

Index

AEC (Atomic Energy Commission) Bahrain, as aspiring nuclear power 89-90 222 - 3**AEG 220** Bangladesh, as aspiring nuclear power Algeria, as aspiring nuclear power 222 - 3222 - 3el-Baradei, Mohamed 267 Allais, Maurice 104-8, 136 Barakah nuclear power plant 274-5 Allais paradox 104-8 baseload generating technology 64-6 Alstom 274-5 baseline standards 188-9 Andra (Nuclear Waste Authority) 25 Bayes' rule 88, 118-25 ANRE (Agency for Natural Resources Bayes-Laplace rule see Bayes' rule and Energy) 162, 164-5 Bayesian algorithms 123 Apostolakis, George E. 178 Bayesian revision 126-8 Areva 9-10, 58-9, 221-2, 270, 274-5, and conditional probabilities 119-21 Laplace reinvention of 125-32 dominant position in nuclear probability density function 126-8 industry 282 Argentina, as nuclear power user and rule of succession 125-32 211 - 12and statistical reasoning 124-5 see also nuclear accidents; Armenia, as nuclear power user 211–12 ASN (Autorité de Sûreté Nucléaire) probability 169, 186-7, 191, 198, 199, 203, Bayes, Thomas 118 236, 241-2, 257 Bechtel nuclear plant 49 aspiring nuclear powers 222-5 Belarus Atomic Energy Act 227, 228, 229, as aspiring nuclear power 222-3 279-82 Chernobyl pollution 244–5 Chernobyl-related cancers 85-6 Section 123 283-4 Atomic Energy Authority Safety and Belgium Reliability Directory 190 as nuclear power user 211-12 Atoms for Peace 213-15, 265, 266 phasing out nuclear power 226, 256 Austria, political decisions 207-9, 256 Bernoulli, Daniel 103-4



Bertel, E. 38	Chevet, Pierre-Franck 202
Brazil, as nuclear power user 211–12,	Chile as aspiring nuclear power 222–3
221–2	China
Browns Ferry reactor fire 175–6	as authorized nuclear-weapon state
Brussels Convention 252	267
Bugey reactors 44–5, 50	early nuclear development 217
Bulgaria	and NSG 289–91
as nuclear power user 211–12	nuclear aid to Pakistan 290
reactor safety 249	as nuclear power user 211–12
Bushehr reactor 276	political decisions 207–9
	reactors 1–2, 52–3, 61, 271, 272,
Canada	274
heavy-water reactor 216-17	EPR (European Pressurized
in international nuclear market	Reactor) 9–10, 58–9, 61
271	technology transfer 221–2
as nuclear power user 211–12	and Westinghouse reactors 271,
Cantor, Robin 45	272
carbon emissions 13, 73-4, 223-4	China syndrome 158
coal 67–8	Chooz A reactor 23
cost of 16–21, 42	Civaux 2 reactor 50
markets and cost 18–20	civil liability see nuclear accidents
optimal level 172	climate change 223–4, 298
pollution abatement targets 20–1	coal
see also climate change; European	compared to nuclear power 66–72
Union Emissions Trading	emissions costs 67–8
Scheme	fatalities/accidents incidence 116
carbon tax 2–3, 20, 30	levelized costs 66
Carlsbad, New Mexico waste storage	coal baseload technology 64–6
25	cognitive science, and probability
CEA (Commissariat à l'Energie	121–3
Atomique) 189, 192, 217–18,	cognitive systems 110–11
219	Commission on the Accident at Three
CEA-EDF nuclear action plan	Mile Island 179–85
220	conditional probability see probability
Chernobyl Forum 85–6	Connecticut Light and Power
Chernobyl nuclear accident 1-2, 4,	Company 176
79–80	Conseil d'Etat 186
areas affected 244-5	Conventions, nuclear 251-6
cancer incidence 85–6	Cooper, Mark 48
cost of 86	core-damage frequency 177
liability 1–2, 4	core-melt see nuclear accidents
radioactive emission 82-3, 84	cost-benefit analysis 39-40



