

INDEX

- Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (1994), 147–150, 297–298, 431–432
- Access
 to information, 147–148
 to justice, 147–149
 as purpose of energy governance, 22, 25–28, 435, 437
- Acheson, Dean, 300
- Activity, energy as, 18–20, 32
- Ad hoc* approach to international law of energy
ad hoc governance of energy projects
 bilateral nature of, 196–197
 ECT distinguished, 196–197
 entitlements over energy resources, limited to, 196–197
 hybrid nature of, 196
 insulation from other law, 197
 normative interactions, 197–200
 overview, 195
 plurilateral nature of, 196–197
 specific target of regulatory framework and, 195–196
 UNCLOS distinguished, 197
 bilateral nature of rules, 37
 electricity transmission lines, 243–244, 281–284, 436, 438 (*See also* Electricity transmission lines)
 hydrocarbons, joint development of, 194–195, 436, 438 (*See also* Hydrocarbons, joint development of)
 hydroelectric projects in
 international watercourses, 243–247, 436 (*See also* Hydroelectric projects in international watercourses)
 offshore wind power, 243–244, 260–262, 436, 438 (*See also* Offshore wind power)
 oil and gas pipelines, 243–244, 269–274, 436 (*See also* Oil and gas pipelines)
 overview, 9, 37–39, 435–436
 specificity of rules, 37–39
 verticality of rules, 37
 Adverse effects. *See* Negative externalities
- Afghanistan, oil and gas pipelines and, 274
- African Charter on Human and Peoples' Rights (1982), 51–52, 54–55, 65, 151, 172
- African Commission on Human and Peoples' Rights, 51–52, 151, 173–174
- African Energy Commission (AFREC), 376
- Agenda 21 (1992), 26
- Agreement for Cooperation in Dealing with Pollution of the North Sea by Oil and Other Harmful Substances (1969), 182
- Agreement on Subsidies and Countervailing Duties (SCM Agreement) (1994), 408
- Agreement on Technical Barriers to Trade (TBT Agreement) (1994), 115, 121–123

- Agreement on the Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement) (1994), 18
- Agreement on Trade-Related Investment Measures (TRIMS Agreement) (1994), 88, 91–92, 119
- Air pollution
gasoline and, 117–118
LRTAP Convention and, 162–163
MARPOL and, 161–162
substantive requirements generally, 161–163
volatile organic compounds (VOCs), 161–162
- Albania
investment claims in renewable energy sector, 422
oil and gas pipelines and, 272
- Albemarle Corp., 430–431
- Algeria
Latin American Energy Organization (OLADE) and, 388
nuclear cooperation agreements (NCAs) and, 314–315
OPEC and, 356
WTO and, 82
- Algiers Summit (1975), 354
- American Convention of Human Rights (1969), 52, 54–55, 65, 172
- Amnesty International, 280–281
- Anglo–French Suez Canal Company, 349
- Anglo–Iranian Oil Company (AOIC), 351
- Antarctic Treaty (1959), 168–169
- Arab nationalism, 349
- Arab Petroleum Conference (1959), 350
- Argentina
climate change law in, 166
critical raw materials, geopolitics of, 403–404
hydroelectric projects in international watercourses and, 250–251
lithium in, 431
service contracts in, 213
Spain, BIT with, 175
US, BIT with, 108–109
YPF, 213
- Artificial islands, 46–47
- Asia–Pacific Energy Cooperation (APEC) Energy Working Group, 364, 376
- Association of Southeast Asian Nations (ASEAN)
Council on Petroleum (ASCOPE), 391
Declaration of ASEAN Concord, 391–392
Energy Cooperation Framework Agreement, 392–394
ASEAN Centre for Energy, 393
ASEAN Ministers on Energy Meeting (AMEM), 392–394
ASEAN Plans of Action for Energy Cooperation (APAECs), 394
ASEAN Power Grid, 393
in context of economic integration, 394
International Energy Agency (IEA) and, 393
International Renewable Energy Agency (IRENA) and, 393
legal framework, 392–393
Medium-Term Programme of Action on Energy Cooperation, 394
origins of, 391–392
overview, 9
proto-centralisation in, 347
as regional cooperation organisation, 376
Senior Officials Meeting on Energy (SOME), 392–394
Trans-ASEAN Gas Pipeline, 393
Petroleum Security Agreement, 391–392
- Australia
Australia–Timor-Leste Boundary Treaty, 225
critical raw materials, geopolitics of, 403–404

- Australia (cont.)
 joint development agreements (JDAs) and, 210, 215–217
 lithium in, 431
 nuclear energy and, 302
 Timor Gap Treaty and, 4–5, 44, 188, 225–227
- Austria
 electricity transmission lines and, 283
 Nabucco Pipeline Project and, 198
 nuclear energy and, 339
 Renewable Energy and Energy Efficiency Partnership (REEEP) and, 370
- Availability as purpose of energy governance, 21–25, 435
- Azerbaijan
 BTC Pipeline and, 198–199
 energy production versus consumption in, 69–70
 oil and gas pipelines and, 272, 274–276
 WTO and, 82
- Bahrain, joint development agreements (JDAs) and, 209, 224
- Baku–Tbilisi–Ceyhan Pipeline, 272
- Baltic Sea, 159
- Ban Ki-moon, 27, 369
- Barbados, joint development agreements (JDAs) and, 219–220
- Barcelona Convention on Freedom of Transit (1921), 95
- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (1989), 331
- Belgium
 electricity transmission lines and, 283
 North Seas Energy Cooperation Initiative and, 263
 nuclear energy and, 302
- Biden, Joe, 413
- Bilateral investment treaties (BITs)
 Argentina–Spain BIT, 175
 Argentina–US BIT, 108–109
 international energy transactions and, 72
 investment law and, 89–91
 rules governing, 74
- Biol, F., 295, 361–362
- BITs. *See* Bilateral investment treaties (BITs)
- Bolivia
 lithium in, 431
 oil and gas pipelines and, 274
- Bonn Agreement (1969), 182
- Boundary and delimitation agreements, 207
- Branch-based conception of international law
 conflicting goals in, 3–5
 energy transformation and, 433–434
 international law of energy and, 3–5
 negative externalities, inapplicability to, 104–105
 shortcomings of, 2–3
 transversal perspective, move toward, 8, 434
- Brazil
 climate change law in, 166
 hydroelectric projects in international watercourses and, 250–251
 Itaipu Dam and, 63–64
 nuclear cooperation agreements (NCAs) and, 315
 nuclear energy and, 303
 oil and gas pipelines and, 274
- Brent Spar (oil installation), 158
- British Institute of International and Comparative Law, 217–218
- Brunei, joint development agreements (JDAs) and, 214–215
- Brussels Supplementary Convention (1960)
 adoption of, 335
 environmental protection and, 344
 scope of application, 337
 tiered compensation, 340
- BTC Agreement (1999), 274–276, 279–281
- BTC Pipeline, 198–199
- Buildings Efficiency Accelerator (BEA), 369

- Bulgaria
 Gazprom and, 84
 investment claims in renewable energy sector, 422
 Nabucco Pipeline Project and, 198
 Byrnes, J.F., 300
- Cameroon, oil and gas pipelines and, 274
- Canada
 Canadian Environmental Policy Act (CEPA), 166
 climate change law in, 166
 Comprehensive Economic Trade Agreement (CETA) and, 113
 feed-in-tariff (FIT) scheme, 91
 GATT and, 92–93
 human rights law in, 175
 hydroelectric projects in
 international watercourses and, 250, 252
 investment claims against, 5–7
 investment claims in renewable energy sector, 422
 misalignment between trade and investment law in, 91
 NAFTA and, 92–93
 nuclear energy and, 302, 307, 310–311
 oil and gas pipelines and, 271, 274
 stranded fossil fuel assets, geopolitics of, 400–401
- Candiotti, Enrique, 205
- Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), 130–131, 410
- Carbon pricing mechanisms, 128–129
- Carter, Jimmy, 308–309
- Carve-outs
 derogation, 109–110
 national security, 110–111
 non-precluded measures, 108–109
 overview, 107
 public procurement, 109–110
 taxation, 107–108
- Caspian Pipeline Consortium (CPC) Pipeline, 272
- Central American Electrification Council (CEAC), 390
- Centralised approach to international law of energy
 defining features, 292–293
 energy, focus on, 293–295
 interaction between rules, 292–293
 international institution, existence of, 293–294
 multilateral nature of rules, 39
 normative interactions, 296–298
 normative powers of institutions, 293, 295
 nuclear energy and, 291–292, 298–299
 (See also Nuclear energy)
 overview, 9, 39–41, 435–436
 proto-centralisation, 40, 346–347
 (See also specific organisation)
 scope of governance, 293, 295–296
 specificity of rules, 39
- Chad, oil and gas pipelines and, 274
- Chagos Archipelago, 188
- Chernobyl disaster (1986), 136, 180, 304, 306, 328, 333, 336–337, 339, 342, 344
- Chicago Mercantile Exchange (CMEX), 346
- Chile
 critical raw materials, geopolitics of, 403–404
 lithium in, 430–431
- China
 Belt and Road Initiative (BRI), 403–404
 climate change law in, 166
 critical raw materials, geopolitics of, 402–404, 430
 ECT and, 73
 energy production versus consumption in, 67
 England compared, 11–12
 EU Emissions Trading Directive and, 410
 export measures in, 118–119
 “green industrial policies” and, 406–420
 International Energy Agency (IEA) and, 361–362

- China (cont.)
 International Energy Forum (IEF)
 and, 364
 joint development agreements
 (JDAs) and, 214–215
 lithium in, 431
 nuclear cooperation agreements
 (NCAs) and, 314–315
 nuclear energy and, 307–311
 offshore wind power in, 261
 oil and gas pipelines and, 272–273
 “Principled Consensus,” 214–215
 renewable energy in, 398
 stranded fossil fuel assets, geopolitics
 of, 400–402
 tariffs in, 77–78
 in WTO, 82–83
 Clean Energy Ministerial (CEM),
 370
 Climate change
 adaptation measures, 166–167
 domestic laws and, 166–168
 Framework Convention on Climate
 Change (UNFCCC), 120
 Intergovernmental Panel for Climate
 Change (IPCC), 401
 Kyoto Protocol
 Annex A, 129
 Annex B, 129
 Annex I countries, 164–165
 EU Emissions Trading Directive
 and, 410
 overview, 164–165
 pricing mechanisms in, 129–130
 mitigation measures, 166–167
 Paris Agreement (2016)
 limits of, 432
 NDCs, 165–166
 overview, 165–166
 pricing mechanisms in, 131
 stranded fossil fuel assets,
 geopolitics of, 401
 substantive requirements generally,
 163–164
 UNFCCC, 120, 164, 374, 415, 433
 COBRA Cable Interconnector, 265
 Collective subjects, rules conferring
 entitlements, 50–53
 Colombia, joint development
 agreements (JDAs) and,
 219–220
 Colonialism, 212
 Columbia River Treaty (1961), 250, 252
 Commission on Sustainable
 Development (CSD), 26–27
 Commonwealth of Independent States
 (CIS) Free Trade Agreement
 (2011), 100–101
 Comprehensive Economic Trade
 Agreement (CETA) (2016),
 113
 Conceptual foundations of
 international law of energy
ad hoc approach (*See Ad hoc*
 approach to international law of
 energy)
 approach defined, 34
 centralised approach (*See*
 Centralised approach to
 international law of energy)
 comparison of approaches, 35–36
 criteria for distinctive features of
 approaches, 34–36
 externalities (*See Externalities*)
 foundational approach (*See*
 Foundational approach to
 international law of energy)
 legal object, energy as (*See Legal*
 object, energy as)
 level of specificity of rules, 34–35
 overview, 9
 purposes of energy governance (*See*
 Purposes of energy governance)
 spatial scope of rules, 35
 transversality of rules, 35
 verticality of rules, 35
 Concessions, 212
 Conference on International Economic
 Co-operation (CIEC), 362
 Congo, Democratic Republic of (DRC)
 critical raw materials, geopolitics of,
 403
 Ugandan occupation of, 65
 Virunga National Park, 170–171, 176
 World Heritage Convention and,
 170–171

