A EUROPEAN MARKET FOR ELECTRICITY?

Monitoring European Deregulation 2
Monitoring European Deregulation 2

Lars Bergman  
*Stockholm School of Economics and SNS*

Gert Brunekreeft  
*Albert-Ludwigs Universität Freiburg*

Chris Doyle  
*Director, London Economics and University of Warwick*

Nils-Henrik M von der Fehr  
*University of Oslo*

David M Newbery  
*Department of Applied Economics, University of Cambridge and CEPR*

Michael Pollitt  
*Judge Institute of Management Studies, University of Cambridge*

Pierre Régibeau  
*University of Essex and CEPR*

Romesh Vaitilingam (Editor)
Centre for Economic Policy Research

The Centre for Economic Policy Research is a network of almost 500 Research Fellows, based primarily in European universities. The Centre coordinates its Fellows’ research activities and communicates their results to the public and private sectors. CEPR is an entrepreneur, developing research initiatives with the producers, consumers and sponsors of research. Established in 1983, CEPR is a European economics research organization with uniquely wide-ranging scope and activities.

CEPR is a registered educational charity. Institutional (core) finance for the Centre is provided by major grants from the Economic and Social Research Council, under which an ESRC Resource Centre operates within CEPR; the Esmée Fairbairn Charitable Trust and the Bank of England. The Centre is also supported by the European Central Bank; the Bank for International Settlements; 22 national central banks and 45 companies. None of these organizations gives prior review to the Centre’s publications, nor do they necessarily endorse the views expressed therein.

The Centre is pluralist and non-partisan, bringing economic research to bear on the analysis of medium- and long-run policy questions. CEPR research may include views on policy, but the Executive Committee of the Centre does not give prior review to its publications, and the Centre takes no institutional policy positions. The opinions expressed in this report are those of the authors and not those of the Centre for Economic Policy Research

Executive Committee
Co-Chairmen
Guillermo de la Dehesa
Anthony Loehnis
Jan Krysztof Bielecki
Diane Coyle
Quentin Davies, MP
Bernard Dewe Mathews
Francesco Giavazzi

Denis Gromb
Philippe Lagayette
Peter Middleton
Rafael Repullo
Bridget Rosewell

Mario Sarcinelli
Kermit Schoenholtz
Philippe Weil

Officers
President
Richard Portes

Chief Executive Officer
Stephen Yeo

Research Director
Mathias Dewatripont

October 1999
SNS

SNS – the Swedish Center for Business and Policy Studies – is a private, non-profit organization with the aim of promoting research on economic and social issues of importance to public decision-makers, and making it readily accessible to a broad audience. To this aim, SNS engages social scientists at leading universities in applied research on topical policy problems. It is also one of Sweden’s major publishers in the social sciences.

SNS was established in 1948 as an association of concerned individuals in the Swedish business community. Today, SNS has 4000 individual members organised in 50 local chapters in Sweden and abroad. An important source of funding is annual contributions from 270 subscribers, including Sweden’s largest corporations and most important government agencies. Other major sources of funding are research grants, book sales, and conference fees.

SNS sees its unique role in Sweden as a bridge between social science research and decision-making in business and public life. It provides an independent forum for discussion of policy issues among prominent individuals in business, the political sphere, the media and the academic community. As an organization, SNS does not take a stand on policy matters.

Executive Board
Chairman Carl-Johan Bonnier
Vice Chairman Roger Holtback
Inga-Britt Ahlenius Torsten Persson
Katja Elväng Hans Tson Söderström
Lars Frithiof Lars H Thunell
Ingemar Hansson Michael Treschow

Officers
President and CEO Hans Tson Söderström
Vice President Birgitta Swedenborg
Research Directors Göran Arvidsson
Per Molander Olof Petersson Stefan Sandström