costs	Czech Republic
accountancy methods 11-13	as nuclear power user 207, 208,
capital cost 36-7	211–12
carbon emissions 16–21	reactor building 256
civil liability see nuclear accidents	Temelin reactor safety 249
competitiveness 3–4, 8	
dynamic of 8	Daya Bay nuclear power plant 221–2
economies of scale 43-4,	DCNS 62-3
45	De Finetti, Bruno 97–8
EPRs 58–9	decision theory 103, 121-3
evaluation 7–8	decommissioning see reactors,
external 11–13	decommissioning
external effects 13–16, 19	Delors, Jacques 258
financing 37	discount rate 8, 23–32
fuel 8	calculation 27, 33-4, 41, 172
IDC (construction financing/interest	and euro conversion 39
cost) 38	Stern Review (2006) 29–31
interest rates and discounting	District of Columbia Court of Appeals
26–7	176, 200
investment 39	dominant companies in nuclear
levelized cost method 39-42, 70,	industry 282
72–3	Doosan 221–2, 274–5, 280–1
load factor 37, 143	dual-use goods 287
maintenance 44	
modular building 59-60, 61-2	earthquake risk 93–4, 98, 195–6,
Monte Carlo method 70–2	297–8
nuclear accident liability see nuclear	economics, and psychology 110-11
accidents	EDF
operating 44	and Areva 58–9
and opportunity 10–11	civil liability costs/limits 149–51,
overnight construction cost 36–7,	152–3, 253
41, 44–5, 46, 57	costs 11–13
per unit of power 39	decommissioning/waste costs 24, 33
private 11–13	241–2
rising see rising costs	international trade 274
safety goals 172–4	reactor building 51
social costs 11–13	safety goals 179, 187–8
standardization 59–60	Egypt, as aspiring nuclear power 222–3
technical production costs	268
36–7	Einstein, Albert 212–13
and technical progress 77	Eisenhower, Dwight D. 213-15, 266
variations 10–12, 77–8, 296	electricity market liberalization 2-3,
CPR-1000 reactor 52-3	40–1, 57–8, 69–70



electricity storage 75–6	expected utility theory 103-4, 108-9
Ellsberg, Daniel 104–8, 112	export controls see nuclear trade
emissions see carbon emissions;	ExternE study 82, 84, 86–7
nuclear accidents	
energy independence 13–15, 218, 223,	Farmer, F. R. 190
224, 298	Fessenheim nuclear plant 44–5, 204,
Ensreg (European Nuclear Safety	220-1, 235-6, 237-40, 241-2
Regulation Group) 256–8	Finland
EPC (engineering, procurement and	as nuclear power user 211-12
construction) industry 277–9	reactor building 256
EPR (European Pressurized Reactor)	Flamanville, France reactor 40, 54–6,
9–10, 54–6, 58–9, 61, 187	58–9
Epstein, Paul 67	Framatome 220–1
Erdogan, Tayyip 281	France
Ethics Committee for a Safe Energy	ASN (Autorité de Sûreté Nucléaire)
Supply 229, 231–2, 233	see ASN
Euratom Treaty 253–6	as authorized nuclear-weapon state
European Atomic Energy Community	267
244	carbon emissions 22
European Commission, enforcement	civil liability costs/limits 149-51,
powers 264	152–3
European common energy policy 258–9	Conseil d'Etat 186
European power grid 244, 245	consensus-based regulation 198
European safety standards 247–51	early reactor development 190–1
European Union	EDF costs 10–11
carbon costs 18–20	energy independence 218
civil liability	and gas-cooled, graphite-moderated
discrimination/variations 251-6	technology 220–1
limits 149–51	in international nuclear market
coexistence and conflicting views	271
256–9	national prestige 217–18
gas imports 13–15	nuclear accident liability 35, 36
international governance issues	nuclear exports 285
295	nuclear industry 2-3
nuclear safety 1–2, 298	as nuclear power user 211–12
internal standards variations 247–51	nuclear research 219
international cooperation 244–7	nuclear trade 285
local-global balance 248-50	overnight construction cost 44-5
reactor stress safety tests 256-8	plant closure 235-43
renewable energy targets 73–4	political party policies 237-40,
European Union Emissions Trading	241–2
Scheme 19, 73–4	reactor building 256
failure of 22	reactor risk probability 187–8