- Continental shelf
 Antarctic Treaty and, 168–169
 disused oil installations, pollution
 from, 156–158
 hydrocarbons, joint development of,
 201, 233
 joint development agreements
 (JDAs) and, 208, 223, 225
 sovereignty versus sovereign rights,
 46–48
 US and, 12
- Convention on Assistance in Case of a
 Nuclear Accident or
 Radiological Emergency (1986),
 333–334, 342–344
- Convention on Early Notification of a
 Nuclear Accident (1986), 333,
 342–343
- Convention on Nuclear Safety (CNS)
 (1994), 328–330, 342–343
- Convention on the Elimination of All
 Forms of Discrimination
 against Women (CEDAW)
 (1979), 54–55
- Convention on the Law of the Sea
 (UNCLOS) (1982)
ad hoc governance of energy projects
 distinguished, 197
 competing uses of energy and,
 60–61
 environmental protection and,
 138–142, 145
 hydrocarbons, joint development of
 cooperation in good faith,
 232–236
 mutual restraint, 228–232
 notification, consultation, and
 information exchange, 237–238
 prevention of harm, 242
 hydroelectric projects in
 international watercourses and,
 260
- International Seabed Authority (ISA)
 and, 44
 joint development agreements
 (JDAs) and, 208, 220–221, 223
 marine environment and, 152–158
 maritime delimitation and, 58–59
- North Seas Energy Cooperation
 Initiative and, 263
 offshore wind power and, 267–268
 oil and gas pipelines and, 277–278
 response to harmful events and,
 181–182
 seabed and subsoil and, 46, 140–142,
 152
 sovereignty versus sovereign rights,
 46–48
 state responsibility and, 187–188
 transit of energy resources and, 95,
 97–98, 101
 UNFCCC compared, 164
- Convention on the Physical Protection
 of Nuclear Material (1980),
 304–305, 322–324, 329–330
- Cooperation in good faith
 environmental protection, 133,
 136–137
 hydrocarbons, joint development of,
 227, 232–236
- Cost internalisation
 overview, 127
 polluter-pays principle, 127–128
 pricing mechanisms, 128–131
- COVID-19 pandemic, 398–399, 415
- Critical raw materials
 disputes regarding, 414, 429–431
 geopolitics of, 402–404
 Heavy Rare Earth Elements
 (HREEs), 403
 Light Rare Earth Elements (LREEs),
 403
 lithium, 430–431
 manganese, 430
 molybdenum, 430
- Croatia, Espoo Convention and, 144
- Czechoslovakia. *See also* Czech
 Republic; Slovakia
 hydroelectric projects in international
 watercourses and, 253
 nuclear energy and, 303
- Czech Republic
 Gazprom and, 84
 investment claims against, 5–7
 investment claims in renewable
 energy sector, 422

- Dams, 244
- Decision on the Disposal of Disused Offshore Installations (1998), 160–161
- Denmark
- electricity transmission lines and, 283, 288
 - North Seas Energy Cooperation Initiative and, 263
 - offshore wind power in, 261
 - oil and gas pipelines and, 47
 - oil production in, 380
 - renewable energy and, 371–372
- Derivative entitlement-holders, 43
- Differentiation, 86–87
- Distributive justice, 22
- Diversification as purpose of energy governance, 21–22, 24–25, 435
- Dolphin protection, 122
- Dolzer, R., 49
- DRC. *See* Congo, Democratic Republic of (DRC)
- Droit commun*, 42–43
- Dual-pricing, 75–76
- Earth Summit +5 (1997), 26
- Economic Community of West African States (ECOWAS)
- Centre for Renewable Energy and Energy Efficiency (ECREEE), 374
 - Energy Protocol, 68, 100–101
 - Regional Electricity Regulatory Authority (ERERA), 374
- ECT. *See* Energy Charter Treaty (ECT) (1994)
- Ecuador
- Latin American Energy Organization (OLADE) and, 388
 - in WTO, 82
- EEZs. *See* Exclusive economic zones (EEZs)
- Effectivités*, 57–58
- Efficiency as purpose of energy governance, 21–23, 435
- Egypt
- Grand Ethiopian Renaissance Dam and, 63–64
 - hydroelectric projects in international watercourses and, 249
 - Six-Day War and, 353
 - Yom Kippur War and, 357
- Eisenhower, Dwight, 300–302, 335
- Ekofisk Pipeline, 271
- Electricity transmission lines
- ad hoc* governance, 243–244, 281–284, 436, 438
 - agreements
 - intergovernmental agreements (IGAs), 285–286
 - inter-utility agreements, 286–287
 - issues addressed in, 283
 - market integration and, 288–289
 - nature of, 283
 - overview, 284–285
 - power purchase agreements (PPAs), 287–288
 - transmission service agreements (TSAs), 287–288
- bilateral systems, 283
- ECT and, 286, 288–289
- fluidity of cross-border sales, 283
- GATS and, 289
- GATT and, 286, 289
- host government agreements (HSAs), 286
- integration, degree of, 282–283
- multilateral systems, 283
- pipelines, 289
- trade law and, 289
- transit of energy resources and, 289–290
- as weak link in energy transformation, 399
- Emergency Notification and Assistance Technical Operations Manual (ENATOM), 333
- Energy Charter Conference, 73, 294–295
- Energy Charter Treaty (ECT) (1994). *See also specific member activity, energy as, 18–19, 32*
- ad hoc* governance of energy projects distinguished, 196–197
 - adoption of, 25, 69

- Annex EM I, 77
 Annex W, 102
 centralised approach and, 294–295
 electricity transmission lines and, 286, 288–289
 energy production versus consumption and, 69–70
 entitlements over energy resources under, 66
 environmental protection, modulation of primary norms, 111–112
 GATT and, 70, 200–212
 intellectual property rights (IPRs) under, 15, 18
 international energy transactions generally, 68
 investment aspects, 70–72, 411
 members, 73
 Model Electricity HGA, 286
 Modernisation Group, 71
 most-favoured nation (MFN) treatment in, 72
 national treatment in, 72
 non-discrimination in, 66
 oil and gas pipelines and, 271–272, 276
 polluter-pays principle and, 127–172
 producer/consumer organisations compared, 347
 Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA), 124–172
 taxation carve-outs, 107–108
 trade aspects, 70
 transit aspects, 72–73, 95, 98–100, 278
 transit of energy resources and, 101–102
 as umbrella agreement, 100–101
 unique nature of, 100–101
 Energy policies, international law of energy and, 7–8
 Energy services, 80–81
 Energy transformation
 branch-based conception of international law and, 433–434
 consolidation phase, 27
 critical raw materials, geopolitics of, 402–404
 electricity transmission lines and grids as weak link in, 399
 expansion phase, 27–28
 as inflexion point, 13–14, 395
 institutionalisation phase, 27
 international law and
 as “battlefront,” 405–406, 433, 437, 439
 competition within renewable energy sector, 414–420
 critical raw materials, disputes regarding, 414, 429–431
 Emissions Trading Directive, 406–407, 409–410
 harnessing existing rules to support transformation, 414–431
 as hindering transformation, 406–414
 investment claims in renewable energy sector, 414, 420–429
 limiting adverse effects of transformation, 431–433
 negative externalities, limiting, 431–433
 overview, 395
 participatory requirements, 431–432
 recoupment of lost value, 406–407, 411–414
 “stability” struggle, 420–429
 subsidies, 406–409, 433
 introduction phase, 26
 overview, 8, 395
 stranded fossil fuel assets, geopolitics of, 400–402
 from transition to transformation, 399–400
 transversal perspective, move toward, 8, 434
 Energy transport facilities, 98–100
 England. *See* United Kingdom
 Entitlements over energy resources
 ad hoc governance of energy projects limited to, 196–197
 derivative entitlement-holders, 43

- Entitlements over energy resources (cont.)
- ECT, under, 66
 - foundational approach, rules in generally, 36–37, 42
 - hydrocarbons, joint development of, effect on, 200–201
 - international energy transactions distinguished, 66–68
 - originary entitlement-holders, 43
 - overview, 435
 - during post-war reconstruction, 13
 - rules allocating entitlements
 - asymmetric conditions, 64–66
 - competing uses of energy, 60–64
 - environmental protection compared, 62
 - international watercourses compared, 62–64
 - lack of specificity, 57
 - maritime delimitation, 58–60
 - overview, 56–57
 - title versus *effectivités*, 57–58
 - rules conferring entitlements
 - to collective subjects, 50–53
 - to indigenous and tribal peoples, 50–53
 - to individuals, 53–55
 - to international organisations, 55–56
 - overview, 43–44
 - to peoples, 48–50
 - to states, 45–48
 - rules governing generally, 32, 436
 - sovereignty and, 438
- Environmental control technology (EnvCT), 218–219
- Environmental impact assessments (EIAs), 133–136, 142–146
- Environmental protection
- Antarctic environment, 168–169
 - area-based management techniques, 168
 - case law, 132–133, 137–142
 - climate change (*See* Climate change)
 - cooperation in good faith, 133, 136–137
 - environmental impact assessments (EIAs), 133–136, 142–146
 - global commons, prevention of harm to, 134
 - human rights and, 104, 147–149, 171–172
 - ICJ and, 132–133, 135–136
 - indigenous and tribal peoples and, 150–151
 - information, access to, 147–148
 - ITLOS and, 137–138, 140–142, 145
 - joint development agreements (JDAs) and, 217–220
 - justice, access to, 147–149
 - marine environment (*See* Marine environment)
 - modulation of primary norms, 111–112
 - no-harm principle, 134
 - nuclear energy and
 - overview, 306, 341–342
 - prevention of harm, 342–343
 - reparation of harm, 344–345
 - response to harmful events, 343–344
 - oil and gas pipelines and, 279–281
 - participation in decision-making, 147–148
 - polluter-pays principle, 127–128
 - prevention of harm, 132–134
 - principles of customary international environmental law generally, 132
 - procedural environmental human rights, 147–149
 - relevance of risk, 134
 - requisite harm, 134
 - right to exploit resources, 134
 - rules allocating entitlements compared, 62
 - strategic environmental assessments (SEAs), 142
 - UNCLOS and, 138–142, 145
- Escazú Regional Agreement on Access to Information, Public Participation and Justice in Environmental Matters in Latin America and the Caribbean (2018), 147–149, 431–432

