

Acetone, 228,
Acetonitrile, 175,
Acetylene, 254,
Acid rain, 13, 276, 404,
Actinomycetes, 296,
Aerosols, 416, 417, 418, 419,
Aerospace, 292,
Afghanistan, 378,
Africa, 169, 286, 294, 418, 434,
African Centre for Holistic Management, 455,
African manatees, 396,
Agbogbloshie, 278,
Agriculture, 3, 4, 5, 17, 159, 193, 207, 213, 304, 314, 351, 374, 381, 430, 433, 439, 441,
445, 453, 458, 461,
Aguascalientes Zarca, 387,
Ainu, 251-252,
Air, 120, 203, 287, 295, 299, 327, 328, 329, 380, 406, 413,
Aircraft, 275, 284,
Airplanes, 417,
Air energy storage facilities, 201,
Air pollution, 120, 121, 182, 200, 210, 211, 264, 269, 271, 274, 328,
Akko, 304,
Alabama, 201, 314,
Alaska plantain, 217,
Albania, 393,
Alberta, 387,

Alberta Tar Sands, 350,
Algae, 231, 232, 233, 356, 407, 413,
Alloys, 272, 377,
Alternative energy, 365, 435,
Aluminum, 247, 254, 258, 266, 274, 275, 290, 339, 351, 404,
Amazon, 30, 105, 118, 236, 385, 386, 393, 395,
American, 36, 294, 302, 354, 423, 429, 446,
American crocodiles, 350,
American dipper, 399,
American Indian nations, 310-311, 331,
American Medical Association, 234,
American pikas, 23,
American Planning Association, 303,
American Wood Preservers Institute, 358,
Ammonia, 216, 254, 276,
Ammonium oxalates, 231,
Amphibians, 348, 445,
Amphipods, 409,
Anchovies, 398,
Andreas, Dwayne, 443,
Andrews, Clinton, 375,
Andes, 387,
Anemia, 170,
Anez, Jeanine, President, (Bolivian), 168,

Animal, 2, 15, 32, 47, 104, 150, 159, 163, 171, 229, 230, 299, 305, 318, 333, 337, 342, 344, 345, 346, 347, 359, 391, 397, 408, 409, 410, 417, 419, 433, 446, 449, 451, 452, 455, 456, 459, 471,

Animal migration, 391,

Annual Energy Outlook, 249,

Ant, 299,

Anthropoids, 8, 472,

Anthropomass, 434,

Antibiotics, 400,

Antimony, 281,

Anxiety, 149,

Apartheid, 426,

Apex predator, 453,

Apple, 165,

Appliances, 93, 292, 369,

Aquatic habitat, 344,

Aquifers, 340, 444,

ArcelorMittal, 269,

Archeology, 217, 363,

Archer Daniels Midland, 443,

Arctic, 463,

Arctic Circle, 424,

Arctic Council, 463,

Argentina, 168, 389,

Armies, 6, 304,

Arnett, Peter, 430,

Arsenic, 104, 125, 173, 175, 223, 227, 268, 281, 403,

Asbestos, 216,
Asia, 279, 355, 394, 418,
Aspen, 452,
Asphalt, 343, 350, 351, 353, 376,
Atacama desert, 159,
Athabaskan River, 1,
Atlantic Ocean, 387,
Atmosphere, 100, 406, 407, 416, 436, 439, 453, 462,
Audio speaker, 284,
Audubon, John James, 380,
Australia, 41, 123, 276, 354, 405,
Austria, 290, 394,
Automobile, 178-179, 213, 340, 342, 343, 347, 349,
Bacteria, 3, 8, 9, 102, 261, 262, 294, 295, 297, 298, 345, 398, 415, 417, 451, 457, 472,
Bacterial spores, 415,
Badgers, 452,
Bangladesh, 279, 317,
Baosteel, 269,
Baker, Robert, 361,
Banks, 250,
Baotou, (China), 101, 429,
Barium, 377, 406,
Barium sulfate, 169,
Barium titanate, 176,
Barnacles, 409,

Barotrauma, 133,
Barrage, 408, 409,
Basket weaver, 309, 310,
Bass, 397,
Bath County Station, 187,
Bats, 132-133, 134, 138-141, 142, 143, 190, 196, 300, 420, 421,
450, 470,
Bat Conservation International, 140,
Batteries, 157-158, 161-163, 169, 171, 174, 176, 177, 184, 197,
200, 277, 283, 285, 318, 342, 359, 420,
Bauxite, 254, 275, 393,
Bay of Fundy, 409, 410, 411, 412, 470,
BC Hydro, 387,
Beaches, 195, 217, 398,
Bear, 127-128, 218, 251, 294, 295, 298, 299, 337, 350, 397, 453,
472,
Bear Brook State Park, 371,
Beargrass, 217,
Beavers, 19, 399, 452,
Bees, 450,
Beetles, 219, 298, 344, 450,
Belarus, 46,
Belgium, 276, 372,
Bellingham, (Washington State), 241, 242, 243, 356,
Belo Monte dam, 393,
Belo Sun gold mine, 393,
Beni River, 395,

Benthic zone, 415,

Benzene, 276,

Bernard, Dorene, 412,

Bezos, Jeff, 464,

Bhutan, 393,

Bicycling, 306, 307,

Big box stores, 296, 337,

Big cats, 453,

Bighorn sheep, 350,

Bill Gates, 426,

Biodiversity, 195, 210, 303, 343, 361, 388, 390, 439, 449, 450, 465,

Biodiversity hotspot, 46,

Biofilms, 8

Biofuels, (Biomass), 8, 44-46, 48, 51-53, 59, 60, 64, 67, 71, 82, 232, 240, 332, 366, 412, 433, 434,

Biomass, see Biofuels

Biomes, 1, 4, 233, 396, 445, 447, 451,

Biophilic, 325,

Bioplastics, 281,

Biotic communities, 443, 453,

Biotic Cleansing, 3, 217, 448,

Biotopes, 304,

Birds, 21, 47, 49, 132-138, 141, 142, 143, 173, 235, 298, 355, 375, 397, 399, 408, 410, 413, 414, 420, 448, 449, 450, 452, 457,

Birth defects, (teratogens), 96, 120, 162, 183, 350, 358, 404,

Bismuth-based oxide, 377,

Bison, 2, 12, 19, 251, 347, 380, 420, 434, 451, 452,

Bitumen, 350,
Black-footed ferrets, 456,
Black oaks, 457,
Blacksmith Institute, 287,
Black Sea, 236,
Blacktop, see asphalt
Blades, 410,
Blenny, 408-409,
Blowouts, 406,
Bluegill, 397,
Blue whale, 411,
Bluffs, 195,
Boats, 212, 394,
Bodies, 294, 295,
Bogs, 440, 441,
Boise Cascade, 357,
Bolivia, 158, 159, 161, 168, 395,
Bolsonaro, Jair, President, Brazil, 168,
Bones, 218, 294,
Bonneville dam, 380,
Borgstrom, Georg, (*Hungry Planet*), 315,
Boron, 403,
Boron oxide, 227,
Boruca, 388,
Bottled water, 296,

Bottles, 257, 261, 264, 287, 290, 296,

Boulton and Watt, (Steam engine design), 212-213,

Boycott, divestment, and sanctions, (BDS), 426,

Brain damage, 170, 225,

Brant, 409,

Brazil, 105, 117, 118, 119, 148, 255, 385, 386, 387, 389, 390, 393,

Brazilian National Institute of Space Research, 385,

Breitburg, Denise, 462,

Bribri, 388,

Bridges, 344,

Bright greens, 25, 40, 41, 44, 45, 53, 58, 60, 66, 67, 68, 75, 76, 77, 82, 96, 107, 157,
160, 163, 164, 166, 179, 184, 186, 192, 193, 197, 205, 208, 209, 222, 226, 229, 233, 234, 236,
238,
245, 253, 254, 256, 262, 265, 266, 274, 275, 311, 315, 321,
322, 331, 332, 336, 341, 351, 352, 354, 356, 360, 361, 365,
367, 377, 383, 386, 393, 402, 403, 413, 420, 421, 428, 429,
430, 435, 436, 442, 445, 464, 465, 467, 468, 471,