October 1999
INTRODUCTION: EUROPE’S NETWORK INDUSTRIES: TOWARDS COMPETITION

Chris Doyle and Martin Siner

0.1 The evolution of competition and regulation 3
0.2 Air transport 6
  0.2.1 Computer reservation systems 7
  0.2.2 Airport landing and take-off slots 7
  0.2.3 Ground handling facilities 8
  0.2.4 Access charges 8
  0.2.5 Alliances 8
  0.2.6 State aid 9
0.3 Maritime transport 9
0.4 Rail transport 10
0.5 Natural gas 11
0.6 Postal services 12
0.7 Telecommunications 13
  0.7.1 January 1998 – the beginning of a new era 13
  0.7.2 Interconnection – the devil is in the detail 16
  0.7.3 Number portability and carrier pre-selection – United Kingdom ahead and behind 18
  0.7.4 Access and local loop unbundling 19
  0.7.5 Universal service – France and Italy stand out, others to follow? 20
  0.7.6 Convergence 21
  0.7.7 Mobile telephony and voice over IP 21
  0.7.8 The 1999 Telecommunications Review 22
0.8 Concluding remarks 23
## PART 1 ISSUES IN ELECTRICITY MARKET INTEGRATION AND LIBERALIZATION

*Michael Pollitt*

### 1 Electricity Market Integration and Liberalization

1.1 The structure of the electricity industry  
1.2 A single electricity market in Europe?

### 2 Progress with European Electricity Liberalization

2.1 The pace of liberalization  
2.2 Ownership  
2.3 Vertical integration  
2.4 Mergers  
2.5 Prices and costs  
2.6 Regulation  
2.7 The role of the European Commission

### 3 The Social and Political Context of Electricity Supply

3.1 Public service and obligations to supply  
3.2 Security of supply  
3.3 Environmental effects of electricity  
3.4 Electricity subsidies to encourage employment  
3.5 Social impacts as constraints on free trade

### 4 Current Impediments to Efficient Trade in Electricity

4.1 Ownership restrictions  
4.2 Entry restrictions  
4.3 Market structure  
4.4 Market power  
4.5 Access to networks  
4.6 Transmission constraints and expansion of the transmission network  
4.7 Trading arrangements and market design  
4.8 Stranded contracts  
4.9 Subsidies  
4.10 Electricity and fuel taxes

### 5 The EU Electricity Directive

5.1 The EU Electricity Directive  
5.2 Complying with the Directive  
  5.2.1 Generation  
  5.2.2 Transmission and system operation  
  5.2.3 Distribution and retailing  
5.3 Progress with implementing the Directive
PART 2  COUNTRY STUDIES

Lars Bergman, Gert Brunekreeft, Nils-Henrik M von der Fehr, David M Newbery and Pierre Régibeau

6  The UK Experience: Privatization with Market Power  89
   6.1 Restructuring and ownership changes  89
   6.2 Industrial structure and market power  93
      6.2.1 The electricity pool  93
      6.2.2 Achieving effective competition in generation  95
   6.3 Performance
      6.3.1 The impact of competition on performance  99
      6.3.2 Performance in Scotland and Northern Ireland  102
   6.4 Regulation
      6.4.1 Regulating distribution  104
      6.4.2 Regulating transmission  105
   6.5 Support for renewables  106
   6.6 Current issues and debates  108
   6.7 Costs and benefits of liberalizing the franchise market  112
   6.8 Conclusions  114

7  The Nordic Experience: Diluting Market Power by Integrating Markets  116
   7.1 The Nordic market
      7.1.1 Generation mix  117
      7.1.2 Market concentration  118
      7.1.3 System operation  118
   7.2 Nord Pool and ELBAS
      7.2.1 The Elspot market  120
      7.2.2 The Eltermin market  122
   7.3 Norway
      7.3.1 Industry structure and regulatory reform  123
      7.3.2 The wholesale market – competition in generation  126
      7.3.3 Competition in the retail market  128
      7.3.4 Regulation of the networks  131
      7.3.5 Conclusion  135
   7.4 Sweden
      7.4.1 The restructuring process  137
      7.4.2 System control and transmission pricing  137
      7.4.3 Regulation  139
      7.4.4 Ownership changes  140
      7.4.5 Market power  141
      7.4.6 Performance: prices and competition  142
      7.4.7 Performance: regulation  144
      7.4.8 Current issues and debates  145
8 Germany: Negotiating Access
8.1 Industry structure 147
8.2 Legislative setting 150
  8.2.1 Entry and access 150
  8.2.2 Access charges 152
  8.2.3 Regulation 155
  8.2.4 Separate accounts 157
8.3 Early experiences and current debates 158
8.4 Conclusions 162

