administrative incentive pricing (AIP) 217, 218
air-conditioner cycling programmes 110
airwave access 50
Alaska, gas exports to US 99
alternating current (AC) networks 90
analogue spectrum rights 216
Anderson, Terry 44
anti-competitive hoarding 218
Argentina, user-pays transmission arrangements 24–6
Asset Pricing (Cochrane) 195–6
AT&T Wireless 55
auctions
electricity markets 20–21
spectrum 40, 217
Australia, electricity markets 16, 18, 23–4
barbed wireless hypothesis 44, 54
Barcelona European Council 79
barriers to competition 42, 209
BBC (British Broadcasting Corporation) 213, 214
Beesley, Michael 205
Belgium, postal sector 121, 132, 154
Bencikler, Yochai 43
BETTA (British Electricity Trading and Transmission Arrangements) 91
Better Regulation Task Force (BRTF) 171–2
blackouts 83, 85, 90–91, 118
bottlenecks 208–10, 211, 221, 222, 224
Brazil, electricity crisis 84–5
British Airways Authority 200
British Electricity Trading and Transmission Arrangements (BETTA) 91
British Gas 31
British Telecommunications plc (BT) 199, 208–9, 210–11, 222
broadband networks 54, 222, 224
broadcasting, strategic approach to regulation 212–16, 224
benefits of 213–14
competition in 212, 213
digital 215–16
relevance of failure 215
BT (British Telecommunications plc) 199, 208–9, 210–11, 222
Buenos Aires 25
bulk mail 121, 164
cable 208, 212, 213, 221, 222, 227
California, electricity markets 21, 32, 84, 106
Canada
electricity crisis, Ontario 84–5
electricity markets 14, 18, 100
capital asset pricing model (CAPM) 192–3, 195, 196–8
capital, cost of 190
capital asset pricing model 192–3, 195, 196–7
debt overhang 191, 194
different costs for different parts of the business 198–200
estimation, proposal for conflict reduction 200
financeability 192, 193, 194–5
leverage 189–92
other models 195–8
three-factor model 195–8, 200
CBS (Columbia Broadcasting System) 42, 57
CCGT (combined-cycle gas turbine) technology 101, 110, 111
CDMA (code division multiple access) networks 41, 47, 48, 51
CEER (Council for European Energy Regulators) 69–70
cellular markets 49, 50
Central Electricity Generating Board (CEGB) 11
Central Park commons analogy 44–6, 48
CERP (Committee for European Postal Regulators) 130
Chile, electricity crisis 84–5
Chiltern Line 181
China, DHL expansion into 122
Cingular 55
climate change 34
Coase, R. 37, 39–40, 42, 56
Cochrane, John 195
code division multiple access (CDMA) networks 41, 47, 48, 51
combined-cycle gas turbine (CCGT) technology 101, 110, 111
Combined Heat and Power (CHP) 34
Commission for Aviation Regulation 192
Committee for European Postal Regulators (CERP) 130
commons 45, 46–9
Central Park analogy 44–6
communications see mobile phone networks; postal sector; telecommunications
Community Rail Partnerships 181
company failure, provision for coping with 203–4
competition
broadcasting 212, 213
electricity markets 17–19
in fixed telecommunications, barriers to 209
non-price competition 17
promotion of by regulators 205–6
competition agencies 79
Competition Authority 200
competition law 79, 153
competitive bidding
electricity markets 20–21
spectrum 40, 217
congestion
airwaves 43
management at electricity connectors 71
management mechanisms 69
transmission network 95, 96
consumer protection 223
consumers’ interests 221
contestability 220, 221
corvergence 221–2
cordless phones 49, 52, 54
Correos (Spain) 137, 138
corruption 35
cost–benefit analysis 217
cost of capital 190
capital asset pricing model 192–3, 195, 196–7
debt overhang 191, 194
different costs for different parts of the business 198–200
estimation, proposal for conflict reduction 200
financeability 192, 193, 194–5
leverage 189–92
other models 195–8
three-factor model 195–8, 200
Council for European Energy Regulators (CEER) 69–70
creative destruction 41, 221
cross-border energy trade 66, 69, 71
curtailment notices 110
CVC Capital Partners 132
Da Silva, Luis Correia 193
Davies, James 196
day-ahead price signals 110
debt overhang 191, 194
demand response in electricity industry 106, 109–11
Denmark Post 121, 132
DHL (Deutsche Post) 121, 122, 132, 138–9, 141–3, 165
acquisitions (1997–2002) 142, 143
market share 137, 138
STAR programme 154
Digital Audio Broadcasting (DAB) compatible Broadcasting Act licenses 218
digital broadcasting 212, 215–16, 218
digital subscriber line (DSL) 49, 221, 222
digital switchover 218
direct current (DC) interconnection 91
Distribution Network Operator (DNO) price review 93
DSL (digital subscriber line) 49, 221, 222
dual-fuel capabilities 110
Dublin Airport Authority (DDA) 192
Index