Bristol, 339,

Britain, 237, 238, 245, 423, 448,

British Colombia, 328, 331, 349, 372, 388,

Brown, Lester, 22, 88, 111, 367, 428, 465,

Brune, Michael, 424, 425,

Brunner, Keith, 428,

Bryan OBO, 230,

Buffalo, 341, 456,

Buffet, Warren, 108, 370,

Bullets, 286,

Bull trout, 399,

Bunker fuel, 288, 316,

Burrell, Charlie, 447, 448, 449,

Burundi, 394,

Buses, 312,

Butane, 176,

Butterflies, 2, 22, 217, 337, 348, 349, 448, 450,

C40 Cities Climate Leadership Group, 302, 341,

Cabagra, 388,

Ca'ceres, Berta, 387,

Caddisflies, 384,

Cadmium, 126, 173, 268, 281, 282,

CAES.Adiabatic compressed air, 203,

Calcium oxide, 270,

California, 94, 132, 137, 163, 190, 214, 215, 231, 316, 328, 341, 346, 371, 401, 430, 433, 457,

Camas, 295,

Cambodia, 354, 355, 391,

Campania, 318,

Canada, 140, 203, 241, 277, 368, 387, 388, 394, 463,

Cancer, 13, 14, 21, 96, 99, 101, 120, 175, 176, 181, 183, 284, 350, 351, 358, 404, 417,

Canoes, 310,

Capacitor, 224,

Cap and trade, 243, 244,

Capitalism, 30, 41, 90, 91, 211, 212, 214, 219, 221, 245, 258, 287, 424, 425, 428, 443, 458,

Capitalists, 12, 32, 76, 154, 215, 220, 246, 247, 291, 295,

Carajas mine, 118,

Car batteries, 277,

Carbon, 2, 48-49, 73, 116, 175, 215, 231, 233, 244, 245, 250, 262, 273, 299, 300, 360,
386, 397, 405, 406, 407, 408, 427, 434, 436, 439, 440, 453, 454, 455, 457, 462,

Carbon capture, 405, 454,

Carbon dioxide, 48, 51, 71, 73, 172, 182, 189, 191-192, 207, 232, 233, 244, 250, 264, 299,
407, 415, 436, 438, 439, 440, 441,
454,

Carbon electrodes, 273,

Carbon emissions, 184, 189, 237, 240, 243, 245, 250, 251, 274,
275, 317, 318, 329, 385, 405, 436, 470,

Carbon fiber, 203, 342,

Carbon footprint, 238,

Carbon for Life, 455,

Carbon-free, 386, 393, 397,

Carbonic acid, 406,

Carbon intensity, 250,

Carbon monoxide, 201, 276,

Carbon nanotubes, 175,

Carbon-neutral, 45, 49, 51, 53, 232, 233, 251,

Carbon reduction, 443,

Carbon tax, 243, 244,

Carcinogens, 287, 294, 358,

Cars, 55, 56, 69, 102, 116, 143, 157, 158, 161, 163, 165, 178, 179, 209-210, 231,
232, 233, 237, 250, 262, 266, 269, 292,
296, 316, 322, 324, 327, 335, 342, 346, 347, 348, 349, 353,
360, 362, 363, 378, 438,

Carson, Rachel, (*Silent Spring*), 20-21, 28,

Cascade Mountains, 392,

Catalytic converters, 283,

Cathode ray tubes, 284,

Cattle ranching, 393,

Cedar, 17, 218, 308, 309, 310,

Cedar trees, 308,

Cell phones, 174, 177, 254, 262, 279, 280, 284, 285,

Cell towers, 296,

Cement, 232-233, 247, 332, 354, 438,

Cement factory, 232, 233,

Cement plant, 233,

Central America, 169, 286, 388, 389,

Central Asia, 418,

Central Cascades, 330,

Ceramics, 286

Cerium, 228, 230, 231, 283,

Cerium oxide, 231,

Cesium, 405,

CH2M Hill, 326,

Chameleon, 408-409,

Chavez, 246,

Chemicals, 21, 182, 198, 216, 237, 268, 276, 336, 340, 343, 356, 358, 374,
405, 406, 441, 448,

Chemistry, 229, 358,

Chen, Stephen, 282,

Chickens, 295,

Children, 121, 170, 172, 173, 279, 348, 441, 446,

Chile, 158, 159, 161, 168, 394, 395, 429,

China, 40, 86, 87, 88, 98-99, 100-101, 105, 129, 200, 223, 230, 237, 249, 259, 269,
281, 282, 288, 291, 302, 355, 372, 390,
391, 395, 429, 463,

Chinese State Grid Corporation, 372,

Chinook salmon, 399,

Chip, 228, 229,

Chivers, Danny, 246-248,

Chlorinated dioxins, 276,

Chlorine, 254, 275, 276,

Chromium, 271, 281, 406,

Churches, 426,

Circuit boards, 278,

City, 4, 5, 302, 303, 304, 310, 312, 313, 314, 315, 317, 318, 319,
320, 321, 323, 327, 332, 334, 335, 336, 337, 338, 339, 340,
341, 353, 354, 360, 361, 363, 364, 369, 385, 390, 391, 424,
426, 432, 456, 471,

City-based economy, 312,

City planners, 308,

Civilization, 4, 6, 7, 14, 17, 22, 23, 28, 70, 73, 150, 213, 221, 222,
251, 271, 314, 321, 361, 397, 412, 419, 433, 464, 466,

Clams, 409,

Clean Air Act, 264,

Cleaning products, 327,

Clean Line, 371,

Clearcut, 392, 444,

Climate, 2, 16, 51, 72, 81, 114, 150, 151, 152, 179, 244, 245, 302, 334, 336,
345, 361, 393, 411, 416, 419, 424, 429, 436, 451,
457, 462,

Climate activist, 24, 403,

Climate change, 2, 386, 415, 418, 423, 424, 429, 463,

Climate emissions, 411,

Climate engineering, see geoengineering, 416,

Climate Governance in the Developing World, 386,

Climate movement, 423,

Climate Progress, 336,

Climate refugees, 459,

Climate scientist, 465,

Clearcuts, 296, 306, 329, 330, 331, 339, 345, 349, 373,

Cliffs Natural Resources, 121,

Climate, 2, 16, 24, 51, 72, 83, 150, 152, 158, 195, 207, 420, 439, 462,

Climate Change, 2, 23, 106, 107, 151, 152, 207, 208, 243, 251, 302, 361, 382, 442,

Climate movement, 425,

Climate Progress, 65,

Clothing, 294, 296, 310,

Clothing industry, 293,

CO₂, 48, 72, 79-80, 89, 100, 154, 207, 316, 405, 406, 430, 437, 439, 462, 470, 471,

Coal, 71, 83-86, 123, 185, 191, 197, 198, 203, 208, 212, 213, 225, 239, 274, 336, 356, 366, 373, 376, 397, 401, 417, 425, 426, 427, 430, 436, 437, 440, 457, 458,

Coal-fired Power Plant, 192, 206, 208, 237, 238, 291, 317, 398, 351-352, 368,

Coal mines, 121, 197, 198, 436,

Coastal wetlands, 439,

Coast Range, 330,

Coaster, Lefty, 42,

Cobalt, 163, 276,

Coca-Cola, 147,

Cod, 463,

Coho salmon, 343, 352, 457,

Coke, (coking coal or metallurgical coal), 123, 171-172, 201, 272, 351,

Colonization, 311, 356, 387,

Colorado, 54, 82, 127, 152, 214, 314, 359, 456,

Colorado River, 324,

Columbia, 148, 329, 382,

Columbia River, 319, 368, 379, 380, 381, 382, 397,

Commerce Clause, 242,

Commercial fishing, 400, 443,

Communication infrastructures, 389,

Community, 1, 7, 10, 32-34, 120, 218-219, 243, 248, 265, 268, 297, 303, 305, 315, 319, 325, 337, 340, 344, 349, 355, 366, 376, 378, 388, 389, 398, 404, 418, 440, 442, 443, 446, 452, 454, 459,

Compact city model, 303, 307, 308, 356,

Compact Fluorescent Lamp (CFL), lightbulbs, 224, 225, 226, 227,

Compressed air, 201, 202,

Compressed air energy storage, (CAES), 202, 203,

Compressors, 157,

Computers, 174, 272, 278, 279, 280, 289, 296, 303, 360, 368, 423,

Concentrated Solar Power (CSP), 93-94,

Concrete, 113-114, 115, 155, 199, 210, 270, 283, 294, 308, 309, 326, 336, 350, 351, 352, 353, 354, 357, 377, 385, 400, 441,