France (cont.)	Gaulle, General Charles de 217–18
reasons for adopting nuclear power	GDF-Suez
217–19	liability limit 253
regulatory model 201–4	price controversy 9–10
rising reactor costs 49–50, 52, 55–6	reactor building 274-5, 281
safety costs 202–3	GE Hitachi Nuclear Energy 280–1
safety regulation 186–92, 297–8	General Electric 271, 272, 280–1
comparisons with US 198-9	Germany
early years 189–91	Chernobyl pollution 244–5
safety supervisory bodies 189–90	civil liability limits 149–51, 153–4
safety systems 4–5	compensation rules 155
technology transfer 221–2	and Fukushima Daiichi disaster
and US experience 190-1	229–32
and US technology adoption 220–1	as nuclear power user 211-12
waste management 32	phasing out nuclear power 226
and Westinghouse 190–1, 220–1	economic cost 228–9, 230–1
see also EDF	political party policies 226-30,
free-riding 144, 145	234–5
fuel cost 8	reason for decision 232, 256
fuel rod cladding 158	speed of exit 226-35
Fukushima Daiichi nuclear accident	reactor closure/decommissioning
1-2, 4-5, 296-7	1–3, 207–8, 209
and European policy 256–8	technology transfer 221–2
and frequency predictions 91–2	and Westinghouse/General Electric
and German policy 207, 208	221–2
prediction failures 93-4, 98-100	Gigerenzer, Gerd 116, 123
safety regulation 139, 160-71, 297-8	Gollier, Christian 31
seawall design 99–100	Gould, Stephen Jay 122-3
and US safety regulation 201	governance
see also Japan; safety regulation	internal differences 259-64
	international export controls
gas	282–6
compared to nuclear power 66-72	international governance, and
emissions costs 68–9	collective good 245–7
levelized costs 66	international tensions 246–7,
market liberalization 69–70	259–62
reserves 223	national sovereignty, and policies
semi-baseload technology 64–6	262–3
shale gas 1-2, 68-9	nuclear security issues 293-4, 299
gas-cooled, graphite-moderated	and nuclear weapon proliferation
technology 220–1	266
Gates, Bill 62	supranational 244–64



Index • 333

as non-NPT state 267, 284-5, 291-2 greenhouse gases see carbon Gronlund, Lisbeth 86 NSG dispute over exports 291-2 Grubler, Arnulf 50 as nuclear power user 211-12 Guangdong Nuclear Power Group 58-9 and nuclear weaponry 215 reactors 52-3 harmonization of European safety technology transfer 221-2 standards 247-51 indifference principle 129 Indonesia, as aspiring nuclear power heuristics 109-10 availability heuristic 113 222 - 3industrial nationalism, and reactor representativeness heuristic 113 Hewlett, James 45 exports 2-3 Hinkley Point reactor plans 56 INPO (Institute of Nuclear Power Hirai, Yanosuke 195-6 Operations) 145-6, 199 Hiroshima bomb 212-13 intermittent energy sources 64-6, 73, Hollande, François 236, 237-40, 241-2 hostile attacks 15 international borders, and collective House of Representatives Foreign good 245 Affairs Committee 284 international governance, and Hungary, as nuclear power user 211-12 collective good 245-7 hydro-electric peaking technology 64-6 international regrouping, of nuclear hydrocarbon reserves 223 industry 300 hydrocarbon-producing countries, as inverse probability 120-1 aspiring nuclear powers 223 investment cost see cost Hyundai 274-5 Iran non-proliferation treaty 1-2 IAEA (International Atomic Energy as nuclear power user 211-12 Agency) 160-1, 209, 211, nuclear threat from 283-4 214-15, 250-1 reactor construction 276 budget/resources 268-9 uranium enrichment 1-2 cooperation between states 263-4 Iraq, as aspiring nuclear power 222-3, ineffective inspections by 287 268 list of aspiring nuclear powers 222-3 IRRS (International Regulatory and Non-Proliferation Treaty 266-9 Review Service) 160-1 strengths and weaknesses of 266-9, IRSN (Institut de Radioprotection et 293-4 de Sûreté Nucléaire) 191 and weapon proliferation 266, 287 Israel, as non-NPT state 267 ITER reactor 255 IDC (construction financing/interest cost) 38 Itochu 281 Import-Export Bank of Korea 274 India Jaczko, Gregory 181, 201 fuel reprocessing 284-5 Jamaica, as aspiring nuclear power 222 - 3IAEA inspection issues 291–2