9 Regulatory Reform in the Spanish Electricity Industry: Same as it Ever Was?
9.1 Evolution of market structure and ownership 164
9.2 Investment decisions 167
9.3 Pricing mechanisms 167
  9.3.1 The wholesale market 168
  9.3.2 Regulated prices 169
  9.3.3 Evaluation 171
9.4 Input markets 175
9.5 Regulatory process and institutions 177
9.6 Conclusions 178

10 France: If it Ain’t Broke?
10.1 French electricity means EdF 182
10.2 The reform 184
10.3 Evaluation 188
10.4 EdF: national champion and social instrument 191
10.5 International competition 193
10.6 Conclusion 194

11 Hungary: Restructuring, Privatization but Delayed Price Adjustment
11.1 Restructuring and ownership changes 196
  11.1.1 Privatization 197
11.2 The regulatory structure 199
11.3 Operation and pricing 201
11.4 Structural tensions in the present system 203
  11.4.1 Competitive tenders for new power 207
11.5 Reform issues 208
  11.5.1 Tariff structure and level 209
11.6 Further restructuring and privatization 211
11.7 Conclusions 212
PART 3 POLICY LESSONS FOR THE EUROPEAN ELECTRICITY MARKET

Lars Bergman, Nils-Henrik M von der Fehr, David M Newbery and Pierre Régibeau

12 The Problems and Experience of Liberalization

12.1 Progress to date

12.1.1 Ownership and concentration
12.1.2 Vertical separation
12.1.3 Transmission
12.1.4 Investment
12.1.5 Electricity markets
12.1.6 Regulation and social policies

12.2 Different models for different situations?

12.2.1 Access to primary energy sources and initial fuel mix
12.2.2 Initial industry structure
12.2.3 Social preferences
12.2.4 Initial conditions and subsequent policy choices

12.3 Policy lessons

13 EU Issues and Recommendations

13.1 Structural reform

13.1.1 Generation
13.1.2 Transmission and system operation
13.1.3 Unbundling
13.1.4 Access to transmission
13.1.5 Distribution and retailing

13.2 Trading arrangements

13.2.1 Physical trade
13.2.2 Transmission pricing
13.2.3 Financial contracts markets
13.2.4 Retailing

13.3 Market integration and international trade

13.3.1 Transaction-based and non-transaction-based approaches
13.3.2 Outline of a cross-border transmission pricing system

13.4 Public service obligations

13.4.1 Universal service and consumer protection
13.4.2 Environmental protection

13.5 Visions of the single electricity market

13.6 Concluding remarks

Glossary
Bibliography
Index
MED Steering Committee Members

Lars Bergman
Stockholm School of Economics and SNS

Damien Neven
Université de Lausanne and CEPR

David M Newbery
Department of Applied Economics, University of Cambridge and CEPR

Lars-Hendrik Röller
Wissenschaftszentrum Berlin für Sozialforschung and CEPR
Reference Group Members: MED 2 (Electricity)

Lennart Lundberg, formerly Vattenfall (Sweden) (Chairman)

István Bakács/András Kascó, Magyar Villamos Művek (Hungary)

Peter Cox/Andrew Foster, OM Gruppen (Sweden)

Michael Gibbons, PowerGen (United Kingdom)

Stig Göthe, Vattenfall (Sweden)