Condominiums, 309,

Congo, 163, 303, 395, 396,

Congo blind barb, (Nzonzi a mpofa), 396,

Connecticut, 373,

ConocoPhillips, 79,

Conservation, 22, 400, 449, 450, 465,

Constitution of the Iroquois Confederacy, 319,

Construction, 94, 115, 187, 207, 210, 212, 232, 233, 257, 267, 270, 283, 292, 306, 309,
324, 327, 336, 337, 343, 370, 372, 373, 386, 387, 391, 392, 394, 395, 399, 400,
403, 414, 435,

Consumer, 340,

Container ships, 318,

Contaminants, 125, 126, 146, 268, 276, 343, 350, 406,

Continuous grazing, 453,

Copenhagen, 339,

Copepods, 408,

Copper, 13, 14, 92, 97, 105, 114, 124-127, 128, 158, 171, 200, 231, 247, 250,
255-256, 266, 268, 290, 314, 332, 377, 463,

Copper mine, 13,

Copper sulfate, 126,

Copper sulfide, 125,

Coral Reefs, 2,

Corn, 339,

Corporate, 79, 142, 153, 229, 241, 242, 249, 250, 269, 331, 419,

Corsica, 432,

Cosmetics, 286,

Costa Rica, 384, 385, 386, 388, 389,

Cottonwoods, 452,

Cougar Creek Dam, 394,

COVID-19, 470,

Cows, 109, 233, 453,

Cox, Stan, 335,

Coyotes, 219, 452,

Crabs, 354, 356, 409, 463,

Creatures, 2, 7, 8, 9, 10, 46, 128, 408, 409, 410, 415, 416, 431, 452, 456,

Creosote, 356-357, 358, 359, 360,

Critical Materials Institute, 285,

Crocodile, 396,

Crude oil, 216

Crustaceans, 8, 415,

Crystal, 227, 228,

Cullet, 263, 264, 265,

Culture, 4, 5, 6, 7, 12, 17, 167, 210, 252, 261, 262, 265, 281, 294, 295, 296, 297, 299, 300, 310, 311, 316, 325, 326, 330, 331, 339, 340, 347, 362, 363, 364, 387, 416, 417, 424, 428, 430, 435, 439, 457, 463, 464, 465, 466, 467, 471, 472,

Culverts, 344,

Cummins, Ronnie, 454,

Cupro-nickel, 200,

Curre', 388,

Czech Republic, 46,

Dadswell, Mike, 410, 411,

Daffodil, 295,

Daily Kos, 42, 65,

Daily Star, 279,

Dams, 43, 140, 142, 186, 187, 195, 291, 296, 312, 329, 380, 381,

382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393,
394, 395, 397, 398, 399, 400, 401, 408, 414, 441, 444, 445,
470,

Darkling beetles, 297,

Davis, Jay, 343, 344,

Day, John W., 339,

Decoupling, 249-250, 361,

Deer, 294, 346, 350, 450, 452,

Deforestation, 393, 433, 437, 438,

Degrowth, 246,

Delaware, 255, 373,

Deloria, Vine, Jr., 217,

Democracy Now, 30, 41, 60-61,

Democratic Party, 30,

Democratic Republic of Congo, (DRC), 393, 395, 396,

Denmark, 244, 245, 463,

Dentistry, 398,

Department of Energy, (DOE), 202, 226,

Depots, 316,

Depression, 149,

Der Spiegel, 39, 71-72,

Desert, 89, 95, 109, 190, 211, 307, 309, 338, 345, 354, 408, 430,
469,

Desert Renewable Energy and Conservation Plan, 429,

Desert tortoises, 95, 190, 350, 413, 469,

Desert Bighorn Sheep, 190,

Die, (silicon chip), 227, 228,

Diesel dump trucks, 121,
Diesel fuel, 317, 318, 342, 351, 359,
Diesel power plant, 401,
Diethyl carbonate, 175,
Dimbangombe River, 455,
Dinorwig Power Station, 189,
Diodes, 231,
Diode bridge, 224,
Dioxin, 201, 254, 275, 278,
Direct reduced iron, (DRI), 269,
Displacement, 235, 238, 240,
Diversity, 218-219,
Dixie Valley toad, 403,
Doe Run Resources, 172-173, 174,
Dollar neutral, 49-50,
Doping, 228,
Double bind, 142-143,
Douglas fir, 309, 392,
Downcycling, 257, 260, 261, 283,
Dragonflies, 450,
Drawdown, 4, 5, 321, 323, 339, 412, 444, 466,
Dross, 254,
Drought, 401, 417,
Drucker, Peter, 221,
Dry climates, 451,
Dryland savanna, 455,

Dubai, 354,

Duck, 251, 471,

DuPont, (Chemours), 182, 183,

Dump, 288,

Dunes, 409,

Dung beetles, 450,

Dungeness crab, 399,

Dutch, 307,

Dyes, 276,

Dynamite, 394,

Dysprosium, 283,

EPA, Environmental Protection Agency, 21, 80, 122, 172, 173,
224, 264, 314,

Eagles, 135, 137, 190, 219, 300, 399, 470,

Eagle Mountain Pumped Hydro Project, 190,

Earth, 3, 9, 10, 14, 15, 95, 97, 100, 117, 119, 160, 212, 248, 262,
271, 294, 295, 296, 300, 303, 320, 327, 330, 338, 341, 342,
345, 347, 351, 354, 359, 360, 363, 388, 406, 407, 413, 414,
416, 417, 419, 420, 421, 430, 435, 438, 446, 448, 454, 459,
462, 464, 466, 467, 468,

Earthworms, 295, 450,

Earthquakes, 282, 405,

Earth Policy Institute, 22,

Eco-building, 326,

Eco-certification, 331,

Ecological Applications, 343,

Ecology, 23, 98, 255, 304, 324, 325, 326, 335, 348, 385, 449, 459, 472, 473,

Economic downturn, 471,

Economic growth, 77, 236, 246, 249, 250, 361, 446,

Economic system, 319-320, 467,

Economical, 198, 250, 276,

Economy, 33, 39, 237, 249, 258, 289, 290, 292, 294, 312, 327, 339, 367, 401, 412, 424,
428, 438, 446, 447, 458, 470, 471,
472,

Ecosystems, 127, 304, 342,

Ecuador, 395,

Eddy, Shannon, 430,

Eel grass, 296, 356,

Efficiency, 16, 192, 206, 209, 210, 211-215, 218-219, 221, 222-223, 224,
225, 241, 249, 265, 287, 288, 292, 306, 315,

Efficient appliances, 269,

Eggs, 295, 399, 409,

Ehrenfeld, David, 7,

El Diquis dam, 388

Electrical engineers, 368,

Electric arcs, 269, 270,

Electric arc furnaces, (EAF), 269, 270, 272, 273,

Electric cars, 158, 162, 161, 163, 232, 244, 253, 278, 280, 283, 336, 341, 342, 356, 402,
419,

Electric hookups, 318,

Electric lines, 389,

Electric-powered freight trains, 317,

Electric semi-trucks, 318,

Electric train cars, 317,

Electric-vehicle, 161, 207, 247, 276, 284, 341,

Electricity, 37, 39-40, 42-45, 53, 56-58, 61-65, 70-71, 103, 111, 117, 151,
196, 199, 203, 206, 207, 215-216, 223,
224, 225, 227, 231, 232, 237, 238, 240, 246, 261, 262,
270, 291, 332, 335, 365, 366, 367, 368, 377, 378, 384,
386, 390, 392, 395, 397, 399, 401, 404, 407, 408, 414,
415, 435,

Electricity grid, 367, 369, 370,

Electrodes, 269, 272, 273, 291,

Electrolysis, 185,

Electromagnets, 263,

Electronics, 157, 174, 224, 228, 237, 254, 275, 277, 278, 279, 284, 420, 423, 438,

Elephant, 251, 434, 456, 471,

Electronic waste, see E-waste, 314,

Elk, 399, 452, 453,

Elwha River, 398, 399,

Emissions, 173, 207, 245, 271, 275, 282, 303, 317, 342, 385, 386, 388, 411, 430, 437,
438, 439, 443, 470,

Emissions credits, 245,

Emperor penguins, 23,

Empire, 295, 304, 313,

Endangered, 46, 153, 337, 349, 390, 411,

Endangered species, 349, 418,

Endangered Species Act, 328,

Endangerment, 305,

Endemic, 47, 390, 396,

Energy, 12, 37, 41, 54-58, 59, 60, 63, 64, 90, 118, 153, 167, 184, 191, 197, 198,
199, 201, 208, 209, 211, 212, 213, 214, 216,
219, 223, 224, 226, 232, 235, 236, 238, 239, 240, 247, 249,
255, 260, 264, 270, 274, 280, 285, 292, 293, 303, 304, 306,
307, 311, 325, 332, 334, 335, 336, 339, 351, 353, 359, 360,
361, 362, 364, 365, 367, 369, 373, 384, 393, 397, 404, 407,
408, 411, 412, 415, 421, 425, 438, 440, 442, 463, 464, 469,