I.m.a.m	I alabama mamant 21
Japan Diet 165–6	Lebègue report 31
government influences 165–6	Lee Myung Bak 274 levelized cost method see cost
Nisa 163–5, 167–8	liability see nuclear accidents
as nuclear power user 211–12	Lisbon Treaty 259
reactors 52–3	Lithuania
regulatory capture by industry 166–71	as nuclear power user 211–12
	reactor safety 249 load factor see cost
revolving door (amakudari) policy 162–3	load-balancing 64–6
safety regulation 139, 160–71,	load-balaneing 0 1 –0
195–6, 297–8	Madarame, Haruki 167
safety systems 4–5, 160–71	Maine Yankee nuclear plant 24
Supreme Court judges 165	Malaysia, as aspiring nuclear power
technology transfer 221–2	222–3
see also Fukushima Daiichi; safety	Manhattan Project 212–13, 216–17
regulation	Merkel, Angela 207, 208, 229, 230
Japan Steel Works 274	Meserve, Richard A. 177
JNES (Japan Nuclear Energy Safety	Mexico, as nuclear power user
Organization) 164	211–12
Joskow, Paul 73	Millstone nuclear plant 194–5
, ooko, 2 dar 10	MIT studies 54, 55, 57–8, 70, 89–90
Kahneman, Daniel 103, 108–11,	Mitsubishi Heavy Industries 281
112–13, 122–3, 136	Monnet, Jean 253
Kazakhstan, as aspiring nuclear power	1,101,111,111
222–3	Nagasaki bomb 212–13
Kennedy Commission 179–85	al-Nahyan, Khalifa bin Zayed 274
Kenya, as aspiring nuclear power	national independence 13–15
222–3	national policies 5, 207–9, 298
Kepco 274–5	national prestige 217–18
Keppler, J. H. 229, 231	national sovereignty 262–3
Keynes, John Maynard 96–7, 104–8,	natural frequency format 124
112, 129	Naudet, G. 38
Khan, Abdul Qadeer 285	Neckarwestheim nuclear plant 228
Korea Electric Power Corporation	Netherlands, as nuclear power user
221–2, 269–70	211–12
Korea Hydro and Nuclear Power 274–5	Newbery, David 74
Krümmel reactor 229	NIED (National Research Institute for
	Earth Science and Disaster
Lacoste, André-Claude 202, 256–8	Prevention) 99
Laplace, Pierre-Simon 118, 125–32; see	Nisa 163–5, 167–8
also Bayes' rule	Nordhaus, William D. 30



North Korea	and collective good 245–7
and NPT 268	core-melt frequency 87–90, 91, 92,
as nuclear power 268	93, 132–7
nuclear threat from 283–4	core-melt probability 132–7, 185
Northeast Utilities 194–5	costs of 31, 86–7
NPT see Treaty on the Non-	disaster aversion 102–17
Proliferation of Nuclear	earthquake risk 93–4, 98
Weapons	emissions from 82–6
NRC (Nuclear Regulatory	European safety standards 247–51
Commission) 89–90, 175–6,	event trees 88–91
177–8, 179, 182–3, 199–201	ExternE study 82, 84, 86–7
NREL (National Renewable Energy	fires 175–6
Laboratory) 76	frequency calculation 37
NSC (Nuclear Safety Commission)	frequency predicted/actual 91–101
164–5	heuristics see heuristics
NSG (Nuclear Suppliers Group) 266,	international cooperation 244
286–95	levels 79
and China 289–91	person-Sv unit 83
constituent states 286, 288	predicting next event 125–32
disparate interests 291–2	probability see probability
export controls 288	reactor risk probability 187–8
and exports to India 291–2	risk ambiguity 112
future role 292	risk assessment 4
instability of 291	solvency and accident liability
lack of control/enforcement 289–91	147–8
membership benefits 291	spent-fuel risk 93–4
membership size 291–2	tsunami/tidal wave risk 93–4, 98,
and Non-Proliferation Treaty 288–9	99–100
roles of 286–7	uncertainty 95–6
seen as restrictive cartel 289–91	see also risk; safety regulation
supply/competition restriction by	nuclear baseload technology 64–6
289	nuclear fuel 15–16
and weapon proliferation 286–9	nuclear power
nuclear accidents 1–3, 4	Atoms for Peace speech 213–15
Bayes' rule see Bayes' rule	compared to gas/coal 66–72
Bayesian algorithms 123	competitiveness 72–8
cancer incidence from 82–6	current users 211–12
certainty 95–6	and European discord 256-9
civil liability 34–6, 42, 113, 142,	international cooperation
146, 147–54, 156, 253	agreements 215–16
hidden subsidy 151–6	military use 207, 208
within Europe 251–6	national policies 5, 207–9, 298