Kyran Hanks/Peter Styles, Enron Europe (United Kingdom)

Knut Herstad, EnFo (Norway)

Leif Josefsson, Sydkraft (Sweden)

Jan Magnusson/Roger Kearsley, Svenska Kraftnät (Sweden)

Thomas Meyer, Preussen Elektra (Germany)

Dave Sowden/Mike Calviou, National Grid Group (United Kingdom)

Georg Styrbro, Eltra (Denmark)

Timo Toivonen, Fingrid (Finland)

Jean-Michel Trochet, Electricité de France (France)
List of Figures

Figure 0.1  Number of operators authorized to offer national public voice telephony, August 1998 15
Figure 0.2  Interconnection charges per minute, March 1999 17
Figure 0.3  Local loop unbundling through copper line rental 19
Figure 6.2  Generation in England and Wales 92
Figure 6.2  UK electricity supply by fuel 93
Figure 6.3  Prices in the Electricity Pool at 1995/6 constant prices (monthly averages) 96
Figure 6.4  CEGB costs/unit equivalent output at 1994/5 prices 101
Figure 6.5  Real electricity prices CEGB industry and domestic 101
Figure 7.1  Statnett Marked/Nord Pool, trade and prices, weekly 1991/7 121
Figure 10.1  Output by plant type (TWh, 1997) 183
Figure 11.1  Structure of electricity prices: Hungary 1997, United Kingdom 1993–7 202
Figure 11.2  Real domestic electricity and gas prices: Hungary and United Kingdom 1970–99 204
Figure 11.3  Industrial electricity prices pre-tax at PPP rates 205
Figure 11.4  Domestic electricity prices pre-tax at PPP rates 206

List of Boxes

Box 0.1  The evolution of competition 4
Box 0.2  The evolution of regulatory activity 4
List of Tables

