

Index

- ACORE *see* American Council on Renewable Energy
- ADS concept, the 616–18
- AERE *see* Atomic Energy Research Establishment
- airplanes, solar-powered 242–44
- American Council on Renewable Energy (ACORE) 544, 577, 583, 588–89
- American Solar Energy Society 553
- ASEM *see* European Championship of Alpine Solarcars
- Atomic Energy Research Establishment (AERE) 524–25
- atomic energy systems 309, 315
- Bangladesh Renewable Energy for Rural Electrification project 462
- Barefoot College, India 473–75, 477–78, 480, 519
- bicycles, solar-powered 621–22
- bio-energy 24, 80, 355, 395
- biogas 149, 180, 189, 195, 681, 728, 745
- biomass 108, 115, 127, 301–2, 304, 391, 414, 440, 492, 511, 558, 566, 572, 643, 761–62
- biomass energy 408, 437, 577
- British Wind Energy Association (BWEA) 502
- building integration 8, 76, 82, 96, 141, 147, 149
- building technology 709, 719, 742, 762
- buildings
- efficient 739, 766
 - insulation of 743
 - refurbished 745
 - zero-energy 9, 715
- BWEA *see* British Wind Energy Association
- carbon capture and storage (CCS) 59, 112, 563, 566
- CCS *see* carbon capture and storage
- CdTe cells 18, 65, 178, 636–39
- cells, high-efficiency 39, 244–45
- CERE *see* Communities of Europe for Renewable Energies
- China bio-energy programme 189
- China Renewable Energy Industry Association (CREIA) 515
- China Renewable Energy Society 438, 548
- China solar energy industry 428, 432
- China solar PV industry 437–40
- Chinese Wind Energy Association (CWEA) 436
- CIF *see* Climate Investment Fund
- Climate Investment Fund (CIF) 468, 470

- Communities of Europe for Renewable Energies (CERE) 101, 144, 374
- concentrating solar power (CSP) 25, 117–18, 120
- concentrators 228–29, 237, 242, 245, 248, 350, 650–51
- conventional electricity 19, 57, 111, 134, 138, 185, 193, 646
- conventional energy providers 4, 134
- conversion efficiency 42, 54, 200, 219, 232, 249, 425, 541, 658–60
- cost recovery time 424
- CREIA *see* China Renewable Energy Industry Association
- crystalline silicon 349–51, 353
- CSP *see* concentrating solar power
- Cu₂S cells 47
- CWEA *see* Chinese Wind Energy Association

- diamond 262, 265–66, 271, 273
- DSC *see* dye-sensitized mesoscopic solar cells
- dye-sensitized mesoscopic solar cells (DSC) 655–59

- ecologic pump storage power plants (EPSPP) 746, 749–50, 756
- EIB *see* European Investment Bank
- electric cars 63, 124, 305, 308, 314, 668–69, 711, 732, 752, 754, 756
 - solar-powered 683, 712, 731, 745, 752–55
- electric eco-efficient end-uses 361
- electricity
 - grid 185, 463
 - solar photovoltaic (PV) 357
 - electricity access 454, 458
 - electricity storage 63, 348, 363
 - energy autonomy 6, 49
 - energy conservation 114, 120, 127, 424, 439, 603
 - energy crisis 205, 231, 330, 367, 525, 637
 - energy feed-in 674–76
 - energy-hungry countries 112
 - energy illiterates 758, 765
 - energy-independent countries 759
 - energy-intensive business buildings 744
 - energy-intensive businesses 727, 742, 745, 762
 - energy monopolies 309
 - energy pay-back time 62, 96
 - energy poor 150, 157
 - energy poor countries 151
 - energy poverty trap 488–89, 491, 493
 - Energy-related CO₂ emissions 565
 - energy storage 322, 577
 - EPIA *see* European Photovoltaic Industry Association
 - EPSPP *see* ecologic pump storage power plants
 - ESA *see* European Space Agency
 - ESC *see* European Solar Challenge
 - EURE *see* European Utilities for Renewable Energies
 - European Association for Renewable Energy 292
 - European Biomass Industry Association 395–96, 411
 - European Championship of Alpine Solarcars (ASEM) 678, 685–86, 689, 691, 768
 - European Charter for Solar Energy in Architecture 147
 - European Council on Solar Energy 84