336 • Index

nuclear power (cont.) Treaty see Treaty on the perception biases against 111-17 Non-Proliferation of Nuclear pioneering countries 216-17 Weapons post-war policy 213-15 vertical proliferation 265 reasons for adoption 217-19 nuclear power plants see reactors Oettinger, Günther 256-8 nuclear research 219 oil reserves 223 power/weaponry duality 215-16 oil-fired baseload technology 64-6 nuclear risk see risk oil/gas industry model 277-9 Olkiluoto, Finland reactor 54-6, 58-9 nuclear safety see safety regulation nuclear trade 269-73 Onagawa nuclear plant 195-6 123 agreements 283-4 comparisons with armament and oil/gas industries 273-82 OPEC (Organization of Petroleum consortiums 275 Exporting Countries) 291 and EPC (engineering, procurement Oppenheimer, Robert 212-13 overnight costs see cost and construction) industry 277-9 export controls 282-95 Paik, Soon 47 collective action on 286-95 Pakistan dual-use goods 287 as non-NPT state 267 and IAEA see IAEA nuclear aid from China 290 international cooperation 282-6 as nuclear power user 211–12 and NSG see NSG and nuclear weaponry 215, 285 political support for 293 Paris Convention on Nuclear security issues 293-4 Third-Party Liability 252-3 United States 283-6 peaking generating technology 64-6 government involvement 274-5 person-Sv unit 83 government/companies Philippines, as aspiring nuclear power collaboration 279-82 222 - 3heads of state involvement 274-5 photovoltaic see solar energy state intervention and imports 277 Pierrelatte enrichment plant 218 tendering 277 see also IAEA; NSG; risk; safety as aspiring nuclear power 222-3, 224 regulation Chernobyl pollution 244-5 nuclear waste see waste as gas consumer 224 nuclear weapon proliferation political consequences 2-3 and governance 266 pollution see carbon emissions horizontal proliferation 265 pollution abatement 20-1 and NSG 286-9 Pompidou, Georges 220 posterior probability see probability and nuclear exports security 293-4 risk 15-16, 283-4 power demand variations 73 PRC see China and scientific cooperation 269



Price-Anderson Act (1957) 151	construction consortiums 274–5,
prior probability see probability	280–1
probability	construction/design regulations
conditional probability 38, 88–91,	139–40
119–21	construction times 44, 45, 269–70
core-melt see nuclear accidents	containment building 158
Keynes on 96–7, 104–8, 112, 129	decommissioning 1–3, 23–32, 178,
perceived probabilities 102-17,	256
234	costs 33–4
posterior probability 120-1,	financing 274
126–8	learning effects 46
predicting next nuclear accident	and military ambitions 224
125–32	modular building 59-60, 61-2
prior probability 120-1, 123-5,	paliers 239
126–8, 296–7	R&D 271
probabilistic safety assessment 81-7,	reactor age 236-40
88–101, 157–8	reactor structure 158
results divergence causes 88-101,	rising costs 49–50, 52–3, 55–63,
296–7	77–8
probabilities perception	safety 46–9, 236–40
biases 103–11	shutdowns and age 238–9
against nuclear power 111–17	simplification 47–8
psychology of 121–3	small/mini reactors 62–3, 298–9
subjective probability 97–8	standardization 59–60
very low probabilities 114–15	underwater 62–3
see also nuclear accidents; risk	Unplanned Unavailability Factor
proliferation <i>see</i> nuclear weapon	238
proliferation	regulation see safety regulation
psychology	renewable energy
and decision-making 121–3	competitive advantages 72–8
and economics 110–11	EU targets 73–4
and economics 110 11	sources 64–6
Ramsey, Frank Plumpton 27, 28, 97–8	representativeness heuristic 113
Ramseyer, J. Mark 165	Republic of Haiti, as aspiring nuclear
Rasmussen, Norman 89–90	power 222–3
Rasmussen report 89–90	RIPBR (risk-informed and
reactor model effect 239	performance-based regulation)
	performance-based regulation) 177
reactors	
accidents see nuclear accidents	rising costs 44–63, 296, 298–9
age and safety 236–40	learning effects 46
construction 1–3, 77–8, 256,	limits to 53–4
269–70, 271, 272; see also costs	overnight cost 44, 46