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1</td>
<td>Obstacles to competition in network industries and remedies</td>
<td>3</td>
</tr>
<tr>
<td>0.2</td>
<td>Europe's network industries in 1999</td>
<td>5</td>
</tr>
<tr>
<td>0.3</td>
<td>Status of National Regulatory Authorities (NRAs) in Europe</td>
<td>14</td>
</tr>
<tr>
<td>0.4</td>
<td>Status of licensing in Europe</td>
<td>14</td>
</tr>
<tr>
<td>0.5</td>
<td>Status of interconnection in Europe</td>
<td>18</td>
</tr>
<tr>
<td>0.6</td>
<td>Status of LLU in Europe in early 1999</td>
<td>20</td>
</tr>
<tr>
<td>1.1</td>
<td>Generation technology (as a percentage of national output), 1996</td>
<td>30</td>
</tr>
<tr>
<td>1.2</td>
<td>Transmission and distribution systems (using national definitions), 1997</td>
<td>32</td>
</tr>
<tr>
<td>1.3</td>
<td>Structure of electricity demand (as a percentage of final sales), 1996</td>
<td>33</td>
</tr>
<tr>
<td>2.1</td>
<td>Market openness in selected countries at 19 February 1999</td>
<td>38</td>
</tr>
<tr>
<td>2.2</td>
<td>Electricity prices, 1998</td>
<td>43</td>
</tr>
<tr>
<td>2.3</td>
<td>Generating capacity and output, 1996</td>
<td>44</td>
</tr>
<tr>
<td>2.4</td>
<td>European National Regulatory Authorities in electricity</td>
<td>46</td>
</tr>
<tr>
<td>2.5</td>
<td>Powers and functions of National Regulatory Authorities</td>
<td>48</td>
</tr>
<tr>
<td>3.1</td>
<td>Attitudes to nuclear power in countries with existing nuclear stations</td>
<td>55</td>
</tr>
<tr>
<td>3.2</td>
<td>Electricity share of national atmospheric emissions in selected countries, 1996</td>
<td>56</td>
</tr>
<tr>
<td>3.3</td>
<td>Employment in the primary energy sector of selected countries, 1996</td>
<td>59</td>
</tr>
<tr>
<td>4.1</td>
<td>Restrictions on electric utility ownership in selected countries</td>
<td>63</td>
</tr>
<tr>
<td>4.2</td>
<td>Market shares of renewables as a percentage of total generation, 1996</td>
<td>73</td>
</tr>
<tr>
<td>4.3</td>
<td>Tax rates on electricity and fuel for electricity generation, 1997</td>
<td>75</td>
</tr>
<tr>
<td>5.1</td>
<td>Implementation of the EU Electricity Directive as at 19 February 1999</td>
<td>82</td>
</tr>
<tr>
<td>7.1</td>
<td>Maximum import/export capacity between the Nordic countries, 1998 (MW)</td>
<td>117</td>
</tr>
<tr>
<td>7.2</td>
<td>Power generation in the Nordic countries, 1998 (GWh)</td>
<td>117</td>
</tr>
<tr>
<td>7.3</td>
<td>Power generation and trade in 1995 and 1996 (GWh)</td>
<td>118</td>
</tr>
<tr>
<td>7.4</td>
<td>Annual turnover at Nord Pool, 1993–9 (TWh)</td>
<td>122</td>
</tr>
<tr>
<td>7.5</td>
<td>Electricity prices, 1994</td>
<td>124</td>
</tr>
<tr>
<td>7.6</td>
<td>Ownership of generation capacity, 1996</td>
<td>124</td>
</tr>
<tr>
<td>7.7</td>
<td>Networks</td>
<td>131</td>
</tr>
<tr>
<td>7.8</td>
<td>Network tariffs, 1996</td>
<td>131</td>
</tr>
<tr>
<td>7.9</td>
<td>Ownership of generation and distribution, 1990</td>
<td>140</td>
</tr>
<tr>
<td>7.10</td>
<td>Electricity prices (öre/kWh) for household consumers, 1996–9</td>
<td>143</td>
</tr>
<tr>
<td>7.11</td>
<td>The ranges of household electricity prices (öre/kWh), 1996–9</td>
<td>143</td>
</tr>
<tr>
<td>7.12</td>
<td>Electricity distribution prices (öre/kWh) for household consumers</td>
<td>144</td>
</tr>
</tbody>
</table>
List of Tables

Table 8.1 Market shares and concentration ratios in 1994 production 149
Table 8.2 The German ESI 150
Table 8.3 ‘Fictional’ numbers for the various price components in the access charges 159
Table 9.1 Market shares in generation and distribution, 1995 165
Table 9.2 Transmission lines and substations, 1996 166
Table 9.3 Components of the average gross wholesale price, 1998 172
Table 9.4 Average marginal prices in daily and intraday markets (Pesetas per kWh) 173
Table 9.5 Net available capacity by fuel type, 1995 (% of total net available capacity) 175
Table 10.1 EdF’s installed capacity by fuel type, 1997 183
Table 10.2 EdF’s financial data 184
Table 10.3 Temporary access tariffs 186
Table 10.4 International comparison of transmission charges 188
Table 10.5 Electricity price indices, 1997, before taxes (France = 100) 192
Table 12.1 Ownership and concentration 218
Table 12.2 Vertical separation and distribution 220
Table 12.3 Transmission 221
Table 12.4 Investment 222
Table 12.5 National electricity markets 223
Table 12.6 Regulators and social policies 225
The regulation of network industries has emerged as a key issue on the European policy agenda, yet there is little high quality research capable of informing European policy-makers on these issues. In 1997, the Centre for Economic Policy Research (CEPR) and the Swedish Center for Business and Policy Studies (SNS) therefore launched a new series of reports on *Monitoring European Deregulation*. The aim is to bring together annually a team which includes some of Europe’s leading researchers in the field of network industries to specifically address the issues of regulation and deregulation in Europe. The first Report was published in September 1998. The initial section of the 1998 Report concentrated on the general issues which arise in the regulation of network industries, with a second section focusing specifically on the telecoms industry.