470,

Energy density, 193, 194, 318,

Energy industry, 3,

Energy Information Administration, 274,

Energy Report, 411,

Energy storage, 156-157, 179, 186, 192, 196, 197, 200, 202, 204,
205, 207, 276, 286,

Energy technologies, 216,

England, 357, 382,

Enhanced Geothermal Systems, (EGS), 405,

Enhanced oil recovery, (EOR), 406,

Enterprise Hydraulic Works, 219,

Environment, 30, 216, 271, 282, 303, 321, 371, 407,

Environmental, 54, 138, 173, 223, 226, 227, 229, 233, 255, 256,
257, 271, 274, 278, 280, 281, 285, 286, 305, 306, 307, 322,
324, 339, 343, 350, 352, 361, 376, 382, 383, 386, 387, 388,
404, 418, 423, 437, 443, 446, 459,

Environmental activist, 28,

Environmental groups, 275, 342,

Environmental Laureates Declaration on Climate Change, 23,

Environmentalism, 20, 27, 54, 166, 256, 306, 382,

Environmentalist, 24, 28, 31, 38, 87, 117, 142, 145, 152, 153, 196, 209, 225, 243,
308, 311, 320, 342, 378, 382, 383,
386, 396, 403, 411, 423, 430, 432, 449, 469, 471,

Erbium, 284,

Estonia, 440, 441,

Estuaries, 398, 399, 407, 408, 409,

Ethiopia, 393,

Eulachon smelt, 380, 381, 399,

Eurasia, 418,

Europe, 72, 240, 248, 278, 317, 328, 404, 405, 452, 458,

European Coal and Steel Community, 244,

European Environmental Agency, 303,

European Union, (EU), 244, 245, 277, 288, 293,

Europium, 283, 284,

Exajoules, 239,

Exmoor ponies, 450,

Explosives, 254, 286, 287, 394,

Externalities, 30,

Extinction, 2, 347, 348, 390,

Extraction, 247, 248, 249, 250, 255, 325,

Extractive Processes, 14, 224, 247,

ExxonMobil, 115, 419, 427,

E-waste, 278, 279, 280,

Facebook, 244,

Factories, 57, 93, 142, 166, 167, 168, 213, 219, 220, 229, 232,
259, 260, 265, 267, 271, 273, 281, 291, 292, 326, 329, 330,
338, 355, 378,

Factory farms, 400,

Farms, 213, 316, 355, 447, 448, 451, 453, 454,

Farmers, 390, 453, 454, 455,

Farrelly, Elizabeth, (Blubberland), 303,

Fast Company, 384,

FDA, (Food and Drug Administration), 286,

Fearnside, Philip, 385,

Federal Energy Regulatory Commission, 369,

Federal government, 370,

Federal Highway Administration, 349,

Fences, 296,

Fender's blue butterfly, 348, 349,

Fertilizers, 215, 270, 340, 448,

Fiber optic cables, 284,

Finland, 440, 463,

Fish, 12, 103, 114, 121, 127, 153, 160, 163, 187, 188, 190-191, 193, 195, 196,
235, 249, 319, 320, 328, 329, 333, 344, 352,
354, 355, 356, 380, 381, 384, 390, 391, 396, 397, 398, 400,
408, 409, 410, 420, 441, 445, 461, 463,

Fish hatcheries, 400-401,

Float glass, 265,

Flooding, 352, 417,

Flora and fauna, 361,

Florida, 350, 358,

Florida panther, 350,

Florida yew, 46,

Flowers, 348, 349, 441, 448,

Fluorescein, 405,

Fluorine, 182,

Fluorite, 271,

Fluorosis, 271,

Fluorspar, 271-272,

Food, 4, 314, 316, 319, 328, 332, 333, 334, 335, 336, 338, 344, 359, 360, 384, 390, 394,
397, 400, 408, 409, 415, 417, 447, 456, 458, 459, 472,

Forests, 17, 28, 45, 46, 47, 48, 49, 50, 52, 53, 103, 108, 109-110, 118, 145-146, 153, 182, 209, 215, 217, 222, 240, 249, 251, 271, 281, 288, 289, 296, 298, 299, 300, 304, 305, 309, 310, 315, 320, 327, 328, 330, 331, 332, 333, 338, 340, 345, 346, 365, 371, 373, 379, 380, 382, 388, 389, 390, 392, 397, 398, 408, 415, 424, 437, 438, 439, 440, 442, 444, 454, 457, 458, 472,

Forest Stewardship Council, (FSC), 331, 332,

Fork, David, 206,

Formaldehyde, 176, 216,

Fossil Free campaign, (350.org), 426, 427,

Fossil fuel, 3, 40, 77, 115, 176, 191, 202, 207, 211, 215, 227, 238, 240, 241, 246, 247, 249, 251, 263, 282, 318, 325, 338, 350, 351, 372, 376, 405, 407, 412, 419, 427, 428, 437, 438, 454,

Fox, 21, 23, 251, 295, 298, 452,

Fracking, 405, 426, 443,

Fragmentation, 344, 345, 359, 374, 403,

Frass, 298, 299,

Free market, 443,

Freeways, 296,

Freshwater habitats, 343,

Friedman, Alice J., 194,

Friedman, Thomas, 37-38, 470,

Frogs, 25-27, 296, 337, 346, 348, 396,

Fucks, Ralf, 37, 86,

Fuel, 440,

Fuel cells, 157, 179-180, 182, 183, 184-185, 192, 231,

Fuel spills, 268,

Fungi, 8, 229, 261, 294, 295, 299, 345, 397, 472,

Furans, 278,

Furnaces, 97, 269, 270, 272, 273,
Gaddafi, 246,
Gadolinium, 228, 230, 231,
Gallium arsenide, 227,
Gallium arsenide phosphide, 227,
Gallium phosphide, 227,
Gamma radiation, 231,
Gannet, (see Northern gannet)
Ganzizhou Rongda lithium mine, 160,
Garcia, To'mas, 387,
Gas, 81, 201, 235, 242, 250, 366, 373, 376, 397, 401, 405, 406,
407, 417, 425, 426, 430, 436, 437, 457, 458,
Gasoline, 213, 232, 241, 267, 342, 385,
Gates, Bill, 64,
GDP, (Gross Domestic Product), 249, 250,
Geese, 449, 450,
Gemasolar concentrated-solar plant, 199-200,
General Electric, 234,
Genetic mutations, (mutagens), 350, 358,
GenX, 183,
Geoengineering, (climate engineering), 416, 417, 418, 419,
Georgescu-Roegen, Nicholas, 246,
Geothermal brine injection, 405,
Geothermal drilling, 403,
Geothermal energy, 402, 403, 404,
Geothermal facilities, 404,

Geothermal industry, 404,
 Geothermal power, 403,
 Geothermal wells, 402, 405,
Geotrupes mutator, 450,
 Germ 309,
 Germanium, 227,
 Germany, 36-48, 52-53, 58-69, 73-78, 80, 81, 83, 84, 88, 106, 151, 161, 163,
 201, 203, 240, 290, 316, 372,
 Ghana, 278,
 Ghost acreage, 315,
 Gibbs, Jeff, 435,
 Gigafactory, 166-167, 168,
 Giraffe, 456,
 Girls, 459,
 Glaciers, 23, 414, 415,
 Glass, 263, 264, 265-266, 280, 282, 283, 286, 334,
 Glencore, 250,
 Glendinning, Chellis, 7, 435,
 Global climate, 454,
 Global Compact Cities Program, 303,
 Global economy, 236, 289, 290, 306,
 Globalization, 76, 84, 105, 157, 209, 229,
 Global Justice Ecology Project, 428,
 Global supply lines, 339,
 Global warming, 23, 45, 73, 76, 106, 107, 188, 196, 208, 210, 226, 227, 236,
 245, 251, 311, 312, 329, 353, 381, 399, 401,
 417, 419, 424, 427, 437, 438, 453, 457,

Gold, 109, 228, 229,

Golden eagles, 137, 190, 300, 470,

Goldman Sachs, 426,

Goldthread, 217,

Goliath tigerfish, (mbenga), 396,

Gonzalez, Guillen Mo, 159-160,

Google, 206-207,

Government, 88, 89, 90, 118, 137, 216, 220, 229, 242, 247, 275,
323, 327, 370, 388, 389, 391, 394, 395, 412, 416, 417, 419,
443, 444, 445, 446, 462, 470,