- Espoo Convention on Environmental Impact Assessment in a Transboundary Context (1991), 142–145, 298
- Estonia
 electricity transmission lines and, 283
 Gazprom and, 84
 oil and gas pipelines and, 278
- Ethiopia, Grand Ethiopian Renaissance Dam and, 63–64
- Eurasian Economic Union, 100–101
- EURATOM, 304–305, 315, 326–327, 377
- European Atomic Energy Community, 377
- European Coal and Steel Community (ECSC), 302, 377
- European Convention on Human Rights (1953), 172
- European Court of Human Rights (ECtHR), 52–53, 149–150, 172–173
- European Court of Justice (ECJ), 409–410
- European Economic Area (EEA), 410
- European Economic Community (EEC), 377–378
- European Energy Charter (1991), 73
- European Monitoring and Evaluation Programme (EMEP), 162–163
- European Nuclear Energy Agency, 302
- European Renewable Energy Council (EREC), 376
- European Social Charter (1996), 54–55
- European Union
 Climate Action Directorate (CLIMA), 385
 climate change law in, 167
 Combined Nomenclature, 19, 70
 Comprehensive Economic Trade Agreement (CETA) and, 113
 critical raw materials, geopolitics of, 402
 Emissions Trading Directive, 130, 406–407, 409–410
 Energy Directorate (ENER), 385
 energy infrastructure in, 100–101
 Environment Directorate (ENV), 385
 Gas Directive, 66, 85
 “green industrial policies” and, 406–420
 Maastricht Treaty, 379, 385
 pricing mechanisms in, 130
 regional energy governance system
 Agency for Cooperation of Energy Regulators (ACER), 381–386
 Amsterdam Forum, 387
 Berlin Forum, 387
 Citizen’s Energy Forum, 387
 “Clean Energy for All Europeans,” 385
 Council of European Energy Regulators (CEER), 386
 Electricity Regulatory Forum, 387
 “Energy Packages,” 22, 381–385
 “An Energy Policy for the European Union” (White Paper), 378, 385
 energy-specific bodies, 385–386
 European Network of
 Transmission System Operators —Electricity (ENTSO-E), 381–384, 386
 European Network of
 Transmission System Operators —Gas (ENTSO-G), 381–384, 386
 European Regulators Group for Electricity and Gas (ERGEG), 385–386
 “A European Strategy for Sustainable, Competitive and Secure Energy” (Green Paper), 385
 First Package, 385
 Florence Forum, 387
 Fossil Fuel Forum, 387
 Fourth Package, 385
 Gas Regulatory Forum, 387
 general EU bodies, 384–385
 London Forum, 387
 Madrid Forum, 387
 multi-stakeholder fora, 387
 normative powers, 381–384
 overview, 9
 proto-centralisation in, 347

- European Union (cont.)
 purposes of energy governance
 and, 437
 as regional cooperation
 organisation, 375–376
 Regulation 2018/1999, 381–384
 shared competence, energy as,
 379–381
 socio-technical transitions and, 406
 Sustainable Energy Forum, 387
 Third Package, 84–86, 385–386, 437
 Single European Act, 378
 stranded fossil fuel assets, geopolitics
 of, 401–402
 transit of energy resources and,
 100–101
 Treaty of Lisbon, 379, 385
 Treaty on the Functioning of the
 European Union (TFEU),
 55–56, 378–380, 385
- Exception clauses
 energy security, 123–124
 export measures, 118–119
 GATT Article XX, 117–118
 overview, 116–117
 processes and production methods,
 122–123
 renewable energy support schemes,
 119–121
 technical barriers to trade, 121
- Exclusive economic zones (EEZs)
 Antarctic Treaty and, 168–169
 disused oil installations, pollution
 from, 156–158
 hydrocarbons, joint development of,
 201, 233
 joint development agreements
 (JDAs) and, 208, 223, 225
 offshore wind power and, 264,
 267–268
 oil and gas pipelines and, 277–278
 sovereignty versus sovereign rights,
 46–48
- Export measures, 78–80, 118–119
- Externalities
 defined, 29–30
 international energy transactions
 and, 29
 negative externalities (*See* Negative
 externalities)
 rules governing international energy
 transactions and, 32–34
 third parties and, 30–31
 transactions versus, 30
 transit of energy resources and, 33
 Exxon Valdez oil spill (1990), 182
- Fiji, climate change law in, 166
- Finland
 critical raw materials, geopolitics of,
 403
 electricity transmission lines and,
 283, 288
 Espoo Convention and, 144
 hydroelectric projects in
 international watercourses and,
 249
 Nordic Saami Convention and, 52–53
 oil and gas pipelines and, 66
 “First in, last out; last in, first out,” 5,
 397–398
- Fishing rights, 152–153
- Flows, 15–16
- Fossil fuels
 consumption of, 396–398
 hydrocarbons, joint development of
 (*See* Hydrocarbons, joint
 development of)
 move away from (*See* Energy
 transformation)
 statistics on consumption of, 396–398
 stranded fossil fuel assets, geopolitics
 of, 400–402
 subsidies, 407–409
- Foundational approach to international
 law of energy
 entitlements over energy resources,
 rules regarding, 36–37, 42 (*See*
also Entitlements over energy
 resources)
 geographical mismatch of production
 and consumption and, 42
 international energy transactions,
 rules regarding, 36–37, 42 (*See*
also International energy
 transactions)

- lack of specificity of rules, 36
 negative externalities, rules
 regarding, 36–37, 104–105 (*See also* Negative externalities)
 overview, 9, 36–37, 435–436
 relevant versus irrelevant rules, 36–37
 transit of energy resources, rules
 regarding, 42 (*See also* Transit of energy resources)
- Fourth Geneva Convention, 65
- Framework Convention on Climate Change (UNFCCC) (1992), 120, 164, 374, 415, 433
- France
 critical raw materials, geopolitics of, 403
 electricity transmission lines and, 283
 Espoo Convention and, 144
 gilets jaunes (yellow vests), 7, 433
 human rights law in, 177–178
 International Energy Forum (IEF) and, 362–363
 International Renewable Energy Agency (IRENA) and, 372–373
 North Seas Energy Cooperation Initiative and, 263
 nuclear cooperation agreements (NCAs) and, 314
 nuclear energy and, 302, 310–311
 Suez crisis and, 349–350
- Free trade agreements (FTAs)
 CIS Free Trade Agreement, 100–101
 international energy transactions and, 68
 investment law and, 89–91
 North American Free Trade Agreement (NAFTA), 53–54, 92–93, 116, 124, 419
 Oman–US FTA, 113–114
 rules governing, 74
- Friendly Relations Declaration (1970), 48
- Frigg Field, 219, 222
- FTAs. *See* Free trade agreements (FTAs)
- Fukushima disaster (2011), 304, 325–326, 333–334, 337, 339, 411
- Gas Exporter Countries Forum (GECF), 364–367, 436
- GATS. *See* General Agreement on Trade in Services (GATS)
- GATT. *See* General Agreement on Tariffs and Trade (GATT)
- Gazprom, 79, 84–85, 123
- General Agreement on Tariffs and Trade (GATT)
 derogation, 109–110
 differentiation, 86–87
 ECT and, 70, 200–212
 electricity transmission lines and, 286, 289
 energy security and, 123–124
 energy services, 80–81
 energy trade generally, 74–75, 78
 exception clauses, 117–118
 export measures and, 78–80, 118–119
 “like products” under, 86, 114–115
 misalignment between trade and investment law and, 92–93
 national security carve-out, 110–111
 network-bound transit, 81
 OPEC and, 357
 processes and production methods and, 122–123
 public procurement carve-out, 109–110
 quantitative restrictions prohibited, 85–86
 renewable energy support schemes and, 119
 Revised Government Procurement Agreement and, 112–113
 state trading enterprises (STEs) and, 84
 technical barriers to trade and, 121
 transit of energy resources and, 95–97, 102, 278
 TRIMS Agreement and, 88
- General Agreement on Trade in Services (GATS)
 electricity transmission lines and, 289

- General Agreement on Trade in Services (GATS) (cont.)
 energy security and, 123–124
 energy services, 80–82
 energy trade generally, 78
 investment law and, 89
- Geneva Convention on the Continental Shelf (1958), 201
- Geographical mismatch of production and consumption
 foundational approach and, 42
 internationalisation of energy markets and, 93–94
 overview, 435
 during post-war reconstruction, 13
 rules governing, 32–33
- Georgia
 BTC Pipeline and, 198–199
 oil and gas pipelines and, 272, 274–276
 in WTO, 82
- Germany
 critical raw materials, geopolitics of, 403
 electricity transmission lines and, 283, 288
 energy transition in, 5
 Industrial Revolution in, 398
 International Renewable Energy Agency (IRENA) and, 372, 375
 investment claims in renewable energy sector, 422
 North Seas Energy Cooperation Initiative and, 263
 offshore wind power in, 261
 oil and gas pipelines and, 47, 66, 272, 275
 renewable energy and, 371–372
- Global Bioenergy Partnership (GBEP), 370
- Global Commission on the Geopolitics of the Energy Transformation, 3, 16, 399
- Global Energy Efficiency Accelerator Platform, 369
- Gore, Al, 401
- Grand Ethiopian Renaissance Dam, 63–64
- Greater Sunrise Field, 216–217
- Greece
 electricity transmission lines and, 282
 oil and gas pipelines and, 272
- Green Climate Fund (GCF), 432
 “Green industrial policies,” 408, 414–419, 438
- Greenpeace, 158
- Grímsson, Ólafur Ragnar, 399
- Guinea–Bissau
 joint development agreements (JDAs) and, 210–211, 216, 219–220, 222
 Management and Co-operation Agreement between the Government of the Republic of Senegal and the Government of the Republic of Guinea-Bissau, 44
- Gulf War (1990–1991), 64, 185–186, 354–355, 359, 362–363
- Guyana, joint development agreements (JDAs) and, 219–220
- Hague Regulations (1907), 65
- Happold, M., 248
- Harmonised System, 19, 70, 77
- Heavy Rare Earth Elements (HREEs), 403
- Helsinki Convention on the Protection and Use of Transboundary Watercourses and International Lakes (1992), 159, 246, 259
- Hemispheric Energy Initiative, 390
- Hiroshima bombing (1945), 299–300, 304
- Human rights. *See also specific Convention or tribunal*
 corporate policies and, 179
 domestic laws and, 174–175
 energy as, 54–55
 environmental protection and, 104, 147–149, 171–172
 guidelines and standards and, 175–177, 179–180
 of indigenous and tribal peoples, 150–151
 oil and gas pipelines and, 279–281

- parent–subsidiary relationship, duty of care in, 177–179
- private operators, duties of, 174–180
- procedural dimension of, 147, 149–150
- procedural environmental human rights, 147–149
- states, duties of, 172–174
- substantive requirements generally, 171–172
- Human Rights Committee, 173–174
- Hungary
 - Gazprom and, 84
 - hydroelectric projects in international watercourses and, 253
 - Nabucco Pipeline Project and, 198
- Hunt Oil, 180
- Hurricane Katrina (2005), 359
- Hurricane Rita (2005), 359
- Hybrid Projects Study, 265
- Hydrocarbons, joint development of
 - ad hoc* governance, 194–195, 436, 438
 - “artificial gap,” 194
 - boundary and delimitation agreements, 207
 - continental shelf and, 201, 233
 - entitlements over energy resources, effect of, 200–201
 - exclusive economic zones (EEZs) and, 201, 233
 - hydroelectric projects in international watercourses compared, 246–247
- ICJ and, 259
 - mutual restraint, 229–230
 - no-harm principle, 240–241
 - notification, consultation, and information exchange, 238–239
- ILC and, 194–195, 204–207
- ITLOS and
 - mutual restraint, 230–231
 - prevention of harm, 242
- joint development agreements (JDAs) (*See* Joint development agreements (JDAs))
 - literature on, 202–204
 - location of resources, effect of, 201
 - maritime delimitation and, 202–203
 - multiple drilling, negative effect on resource recovery, 201–202
 - OPEC and, 200–201
 - overview, 200–204
 - straddling/disputed deposits
 - consultation, 227, 236–239
 - cooperation in good faith, 227, 232–236
 - information exchange, 227, 236–239
 - mutual restraint, 227–232
 - no-harm principle, 227, 239–242
 - notification, 227, 236–239
 - overview, 227–228
 - pooling and, 228
 - prevention of harm, 227, 239–240, 242
 - rule of capture and, 228
 - unitisation and, 228
- UNCLOS and
 - cooperation in good faith, 232–236
 - mutual restraint, 228–232
 - notification, consultation, and information exchange, 237–238
 - prevention of harm, 242
 - unitisation agreements, 208
- Hydroelectric projects in international watercourses
 - ad hoc* governance, 243–247, 436
 - agreements
 - dispute settlement, 256
 - modalities of cooperation, 249–251
 - overview, 247–248
 - sharing formulae, 251–252
 - territorial implications, 252–254
 - boundary delimitation and, 245
 - dams, 244
 - hydrocarbons, joint development of compared, 246–247
 - hydrocarbons compared, 246–247
 - ICJ and, 253, 256–257, 259
 - ILC and, 245–246, 253