e-messaging 144, 145
EasyNet 222
economic bottlenecks in fixed telecoms 208–10
EdF (Electricité de France) 64
effective competition 220–1, 222–3
efficient allocation 224
electricity crises 84–5
electricity from renewable sources 9–10
electricity interconnectors 23–4, 78–9, 96–7
congestion management 71
electricity sector
competitive markets, development 10–22
competition and contracts 17–19
Nordic countries 17–18
United Kingdom 18–19
wholesale markets 10–11
generating capacity 95, 100
generation market power, US 11–12
infrastructure 88–9, 95
investment incentives 100–106
liberalisation
effects of 90
EU model 65
non-price competition 17
regulation, alternatives
merchant and regulated
interconnectors 23–4
merchant vs regulated transmission 22–3
negotiated settlements 26–7
user-pays transmission 24–6
residential markets 14, 15
retail competition
alternatives to 19–22
obstacles 14, 16–17
United Kingdom 13
worldwide 14, 15
standard model of reform 7–10
competition and regulation 7–8
government role 9–10
supply security 83–6
demand side 109–10
electricity and gas markets
interaction 110–13
generation resource adequacy, UK 108–9
generation resource adequacy, US 100–108
market imperfections 100–108
network regulatory framework 92–7
reasons for concern 86–91
regulatory imperfections 108
system operating reliability 85
transmission interconnectors 23–4, 96–7
capacity 78–9
congestion management 71
electricity spot markets 107, 111, 112
energy efficiency 9, 34
energy liberalisation, European Union 61–2, 77–8
competition policy 73, 78
and integration 65–6
integration and transmission capacity 66–8, 78–9
and privatisation 63–5
regulatory framework
procedures 71–3
technical substance 68–71
sector inquiry 79–80
and segmentation 81
Enterprise Act 211
entry barriers 42
entry pricing model 147
EON/Ruhrgas 79
Equality of Access Board 210–11
equality of access in telecommunication networks 210
ERGEG 66, 71, 75
Ethernet 43, 45
European Electricity Regulation Forum 68–9
European Gas Regulatory Forum 68
European Regulators Group for Electricity and Gas (ERGEG) 66, 71, 75
European Union
communications policy 224
energy liberalisation 61–2, 77–8
competition policy 73, 78
and integration 65–6
integration and transmission capacity 66–8, 78–9
and privatisation 63–5
regulatory framework, procedures 71–3
regulatory framework, technical substance 68–71
sector inquiry 79–80
and segmentation 81
exclusive spectrum rights 43, 50–52,
53–4, 55–6
marginal value 52
extreme weather conditions 112, 118

Fama, E. 195
fast response gas storage facilities 98
Federal Communications Commission (FCC) 37
Federal Energy Regulatory Commission (FERC) 26, 91, 94, 95,
96, 97
Federal Power Commission 26
Federal Radio Act (1927) 37, 42, 57
FERC see Federal Energy Regulatory Commission (FERC)
financeability 191, 192, 193, 194–5,
202–3
Finland 14, 18
Finland Post 144, 145, 165
First Energy 90–91
fixed link telecommunications 199,
208–12, 220, 221
fixed-price contracts 18, 19
forward capacity obligations 108
Fourth Line 25
France
ergy markets 64
postal sector 137, 138, 140, 154
franchise management in UK rail sector
172, 181–2
free voice calls 61
French, K. 195