rising costs (cont.)	safety degradation 177
reactors 49-50, 52-3, 298-9	safety goals 179–85
21st century construction 55–63 and safety regulation 46–9, 60	quantitative/qualitative objectives 179–85
and Three Mile Island 46	subsidiary benchmarks 182–3
risk	safety investment 116
Allais paradox 104–8	safety regulation 46–9, 60, 299
aversion 103-4, 116-17	and civil liability see nuclear
cooperation on 299	accidents
definition 35	collective regulation 145-6
economic costs 299	companies exceeding legal
nuclear accidents see nuclear	requirements 195–6
accidents	competition authorities 193
nuclear weapon proliferation risk	consensus-based 198
15–16	containment building 158
objectives/principles 179–80	and cost-cutting 194–5
perception 2–3	countries exceeding legal
political decision-making 294–5	requirements 195–6
population density around reactors	defence in depth 158
181–2	determinist approach 157–9
tidal wave/tsunami risk 93-4, 98,	economic costs 172-4, 199, 205
99–100, 297–8	economic limits on 173
see also probability	engineers' 157–60
Roosevelt, Franklin D. 212–13	Ensreg (European Nuclear Safety
Roques, Fabien 71	Regulation Group) 256–8
Rosatom 270	Euratom Treaty 255
Rothwell, Geoffrey 45	European Directive 250–1
rule of succession 125-32	European safety standards 247-51
Russia	local-global balance 248-50
as authorized nuclear-weapon state	European stress safety tests 256–8
267	fire-protection 175-6, 178-9, 200
Chernobyl-related cancers 85–6	free-riding 144, 145
early nuclear development 216–17	fuel rod cladding 158
fuel supply 15–16	Fukushima Daiichi 139
gas exports 13-15, 224	incentive-driven 142-7, 154-5
in international nuclear market 271	influences on 205–6
nuclear accident liability 35	INPO (Institute of Nuclear Power
nuclear exports 276–7	Operations) 145–6
political decisions 207–9	inspection 146, 170, 194
reactor construction 271, 272	international tensions 246–7
reactor exports 271, 272	and law of substitution 173
reactors 52–3	legal framework 205–6



main lines of defence 158	Service Central des Installations
market forces 142	Nucléaires 187
need for 141–56	shale gas 1-2, 68-9
operator rules 205	Siemens 220
performance-based standards 173-9	Simonnot, Philippe 192
political decision-making 294–5	Slovakia, reactor safety 249
probabilistic approach 81–7, 88–101,	Slovic, Paul 111
157–8, 159	solar energy 73, 74–6
quantitative/qualitative objectives	solvency, and accident liability 147–8
179–85	South Africa, as nuclear power user
reactor age 236-40	211–12, 221–2
reactor/cooling structure 158	South Korea
regulator independence 299	in international nuclear market 271
regulator powers 299	as nuclear power 266
regulators/regulated relationships	as nuclear power user 211–12
193–8	nuclear trade alliance with US
regulatory capture by industry	280–1
166–71	reactor construction 221-2, 269-70,
RIPBR (risk-informed and	271–3
performance-based regulation)	reactors 52–3
177	technology transfer 221–2
sectoral regulators 193	sovereignty 262–3
self-regulation 142–7	Spain
state/public intervention 141-2, 147	as nuclear power user 211–12
technical dialogue 197	phasing out nuclear power 226
and technology-based standards	spent-fuel pools 93-4, 201
173–9	Stern Review (2006) 29-31, 32
undercover inspections 194	Stigler, George J. 166–7
see also France; IAEA (International	subjective probability see probability
Atomic Energy Agency); Japan;	succession, rule of 125-32
NSG (Nuclear Suppliers	Sudan, as aspiring nuclear power 222–3
Group); nuclear accidents;	Sugaoka, Kei 162
United States	Sunstein, Cass 114
safety systems 4–5	supranational governance 244–64
Saint Petersburg paradox 103–4	Svinicki, Kristine 201
Sarkozy, Nicolas 241, 274, 275	Sweden
Saudi Arabia, as aspiring nuclear power	as nuclear power user 211–12
222–3	phasing out nuclear power 226
Savage, Leonard Jimmie 97–8, 105, 136	Switzerland
Schriver, William 47	as nuclear power user 211–12, 221–2
security issues 15–16, 293–4, 299	phasing out nuclear power 226
semi-baseload technology 64-6	political decisions 207–9