Graedel, Thomas, 285,

Grand Coulee Dam, 470,

Graphite electrodes, 269, 270, 272, 273,

Grain, 249, 250, 453,

Grass, 4, 12, 19, 295, 298, 310, 442, 448, 451, 452, 453, 455, 456, 457, 459, 472,

Grass-based farming, 454-455,

Grassland, 2, 17, 19, 160, 251, 300, 304, 305, 315, 338, 382, 408, 420, 438,
439, 440, 451, 453, 454, 456, 457, 470,

Gravel, 350, 354,

Grazers, 453,

Grazing animals, 449, 455,

Grazing species, 449,

Great auks, 347,

Great Depression, 470,

Great Lakes, 358,

Greater sage grouse, 136-137, 300,

Great Plains, 316, 452,

Green, 38, 47, 54, 82, 95, 127, 128, 154, 160, 199, 203, 205, 238,
253, 281, 293, 302, 303, 306, 317, 322, 323, 326, 327, 331,
342, 354, 356, 357, 360, 363, 370, 382, 384,
387, 392, 401, 404, 442, 447, 336, 339, 341,

Green Academy, 289,

Green automobiles, 342, 354,

Green building, 322, 324, 326, 340,

Green city, 302, 306, 307, 322, 339, 362, 364,

Green economy, 127, 331,

Green energy, 156, 199, 207, 208, 211, 236, 238, 241, 246, 367,
372, 383, 411, 423, 436, 469,

Greenhouse gas, 44, 76, 207, 249, 250, 264, 316, 417, 434, 436,
438, 440, 458,

Greenhouse gas emissions, 73, 78-80, 189, 191, 201, 207, 236,
361, 385, 392, 437, 438, 453, 455, 238, 243, 244, 250, 351,

Green grid, 365,

Green-growth, 363,

Greenland, 450,

Green landscapes, 337, 338, 340,

Greenpeace, 24, 30, 81, 303, 411,

Green Power, 336,

Green spaces, 337, 338, 340,

Green technologies, 253, 266, 278, 424, 429, 435, 437,

Green trains, 356,

Green transit, 341,

Greenwashing, 327, 400,

Greylag goose, 449,

Grid, 93, 366, 367, 368, 369, 370, 372, 374, 375, 377, 378,

Grid power, 174,

Grid-scale energy storage, 195, 196,

Grist, 197,

Grizzly bear, 127-128, 218, 380, 453,

Gross Domestic Product, 361,

Groundwater, 129, 190, 268, 312, 350, 381, 403, 405, 406,

Growth, 75, 77, 97, 183, 237, 246, 249, 289, 428,

Guardian, The, (Publication), 101,

Guaymi, 388,

Gurukula Botanical Sanctuary, 418,

Habitat, 127, 132, 135, 341, 343, 344, 345, 349, 354, 375, 398, 402, 403, 407,
415, 418, 421, 441, 448, 449, 450, 455, 456,

Habitat destruction, 342, 343, 359,

Habitat fragmentation, 344, 375, 397,

Habitat isolation, 195,

Habitat starvation, 397,

Hail, 282, 283,

Hall, Charles, 339,

Hall, Heather, 314,

Hanford Reach, 381,

Hanford Site, 381,

Harbor porpoise, 411,

Harbor seals, 409,

Hard disk drive, 284, 289,

Hart, Elaine, 367,

Harvard's Solar Geoengineering Project, 152,

Harvey, Graham, 454,
Hatcheries, 400-401,
Hathaway, 370,
Hawk, 295, 457,
Hazardous waste, 281, 344,
Heat, 53, 203,
Heavy metals, 223, 276, 350,
Heineken, 147,
Heinrich Boll Foundation, 238,
Helium gas, 377,
Herbicides, 131, 373,
Herders, 455,
Heron, 217,
Herring, 398,
Hexaflouroethane, 100,
Hexavalent chromium, 268,
Hierarchy, 9,
Highways, 296, 343, 346, 363, 365, 367, 391, 445,
High-voltage direct current, (HVDC), 214,
Himalaya, 418,
Hiroshima, 381,
Hirsch, Afua, 278,
Hoary bat, 141, 421,
Hogan, Linda, 222,
Holistic management, 453,
Honduran, 387,

Honecker, James, 369,

Hoover Dam, 394, 470,

Horses, 9, 178, 179,

Hot tank, 199,

Housing, 93, 174, 212, 308-309, 324, 353, 368,

Houston, 268,

Huckleberries, 472,

Humans, 1, 2, 3, 4, 6, 10, 16, 17, 118, 24, 25, 36, 44, 51, 59, 100, 120, 132, 139, 143,
147, 149, 181, 219, 229, 239, 242, 247,
256, 261, 278, 280, 296, 298, 299, 303, 304, 305, 312, 320,
325, 337, 338, 351, 353, 354, 358, 361, 375, 382, 383, 385,
396, 408, 412, 416, 417, 418, 433, 434, 435, 445, 448, 449,
453, 455, 458, 459, 462, 464, 465, 466, 467, 469, 472,

Human rights, 24, 120, 147, 195, 459,

Huntorf plant, 201, 203,

Hurricanes, 150, 282, 283,

Hybrid cars, 289, 443,

Hydro, 31, 67, 71, 82, 87, 157, 194, 232, 239, 240, 373, 383, 384,
393, 394,

Hydrocarbons, 184, 198, 350,

Hydrochloric acid, 96, 97, 201, 230,

Hydroelectric, 388,

Hydroelectric dams, 368, 383, 384, 389, 392, 393, 395, 396, 399,
401, 404,

Hydroelectricity, 386, 401,

Hydroelectric plants, 366,

Hydrogen, 184, 185, 254,

Hydrogen fuel cells, 157, 182, 184,

Hydrogen fluoride, 182,

Hydrogen gas 179,
Hydrogen sulfide, 404,
Hydropower, 43, 379, 383, 384, 386, 387, 393, 395, 397, 401,
Iberian lynx, 347,
Iceland, 103, 394, 403, 404, 463,
Idaho, 102, 103, 104, 349, 371,
Idaho Power, 371,
Illinois, 338, 370,
Imperialism, 229,
Incandescent, 223, 224, 225, 227,
Incinerators, 283, 398,
India, 17, 317, 355, 418, 441, 445, 458,
Indigenous, 124, 147, 148, 153, 251, 297, 303, 310, 311, 313,
387, 388, 390, 398, 466,
Indigenous Lenca, 387,
Indium, 227, 284,
Indonesia, 237, 355,
Industrial agriculture, 436,
Industrial capitalism, 91, 245,
Industrial Civilization, 14, 18, 70, 73, 107, 153, 175, 256, 293, 296, 299, 311, 313,
314, 320, 331, 354, 363, 396, 397, 412,
433, 434, 435, 436, 458, 464, 466, 469,
Industrial development, 449,
Industrial ecology, 352,
Industrial economy, 33, 70, 158, 163, 241, 288, 382, 425, 429, 442, 469,
Industrial electric grid, 369,
Industrial electricity, 291, 365, 370, 435,

Industrial energy, 438, 467,

Industrial fishing, 311, 312, 329, 381, 461,

Industrial forestry, 331

Industrial logging, 312,

Industrial ocean traffic, 471,

Industrial products, 176, 268,

Industrial recycling, 295, 297, 424,

Industrial revolution, 219, 454,

Industrial solar energy, 91,

Industrial supply chain, 291,

Industrial technology, 16, 224, 229, 317, 435,

Industrial wind energy harvesting facility, 114, 149,

Industry, 30, 35, 36, 37, 73, 88, 90, 105, 121, 122, 132, 143, 180, 196, 201,
214, 215, 237, 243, 246, 248, 255, 256, 257, 258,
259, 260, 261, 264, 267, 274, 275, 278, 281, 282, 287, 288,
289, 291, 292, 293, 294, 295, 300, 304, 311, 312, 317, 323,
325, 326, 327, 331, 339, 351, 352, 353, 355, 356, 360, 368,
369, 373, 388, 390, 395, 396, 402, 403, 405, 412, 414, 421,
423, 425, 426, 427, 429, 440, 441, 443, 449, 458, 459, 467,
471,