Gas and Electricity Markets Authority (GEMA) 9
gas pipelines 94, 97
gas sector 97
import contracts 80, 81
infrastructure 88, 89, 97
liberalisation 82–3
liquefied natural gas (LNG) 82, 91,
98–100
storage 88, 89, 97–8
supply security 83–4, 85, 86
demand side 109, 110
gas and electricity markets interaction 110–13
network regulatory framework
92–4, 95, 97–8
reasons for concern 86–7, 88–9, 91
resource adequacy 86, 98–100
system operating reliability 85
GdF (Gaz de France) 64
generating capacity 100–101, 103, 108
generation market power 11–12
Germany 14, 40, 132
Cartel Office 79
energy regulators 69
gas market 79
gold-plating 23, 24, 25
good neighbour policy 51
government, increasing role in regulation
9–10, 34
grayeyard scenario 147
Greece, postal privatisation 132
GSM–DECT Guard Bands 219

Hardin, Garrett 49
Hazlett, Thomas 52
Hill, P.J. 44
hold-up risk 218

incentive contracts 93
incentive regulation programmes 91
independent regulatory bodies 34
India 40
information economy 42
Innovator’s Award 39–40, 42, 56–7
Institut d’Économie Industrielle (IDÉI) 147
Institute of Electrical and Electronic Engineers (IEEE) 43
integration and liberalisation in European markets 65–6
interconnectors 23–4, 96–7
capacity 78–9
congestion management 71
interference between radio users 38–9
interruptible contracts 103
investment, in natural gas pipeline
capacity 94
investment incentives, electricity sector
105–6
involuntary rationing of demand 83–4,
85, 88
Index

Italy
- electricity sector 85, 90
- postal sector 132, 137, 138, 147

Japan
- DHL expansion into 122

L-Band 219

La Poste (France) 137, 138, 140

Lawson, Nigel 34

Lerner index 11–12

Lessig, Larry 43, 45

leverage 189–95
- debt overhang problem 191, 194
- debt ratios 190–91
- financeability 191, 192, 194–5
- gearing for individual utility companies 190
- gearing, trends for utilities over time 191
- and investment programmes 191–2, 194

liberalisation 78
- of electricity and natural gas sectors 86, 89
- integration and transmission capacity 66–8
- and integration in European markets 65–6
- in North America and Europe, effect on electric transmission networks 90
- and privatisation 63–5

liberally licensed bands 48, 54
- licensed spectrum bands 48, 49
- licensing of mobile phone services 40
- line rental price caps 211
- liquefied natural gas (LNG) 82, 91, 98–100
- listen before talk protocol 45
- litigation 226
- Littlechild, Stephen 205
- LNG see liquefied natural gas
- lobbying 35
- local loop unbundling 209
- location marginal price (LMP) mechanism 89–90

Maine, electricity supply 20–21

McGowan, F. 72–3

Meckling, W. 41

merchant generating companies 101
merchant investment 23, 94, 96
merchant transmission 22–4
mergers 73, 78
Merseyrail 181

Minasian, J. 41

mobile phone networks 50–51
- equipment expenditures 53
- spectrum property rights 40, 41
monopolies 35, 64
multi-product networks 222
multi-year tranches 20
Muñoz, Roberto 52
Murray, Iain 182

natural gas sector 97
- import contracts 80, 81
- infrastructure 88, 89, 97
- liberalisation 82–3
- liquefied natural gas (LNG) 82, 91, 98–100
- storage 88, 89, 97–8
- supply security 83–4, 85, 86
- demand side 109, 110
- gas and electricity markets
  - interaction 110–13
- network regulatory framework 92–4, 95, 97–8
- reasons for concern 86–7, 88–9, 91
- resource adequacy 86, 98–100
- system operating reliability 85
- negotiated settlements 26–7
- net avoided cost (NAC) approach 147
- net revenue gap problem 103
Netherlands, postal sector 121, 132, 150
Network Code 177
network monopolies 35
network operators 51, 74–5
network planning 66–8
Network Rail 172, 174, 177–8, 179, 181, 187