- Hydroelectric projects in international watercourses (cont.)
 indigenous and tribal peoples and, 255
 negative externalities and, 254–256
 New York Convention (*See* New York Convention on the Non-Navigational Uses of International Watercourses (1997))
 principles
 cooperation in good faith, 258–259
 equitable and reasonable utilisation, 257–258
 no-harm principle, 258
 overview, 256–257
 prevention of harm, 260
 pump storage hydropower (PSH), 244
 UNCLOS and, 260
- IAEA. *See* International Atomic Energy Agency (IAEA)
- Iceland
 EU Emissions Trading Directive and, 410
 joint development agreements (JDAs) and, 222
- ICJ. *See* International Court of Justice (ICJ)
- IEA. *See* International Energy Agency (IEA)
- IEF. *See* International Energy Forum (IEF)
- ILC. *See* International Law Commission (ILC)
- ILO. *See* International Labour Organization (ILO)
- Inclusiveness, 7
- India
 climate change law in, 166
 electricity transmission lines and, 285–286
 energy production versus consumption in, 67
 greenhouse gases in, 4
 “green industrial policies” and, 406–420
 hydroelectric projects in international watercourses and, 249
 Indus Water Treaty and, 139–140, 258
 International Energy Agency (IEA) and, 361–362
 International Energy Forum (IEF) and, 364
 Jawaharlal Nehru National Solar Mission (NSM), 119
 Kishenganga Hydro-Electric Project (KHEP), 139–140
 local content requirements (LCRs) in, 4
 nuclear cooperation agreements (NCAs) and, 313
 nuclear energy and, 303
 nuclear tests by, 308
 oil and gas pipelines and, 272–274
 renewable energy in, 398
 renewable energy support schemes in, 119
- Indigenous and tribal peoples
 Declaration on the Rights of Indigenous Peoples, 50–64, 151
 environmental protection and, 150–151
 human rights of, 150–151
 hydroelectric projects in international watercourses and, 255
 participatory requirements, 431–432
 rules conferring entitlements, 50–53
- Individuals, rules conferring entitlements, 53–55
- Indonesia
 GATT and, 75
 “green industrial policies” and, 418
 International Energy Agency (IEA) and, 362
 OPEC and, 352–353
 Timor Gap Treaty and, 4–5, 44, 188, 225–227
- Industrial Revolution
 in Germany, 398
 as inflexion point, 10–12
 slavery and, 11–12
 as socio-technical transition, 397–398

- in United Kingdom, 10–12, 398
- Indus Water Treaty (1960), 139–140, 255–256, 258
- Inflexion points
 - energy transformation as, 13–14, 395
 - Industrial Revolution as, 10–12
 - overview, 10
 - post-war reconstruction as, 12–13
- Installations, 46–47
- Institut de Droit International (IDI), 245–246
- Insurance
 - nuclear energy, reparations, financial guarantee, 339–340
 - oil spills, civil liability for, 192
- Intellectual property rights (IPRs), 15, 17–18
- Inter-American Court of Human Rights (ICtHR), 52, 151, 172–173
- Intercontinental Exchange (ICE), 346
- Intergovernmental Panel for Climate Change (IPCC), 401
- International Atomic Energy Agency (IAEA)
 - Action Plan on Nuclear Safety, 325–326, 334
 - centralised approach and, 39–40, 291, 294–295, 298–299
 - Code of Practice on the Transboundary Movement of Radioactive Waste, 330–332
 - Commission on Safety Standards (CSS), 325
 - Department of Technical Cooperation, 316
 - dual-use and, 299–303
 - dumping and, 155–156
 - Guidelines for Mutual Emergency Assistance Arrangements in Connection with a Nuclear Accident or Radiological Emergency, 333
 - Guidelines on Reportable Events, Integrated Planning and Information Exchange in a Transboundary Release of Radioactive Materials, 333
- International Energy Agency (IEA)
 - compared, 362
- nuclear cooperation agreements (NDAs) and
 - as broker, 309–310
 - regional agreements, 316
- physical protection of materials and facilities and, 322
- promotional role of, 368
- purposes of energy governance and, 437
- reparation of harm and, 334–337
- Response and Assistance Network (RANET), 334
- response to harmful events and, 333–334
- safeguard agreements and
 - contents of, 318–320
 - inspection, 320–321
 - overview, 304–305, 308–309, 316–317
 - structure of, 318–320
 - undertaking to enter into, 317–318
 - verification, 320–321
- safety and
 - installations and materials, 328–329
 - overview, 304–305
 - radioactive waste management, 331–332
 - radiological protection, 326–327
 - spent fuel management, 331–332
 - standards, 324–326
 - Transport Regulations, 330–331
- Safety Fundamentals, 332
- socio-technical transitions and, 406
- Standing Committee on Civil Liability for Nuclear Damage, 337
- Statute, 303, 309–310, 320–321, 324–326
- Transport Regulations, 330–331
- International Centre for Settlement of Investment Disputes (ICSID) Convention, 109
- International Civil Aviation Organization (ICAO), 130–131, 410

- International Commission on Large Dams (ICOLD), 244, 370
- International Commission on Radiological Protection (ICRP), 326–327
- International Convention for the Prevention of Pollution from Ships (MARPOL) (1973)
- air pollution and, 161–162
- area-based management techniques
- Antarctic environment, 168–169
 - overview, 168
 - World Heritage Convention, 169–171
- joint development agreements (JDAs) and, 220
- marine environment and, 153–157
- response to harmful events and, 181
- International Convention for the Suppression of Acts of Nuclear Terrorism (2005), 305, 323–324
- International Convention on Civil Liability for Bunker Oil Pollution Damage (2001), 189–190, 193
- International Convention on Civil Liability for Oil Pollution Damage (1969), 189, 191–193
- International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (1971), 189, 192
- International Convention on the Harmonized Commodity Description and Coding System (HS Convention) (1983), 19
- International Court of Justice (ICJ)
- Anglo–Iranian Oil Company (AOIC) and, 351
 - on asymmetric conditions, 65
 - on competing uses of energy, 60–61
 - environmental protection and, 132–133, 135–136
 - hydrocarbons, joint development of mutual restraint, 229–230
 - no-harm principle, 240–241
 - notification, consultation, and information exchange, 238–239
 - hydroelectric projects in
 - international watercourses and, 253, 256–257, 259
 - on international organisations, 251
 - on international watercourses, 62–63
 - joint development agreements (JDAs) and, 222–223
 - lex specialis* and, 198
 - on maritime delimitation, 58–59
 - on rights of peoples, 48–50
 - on state responsibility, 185–188
 - on title versus *effectivités*, 57
 - on treaty law, 223
- International Covenant on Civil and Political Rights (1966), 48, 172
- International Covenant on Economic, Social and Cultural Rights (1966), 48, 172
- International Energy Agency (IEA)
- Association of Southeast Asian Nations (ASEAN) Energy Cooperation Framework and, 393
 - Committee on Energy Research and Technology (CERT), 360
 - coordinated emergency response measures (CERM), 359
 - Energy Technology Perspectives*, 360
 - evolving practice, 361–362
 - Gulf War and, 362–363
 - IAEA compared, 362
 - International Energy Forum (IEF) and, 363–365
 - International Renewable Energy Agency (IRENA) and, 361, 375
 - limited powers of, 294
 - normative powers of, 359–360
 - OECD and, 358
 - oil shortage management measures, 359
 - origins of, 357–359
 - overview, 9
 - as producer/consumer organisation, 348
 - Programme of Long-Term Co-operation (LTCP), 360
 - promotional role of, 368

- proto-centralisation in, 40, 346, 358–359, 436
- purposes of energy governance and, 437
- Sharing System, 24–25
- socio-technical transitions and, 406
- Technology Collaboration Programme (TCP), 360
- World Energy Outlook* (WEO), 360, 398–399
- International Energy Charter (2015), 73
- International Energy Forum (IEF)
 - Charter, 363–364
 - evolving practice, 364–365
 - Gas Exporter Countries Forum (GECF) and, 364
 - International Energy Agency (IEA) and, 363–365
 - Joint Organisations Data Initiative (JODI), 364–365
 - Latin American Energy Organization (OLADE) and, 364
 - membership, 364
 - OPEC and, 363–365
 - origins of, 362–363
 - powers, 363–364
 - as producer/consumer organisation, 348
 - proto-centralisation in, 40, 346
 - structure of, 364
 - Symposium on Energy Outlooks, 365
- International energy transactions
 - bilateral investment treaties (BITs) and, 72
 - entitlements distinguished, 66–68
 - foundational approach, rules in generally, 36–37, 42
 - free trade agreements (FTAs) and, 68
 - negative externalities and, 42–43
 - overview, 435
 - during post-war reconstruction, 13
 - rules enabling transactions, 66–68
 - rules governing generally, 32, 436–437
 - rules protecting transactions, 66–68
 - sovereignty and, 94
 - transversality of rules, 68
- International Finance Corporation (IFC), 145–146, 171–172, 197
- International Hydropower Association (IHA), 370
- International Labour Organization (ILO)
 - Convention 169 on the Rights of Indigenous and Tribal Peoples, 50–64, 151, 255
 - Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy, 171–172
- International law
 - branch-based conception of (*See* Branch-based conception of international law)
 - energy transformation and
 - as “battlefront,” 405–406, 433, 437, 439
 - competition within renewable energy sector, 414–420
 - critical raw materials, disputes regarding, 414, 429–431
 - Emissions Trading Directive, 406–407, 409–410
 - harnessing existing rules to support transformation, 414–431
 - as hindering transformation, 406–414
 - investment claims in renewable energy sector, 414, 420–429
 - limiting adverse effects of transformation, 431–433
 - negative externalities, limiting, 431–433
 - overview, 395
 - participatory requirements, 431–432
 - recoupment of lost value, 406–407, 411–414
 - “stability” struggle, 420–429
 - subsidies, 406–409, 433
 - overview, 9
 - socio-technical transitions and, 405–406, 438–439
- International Law Association (ILA), 245–246

- International Law Commission (ILC)
 Articles on State Responsibility, 185, 188, 240
 Draft Articles on Prevention, 134–135, 137, 184–185, 238
 Draft Articles on Transboundary Aquifers, 204–205
 hydrocarbons, joint development of, 194–195, 204–207
 hydroelectric projects in international watercourses and, 245–246, 253
 oil and gas resources and, 56
 Working Group on Shared Natural Resources, 205–207
- International Maritime Organization (IMO), 155, 157–158, 180–181
- International oil companies (IOCs), 200–201
- International organisations, rules conferring entitlements, 55–56
- International Partnership for Energy Efficiency Cooperation (IPEEC), 370
- International Partnership for the Hydrogen Economy (IPHE), 370–371
- International Renewable Energy Agency (IRENA)
 Africa Clean Energy Corridor (ACEC), 374
 Association of Southeast Asian Nations (ASEAN) Energy Cooperation Framework and, 393
 Clean Energy Corridor of Central America (CECCA), 374
 Clean Energy Corridors, 374
 energy, focus on, 294
 evolving practice, 374–375
 formation of, 27
 Global Geothermal Alliance (GCA), 374
 International Energy Agency (IEA) and, 361, 375
 IRENA Coalition for Action, 374
 limited powers of, 294
 membership, 373
 origins of, 371–372
 overview, 9
 powers, 372–373
 as promotion organisation, 371
 proto-centralisation in, 40, 346–347, 436
 purposes of energy governance and, 437
 Small Island Development States (SIDS) Lighthouses Initiative (LHI), 374
 socio-technical transitions and, 406
 structure of, 373
 on subsidies, 407
 West Africa Clean Energy Corridor (WACEC), 374
- International Seabed Authority (ISA), 43–44, 56, 140–142
- International Tribunal for the Law of the Sea (ITLOS)
 environmental impact assessments (EIAs) and, 145
 hydrocarbons, joint development of mutual restraint, 230–231
 prevention of harm, 242
 maritime delimitation and, 59
 prevention of harm and, 137–138, 140–142
 provisional measures, 61
- International watercourses
 hydroelectric projects in (*See* Hydroelectric projects in international watercourses)
 ICJ on, 62–63
 New York Convention (*See* New York Convention on the Non-Navigational Uses of International Watercourses (1997))
 rules allocating entitlements compared, 62–64
- International Year of Sustainable Energy for All (2012), 27
- Interpretive annexes, 113–114
- Intervention Convention (1969), 181
- Investment law
 basic trade disciplines and, 88
 bilateral investment treaties (BITs) and, 89–91