Infrasound, 149,

Inga project, 395,

Inhabitat, 384,

Inks, 276,

Insects, 95, 235, 294, 295, 297, 347, 348, 384, 445, 448, 450, 457,

Insecticides, 286,

Intel, 326,

Intercontinental Cry, 426,

Intergovernmental Panel on Climate Change, 151,

International Energy Agency, 362,
International Monetary Fund, 386,
International trade, 241,
International Union for Conservation of Nature, 450,
Internet, 423,
Invertebrates, 408, 448, 450,
Inverter, 92-93,
Iowa, 4, 338, 370, 378,
Iran, 307,
Ireland, 440,
Iron, 169, 201, 247, 267, 268, 269, 270, 276, 352, 419, 463,
Iron ore, 118-123, 171, 255, 269, 271, 274, 289, 420,
Islands, 97, 159, 217
Isothermal CAES, 203,
Israel, 17, 304, 426,
Isthmus of Tehuantepec, 372,
Itaipu Dam, 389,
Itzkan Seth, 455,
Ivanpah project, 94-95,
Jacobson, Mark Z., 111-112, 115, 116, 117, 124, 127, 132, 133, 135, 138, 150, 151,
161, 192, 205, 246, 367, 373, 374, 375,
383, 384,
Jondachi River, 395,
Japanese badger, 347,
Japanese Hokkaido white wolf, (*Horkew Kamuy*, or “howling god”), 251,
Java rhinoceros, 2,

Jeffrey's, Sheila, 121,
Jepirachi industrial wind-energy facility, 148,
Jones, Christine, 455,
Joshua trees, 469,
Joules, 55, 240,
Jevons Paradox, 215, 216, 235, 262, 292, 299,
Jevons, William Stanley, (The Coal Question), 212, 221,
Kahn, Matthew, 361,
Kaiser, Martin, (Greenpeace), 81,
Kallampuzha stream, 441,
Kanigel, Robert, 221,
Kansas, 369,
Kareiva, Peter, 22, 465,
Karen, (indigenous), 390,
Keeyask Dam, 388,
Kennecott, Rio Tinto, 125-128,
Kentucky, 103,
Kenya, 355, 402,
Kerala, 441,
Kerf, 99,
Key deer, 350,
Keystone species, 359, 397, 450, 456,
Kincaid's lupine, 348,
King, Alex, 286,
King Richard I of England, 382
Kingsnorth, Paul, 108,

Klein, Naomi, (*This Changes Everything*), 24, 27-28, 41, 59-61, 465, 64, 106-107, 152, 429,

Knepp Castle Estate, 447, 450,

Knepp Oak, 448,

Koningstein, Ross, 206,

Kroh, Kiley, 42,

Kudu, 456,

Kumanal, 200,

Kunstler, James Howard, 288,

Kuttemperoor River, 441,

Kwakwaka'wakw, 310,

Kyoto Protocol, 386,

Labrador tea, 217

Laboratories, 229,

Labrador, 388,

Labrador ducks, 2, 471,

Lakes, 101, 127, 188, 260, 340, 346, 355, 391, 392, 403, 415, 416, 450,

Lake Champlain, 370,

Lake Turkana, 147,

Lal, Dr. Ratta, 453,

Lamprey, 380, 381, 399,

Lamprologus lethops, 396,

Land, 4, 10, 17, 88, 91, 105, 115, 121, 124, 128, 131, 147, 148, 151, 187, 198, 213,
217, 246, 248, 254, 268, 295, 304, 308,
313, 314, 315, 319, 320, 325, 326, 331, 337, 339, 340, 342,
344, 345, 351, 353, 355, 358, 359, 361, 373, 374, 375, 376,
378, 385, 388, 403, 406, 407, 416, 418, 423, 427, 430, 432,
433, 436, 437, 439, 440, 444, 449, 450, 454, 455, 466,

Land-based, 319,
Land clearance, 318,
Landfills, 259, 262, 276, 277, 283, 294, 359, 398,
Landscape, 304, 306, 321, 322, 326, 343, 352, 448,
Lanthanum, 283,
La Oroya, (Peru), 173,
Laos, 391,
Large-Scale Solar Association, 430,
Larvae, 384,
Laser diodes, 216, 236,
Las Vegas, 82, 211, 324,
LCD screens, 283, 284,
Leach ponds, 13,
Lead, 169-173, 231, 265, 266, 268, 278, 281, 282, 286, 287,
Lead-acid Batteries, 158, 169, 171, 192, 286, 287, 288,
LED's, (Light Emitting Diodes), 226-229, 230, 231, 234, 235, 236, 335, 413,
LEED, 324-325, 326,
Le Guin, Ursula, 50,
Lenin, 221,
Leopard, 456,
Leopold, Aldo, 421, 423, 473,
Lesotho, 393,
LeVine, Steve, 177,
Lewis, Avi, 41,
Liaoning Province, (NE China), 200-201,

Life, 1, 10, 11, 12, 13, 15, 18, 19, 22, 27, 147, 166, 176, 185, 217, 303, 310, 313, 314,
315, 320, 321, 323, 330, 335, 374, 375, 381, 382,
396, 398, 399, 406, 408, 412, 413, 416, 417, 418,
421, 429, 433, 435, 442, 444, 446, 451, 452, 453, 457, 458,
459, 460, 461, 466, 467, 471, 472, 473,

Lifton, Robert Jay, 331, 464,

Lightbulbs, 56, 106, 223, 224-225, 229, 234,

Light pollution, 149, 344,

Light rail, 359,

LightSail Energy corporation, 203,

Lime, 271,

Limestone, 232, 233, 271, 274,

Limpets, 409,

Lion, 456,

Liquid nitrogen, 377,

Liquid phase epitaxy, (doping), 228,

Liqi River, (Tibet), 160,

Lithium, 158-159, 160, 161, 162, 163, 166, 168, 248, 276, 277, 405,

Lithium battery, 165, 166, 169, 176-177, 192, 193, 276,

Lithium-ion, 158, 177, 276, 277,

Lithium-ion batteries, 158, 177, 276, 277, 318,

Lithium mines, 470,

Littoral zone, 415,

Livestock, 230, 455, 456,

Living beings, 434,

Logging, 46, 53, 172, 193, 241, 312, 327, 328, 329, 331, 344, 356, 357, 358, 381, 387,
388, 392, 400, 437, 438, 441, 458,

London, 237, 317, 447,

Longhouse, 218, 308,

Los Angeles, 287, 336, 341, 471,

Low-polluting vehicles, 269,

Ludington Pumped Storage Facility, 190, 191,

Lumber, 336, 351, 356,

Maasai, 403,

Machine, 5, 6, 14, 15, 16, 70, 82, 112, 113, 116, 130, 132, 143, 146, 162, 167,
200, 205, 219, 220, 229, 237, 248, 258, 260,
264, 267, 269, 295, 305, 309, 368, 376, 407, 416, 417, 423,
435, 471,

Madidi National Park, 395,

Magnesium, 200-201,

Magnesium-carbon bricks, 269,

Magnesium oxide, (MgO), 200, 201, 270,

Magnets, 263, 284, 289,

Maine, 214, 338,

Maipo River, 395,

Mai, Trieu, 369,

Makah, 217-218, 297, 308, 309,

Makah Copper butterflies, 217,

Malaysia, 288, 355,

Mammals, 218, 390, 411, 434, 450, 456,

Managed grazing, 453, 454,

Manganese, 200, 276, 463,

Manitoba, 388,

Mangrove forests, 341, 354, 388, 391, 439, 458,

Manhattan, 303,

Manufacturing, 102, 106, 114, 123, 177, 210, 238, 263, 292, 293,
316, 376, 469,

Manure, 178,

Marano'n River, 395,

Marijuana, 167, 214, 215-216, 262, 438,

Marine life, 462,

Marshall, Jessica, 289,

Marsh, 450,

Marshlands, 382, 450,

Martens, 347,

Massachusetts, 146, 214, 216, 338,

Massachusetts Institute of Technology, (MIT), 144, 216,

Materials, 93, 97, 112, 113, 257, 258, 259, 261, 263, 265, 266,
267, 269, 270, 271, 272, 276, 278, 281, 282, 284, 285, 287,
288, 290, 291, 293, 295, 309, 310, 313, 316, 318, 319, 325,
327, 330, 332, 334, 335, 343, 360, 361, 376, 377, 397, 403,
405, 406, 420, 421, 434, 435, 438,