New Electricity Trading Arrangements (NETA) 89

New England, generating capacity 96, 111–12

New Jersey, electricity supply 20–21
New Zealand
- electricity markets 14, 16
- postal sector 154
- spectrum 40
Newbery, David 10
Nextel 55
non-exclusive spectrum access rights 43
non-price competition in electricity markets 17
non-price discrimination 209
Nordic countries 16, 100
  Denmark, postal sector 121, 132
electricity markets 17–18, 64
  Norway, electricity market 14, 17, 18
  Sweden
electricity market 14, 17, 18
  postal sector 150, 155
NordNed interconnector project 97
North Sea gas fields 91
Norway, electricity market 14, 17, 18
not-for-profit statute 70
nuclear power 35
Ofcom, strategic approach to regulation broadcasting 212–16
  common themes 219–23
  fixed link telecommunications 199, 208–12, 220, 221
  future issues 223–5
  general approach 205–8
  spectrum 216–19, 220, 221–2
Offer (Office of Electricity Regulation) 27
Office of Fair Trading 79
Ofgem (Office of Gas and Electricity Markets) 9, 27, 93, 192
Ofwat (Office of Water Services) 191, 195, 202, 203
Ohio, electricity market 14, 16, 21, 32, 91
oil resources 60, 99
oligopolistic broadcasting market 215
Ontario
  electricity crisis 84–5
electricity market 14, 18
OOM calls see out-of-market mechanisms
Openreach 210, 211
operating reserves 103
ORR (Office of Rail Regulation) 174–5, 178, 179, 184, 186–7
  expanded responsibilities 175–8
  out-of-market (OOM) mechanisms 96, 97, 99, 107
PCS licences 55
peaking capacity 104–6
Pepper, Dr. Robert 222
perfect competition 220–21
perfect contestability 220
pipeline investment 97
PJM Regional Transmission Organisation 12, 102, 114
Pollitt, Michael 11
Portugal, proposed gas and electricity merger 78
postal sector
  market development
    comparison with telecoms, electricity and gas 135
    expansion 141
    importance of 134
    key market trends 140
    main operators 138–40
    market shares 137
    postal networks, development 141–4
    revenue and volume growth 134–6
    services, concentrated demand for 136–7
    USPs profitability 137–8, 139
regulatory development 119
deregulation, reluctance at national level 127–32
  economic trends 123–7
  expansion 124
  Postal Directives 120, 126, 128–9
  postal exception 119–21, 146, 156–8, 159
  postal exception, benefits and costs 151–6
  privatisation of USPs, delay of 132–3
  third-party access model 160–62
  universal postal service 121
  universal service obligation (USO) 125–6, 130, 131, 146
    costs 146–8
    market opening, effect of 149–51
    rationale 148–9
  universal service providers (USPs) 121, 127, 131–2
  business strategies 152–3
  competition, development of 149, 153
efficiency, impact of liberalisation 154–5
expansion 141, 142–3, 143–4, 145
main operators 121–3, 138–40
privatisation, delay in 132–3
profitability 137–8
revenues 123–4, 134–6, 158
Postal Services Act (2000) 121
Postcomm 121, 148, 150, 159, 165
Poste Italiane 137, 138, 147
price-cap mechanisms (RPI-X) 92–3
price-cap regulation 16–17, 93, 106
price discrimination 209
price-driven demand responses 84
price system 38, 40, 41
priority rationing contracts 110
Private Finance Initiative (PFI) projects 200
private monopolies 64, 65
privatisation 63–5
property regime 61
property rights 44
in land 46
in spectrum 48–9, 51, 54, 56
Coase theorem 38, 39, 40
counter argument 42–3
PSB (public service broadcasting) 213–16
public contest method of transmission expansion 24–5
public funding of railway services 174–5
public interest spectrum allocation 38, 42
public service broadcasting (PSB) 213–16
Qualcomm 47
‘quality of service’ regulatory mechanisms 92
Queensland, transmission lines 23–4
Radio Act (1927) 42
radio broadcasting 41
radio frequencies see spectrum
radio interference 38–9