This is the second report launched as part of the *Monitoring European Deregulation* initiative and concentrates on the deregulation of the electricity industry. As with the previous title, the authors begin with a comprehensive guide to the key economic developments currently affecting the network industries as a whole. The detailed study of the deregulation of the electricity industry which follows is split into three distinct sections: the authors begin by analysing the key issues in electricity market integration and liberalisation; this is followed by six country studies; and then, in the final part of the Report, the authors examine the problems and experiences of liberalisation and the policy choices facing the regulators.

The research was financially supported by a number of European companies in the electricity industry. A Reference Group consisting of representatives of these companies (see the list on page xiii) commented on drafts and provided advice to the authors on the issues raised in the Report. The authors enjoyed complete academic freedom in writing the Report, but the industry practitioners in the Reference Group thereby played a valuable role in its preparation. CEPR and SNS are grateful for the financial support that made this venture possible and for the help and enthusiasm provided by members of the Reference Group, chaired by Mr Lennart Lundberg, former Senior Executive Vice President of Vattenfall (Sweden). A research grant from the Swedish Competition Authority is also gratefully acknowledged.

We would also like to thank the authors for all their hard work in producing this insightful Report which will, we are confident, be of great value to anyone interested in deregulation issues. The views expressed in the Report are those of the authors writing in their personal capacity and neither CEPR nor SNS take any institutional policy positions.

Hans Tson Söderström                        Stephen Yeo
*President and Chief Executive Officer*     *Chief Executive Officer*
*SNS*                                       *CEPR*

October 1999
Executive Summary

All current members of the European Union and quite a few hopefuls are liberalizing their electricity markets. Some, like Sweden and the United Kingdom, started the process several years ago and have already accumulated significant experience. Others, spurred into action by the European Commission’s Electricity Directive, which was issued in February 1997 and targeted for implementation by February 1999, have just begun to implement their new regulatory framework.

This Report, the second in the Monitoring European Deregulation series, explores the obstacles to a single European market for electricity, examining the policy choices facing the regulators at both national and EU levels. The Report combines analyses of key issues in electricity-market integration and liberalization with evaluations of practical experiences in the United Kingdom, the Nordic countries, Germany, Spain, France and Hungary. These experiences suggest one important lesson, according to the Report: liberalized electricity systems work – the technical breakdowns predicted by the sceptics just have not happened in the EU.

There has been great variety in different national experiences of liberalization in terms of the degree of concentration in generation, the stringency of unbundling requirements, the design of market mechanisms, and the extent and nature of public ownership and regulatory institutions. By combining theory with this empirical evidence, however, the Report is able to reach a number of significant conclusions and make several bold policy recommendations. It draws a distinction between observations that are relevant to the design of national electricity systems and those that are of particular importance to the emergence of a single European market for electrical power.

I. National issues

At the national level, the Report unambiguously calls for:

- **Reducing concentration in generation.** Whenever market size and the minimum efficient scale of existing power plants allow, a redistribution of generation assets is the preferred approach. The distribution of ownership appears to matter more than its public or private character.

- **Separation of ownership between natural monopoly elements of the system and other activities.** Accounting or even legal separation are not sufficient.

- **Ownership of the transmission system in the hands of the transmission system operator.** Where the whole transmission system is under single ownership, there are advantages in having systems operation in the hands of the transmission system operator. This ensures the solvency of the transmission system operator, which can then be made subject to powerful incentive schemes. In the case of several grids under separate ownership, transmission systems operation should be independent.
Regulated third party access to networks. This is more transparent and hence preferable to both negotiated third party access and the single buyer model. These two alternatives give vertically integrated transmission owners the power to delay the transactions of their rivals. They are also likely to result in stranded contracts, which would hamper further liberalization of the market.

Universal service requirements and environmental policy objectives to be met through a combination of licensing requirements, taxes and emission permits. In a liberalized market, such goals are achievable using these instruments.