- disconnected nature of rules, 74
 ECT and, 70–72, 411
 free trade agreements (FTAs) and,
 89–91
 GATS and, 89
 internationalised system of
 investment protection, 90
 misalignments in, 91
 most favoured nation (MFN)
 treatment and, 90–91
 national treatment and, 90
 negative externalities and, 104
 recoupment of lost value and,
 411–414
 renewable energy sector, investment
 claims in, 414, 420–429, 438
 TRIMS Agreement and, 88
- Iran
- GATT and, 74
 - OPEC and, 350, 352–353
 - Revolution, 354
 - service contracts in, 213
 - Shah, deposing of, 354
 - UK- and US-supported coup in,
 351
 - US and Iranian oil platforms, 36
 - WTO and, 82
- Iraq
- GATT and, 74
 - Kuwait, invasion of, 64
 - nuclear energy and, 309, 320
 - oil and gas pipelines and, 271,
 274–276
 - OPEC and, 352–353
 - service contracts in, 213
 - US invasion of, 354–355
 - WTO and, 82
- Ireland
- North Seas Energy Cooperation
 Initiative and, 263
 - oil and gas pipelines and, 274
- IRENA. *See* International Renewable
 Energy Agency (IRENA)
- Israel
- Six-Day War and, 353
 - Suez crisis and, 349–350
 - Yom Kippur War and, 24, 357
- Itaipu Dam, 63–64
- Italy
- electricity transmission lines and,
 282
 - Espoo Convention and, 144
 - investment claims against, 5–7
 - investment claims in renewable
 energy sector, 422
 - oil and gas pipelines and, 272
- Jamaica, joint development agreements
 (JDAs) and, 219–220
- Japan
- critical raw materials, geopolitics of,
 402
 - Fukushima disaster (2011), 304,
 325–326, 333–334, 337, 339,
 411
 - “green industrial policies” and,
 418
 - Hiroshima bombing (1945),
 299–300, 304
 - joint development agreements
 (JDAs) and, 210, 214–215, 219,
 222
 - Nagasaki bombing (1945), 299–300,
 304
 - nuclear cooperation agreements
 (NCAs) and, 314
 - nuclear energy and, 307, 310–311,
 339
 - offshore wind power in, 261
 - “Principled Consensus,” 214–215
 - stranded fossil fuel assets, geopolitics
 of, 400
- JDAs. *See* Joint development
 agreements (JDAs)
- Johannesburg Plan of Implementation
 (2002), 368–369, 372
- Johannesburg Summit on Sustainable
 Development (2002), 27, 372
- Joint Convention on the Safety of Spent
 Fuel Management and on the
 Safety of Radioactive Waste
 (1997), 330–332, 342–343
- Joint development agreements (JDAs)
 applicable law, 220–222
 architecture for development,
 208–209

- Joint development agreements (JDAs) (cont.)
 common authority with legal personality, 210–211
 concessions, 212
 continental shelf and, 208, 223, 225
 contractual forms of, 211–213
 cooperation in, 209–210
 costs and, 215–217
 dispute settlement, 220–223
 environmental clauses, 219–220
 environmental control technology (EnvCT) and, 218–219
 environmental protection and, 217–220
 exclusive economic zones (EEZs) and, 208, 223, 225
 ICJ and, 222–223
 MARPOL and, 220
 nature of, 208
 negative externalities and, 217–220
 other types of agreements distinguished, 207–208
 overview, 194
 pre-existing rights and, 213–215
 produce-consume-dispose (PCD) approach, 218
 production sharing agreements (PSAs), 212
 revenues and, 215–217
 service contracts, 213
 taxation and, 215–217
 treaty law and
 ICJ on, 223
 nature of agreements, 223–224
 overview, 223
 state succession, 226–227
 third parties and, 196–224
 VCLT and, 223–224
 UNCLOS and, 208, 220–221, 223
 waste management technology (WMT) and, 218–219
- Jordan
 ECT and, 73
 Six-Day War and, 353
- Kazakhstan
 energy production versus consumption in, 69–70
 oil and gas pipelines and, 272, 275
 in WTO, 70, 82
- KCM, 177–179
- Kenya
 critical raw materials and, 430
 investment claims in renewable energy sector, 422
- Kirkuk–Ceyhan Pipeline, 271, 274–276
- Kissinger, Henry, 361
- Komati Basin River Authority, 250–251, 255
- Kriegers Flak project, 265–266
- Kuwait
 GATT and, 75
 Iraqi invasion of, 64
 OPEC and, 350, 352, 356
- Kyiv Protocol on Strategic Environmental Assessment (2003), 142–144
- Kyoto Protocol (1997)
 Annex A, 129
 Annex B, 129
 Annex I countries, 164–165
 climate change and, 164–165
 EU Emissions Trading Directive and, 410
 pricing mechanisms in, 129–130
- Kyrgyzstan, critical raw materials and, 430
- Lama Energy Group, 413
- Lamy, Pascal, 76–77
- Latin American Energy Organization (OLADE)
 in context of energy integration, 389–391
- International Energy Forum (IEF) and, 364
- Lima Agreement (1973), 388–389
- Lima Declaration (2019), 388–391
- membership, 388
- OPEC compared, 389
- origins of, 387–388
- overview, 9
- Permanent Secretariat, 389
- powers, 388–389
- Pronouncement of San José (1979), 389–390
- proto-centralisation in, 347

- as regional cooperation organisation, 376
- structure of, 389
- Latin American State Oil Reciprocal Assistance (ARPEL), 390
- Latvia
 - electricity transmission lines and, 283
 - Gazprom and, 84
- Law of the Sea. *See* Convention on the Law of the Sea (UNCLOS) (1982)
- League of Nations, 95
- Legal object, energy as
 - activity, 18–20, 32
 - overview, 14–15, 20–21, 435
 - product, 17
 - resource, 15–16
 - technology, 17–18
- Legal proximity, 105–107
- Lesotho, hydroelectric projects in
 - international watercourses and, 250
- Lesotho Highlands Water Project Treaty (1986), 250, 255
- “Lex petrolea,” 202–203
- Lex posterior*, 126, 198, 255–256, 296
- Lex specialis*
 - ad hoc* governance and, 194, 197–198
 - centralised approach and, 296
 - GATT and, 119
 - hydroelectric projects in
 - international watercourses and, 255–256
 - negative externalities and, 126
 - oil and gas pipelines and, 276
- Lex superior*, 126, 198–199, 255–256, 296
- Libya, civil war in, 359
- Liechtenstein, EU Emissions Trading Directive and, 410
- Light Rare Earth Elements (LREEs), 403
- “Like products,” 86, 114–115
- Lilienthal, David E., 300
- Limited attention to energy law, 1–2
- Lithium, 430–431
- Lithuania
 - electricity transmission lines and, 283
 - Gazprom and, 84
- Local content requirements (LCRs), 4, 407–408
- “London Club,” 308, 310–311
- London Convention (1961), 155–156
- London Convention on Dumping (1972), 341
- London Protocol (1996), 155–156
- LRTAP Convention (1979), 162–163
- Lubbers, Ruud, 25, 69
- Lukman, R., 363
- Luxembourg, North Seas Energy Cooperation Initiative and, 263
- Maadi Pact (1959), 350
- Maastricht Treaty (1992), 379, 385
- Madrid Protocol on the Antarctic Environment (1991), 168–169
- Malaysia
 - joint development agreements (JDAs) and, 210, 213–216, 219, 222, 294–295
 - Petronas, 213–214
- Manganese, 430
- Marine environment
 - Baltic Sea, 159
 - disused oil installations, pollution from, 156–161
 - dumping, pollution from, 155–156
 - general duties, 152–153
 - MARPOL and, 153–157
 - Mediterranean Sea, 159
 - North East Atlantic Ocean, 159–161
 - prevention of harm, 152
 - regional seas instruments, 158–161
 - seabed mineral resources, pollution from extraction of, 156–161
 - sources of pollution, 153–158
 - substantive requirements generally, 151–152
 - UNCLOS and, 152–158
 - vessels, pollution from, 153–155
- Maritime delimitation
 - hydrocarbons, joint development of, 202–203
 - ICJ on, 58–59
 - ITLOS and, 59
 - rules allocating entitlements and, 58–60
 - UNCLOS and, 58–59

- MARPOL. *See* International Convention for the Prevention of Pollution from Ships (MARPOL) (1973)
- Marshall Plan, 302
- Meade, J.E., 29–31
- Mediterranean Sea, 159
- Mexico
 climate change law in, 166
 dual-pricing and, 75–76
 PEMEX, 213
 service contracts in, 213
- MFN treatment. *See* Most favoured nation (MFN) treatment
- Millennium Development Goals (MDGs), 27–28
- Modular Offshore Grid, 265
- Molybdenum, 430
- Montero Mining, 430
- Morocco
 ECT and, 73
 International Energy Agency (IEA) and, 362
- Mossadegh, M., 351
- Most favoured nation (MFN) treatment
 in ECT, 72
 investment law and, 90–91
 “like products” and, 114–116
 technical barriers to trade and, 121
- Mouton, M.W., 201
- Murase, Shinya, 206
- Nabucco Pipeline Project, 198, 200–212
- Nagasaki bombing (1945), 299–300, 304
- Nasser, Gamel Abdel, 349
- National oil companies (NOCs), 200–201
- National treatment
 in ECT, 72
 investment law and, 90
 “like products” and, 114–115
 technical barriers to trade and, 121
- NCAs. *See* Nuclear energy
- Negative externalities
 branch-based conception of international law, inapplicability of, 104–105
- carve-outs and
 derogation, 109–110
 national security, 110–111
 non-precluded measures, 108–109
 overview, 107
 public procurement, 109–110
 taxation, 107–108
- cost internalisation
 overview, 127
 polluter-pays principle, 127–128
 pricing mechanisms, 128–131
- defined, 30
- energy transformation, international law and, 431–433
- environmental protection (*See* Environmental protection)
- exception clauses
 energy security, 123–124
 export measures, 118–119
 GATT Article XX, 117–118
 overview, 116–117
 processes and production methods, 122–123
 renewable energy support schemes, 119–121
 technical barriers to trade, 121
- foundational approach, rules in, 36–37, 104–105
- human rights (*See* Human rights)
- hydroelectric projects in international watercourses and, 254–256
- international energy transactions and, 42–43
- investment law and, 104
- joint development agreements (JDAs) and, 217–220
- legal proximity and, 105–107
- modulation of primary norms
 environmental protection, 111–112
 implicit modulations, 114–116
 interpretive annexes, 113–114
 overview, 111
 Revised Government Procurement Agreement, 112–113
- new technologies and, 437–438
- overview, 435
- prevention of harm (*See* Prevention of harm)