Mattauch, Melanie, 43,

Matthew, Chiksika, 432,

Mau, Bruce, 315,

Mauritius blue pigeon, 251,

Mayflies, 384,

Maxwell, (supercapacitor cells), 174,

McIntosh, (Power plant), 201-202, 203,

McKibben, Bill, 22-23, 37, 42, 64-65, 129, 435, 465,

McMahon, Edward T., "smart growth", 361,

Meadowlarks, 296, 470,

Meadows, 296, 305, 338, 349, 448, 449,

Mealworms, 297, 298, 299, 300,

Mechanistic mind, 10,

Megadams, 387,

Megajoule, 158,

Mekong Giant Catfish, 391,

Mekong River, 391, 392,

Men, 121,

Mesopotamian elephants, 471,

Mercury, 121, 125, 223, 224, 225, 268, 276, 398, 403,

Metals, 169, 249, 254, 255, 258, 263, 265, 266, 268, 270, 272,
275, 278, 279, 280, 284, 299, 312, 326, 355, 360, 374, 420,

Metals recycling, 266,

Methane, 44, 73, 79-80, 81, 185, 188-189, 342, 385, 386, 388,
399,

Methylate, 398,

Mexico, 147, 169, 372, 378,

Meyer Deanna, 456,

Mice, 295, 452,

Michigan, 121, 162, 386, 406, 459,

Microbes, 451, 455,

Microchips, 290,

Microorganisms, 408,

Micro-plastic, 260,

Microsoft, 282,

Migrations, 391,

Migratory birds, 127, 355,

Mi'Kaq, 412,

Militaries, 5, 89, 90, 289, 292, 381, 389, 390, 391, 438, 447,

Min, Tian, 282,

Mine, 96, 109, 119, 121, 223, 227, 230, 255, 256, 280, 286, 289,
309, 312, 338, 342, 350, 351, 355, 387, 393, 398, 414, 445,

Mining, 14, 95-96, 171, 194, 200, 222, 223, 229, 230, 232, 241, 248, 253, 266, 275, 276,
285, 289, 292, 344, 351, 354, 356,
388, 393, 395, 403, 430, 441, 458,

Mining, Seabed, (ocean), 130-131,

Minnesota, 103, 122,

Mirrors, 94, 95, 266, 283, 419,

Missouri, 172, 173,

Mixed-used neighborhoods, 340,

Mob grazing, 453,

Mojave Desert, 282, 324, 366, 368, 369, 429,

Mollusks, 196,

Monazite, 231,

Money, 72, 244, 248, 254,

Mongabay, 393,

Mongolian, 309,

Monocrop agriculture, 445, 458,

Monsanto, 226,

Monsoon, 418, 419,

Moore, Kathleen Dean, 459,

Morales, President Evo, (Bolivian), 168,

Morozov, Evgeny, 281,

Mosses, 219, 440,

Moths, 448,

Mountain, 102, 108, 109, 125, 127, 128, 130, 136, 160, 198, 210, 289, 337, 338, 373, 418, 443, 222, 248, 288,

Mountain sheep, 452,

Mount St. Helens, 330,

Mozambique, 393,

MRI, 284,

Mud shrimp, 408,

Mule deer, 452,

Mumford, Lewis, 5, 16, 435,

Mursch, Debbie, 196,

Mushrooms, 296,

Musk, Elon, 164-165, 166, 167, 168,

Muskrat, 346,

Muskrat Falls, 388,

Mutagens, see genetic mutations

Myanmar, 390,

Mycorrhizae, 448,

Nagasaki, 381,

Naidoo, Kumi, 24, 111, 428,

Nanjing Fangrun Materials, 282,

Nanoparticles, 180,

Naphthalene, 405,

Napyidaw, 391,

NASA, 149,

Nation, 182, 243, 246, 247, 249, 250, 262, 286, 317, 319, 338, 429, 463, 347, 355, 386, 393, 401,

National Renewable Energy Laboratory, 367, 369,

National Forest, 328,

National Hydropower Association Pumped Storage Development Council, 196,

Native animal, 337,

Native plants, 305, 356, 449,

Natural, 22, 50, 181, 185, 188, 218, 296, 309, 337, 340, 352, 390, 400,

Natural communities, 337, 440,

Natural gas, 35-36, 114, 184, 191, 201, 202, 203, 207, 239, 258, 324, 336, 337, 388, 401, 405, 440, 463,

Natural resources, 249, 331, 464,

Natural Resources Council, 284,

Natural Resources Defense Council, (NRDC), 322-324, 340,

Natural world, 21, 23, 24, 73, 205, 229, 300, 307, 321, 414, 429, 465, 468,

Nature, 4, 7, 9, 31, 87, 153, 209, 295, 315, 322, 325, 336, 337, 472, 360, 403, 407, 433, 471,

Nature, 312, 321, 424, 470,

Nature Geoscience, 250,

Nature preserve, 449,

Navesink watershed, 371,

Nazis, 331,

Near Bay, 218,

Nebraska, 369,

Nematodes, 9,

Neodymium, 114, 129, 283, 284, 285,

Nepal, 393,

Nestos River, 194-195,
Net carbon emissions, 442,
Netherlands, 289, 307, 347,
Nettle, 217,
Net zero carbon, 439,
Neuman, Michael, 306-307, 308,
Nevada, 108-110, 155, 158, 166, 214, 343, 403, 405, 470,
New Deal, 470,
Newe, (Western Shoshone and Goshute), 109, 110,
New Hampshire, 371,
New Jersey, 371, 373, 378,
New Mexico, 371,
New Orleans, 429,
New York City, 294, 314, 317,
New York Times, 75, 77, 79, 88, 362,
New Zealand, 394,
Nickel, 231, 271, 276,
Nigeria, 268,
Nightingale, 450,
Nippon Steel, 269,
Nitrates, 276,
Nitric acid, 231,
Nitrogen, 8, 227, 377,
Nitrogen dioxide, 471,
Nitrogen oxides, 103, 267, 316,
Nitrogen trifluoride, 100,

NGO, 30,

NOAA, 329,

Noise, 128, 344,

Nonfractionability, 10,

Nonhuman, 18, 112, 143, 173, 235, 239, 280, 287, 321, 325, 326,
337, 338, 354, 361, 363, 406, 417, 418, 466, 469,

North Africa, 318, 432,

North America, 317, 357, 368, 391, 456,

North Atlantic islands, 347,

North Atlantic right whale, 470,

North Cascades, 392,

North Korea, 394,

Northern gannet, 409,

Northern Pacific Railroad, 358,

Northern right whales, 411,

North Sea, 414,

Norway, 17, 44, 46, 182, 246, 372, 394, 463,

Norwegian, 393,

Nova Scotia, 410,

Nuble River, 395,

Nuclear, 35, 40, 191, 240, 284, 361, 397,

Nuclear energy, 396,

Nuclear medicine, 231,

Nuclear power, 71, 203, 239, 291, 361, 372, 443, 458,

Nuclear submarines, 231,

Nuclear reactors, 231,

Nuclear waste, 381, 382,

Nuclear weapons, 381,

Nucor, 269,

Nutrients, 407, 457,

Nylon, 216,

Oak trees, 295, 296, 337, 357, 448, 457,

Obama, President, 83, 84, 470,

Ocasio-Cortez, Alexandria, 469,

Ocean, 22, 146, 217, 233, 260, 261, 262, 311, 312, 314, 319, 339, 340, 356, 397, 407,
408, 410, 414, 415, 419, 420, 429,
457, 461, 462, 472,

Ocean mining, 130,

Oceanic shipping, 105,

Ocelot, 350,

Oil, 56-57, 71, 90, 103, 158, 197, 201, 211, 216, 237, 239, 241, 243, 246, 250, 263, 279,
300, 342, 343, 356, 366, 373, 376,
397, 401, 405, 406, 407, 413, 417, 425, 426, 427, 430, 436,
437, 438, 443, 457, 458, 463,