rail regulation
independent regulation, importance of 174–5
infrastructure investment 180–81
longer-term issues 180–82
Network Rail 172, 174, 177–8, 179, 181, 187
Office of Rail Regulation (ORR) 175–8, 184, 187
Periodic Review 179–80
Rail Review 169, 170, 171–4
rail safety regulation 173–4, 176
Strategic Rail Authority (SRA) 171, 172
Rand Corporation 41–2
rationing by price 84
rationing contracts 110
Regional Electricity Companies (RECs) 16, 17, 20
regulatory bodies, cost of 34
regulatory ignorance 35–6
regulatory strategy 205–8
reliability contracts 96
renewables obligation 9–10, 29
rent-seeking process 35, 51
replacement reserves 106
reservable mail services 130–31
residential markets, electricity sector 14, 15
resource adequacy 85–6
retail competition in electricity sector 13, 14, 16–17
revenue-sharing incentives 27
risky bottlenecks 224
rolling blackouts 83, 85
Route Utilisation Strategies (RUSs) 172, 177
Royal Mail 121, 140, 166, 167
effects of postal exception 156–8
entry pricing model 147, 148
market share 137, 138
third-party access model of deregulation 160–62
RUSs see Route Utilisation Strategies (RUSs)
satellite 212, 213, 222
scarcity conditions in energy markets 104–5, 106
scarcity of spectrum 38, 60, 216, 217
Science article (Hardin, 1968) 49
ScotRail 172
signalling investment 180
single European market 65, 77
Sky 222
South Australia, electricity market 18, 23, 24
South Korea, spectrum 52
Spain, postal sector 137, 138
Special Purpose Vehicles (PSVs) 181
spectrum
property regime 41, 49
scarce 38, 60, 216, 217
sharing exclusivity 50–52
spectrum allocation 40–41, 56, 216–19
administrative allocations 40, 48
administrative incentive pricing (AIP) 217
barbed wireless hypothesis 44, 54
Coase theorem 38, 39, 40
commons view 42–4, 53–4, 55
individual rights approach 218
licensed bands 48, 49
market-based 217, 220
market tests 52–6
Ofcom award programme 219
property rights 40, 42, 48–9, 51, 54, 56
public interest regime 38, 42, 46
regime valuations 52–3
unlicensed bands 43, 48–9, 51–2
spectrum in a box 50
spectrum in a tube 43, 45, 53
spillovers 38, 39
spot electric market 107, 111, 112
spot gas market 112
spot-price contracts 18
Sprint 55
*Standard Handbook for Electrical Engineers* 67–8
stipulations 26–7
Strategic Rail Authority (SRA) 171, 172
strategic safety policy 176
structural separation 209
superposts 157
supplier switch 13, 14, 15, 17, 69, 80
supply security
definition 83–6
electricity sector
demand side 109–10
generation resource adequacy, UK 108–9
generation resource adequacy, US 100–108
network regulatory framework 92–7
reasons for concern 86–91
gas and electricity markets interaction 110–13
gas sector 83–4, 85, 86
demand side 109, 110
natural gas resource adequacy 98–100
network regulatory framework 92–4, 95, 97–8
reasons for concern 86–7, 88–9, 91
oil resources 99
Sweden
electricity market 14, 17, 18
postal sector 150, 155
switching suppliers 13, 14, 15, 17, 69, 80
Switzerland, energy regulators 69
system operating reliability 85
TDMA networks 47, 48
technological convergence 221–2
telecommunications 199, 208–12, 220, 221
terrorism 117
Texas, electricity market 14, 16
third generation (3G) wireless systems 41, 219
three-factor model 195–8, 200
TNT (TPG) 132, 139–40, 141, 165
acquisitions (1999–2004) 143–4
tragedy of the anti-commons 218
tragedy of the commons 37, 49, 217
train operators 177, 180
see also rail regulation
transmission arrangements, user-pays 24–6
transmission congestion 96
transmission expansion, public contest
method 24–5
transmission investments 94–5
transmission lines 22, 23
transmission network failures 83, 85
transparency 69, 81
28 day rule 19
unaddressed mail services 124, 144
United Kingdom 40
electricity sector 9, 16
competition and contracts 18–19
Index