Not all aspects of regulatory reforms lend themselves to such bold recommendations. It is, for example, too early to evaluate fully the effect of liberalization on investment incentives. Nevertheless, it appears that explicit incentives, such as capacity payments, are needed and that tender auctions might be the most efficient way of securing non-financially viable renewable generation or even some ancillary services. It is also a little early for a thorough evaluation of the benefits of retail competition. The evidence so far is that retail competition based on metering does not work. On the other hand, competition based on profiling with caps on transaction fees might be effective.

Finally, there are aspects of market design for which there is no clear choice. For example, generation contracts with decentralized dispatch can, in theory, achieve overall system efficiency provided that transmission tariffs are adjusted continuously and all agents react rationally to price changes. In practice, however, transmission tariffs are bound to be imperfect, so that the coordination function of a mandatory pool with centralized dispatch becomes valuable. In this regard, the proposed reform of the trading arrangements in England and Wales, moving from a mandatory gross pool to a balancing pool, could provide some useful evidence.

II. Single market issues

If the single market for electricity is to become reality, it must be as easy to trade electrical power between countries as between different parts of the same country. Access charges are the key to an integrated electricity market, the Report argues. Europe needs a transmission pricing system with the following characteristics:

- Access charges that are simple, transparent and only depend on the point of connection.
- An allocation of charges between entry and exit points that is uniform across jurisdictions and allocates at least a small share to the entry point.
- Some geographic differentiation of access charges to provide incentives to relieve congestion and reduce overall transmission loss.
- A scheme for financial compensation between transmission system operators for transit and loop flows.
III. An agenda for the European Commission

The Report concludes that the Commission should consider supplementing the Electricity Directive with:

- A required separation of ownership between generation and transmission/distribution.
- Strict competition policy oversight of integration between generation and retailing (supply).
- Harmonizing non-tariff conditions for access to transmission and distribution networks.
- The promotion of international transmission pricing rules based on the principles described under the single market issues above.
- The creation of a body in charge of identifying the need for new interconnection facilities, allocating the cost of these facilities between participants and drawing up compensation schemes that ensure a fair and efficient recovery of these costs.
- The organization of a system of trading permits for emissions.
Acknowledgements

During drafting we received comments from a wide range of people and are grateful to everyone who contributed to this project.

Chris Doyle would like to thank Martin Siner, London Business School, for his invaluable contribution in co-writing the Introduction with him. Chris Doyle is also grateful to Giovanni Amendola, Director of Regulatory Affairs at Telecom Italia, for comments received on earlier drafts. David Newbery and Michael Pollitt thank, in particular, the constructive comments from Richard Green and Tanga McDaniel (participants on the ESRC ‘Developing Competition in British Energy Markets’ project) on whose work they built. David Newbery would also like to thank several advisors, particularly Kyran Hanks and András Kascó, who made additional comments during the writing of the Report.

We received excellent and very valuable comments when a preliminary version of the Report was presented to a meeting at the European Commission in Brussels in June 1999. Special thanks go to Pier Paolo Merolla of DGIII and Christopher Jones of DGXVII for the comments and to Ioannis Ganoulis and Geert Dancet for organising the meeting.

We are also particularly grateful to Romesh Vaitilingam who read and edited the entire manuscript and made many constructive comments and suggestions for improvement throughout the writing of the Report.

David Newbery and Michael Pollitt would like to acknowledge the ongoing support of the ESRC ‘Developing Competition in British Energy Markets’ project (grant number R000236828). Lars Bergman would like to thank the Swedish National Energy Administration for the continuing support of his research programme ‘Energy Markets, Energy Policy and Society’. Chris Doyle would like to acknowledge support from the London Business School Regulation Initiative and Phare ACE project ‘Emerging Liberalised Telecommunications Market: Interconnection and Tariff Policies in Central European Countries’ (grant number P96-6100-R).

The views expressed in this Report are our own, and all errors are, of course, our own responsibility.