- reparation of harm (*See* Reparation of harm)
- response to harmful events
 - global scope, instruments with, 181–182
 - overview, 180
 - regional scope, instruments with, 182–183
- rules governing generally, 33–34, 436–437
- separate but formally linked instruments
 - NAFTA, 124
 - North-American Agreement on Environmental Cooperation (NAAEC), 124
 - North-American Agreement on Labor Cooperation (NAALC), 124
 - overview, 124
 - Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA), 124–126
 - stages of intervention, 126
 - states and, 32
 - trade law and, 104
 - transit of energy resources and, 104
- Nepal
 - electricity transmission lines and, 285–286
 - hydroelectric projects in international watercourses and, 249
- Netherlands
 - electricity transmission lines and, 283
 - human rights law in, 177–178
 - North Seas Energy Cooperation Initiative and, 263
 - oil embargo and, 357–358
- Network-bound transit
 - global level rules, 95–98
 - overview, 81
 - regional level rules, 98
- New Jersey Standard Oil, 350
- New York Convention on the Non-Navigational Uses of International Watercourses (1997)
 - adoption of, 245–246, 256–257
 - cooperation in good faith, 258–259
 - equitable and reasonable utilisation, 62–63, 257–258
 - ILC and, 204
 - no-harm principle, 258
 - prevention of harm, 260
- New York Mercantile Exchange (NYMEX), 346
- New Zealand, climate change law in, 166
- Niger, ECT and, 73
- Nigeria
 - GATT and, 75
 - joint development agreements (JDAs) and, 219–222, 225
- Nile Treaty (1929), 258
- Nile Treaty (1959), 258
- 9/11 attacks (2001), 305, 323–324
- No-harm principle
 - environmental protection, 134
 - hydrocarbons, joint development of, 227, 239–242
 - hydroelectric projects in international watercourses, 258
- Non-Aligned Movement, 350
- Non-discrimination
 - in ECT, 66
 - nuclear energy, reparation of harm, 341
 - oil spills, civil liability for, 193
 - transit of energy resources, 94, 98–100
- Non-Proliferation Agreement (1967), 295
- Non-Proliferation Treaty (NPT) (1968), 304–305, 308, 310, 317, 319
- Nordic Saami Convention (2017), 52–53
- Nord Pool, 283, 288
- Nord Stream Pipeline, 47, 144, 272
- Nord Stream 2 Pipeline, 24, 66, 85, 272
- North-American Agreement on Environmental Cooperation (NAAEC) (1993), 124
- North-American Agreement on Labor Cooperation (NAALC) (1993), 124
- North American Free Trade Agreement (NAFTA) (1994), 53–54, 92–93, 116, 124, 419

- North East Atlantic Ocean, 159–161
 Northern Pipeline Agreement (1977),
 271, 274
 North Korea, nuclear energy and,
 309
 North Seas Energy Cooperation
 Initiative, 263
 North Sea Wind Power Hub, 265
 Norway
 concessions in, 212
 critical raw materials, geopolitics of,
 403
 electricity transmission lines and,
 283, 288
 EU Emissions Trading Directive and,
 410
 hydroelectric projects in international
 watercourses and, 249
 International Renewable Energy
 Agency (IRENA) and, 375
 joint development agreements
 (JDAs) and, 219, 222
 Nordic Saami Convention and,
 52–53
 North Seas Energy Cooperation
 Initiative and, 263
 oil and gas pipelines and, 271
 Nuclear energy. *See also specific Treaty
 or entity*
 centralised approach and, 291–292,
 298–299
 destructive power of nuclear fission
 and, 304
 dual-use, 299–303
 environmental protection and
 overview, 306, 341–342
 prevention of harm, 342–343
 repair of harm, 344–345
 response to harmful events,
 343–344
 IAEA (*See* International Atomic
 Energy Agency (IAEA))
 military implications, 22
 non-proliferation, 312
 nuclear cooperation agreements
 (NCAs)
 IAEA as broker, 309–310
 legal structure of transfers, 310–311
 other major suppliers, practice of,
 314–315
 regional agreements, 315–316
 US Section 123 Agreements and,
 311–313
 OECD and
 nuclear cooperation agreements
 (NCAs), 315
 overview, 302, 304–306
 repair of harm, 334–336
 physical protection of materials and
 facilities
 Convention on the Physical
 Protection of Nuclear Material,
 322–324, 329–330
 IAEA Guidelines, 322
 proliferation, 308–309
 purposes of regulation, 303–307
 repair of harm
 environmental protection and,
 344–345
 financial guarantee, 339–340
 IAEA and, 334–337
 non-discrimination, 341
 OECD and, 334–336
 overview, 334–336
 scope of application of treaties,
 336–337
 special drawing rights (SDRs),
 340
 strict liability, 338–339
 tiered compensation, 340–341
 response to harmful events, 333–334
 safeguard agreements
 comprehensive safeguard
 agreements (CSAs), 319–320
 contents of, 318–320
 INFCIRC/66-type agreements,
 318–319
 inspection, 320–321
 item-specific agreements, 318–319
 overview, 304–305, 308–309,
 316–317
 structure of, 318–320
 undertaking to enter into, 317–318
 verification, 320–321
 voluntary offer agreements
 (VOAs), 319

- safety
 Convention on Nuclear Safety (CNS), 328–329
 IAEA and, 324–326
 installations and materials, 328–329
 Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste, 331–332
 nature and scope of instruments, 324–326
 overview, 303–305
 prevention, 326
 radioactive waste management, 331–332
 radiological protection, 326–328
 spent fuel management, 331–332
 standards, 324–326
 transport of materials, 329–331
 Transport Regulations, 330–331
 security and, 303–304
 transfers of materials and technology, 308–309
 types of markets, 307–308
 Nuclear Suppliers Group (NSG), 308, 310–311
- OECD. *See* Organisation for Economic Co-operation and Development (OECD)
- Offshore Protocol (1994), 159
- Offshore wind power
ad hoc governance, 243–244, 260–262, 436, 438
 cables, 268–269
 characterisation of projects, 268–269
 clustering, 262
 combined grid solutions, 264–265
 conventional projects, 264, 266
 exclusive economic zones (EEZs) and, 264, 267–268
 Hybrid Asset Networks Support Agreements (HANSAs), 261
 hybrid projects, 264–266
 installations and structures, 268–269
 interconnector tie-ins, 265–267
 Memoranda of Understanding (MOUs), 261
 modular grids, 265
 neighbour offshore wind farms, 265
 North Seas Energy Cooperation Initiative, 263
 offshore hubs, 265
 principles, 266–267
 UNCLOS and, 267–268
 unique characteristics of, 262
- Oil and gas pipelines. *See also specific pipeline*
ad hoc governance, 243–244, 269–274, 436
 agreements
 basic contents of, 276–277
 connected model, 275–276
 host government agreements (HGAs), 274–275, 277
 integrated model, 276
 intergovernmental agreements (IGAs), 274–277
 private agreements, 275
 project-based, 274
 relation-based, 274
 ECT and, 271–272, 276
 exclusive economic zones (EEZs) and, 277–278
 offshore pipelines and cables, 47–48
 principles
 environmental protection, interaction with, 279–281
 human rights, interaction with, 279–281
 laying of pipelines, 277–278
 oil and gas pipelines and, 278–279
 overview, 277
 UNCLOS and, 277–278
- Oil embargo (1973), 24, 354, 357–358, 377
- Oil Pipeline Convention (1941), 274
- Oil spills
 civil liability for
 additional compensation, 192–193
 insurance and, 192
 IOPC Funds, 190, 192–193
 non-discrimination, 193
 overview, 188–189

- Oil spills (cont.)
 Protection & Indemnity Clubs (P&I Clubs), 192
 scope of application, 189–191
 strict liability, 191–192
 Exxon Valdez oil spill, 182
 Torrey Canyon oil spill, 153–154, 180–181
- OLADE. *See* Latin American Energy Organization (OLADE)
- Oman
 Arabian Oryx Sanctuary, 170
 oil and gas pipelines and, 272, 275
 OPEC and, 356
 US, FTA with, 113–114
 World Heritage Convention and, 170
 in WTO, 82
- OPAL Pipeline, 85
- OPEC. *See* Organization of Petroleum Exporting Countries (OPEC)
- OPRC Convention (1990), 182–183
- Organisation for Economic Co-operation and Development (OECD)
 Guidelines on Multinational Enterprises, 171–172, 175–177
 International Energy Agency (IEA) and, 358
 Nuclear Energy Agency (NEA), 326–327
 nuclear energy and
 nuclear cooperation agreements (NCAs), 315
 overview, 302, 304–306
 reparation of harm, 334–336
- Organization of Arab Petroleum Exporting Countries (OAPEC), 24, 348, 353–354, 357–358
- Organization of Petroleum Exporting Countries (OPEC). *See also specific country*
 anti-trust law and, 357
 assertiveness of, 354
 centralised approach and, 40, 294
 Charter of Cooperation (2019), 355
 Declaration of Cooperation (2016), 355
 Declaratory Statement (1968), 353–354
 downfall of, 354
 evolving practice, 353–355
 export measures and, 79–80
 formation of, 352
 GATT and, 357
 Gulf War and, 362–363
 hydrocarbons, joint development of, 200–201
 International Energy Forum (IEF) and, 363–365
 Joint Ministerial Monitoring Committee (JMCC), 356
 Latin American Energy Organization (OLADE) compared, 389
 limited powers of, 294
 Long-Term Strategy (2010), 355
 membership, 352
 Ministerial Conference, 355–356
 OPEC+, 348
 origins of, 349–350
 overview, 9, 348–349
 permanent sovereignty and, 347–348, 350–352
 as producer/consumer organisation, 347–348
 production controls, 357
 production levels, 356
 promotional role of, 368
 proto-centralisation in, 346, 436
 resolutions, 356
 Solemn Declaration (1975), 354
 structure of, 352–353
 Supplementary Agreement (1964), 353
 Tehran Price Agreement (1971), 354
 VCLT and, 356
- Originary entitlement-holders, 43
- OSPAR Convention (1992), 159–160
- Overland, I., 67
- Owen Falls Dam, 249
- Pakistan
 Indus Water Treaty and, 139–140
 nuclear tests by, 308
 oil and gas pipelines and, 274
- Paraguay
 hydroelectric projects in international watercourses and, 250–251
 Itaipu Dam and, 63–64

- Paris Agreement (2016)
 climate change and, 165–166
 limits of, 432
 NDCs, 165–166
 pricing mechanisms in, 131
 stranded fossil fuel assets, geopolitics of, 401
- Paris Convention (1960)
 adoption of, 305–306, 334–335
 environmental protection and, 344–345
 Joint Protocol, 336–337, 344–345
 overview, 335
 scope of application, 336–337
- Patterson, Morehead, 302
- Pelindaba Treaty (1996), 318
- Peoples, rules conferring entitlements, 48–50
- Permanent Court of International Justice (PCIJ), 257
- Permanent sovereignty
 OPEC and, 347–348, 350–352
 over resources, 45
 UN General Assembly Resolution 1803 and, 45, 48–50, 212
- Peru
 Camisea Gas Project, 180
 Nahua–Kugapakori Reserve, 180
 Paracas National Marine Reserve, 180
- Pipelines. *See* Oil and gas pipelines
- PJM, 283
- PlusPetrol, 180
- Poland, Gazprom and, 84
- Polluter-pays principle, 127–128
- Pomeranz, K., 11–12
- Portugal
 nuclear energy and, 302
 oil embargo and, 357–358
 Timor Gap Treaty and, 4–5, 44, 49–50, 188, 225
- Post-war reconstruction
 entitlements over energy resources during, 13
 geographical mismatch of production and consumption during, 13
 as inflexion point, 12–13
- international energy transactions during, 13
- Pre-existing rights, 213–215
- Prevention of harm
 environmental protection, 132–134 (*See also* Environmental protection)
 human rights (*See* Human rights)
 hydrocarbons, joint development of, 227, 239–240, 242
 hydroelectric projects in international watercourses, 260
 marine environment, 152
 nuclear energy, environmental protection and, 342–343
 overview, 131–132
 seabed and subsoil, 152
- Pricing mechanisms, 128–131
- Priddle, R., 363
- Processes and production methods, 122–123
- Produce-consume-dispose (PCD) approach, 218
- Producer/consumer organisations.
See also specific organisation
 defined, 347
 ECT compared, 347
 Gas Exporter Countries Forum (GECF), 364–367, 436
 International Energy Agency (IEA) (*See* International Energy Agency (IEA))
 International Energy Forum (IEF) (*See* International Energy Forum (IEF))
 OPEC (*See* Organization of Petroleum Exporting Countries (OPEC))
- Product, energy as, 17
- Production sharing agreements (PSAs), 212
- Promotion organisations
 International Renewable Energy Agency (IRENA) (*See* International Renewable Energy Agency (IRENA))
 overview, 367–371
 proto-centralisation in, 368