direct current (DC) interconnection 91
full liberalisation 65
generating capacity 100
generation resource adequacy 108–9
liberalisation 62
non-price competition 17
regulatory framework 92, 93
retail competition 13, 14, 20, 21–2
gas sector 9, 91, 97
demand response capability 110
liquefied natural gas (LNG) imports 82, 91, 99
regulatory framework 92, 93
Office of Fair Trading 79
postal sector 121, 150, 156–8, 164, 166
regulation 7–8, 72–3
government role in 9–10, 34–5
spectrum 52
United States
electricity sector 14, 95
blackouts 90–91
generation market power 11–12
generation resource adequacy 100–108
governmental aggregation 16
network collapse 84, 85
regulation 94
reliability standards 107
retail competition 20
Federal Energy Regulatory Commission (FERC) 26, 91, 94, 95, 96, 97
Federal Radio Act (1927) 37, 42, 57
gas sector 97, 98
demand response capability 110
deregulation process 75
liquefied natural gas (LNG) 99
shortage alerts 82
transmission network 91
negotiated settlements 26–7
postal sector 147, 150
spectrum 37, 40, 50
mobile phone operators 41
unlicensed PCS band (U-PCS) 49
Supreme Court decision, NBC v. the United States 37–8
telecommunications 227
universal postal service 121
universal service obligation (USO) 125–6, 130, 131, 146
costs 146–8
market opening, effect of 149–51
rationale 148–9
universal service providers (USPs) 121, 127, 131–2
business strategies 152–3
competition, development of 149, 153
efficiency, impact of liberalisation 154–5
expansion 141, 142–3, 143–4, 145
main operators 121–3, 138–40
privatisation, delay in 132–3
profitability 137–8
revenues 123–4, 134–6, 158
see also DHL (Deutsche Post); La Poste (France); Royal Mail; TNT (TPG)
unlicensed spectrum bands 43, 48–9, 51–2
marginal valuation 53
 technologies 47, 48
user-pays transmission, Argentina 24–6
USO (universal service obligation) 125–6, 130, 131, 146
costs 146–8
market opening, effect of 149–51
rationale 148–9
USPs (universal service providers) 121, 127, 131–2
business strategies 152–3
competition, development of 149, 153
efficiency, impact of liberalisation 154–5
expansion 141, 142–3, 143–4, 145
main operators 121–3, 138–40
privatisation, delay in 132–3
profitability 137–8
revenues 123–4, 134–6, 158
see also DHL (Deutsche Post); La Poste (France); Royal Mail; TNT (TPG)
Victoria, electricity market 14, 16, 18
VoIP (voice-over-internet protocol) service 54
voltage reductions 107
<table>
<thead>
<tr>
<th>Term</th>
<th>Page References</th>
</tr>
</thead>
<tbody>
<tr>
<td>WACC (weighted average cost of capital)</td>
<td>190, 199</td>
</tr>
<tr>
<td>Wallace, H.</td>
<td>72–3</td>
</tr>
<tr>
<td>water companies</td>
<td>191–2, 202</td>
</tr>
<tr>
<td>weighted average cost of capital (WACC)</td>
<td>190, 199</td>
</tr>
<tr>
<td>Wi-Fi</td>
<td>43, 47, 48–9, 52–6, 217</td>
</tr>
<tr>
<td>WiMAX</td>
<td>53</td>
</tr>
<tr>
<td>wireless networks</td>
<td>41, 42–3, 50–51, 55</td>
</tr>
<tr>
<td>expenditures</td>
<td>53</td>
</tr>
<tr>
<td>technologies</td>
<td>47, 48</td>
</tr>
<tr>
<td>Wolmar, Christian</td>
<td>182</td>
</tr>
</tbody>
</table>