Taishan-1 nuclear plant 58–9	Treaty on the Non-Proliferation of
Taiwan, as nuclear power user 211–12,	Nuclear Weapons 1-2, 209,
221–2	215, 266, 298
Tanzania, as aspiring nuclear power 222–3	authorized nuclear weapon states 267
technological advances 218–19	cooperation/technology transfer 267
technology transfer 221–2, 267	and disarmament 267
Temelin nuclear power plant	and the IAEA 266–9
249	and India 291–2
Tepco 161, 162, 163	non-NPT states 267
Terrapower 62	Turkey's rights within 284–5
Thailand, as aspiring nuclear power	see also nuclear weapons
222–3	proliferation
Three Mile Island reactor accident 46,	tsunami/tidal wave risk 93-4, 98,
79–80, 271	99–100, 297–8
Commission report/	Turkey
recommendations 179–85	as aspiring nuclear power 222-3,
cost of 86	225, 266
and INPO 145	independent nuclear development
and probabilistic safety assessment	284–5
90	political decisions 207–9
quantitative/qualitative objectives	reactor building 276
179–85	international consortium 281
technical rules 177	Tversky, Amos 108–11, 112–13, 122–3
see also safety regulation; United	
States	Ukraine
tidal wave/tsunami risk 93–4, 98,	Chernobyl pollution 244–5
99–100, 297–8	Chernobyl-related cancers 85–6
Tohoku Electric Power 195–6	as nuclear power user 211–12
Tokyo Electric Power 98,	uncertainty, and nuclear accident
281	probability 95–6
Töpfer, Klaus 231	United Arab Emirates
Toshiba, in US/South Korea	as aspiring nuclear power 222–3, 266
consortium 280–1	reactor building 274–5
Total 274–5	United Kingdom
Transparency and Nuclear Safety Act 186	as authorized nuclear-weapon state 267
Treaty on the European Atomic Energy	carbon emissions 22
Community 298	Chernobyl pollution 244–5
Treaty on the Functioning of the	civil liability limits 149–51
European Union (Article 194)	as nuclear power user 211–12
260–2	reactor building 1-2, 256



United States	Venezuela, as aspiring nuclear power
as authorized nuclear-weapon state	222–3
267	vertically integrated companies
baseload technology rankings 67	282
civil liability costs/limits 149–51,	very low probabilities see probability
152–3	Vienna Convention on Civil Liability
decommissioning/waste costs 33-4	for Nuclear Damage (1963)
early nuclear development 216–17	150, 252–3
INPO (Institute of Nuclear Power	Vietnam
Operations) 145–6	as aspiring nuclear power
in international nuclear market	222–3
270–2	reactor construction 276
nuclear export controls 283-6	Vinci 274–5
as nuclear power user 211–12	
nuclear trade alliance with South	waste lifespan 25–6
Korea 280–1	waste management 23-32, 33-4
123 agreements 283–4	Westinghouse
post-war nuclear policy 213–15	in nuclear trade 271–3, 274
regulation shortcomings 199–201	in US/South Korea consortium
regulatory model 199–201	280–1
rising reactor costs 49–52	Westinghouse reactors
safety regulation 2-3, 297-8	AP1000 47, 54, 55, 61, 221–2, 271,
compared with France 198–9	272
safety systems 4–5	in China 271, 272
shale gas 1–2	in France 190–1, 220–1
technology versus performance-based	in Germany 221–2
safety standards 174–9	wind farms 72–8
waste management 32	World Association of Nuclear
see also Three Mile Island	Operators 144–7
Unplanned Unavailability Factor 238	
uranium enrichment 216-17	Zimmerman, Mark 46