- European Investment Bank (EIB) 172
- European Photovoltaic Industry Association (EPIA) 135–36, 519–21, 529, 538, 545–46, 584
- European Solar Challenge (ESC) 712–13, 768
- European Solar Council 101, 374
- European Solar Prize 381, 710–11, 714, 739, 743, 753
- European Space Agency (ESA) 510
- European Utilities for Renewable Energies (EURE) 101, 143
- European Wind Energy Association (EWEA) 106
- EWEA *see* European Wind Energy Association
- fair cost compensation 560
- FAST *see* fixed abrasive slicing technology
- feed-in tariff (FIT) 18–20, 62, 76, 105, 125, 131, 138–39, 151, 180–82, 293, 296, 320, 362, 534–35, 560–61
- first European solar factory 717, 732
- FIT *see* feed-in tariff
- fixed abrasive slicing technology (FAST) 262–63, 266–67, 271–74
- fossil energy 24, 50, 74, 130, 289, 291–92, 294, 318, 669
- fossil energy imports 129, 720
- fossil fuels 42, 112–13, 205, 228–29, 254, 273, 359–60, 367, 436, 487, 492–93, 540, 559, 593, 611
cost of 492–93
- GaAs cells 615
- geothermal energy 302, 314, 418, 558, 567, 570, 577, 756
- German Renewable Energy Act 553
- German renewable energy sector 575
- German wind energy production 750
- Germany's wind energy excess 749
- greenhouses 287, 614
- grid feed-in 726–27
- grid interconnection 673
- heat exchanger method (HEM) 259–64, 267–69, 273–74
- HEM *see* heat exchanger method
- hybrid systems 6–7, 121–22, 158, 207, 222, 414
- hydro-peaking 746–47, 749–50
- hydropower 80, 115–16, 189, 192, 194, 391, 454, 567, 572, 577, 735–36, 758, 761–62
- IEC *see* International Electrotechnical Commission
- independent power plants 579
- industrial countries 136, 163
- International Electrotechnical Commission (IEC) 133, 215, 220–23, 529
- International Renewable Energy Agency (IRENA) 338, 528, 537, 555, 589
- International Solarcar Federation (ISF) 675, 679, 681
- IRENA *see* International Renewable Energy Agency
- ISF *see* International Solarcar Federation

- Karl W. Böer Solar Energy Medal 553
- kerosene 447, 464, 466, 477, 482
- LEDs *see* light-emitting diodes
- light-emitting diodes (LEDs) 3, 266, 467
- light trapping 322, 349
- light vehicles, solar-powered 677, 681, 763
- marine energy technologies 362
- module efficiency 353
- module lifetime 62
- modules
 - high-efficiency 248, 250–51
 - standard photovoltaic 341, 343, 626
 - thin film 449, 651–52
- NASA *see* National Aeronautics and Space Administration
- National Aeronautics and Space Administration (NASA) 47, 49, 141, 243–44, 262, 279–80, 283
- nuclear electricity 355, 400, 407, 735
- nuclear energy 50, 72, 106, 111, 309, 348, 558–59, 562, 564, 673, 678, 725, 737
- nuclear power 24, 51, 60, 113, 186, 282, 291, 294, 330, 391, 574, 579, 669
- nuclear power plants 27, 113, 302, 400, 414, 559, 563–64, 631, 644, 673, 714, 725, 747, 754, 759
- nuclear technology 72, 74, 113, 400–1, 404
- OAPEC *see* Organization of Arab Petroleum Exporting Countries
- ocean energy 108, 577
- OECD *see* Organisation for Economic Co-operation and Development
- off-grid projects 467, 469–70
- off-grid technology 459, 464
- one-sun cells 234–35, 245, 248
- Organisation for Economic Co-operation and Development (OECD) 23, 52, 745, 755
- Organization of Arab Petroleum Exporting Countries (OAPEC) 72
- payback time 21, 26
- peak oil 52, 79, 128–29, 309, 558
- PEB *see* PlusEnergy Building
- photovoltaic cells 281, 361, 498, 594–97, 600
- photovoltaic conversion 533, 540, 542, 653
- photovoltaic effect 38, 40–41, 199–200
- photovoltaic energy 408, 533, 546
- photovoltaic installations 337, 390, 673–74, 682, 739
- photovoltaic integration 342, 344, 625
- photovoltaic panels 255, 363, 489, 598–99, 630
- photovoltaic power systems, cost-effective 255
- photovoltaics, high efficiency 643–44, 646, 648, 650, 652, 654
- photovoltaics electricity cost 540