- Property rights, 105
 Protection & Indemnity Clubs (P&I Clubs), 192
 Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA) (1994), 124–172
 Pump storage hydropower (PSH), 244
 Purposes of energy governance
 access, 22, 25–28, 435, 437
 availability, 21–25, 435
 competition among, 28–29
 diversification, 21–22, 24–25, 435
 efficiency, 21–23, 435
 military implications, 22
 overview, 21
 safety, 22–23, 435
 security, 21–25, 435
 sustainability, 22–23, 25–28, 435, 437
 synergies among, 23
 Qassim, Abd Al-Karim, 350
 Qatar, joint development agreements (JDAs) and, 209, 224
 Quantitative restrictions, 85–86
 Ramsar Convention (1971), 138, 168, 185–186
 Rarotonga Treaty (1985), 318
 Regional cooperation organisations
 ASEAN Energy Cooperation Framework (*See* Association of Southeast Asian Nations (ASEAN))
 EU regional energy governance system (*See* European Union)
 Latin American Energy Organization (OLADE) (*See* Latin American Energy Organization (OLADE))
 overview, 375–376
 Regional Electrical Integration Commission (CIER), 390
 Regional Seas Programme (RSP), 158–159
 REN21, 27, 370, 398
 Renewable energy
 competition in, 414–420
 consumption of, 396–398
 generation of, 398
 International Renewable Energy Agency (IRENA) (*See* International Renewable Energy Agency (IRENA))
 investment claims in, 414, 420–429, 438
 offshore wind power (*See* Offshore wind power)
 statistics on consumption of, 396–398
 statistics on generation of, 398
 support schemes, 119–121
 Renewable Energy and Energy Efficiency Partnership (REEEP), 370
 Reparation of harm
 nuclear energy
 environmental protection and, 344–345
 financial guarantee, 339–340
 IAEA and, 334–337
 non-discrimination, 341
 OECD and, 334–336
 overview, 334–336
 scope of application of treaties, 336–337
 special drawing rights (SDRs), 340
 strict liability, 338–339
 tiered compensation, 340–341
 oil spills, civil liability for
 additional compensation, 192–193
 insurance and, 192
 IOPC Funds, 190, 192
 non-discrimination, 193
 overview, 188–189
 Protection & Indemnity Clubs (P&I Clubs), 192
 scope of application, 189–191
 strict liability, 191–192
 overview, 183
 state responsibility
 breach, consequences of, 184–185
 ICJ on, 185–188
 judicial practice, 186–188
 overview, 183–184
 UNCLOS and, 187–188
 Resource, energy as, 15–16

- Response to harmful events
 environmental protection, 343–344
 global scope, instruments with,
 181–182
 nuclear energy, 333–334, 343–344
 overview, 180
 regional scope, instruments with,
 182–183
- Revised Government Procurement
 Agreement (2012), 112–113
- Rio Conference on Environment and
 Development (“Earth Summit”)
 (1992)
 environmental protection and, 219
 nuclear energy and, 328, 342–343
 sustainability and, 26
- Rio Declaration on Environment and
 Development (1992)
 hydrocarbons, joint development of,
 238
 negative externalities and, 112
 nuclear energy and, 342–343
 polluter-pays principle, 127–172
 prevention of harm and, 133–137
 procedural environmental rights
 and, 147
- Romania
 Aarhus Convention and, 150
 investment claims in renewable
 energy sector, 422
 Nabucco Pipeline Project and, 198
- ROPME Sea Area, 182–183
- Rosenstock, Robert, 204
- Rules. *See specific topic*
- Russia. *See also* Soviet Union
 ECT and, 71, 73
 energy production versus
 consumption in, 69–70
 energy services in, 80–81
 Espoo Convention and, 142
 export measures and, 79
 gas supply, characterisation of, 83–84
 International Energy Forum (IEF)
 and, 364
 “like products” and, 86
 national security carve-out and, 110
 nuclear cooperation agreements
 (NCAs) and, 314–315
 nuclear energy and, 307–311
 oil and gas pipelines and, 24, 47, 66,
 272, 275
 OPEC and, 348, 356
 Saudi Arabia, price war with,
 355
 state trading enterprises (STEs) in,
 79, 84–85
 stranded fossil fuel assets, geopolitics
 of, 400–401
 transit of energy resources and, 97
 in WTO, 70, 82, 84–85
- Saami people, 52–53
- Safety
 nuclear energy
 Convention on Nuclear Safety
 (CNS), 328–329
 IAEA and, 324–326
 installations and materials,
 328–329
 Joint Convention on the Safety of
 Spent Fuel Management and on
 the Safety of Radioactive Waste,
 331–332
 nature and scope of instruments,
 324–326
 overview, 303–305
 prevention, 326
 radioactive waste management,
 331–332
 radiological protection, 326–328
 spent fuel management, 331–332
 standards, 324–326
 transport of materials, 329–331
 Transport Regulations, 330–331
 as purpose of energy governance,
 22–23, 435
- Samsung, 419
- San Salvador Protocol (1988), 54–55
- Sao Tome e Principe, joint
 development agreements
 (JDAs) and, 219–222, 225
- SAPP Inter-Utility Memorandum
 (1994), 287
- Saudi Arabia
 export measures and, 79
 GATT and, 74

- Saudi Arabia (cont.)
 International Energy Forum (IEF)
 and, 363
 joint development agreements
 (JDAs) and, 209–210
 nuclear cooperation agreements
 (NCAs) and, 313
 OPEC and, 350, 352–354, 356
 Russia, price war with, 355
 state trading enterprises (STEs) in,
 79
 in WTO, 82
 Saudi Aramco, 79
 Scheer, Hermann, 371–372
 Schmalensee, R., 128
 Schrijver, N., 23–24, 351
 Seabed and subsoil
 ISA and, 43–44, 140–142
 ITLOS and, 140–142
 prevention of harm, 152
 sovereign rights over, 46
 UNCLOS and, 46, 140–142
 Seal products, 123
 Security
 exception clauses, 123–124
 nuclear energy and, 303–304
 as purpose of energy governance,
 21–25, 435
 Security Control Convention (1957),
 304–305
 Self-defence, 36
 Self-determination, 65–66
 Semipalatinsk Treaty (2006), 318,
 320
 Senegal
 joint development agreements
 (JDAs) and, 210–211, 216,
 219–220, 222
 Management and Co-operation
 Agreement between the
 Government of the Republic of
 Senegal and the Government of
 the Republic of Guinea-Bissau, 44
 Service contracts, 213
 Shell, 158
 Shrimp fishing, 122
 Silesia Solidarity and Just Transition
 Declaration (2018), 433
 Singapore, International Energy
 Agency (IEA) and, 362
 Six-Day War (1967), 353
 Slavery, 11–12
 Slovakia
 Gazprom and, 84
 hydroelectric projects in international
 watercourses and, 253
 Smil, Vaclav, 396
 Society for Solar Energy (ISES), 370
 Socio-technical transitions
 consolidation phase, 397, 405,
 438–439
 Industrial Revolution as, 397–398
 innovation phase, 397, 438–439
 international law and, 405–406,
 438–439
 international law of energy and, 5–7,
 396–399
 market expansion phase, 397,
 438–439
 scaling up phase, 397, 438–439
 SOCO International Plc, 176
 South Africa
 hydroelectric projects in
 international watercourses and,
 250–251
 individual right to energy in, 55
 Non-Proliferation Treaty and, 309
 nuclear energy and, 302
 oil embargo and, 357–358
 South Caucasus Pipeline (SPC), 272
 Southern African Development
 Community Region (SADC)
 Protocol on Energy (1996), 68
 South Korea
 climate change law in, 166
 joint development agreements
 (JDAs) and, 210, 219, 222
 nuclear cooperation agreements
 (NCAs) and, 314–315
 nuclear energy and, 307–311
 offshore wind power in, 261
 Sovereignty
 entitlements over energy resources
 and, 438
 international energy transactions
 and, 94

- permanent sovereignty
 - OPEC and, 347–348, 350–352
 - over resources, 45
 - UN General Assembly Resolution 1803 and, 45, 48–50, 212
- rights of peoples and, 48–50
- sovereign rights versus, 46–48
- of states, 45
- Soviet Union. *See also* Russia
 - arms race, 301–303
 - Chernobyl disaster (1986) (*See* Chernobyl disaster (1986))
 - collapse of, 309, 378
 - GATT and, 74
 - hydroelectric projects in international watercourses and, 249
 - nuclear energy and, 301–303
 - OPEC and, 348
- Spain
 - Argentina, BIT with, 175
 - investment claims against, 5–7
 - investment claims in renewable energy sector, 422
 - renewable energy and, 371–372
- Spatial scope of rules
 - in centralised approach, 39
 - overview, 35
- Special drawing rights (SDRs), 340
- State responsibility
 - ICJ on, 185–188
 - ILC Articles on State Responsibility, 185, 188, 240
 - reparation of harm
 - breach, consequences of, 184–185
 - ICJ on, 185–188
 - judicial practice, 186–188
 - overview, 183–184
 - UNCLOS and, 187–188
 - UNCLOS and, 187–188
- States
 - coercion, 45–46
 - human rights, duties regarding, 172–174
 - negative externalities and, 32
 - permanent sovereignty, 45
 - rules conferring entitlements, 45–48
 - sovereign rights, 46–48
 - sovereignty, 45–48
- State trading enterprises (STEs)
 - export measures and, 78–79
 - GATT and, 84
 - in Russia, 79, 84–85
 - in Saudi Arabia, 79
 - in trade law generally, 84–85
- Stavins, R.N., 128
- STEs. *See* State trading enterprises (STEs)
- Stockholm Declaration on the Human Environment (1972), 133–134, 158, 219
- Stocks, 15–16
- Strategic environmental assessments (SEAs), 142
- Structures, 46–47
- Subsidies
 - fossil fuels, 407–409
 - as hindering energy transformation, 407–409, 433
 - statistics on, 407
 - in trade law, 407–409
- Substantive standards, 85–86
- Sudan
 - Grand Ethiopian Renaissance Dam and, 63–64
 - joint development agreements (JDAs) and, 210
- Suez crisis (1956), 349–350
- Sustainability as purpose of energy governance, 22–23, 25–28, 435, 437
- Sustainable Development Goals (SDGs), 4, 27–28, 368–369, 437
- Sustainable Energy for All (SE4ALL or SEforALL), 27, 369–370
- Swaziland, hydroelectric projects in international watercourses and, 250–251
- Sweden
 - electricity transmission lines and, 283, 288
 - Nordic Saami Convention and, 52–53
 - North Seas Energy Cooperation Initiative and, 263
 - oil and gas pipelines and, 66

