4.4	NWE	434
6.4.5	France, Germany, Austria and Switzerland (EPEX Spot)	436
6.4.6	The Nordic and Baltic Countries (Nord Pool Spot) . . .	438
6.5	Excursion: Germany—Denmark East (Kontek)	439
	References	443
7	Electricity Generated from Renewable Sources and Emission Marketplaces	445
7.1	General Remarks	445
7.2	The Preferential Treatment of RES-E	446
7.2.1	Regulation	446
7.2.2	Signalling the Use of RES-E	453
7.3	Emissions Trading	453
7.3.1	General Remarks	453
7.3.2	Allocation of Emission Allowances	455
7.3.3	Secondary Trading	458
	References	458
 Part III Physical Contracts		
8	Long-Term Electricity Supply Contracts	463
8.1	General Remarks	463
8.2	Business Models	468
8.2.1	General Remarks	468
8.2.2	Excursion: Block-Ownership	470
8.2.3	The Business Models of the Electricity Producer: Basic Business Models	471
8.2.4	End Consumer’s Alternatives to Vertical Integration	483

8.2.5	Long-Term Supply Contracts and Competition Law	484
8.3	Introduction to Master Trading Agreements	488
8.4	The EFET General Agreement	490
8.4.1	General Remarks	490
8.4.2	Scope	491
8.4.3	Conclusion of Individual Contracts	492
8.4.4	The Single Agreement Concept	493
8.4.5	Payments, Netting, Tax, Collateral	494
8.4.6	Contract Period, Assignment, Changed Circumstances, Termination, Close-Out Netting	496
8.4.7	Remedies and Limitations of Liability	502
8.4.8	Terms Characteristic of Electricity Supply Contracts	504
8.4.9	Physical Electricity Options	506
8.5	The Objectives of the Parties	507
8.5.1	General Remarks	507
8.5.2	Grid Access, Delivery Point, Voltage Level	507
8.5.3	Volume	510
8.5.4	Balance	517
8.5.5	Metering	519
8.5.6	Price	519
8.5.7	Settlement	525
8.6	Excursion: The Preferential Treatment of RES-E as an Alternative	527
	References	527
9	Balancing Contracts and Balance Group Contracts	531
9.1	General Remarks	531
9.2	Balance Responsible Party and Balance Group Contracts	532
9.3	Balancing Contracts	535
9.3.1	General Remarks	535
9.3.2	Example: Germany	537
9.4	Demand Management	539
	References	540
10	Transmission Contracts	543
10.1	General Remarks	543
10.2	Connecting the Customer's Assets to the Transmission Network	547
10.2.1	General Remarks	547
10.2.2	Contract Terms	548
10.2.3	Microgeneration	551
10.3	Energising the Point of Connection	554
10.4	Allocation of Transmission Capacity and Scheduling	554
10.5	Exchange of Information and Metering	555

- 10.6 Compliance with Technical Requirements 556
- 10.7 Preventing the Flow, De-energisation, Disconnection, Termination, Curtailment 557
 - 10.7.1 General Remarks 557
 - 10.7.2 Preventing the Flow 557
 - 10.7.3 Curtailment 562
- 10.8 Firmness and Transferability 565
- 10.9 Losses and Transmission Pricing 566
- 10.10 Sanctions for Unauthorised Use 566
- 10.11 Allocation of Liability 567
- References 568

Part IV Financial Contracts

- 11 Financial Contracts 571**
 - 11.1 General Remarks 571
 - 11.2 Exchange-Traded Electricity Futures 577
 - 11.3 Exchange-Traded Electricity Options 581
 - 11.4 Spark-Spread Options 590
 - 11.5 Electricity Swaps 592
 - 11.5.1 General Remarks 592
 - 11.5.2 Price Swaps 593
 - 11.5.3 Locational Basis Swaps 594
 - 11.5.4 Trading, Clearing, Margins 595
 - 11.6 ISDA Master Agreement 596
 - 11.6.1 General Remarks 596
 - 11.6.2 Single Agreement 597
 - 11.6.3 Default, Early Termination, Close-Out Netting 598
 - 11.6.4 Settlement 600
 - 11.7 Excursion: The Definition of “Swaps” in the US 600
 - References 602
- 12 Financial Derivatives on Transmission Capacity 605**
 - 12.1 General Remarks 605
 - 12.2 Physical Transmission Rights 606
 - 12.3 Financial Transmission Rights 607
 - 12.4 Contracts for Difference 611
 - 12.5 Hedging 612
 - 12.6 Transmission Congestion Contracts 613
 - 12.7 Secondary Market 613
 - References 614