- PlusEnergy Building (PEB)
 - 663–64, 666, 668, 670, 672,
 - 674, 676, 678, 680, 682,
 - 702–46, 748, 750–58, 762–64,
 - 766–68
- porous materials 607–8
- poverty 175, 454, 488, 491–92,
- 494, 582, 586
- PSPP *see* pump storage power plants
- pump storage power plants (PSPP)
 - 746–49, 753, 756
- PV, building-integrated 130, 147,
- 181, 344, 439
- PV generators 3, 5–6, 43, 45, 89,
- 114, 130, 146, 163, 312, 409,
- 413
- PV in Berlin 323–34
- PV in Japan 417–18, 420, 422,
- 424, 426
- PV installations, integrated 740,
- 742, 760–61
- PV roof programmes 39, 103,
- 131–33

- quantum solar energy conversion
 - 350

- renewable electricity generators
 - 64, 132
- renewable electricity production
 - 391
- renewable energy research 309,
- 314, 555
- reusable crucible technology 272

- sapphire 259–62
- seasonal storage 63
- semiconductor devices 3, 211–12,
- 321
- semiconductors 2, 34–35, 40–41,
- 54, 70, 195, 228, 240, 545,
- 648–49, 656
- silicon 3, 18, 35, 40–41, 47, 51,
- 54–55, 96, 110, 199–200,
- 231–34, 261, 263–64, 272,
- 274–75
 - amorphous 80–81, 183, 217–18
 - cost of 254, 273–74
- silicon cells 10, 17, 41, 43, 47, 54,
- 70, 76, 78, 230–31
 - crystalline 26, 83, 96, 156,
 - 182–83
 - thin crystalline 349
- silicon meltstock reduction
 - 270–71
- silicon on sapphire (SOS) 261
- silicon solar cells 10–11, 35, 46,
- 96, 200, 228, 230, 246, 255,
- 275–76, 636
- silicon wafers 205, 211–12, 268
 - cost of 262–63
- single crystalline silicon solar
 - cells 349, 351
 - efficiencies of 349, 351
- slicing 263, 265–67
- solar cells
 - amorphous silicon 54, 81
 - conventional silicon 228, 232
 - crystalline silicon 11, 54, 178
 - encapsulation of 213, 610–11
 - high-efficiency 35, 245, 270,
 - 660
 - mono-crystalline 741
 - thin-film 11, 43, 55, 184, 223,
 - 228–30
- solar clay tiles 630–31
- solar collectors 706–7, 714, 731
- solar-electric mobility 678
- solar energy feed-in 669, 674
- solar energy research 230, 446,
- 535, 553, 638
- solar lanterns 447, 462, 465–66,
- 477, 483

- solar lighting 477, 481, 586
- solar mills 491–92
- solar photovoltaic energy
 - conversion 354
- solar pond 514
- solar power for space satellites 43, 45
- solar race cars 242, 667–69, 672, 675, 678
- solar raceboats 676
- solar silicon cost reduction
 - 257–58, 260, 262, 264, 266, 268, 270, 272, 274
- solar thermal power 117, 140, 190, 314
- solar vehicles 664–66, 672
- solar water heaters 429, 476
- SolarBank 577–78, 580–86, 588, 590
- solarcar races 663, 738
- solarcar teams 701–2
- SOS *see* silicon on sapphire
- space applications 35, 43, 204, 217
- space satellites 35, 42–43, 45, 122
- space solar cells 203, 205
- Spirit of Biel 124, 690–92, 694–99, 701–2, 711–13
- storage 7, 54, 63, 114–15, 319
- storage battery 6, 43, 130, 447
- storage technology 22, 63, 115
- sustainable off-grid projects
 - 467
- Swiss Solar Prize 147, 381, 670, 674, 695, 705–11, 714–15, 720, 731, 733–34, 740–42, 745, 752, 755, 759–60
- systems, solar-thermodynamic
 - 506–7
- terrestrial photovoltaic industry
 - 203–18
- thermal solar installations 737
- thermal storage 120
- thin-film solar cells 18, 39, 46, 55, 62, 70, 76–78, 83, 96, 156, 182, 229, 350–51, 353, 635–39
- WCRE *see* World Council for Renewable Energy
- wind electricity 139, 141
- wind energy 25, 78, 105, 108, 137, 149, 369, 372, 389, 408, 560–61, 571–72, 632, 736–37, 747–49
- wind parks 141, 370, 373
- wind turbines 64, 116, 126, 149, 179, 719
- World Council for Renewable Energy (WCRE) 588
- World Solar Challenge (WSC) 124, 239–40, 667, 675, 680–82, 691–97, 700–2, 738
- WSC *see* World Solar Challenge