- Switzerland
 Espoo Convention and, 144
 nuclear energy and, 339
- Syria
 Six-Day War and, 353
 Yom Kippur War and, 357
- Taiwan, offshore wind power in, 261
- Tajikistan in WTO, 82
- Tanzania
 critical raw materials and, 430
 investment claims in renewable energy sector, 422
- TAPI Framework Agreement (2010), 274, 279
- Tariffs
 Canada, feed-in-tariff (FIT) scheme, 91
 in China, 77–78
- Technical barriers to trade, 121
- Technology, energy as, 17–18
- TEPCO, 339
- Thailand
 International Energy Agency (IEA) and, 362
 joint development agreements (JDAs) and, 210, 213–216, 219, 222, 294–295
- Three Mile Island disaster (1979), 304, 333
- Timor Gap Treaty (1989), 4–5, 44, 49–50, 188, 225
- Timor-Leste
 Australia–Timor-Leste Boundary Treaty, 225
 joint development agreements (JDAs) and, 210, 213, 215–217
 Timor Gap Treaty and, 4–5, 44, 49–50, 225–227
 UN Transitional Administration in East-Timor (UNTAET), 43–44, 56
- Timor Sea Treaty (2002), 219–220, 223–224
- Tlateloco Treaty (1967), 318
- Torrey Canyon oil spill, 153–154, 180–181
- Trade Facilitation Agreement (TFA), 96
- Trade law
 disconnected nature of rules, 74
 ECT and, 70
 electricity transmission lines and, 289
 GATS (*See* General Agreement on Trade in Services (GATS))
 GATT (*See* General Agreement on Tariffs and Trade (GATT))
 misalignments in, 91
 negative externalities and, 104
 recoupment of lost value and, 411–414
 rules not energy-specific, 74
 subsidies in, 407–409
 WTO (*See* World Trade Organization (WTO))
- Trans-Adriatic Pipeline, 272
- Trans-Anatolian Gas Pipeline, 272
- Transit of energy resources
 application of principles, 94–95
 balancing of sovereignty and international energy transactions, 94
 Barcelona Convention and, 95
 defined, 72
 due diligence in avoiding delay, 94, 98–99
 duties prohibited, 94, 98–99
 ECT and, 72–73, 95, 98–102, 278
 electricity transmission lines and, 289–290
 energy transport facilities, 98–100
 EU and, 100–101
 externalities and, 33
 foundational approach, rules in generally, 42
 freedom of transit, 94, 98–100
 GATT and, 95–97, 102, 278
 global level rules, 95–98
 importance of, 94
 infrastructure, cooperation in developing, 94, 99–100
 interactions between levels, 101–103
 multiplicity of parties, 74
 negative externalities and, 104
 network-bound transit, 81
 non-discrimination, 94, 98–100
 oil and gas pipelines and, 278–279

- problems in, 94
 project/route-specific rules, 100–101
 proportionality, 94, 98–99
 reasonableness, 94, 98–99
 regional level rules, 98–100
 UNCLOS and, 95, 97–98, 101
 Transit Pipelines Agreement (1977), 274
 Transversality of rules
 in centralised approach, 39
 ECT and, 73
 international energy transactions, 68
 overview, 35
 Transversal perspective of international
 law of energy, 8, 434
 Treaty of Bangkok (1995), 318
 Treaty of Lisbon (2007), 379, 385
 Treaty on the Functioning of the
 European Union (TFEU)
 (1957), 55–56, 378–380, 385
 Tribal peoples. *See* Indigenous and
 tribal peoples
 Triton, 213–214
 Truman, Harry, 12
 Tuna fishing, 122
 Turkey
 Aarhus Convention and, 150
 BTC Pipeline and, 198–199
 critical raw materials, geopolitics of,
 403
 Nabucco Pipeline Project and, 198
 oil and gas pipelines and, 271–272,
 274–276
 Turkmenistan
 oil and gas pipelines and, 274, 279
 WTO and, 82
 2030 Agenda for Sustainable
 Development (2015), 27–28,
 368–369
 Uganda
 DRC, occupation of, 65
 hydroelectric projects in
 international watercourses and,
 249
 Ukraine
 national security carve-out and, 110
 oil and gas pipelines and, 24
 in WTO, 82
 UNCLOS. *See* Convention on the Law
 of the Sea (UNCLOS) (1982)
 UN-Energy, 368–369
 Uniper, 413
 United Arab Emirates
 International Renewable Energy
 Agency (IRENA) and, 372, 375
 joint development agreements
 (JDAs) and, 209
 nuclear cooperation agreements
 (NCAs) and, 312–313
 United Kingdom
 China compared, 11–12
 climate change law in, 166
 concessions in, 212
 electricity transmission lines and,
 282–283
 Espoo Convention and, 144–145
 Hinckley Point C (HPC) Project,
 144–145, 149, 297–298
 human rights law in, 177–179
 Industrial Revolution in, 10–12, 398
 Iran, support for coup in, 351
 joint development agreements
 (JDAs) and, 219, 222
 National Policy Statements, 144
 North Seas Energy Cooperation
 Initiative and, 263
 nuclear cooperation agreements
 (NCAs) and, 311
 nuclear energy and, 298, 302–303,
 310–311
 offshore wind power in, 261
 oil and gas pipelines and, 271, 274
 Planning Inspectorate, 144
 pricing mechanisms in, 130
 renewable energy in, 398
 Suez crisis and, 349–350
 United Nations
 Chief Executives Board for
 Coordination (CEB), 368–369
 Committee on the Effects of
 Atomic Radiation (UNSCEAR),
 326–327
 Compensation Commission, 64,
 185–186
 Conference on New and Renewable
 Sources of Energy (1981), 26

- United Nations (cont.)
 Conference on Trade and Development (UNCTAD), 350
 Convention on the Law of the Sea (UNCLOS) (*See* Convention on the Law of the Sea (UNCLOS) (1982))
 Declaration on the Rights of Indigenous Peoples, 50–64, 151
 Economic Commission for Europe (UNECE), 142, 162, 245–246
 Educational, Scientific and Cultural Organization (UNESCO), 26
 Environment Programme, 158
 Framework Convention on Climate Change (UNFCCC), 120, 164, 374, 415, 433
 General Assembly
 Resolution 55/205, 26
 Resolution 60/199, 27
 Resolution 65/151, 27
 Resolution 523, 23–24, 351
 Resolution 1514, 48
 Resolution 1803, 24, 48, 212, 351–354
 International Law Commission (ILC) (*See* International Law Commission (ILC))
 Principles on Business and Human Rights, 171–172, 175–177
 Security Council Resolution 687, 64
 Statistics Division (UNSD), 364
 Transitional Administration in East-Timor (UNTAET), 43–44, 56
 United States
 Acheson–Lilienthal Report, 300
 Alien Tort Claims Act (ATCA), 174
 anti-trust law in, 357
 Argentina, BIT with, 108–109
 arms race, 301–303
 Atomic Energy Act, 302, 308–309, 311–313
 Atomic Energy Commission (AEC), 300–302
 Bankruptcy Code, 412
 Clean Air Act, 117, 128, 167
 climate change law in, 167
 continental shelf and, 12
 critical raw materials, geopolitics of, 402
 dual-pricing and, 75–76
 ECT and, 73
 electricity transmission lines and, 283
 energy production versus consumption in, 67
 Environmental Protection Agency, 128
 Espoo Convention and, 142
 EU Emissions Trading Directive and, 410
 Export–Import Bank, 180
 “green industrial policies” and, 406–420
 human rights law in, 174
 hydroelectric projects in international watercourses and, 250, 252
 International Energy Forum (IEF) and, 363
 Iran, support for coup in, 351
 Iranian oil platforms and, 36
 Iraq, invasion of, 354–355
 McMahan Act, 300–301
 National Environmental Policy Act, 142
 9/11 attacks, 305, 323–324
 nuclear energy and
 competitiveness, 313
 dual-use, 299–303
 non-proliferation, 312
 nuclear cooperation agreements (NCAs), 311–313
 overview, 307
 Part 810 Agreements, 311
 Section 123 Agreements, 308–309, 311–313
 transfers of materials and technology, 310–311
 oil and gas pipelines and, 271, 274
 oil embargo and, 357–358
 Oman, FTA with, 113–114
 polluter-pays principle in, 128
 renewable energy in, 398
 State Department, 312
 stranded fossil fuel assets, geopolitics of, 400–401

- strategic environmental assessments (SEAs) in, 142
- Three Mile Island disaster (1979), 304, 333
- Yom Kippur War and, 24
- Unitisation agreements, 208
- Uzbekistan, critical raw materials and, 430
- Vattenfall, 411–412
- VCLT. *See* Vienna Convention on the Law of Treaties (VCLT) (1969)
- Vedanta, 177–179
- Venezuela
 International Energy Forum (IEF) and, 363
 Latin American Energy Organization (OLADE) and, 388, 390–391
 OPEC and, 349–350, 352–353, 356
 stranded fossil fuel assets, geopolitics of, 400
- Verticality of rules
 in *ad hoc* approach, 37
 overview, 35
- Vienna Convention (1963)
 adoption of, 305–306, 334–335
 environmental protection and, 344–345
 Joint Protocol, 336–337, 344–345
 non-discrimination, 341
 overview, 335
 scope of application, 336–337
- Vienna Convention on State Succession to Treaties (1978), 226, 253
- Vienna Convention on the Law of Treaties (VCLT) (1969)
 domestic law and, 8
 joint development agreements (JDAs) and, 223–224
 negative externalities and, 126, 131–132
 OPEC and, 356
- Vienna Supplementary Convention (1997)
 environmental protection and, 344–345
 non-discrimination, 341
 scope of application, 337
- strict liability, 339
- tiered compensation, 340–341
- Vietnam, offshore wind power in, 261
- Volatile organic compounds (VOCs), 161–162
- “Washington Group,” 302
- Wassenaar Agreement (1995), 309
- Waste management technology (WMT), 218–219
- Wellington Convention (1988), 168
- West African Power Pool (WAPP), 374
- Westmoreland Coal Company, 412–414
- Wind power. *See* Offshore wind power
- World Bank, 128–129, 131
- World Heritage Commission, 170–171
- World Heritage Convention (1972), 115–116, 138, 168–171
- World Heritage List, 169–171
- World Petroleum Congress (2002), 363
- World Solar Programme (1996–2005), 26
- World Solar Summit (1996), 26
- World Trade Organization (WTO). *See also specific member*
 centralised approach and, 293
 commitments of members, 82–83
 critical raw materials and, 404, 429–430
 dispute settlement in, 106, 404, 408, 415–419, 429–430
 Doha Round, 76, 80
 extent of coverage
 energy services, 80–81
 export measures, 78–80
 network-bound transit, 81
 overview, 78
- Government Procurement Agreement (GPA), 92
- “green industrial policies” and, 415–419
- intellectual property rights (IPRs) and, 18
- as lagging in field of energy law, 76–77
- local content requirements (LCRs) and, 4

- World Trade Organization (WTO).
 (cont.)
 members, 82
 misalignments in trade law, 91
 modalities of application
 differentiation, 86–88
 electricity, characterisation of,
 83–84
 overview, 83
 state trading enterprises (STEs),
 84–85
 substantive standards, 85–86
 Negotiating Group on Natural
 Resource-Based Products,
 75–76
 Negotiating Group on Subsidies and
 Countervailing Duties, 75–76
 Revised Government Procurement
 Agreement, 112–113
 subsidies and, 408
 Tokyo Round, 75, 409
- Trade Facilitation Agreement (TFA),
 96
 TRIMS Agreement, 88
 Uruguay Round, 75, 409
 from “whether” to “how,” 74–78
 WTO. *See* World Trade Organization
 (WTO)
- Yamada, Chusei, 204, 206
 Yemen, ECT and, 73
 Yom Kippur War (1973), 24, 348, 354,
 357
- Zambezi River Authority, 250–251
 Zambia, hydroelectric projects in
 international watercourses and,
 250–251
 Zangger Committee, 308
 Zimbabwe, hydroelectric projects in
 international watercourses and,
 250–251