Oil spills, 146, 306, 342,

Okanagan Grand Chief, 387-388,

Oklahoma, 369,

Olofsson, Martin, 231,

Old English Longhorn, 450,

Old-growth, 17, 337, 392, 472,

Old growth forests, 309, 310, 327, 330, 337, 420,

Olympic Peninsula, 330,

Onion, The, 342,

Ontario, (Canada), 203,

Oostvaardersplassen, 449,

Operation Green Fence, 259,

Optical scanner, 263,

Ore, 223, 230, 231, 256, 274, 436,

Oregon, 154, 214, 330, 349, 405, 433, 437,

Organization for Economic Cooperation and Development, 303,

Organofluorides, 271,

OSA Peninsula, 388,

Oslo, 339,

Osram, 234,

Otter, 346, 399,

Outsourcing, 244, 339,

Overburden, 1-2,

Overshoot, 319,

Owl, 11, 28, 127, 251, 450, 456,

Oxen, 9, 220,

Oxygen, 44, 185, 271, 408, 409, 461,

Oyster mushrooms, 296,

Ozone layer, 26, 417,

PBDEs, see Polybrominated Diphenyl Ethers

PCBs, (Polychlorinated biphenyls), 268,

PV, see Photovoltaic

PacifiCorp, 370,

Pacific Northwest, 310, 328, 329, 366, 380,

Paints, 254, 336,

Pakistan, 279, 317, 459,

Panicker, P. Viswambhara, 441,

Panthers, 350,

Paper, 271, 272, 275, 276, 290, 291, 322, 327,

Paper sludge, 276,

Para', 393,

Parabolic trough systems, 93,

Paragominas, 393,

Paraguay, 389, 390, 393,

Parenti, Christian, 427,

Parfitt, Ben, 388,

Paris, 317,

Paris Climate Accord, 245,

Parking garages, 296,

Parrique, Timothe'e, 361,

Parrot, 251,

Passenger pigeons, 380, 391, 471,

Pavement, 350, 353,

Peace River valley, 387,

Peak shaving, 202, 203,

Peat, 440, 441, 458,

Pellets, 332,

Penal colonies, 14,

People, 4, 7, 52, 75, 96, 102, 103, 104, 112, 119, 120, 122, 147, 148, 152, 156,
160, 167, 175, 222, 241, 242, 256, 261, 263,
273, 286, 296, 297, 303, 304, 305, 306, 308, 312, 313, 314,
319, 320, 331, 333, 340, 346, 353, 360, 361, 363, 364, 378,
387, 388, 389, 390, 396, 403, 412, 419, 423, 424, 425, 427,

429, 431, 434, 443, 445, 446, 449, 451, 453, 454, 463, 464,
465, 466, 467,

People of the red cedar, 310,

Perch, 190, 397,

Peregrine falcons, 450,

Perfluorooctanoic acid, 180-181, 183,

Perfluoro vinyl, 182,

Permaculture, 332, 334,

Peroxide, 280,

Persistent pollutants, 276,

Pesticides, 340, 441,

Petermann, Anne, 428,

Petroleum, 276,

Pets, 340,

Philips, 234,

Phillip Stewart, Okanagan Grand Chief, 388,

Phillips, Ari, 42, 66,

Phoebus, 234,

Phosphor, 228, 284,

Photoresist, 228,

Phototrophs, 407,

Photovoltaic (PV), 92-93, 104, 216, 265, 402, 420, 443,

Phytoplankton, 415, 419,

Pigeon, 251, 347, 419,

Pigments, 286,

Pink-footed geese, 450,

Piñon pine, 108, 109,

Pinus sylvestris, 182,

Pipes, 286,

Pipeline, 241-242

Piscine, 472,

Pitch, 272, 273,

Planes, 105, 419,

Plains, 337,

Planet, 10, 45, 51, 59, 75, 78, 80, 106, 107, 150, 151, 153, 154, 155, 164, 184, 194, 203,
205, 209, 221, 222, 226, 227, 236, 241, 244, 246, 248, 249, 250, 251, 256,
257, 261, 266, 273,
275, 288, 292, 295, 296, 297, 299, 300, 302, 309, 311, 320,
321, 322, 326, 330, 331, 335, 336, 338, 339, 342, 348, 350,
353, 355, 356, 357, 360, 361, 363, 364, 366, 378, 383, 390,
391, 396, 397, 403, 407, 410, 413, 414, 416, 417, 418, 419,
421, 423, 424, 425, 426, 428, 429, 432, 433, 434, 435, 436,
438, 439, 442, 446, 447, 453, 455, 457, 458, 462, 463, 464,
465, 466, 467, 468, 469, 470, 471, 472, 473,

Planet of the Humans, 435,

Plantain, 217,

Plant communities, 337, 344,

Plants, 8, 9, 12, 13, 15, 47, 94, 95, 103, 127, 182, 183, 188, 190, 217, 223, 229,
255, 282, 304, 305, 328, 333, 335, 344, 345,
373, 390, 397, 407, 408, 409, 415, 417, 418, 419, 433, 434,
436, 439, 440, 441, 446, 449, 450, 451, 452,

Planetary life, 10,

Plastic bottles, 287, 290,

Plastics, 88, 210, 229, 237, 257, 258, 259, 260, 261, 262, 263, 266, 278, 279, 281, 283,
286, 287, 288, 290, 296, 297, 299,
311, 332, 334, 336, 351, 360, 405, 406, 438, 441,

Platinum, 180,

Plum Creek, 357,

Plutonium, 381,

Poison, 14, 103, 159, 169, 182, 173, 223, 225, 248, 255, 289, 441, 305, 340, 352, 398, 405,

Polar Bears, 23, 24, 300, 320,

Pollin, Robert, (economist), 236,

Pollution, 13, 48, 51, 96, 98, 99, 101, 105, 120, 121, 124, 125, 126, 129, 142,
147, 159, 173, 178, 189, 200, 201, 204, 223, 227, 232, 233,
235, 243, 244, 253, 260, 261, 262, 265, 268,
269, 274, 275, 276, 281, 282, 287, 293, 300, 311, 312, 316,
317, 326, 339, 343, 344, 350, 352, 354, 355, 356, 359, 404,
441, 444, 448,

Pollution outsourcing, 237, 244,

Polyacrylonitrile, 175,

Polybrominated Diphenyl Ethers, (PBDEs), 278,

Polyester clothing, 260, 261,

Polyester fabrics, 216,

Polyester fiber, 216, 260,

Polyester threads, 260,

Polyethylene, 200, 299,

Polymer exchange membrane, (PEM), 180, 182,

Polymer fume fever, 181,

Polystyrene, 297, 298, 299, 300,

Polytetrafluoroethylene, (PTFE), Teflon, 180-181, 182,

Polyvinyl fluoride, 281,

Ponds, 449, 450,

Pool-dwelling blenny, 408,

Poop, 298,

Population, 3, 111, 136, 138, 139, 140, 141, 213, 243, 247, 304, 306, 308, 314, 328, 329,
334, 343, 350, 354, 369, 391, 400,
415, 435, 446, 448, 452, 457, 458, 464, 470,

Porpoises, 410, 411,

Porter, Darren, 410,

Portland, 332, 333, 339, 394,

Ports, 296, 316, 318,

Potlatch, 357,

Poverty, 129, 230, 279, 355,

Power, 41, 54-58, 192, 196, 199, 213, 214, 227, 262, 263, 318, 336, 338, 360, 365, 366,
367, 368, 369, 370, 375, 377, 378,
383, 390, 392, 393, 396, 404, 410, 428, 438,

Power grid, 365, 366, 367, 370, 373, 376, 377,

Power lines, 296, 365, 375, 378, 403,

Power plants, 368, 403, 405, 440,

Power station, 388, 389,

Poyang Lake, 355,

Prairie, 82, 103, 288, 338, 345, 348, 413, 444, 453, 458,

Prairie Dogs, 17, 32, 337, 341, 359, 452, 456,

Predators, 451, 452, 453,

Predator-prey-pruning cycle, 453,

Preforms, 260,

Preservation, 337,

Primary production, 407-408,

Primates, 389,

Productivity, 221-222,

Profit, 153, 247, 292, 293, 330,

Pronghorn antelopes, 452,

Prostitution industry, 121,

Proto-electrodes, 272,

Protozoa, 8,
Public transit, 306, 341,
Puerto Rico, 283,
Puget Sound, 343,
Pulp, 275, 276, 290, 327,
Pumped Hydro Storage, 186, 187, 188, 190, 194, 195, 196,
Pumped Hydro System, 197,
Purple Emperor butterflies, 450,
Quartz, (publication), 198, 384,
Quebec, 368, 371,
Quijos River, 395,
Rabbits, 452, 457,
Raccoon, 346,
Rademaker, Jelle, 289,
Radiation, 286, 381, 416,
Radioactive, 382,
Radioactive waste, 231, 381,
Radium, 231,
Rail, 318, 356,
Rail line, 357, 359,
Railroad, 178, 267, 356, 357,
Railroad tie, 357, 358, 359, 360,
Rail yards, 316,
Rain, 416, 418, 451, 455,
Rainforest, 349, 393,

Ramsar Convention, (international wetland conservation treaty), 388-389,

Ranchers, 454,

Rapier, Robert, 412-413,

Rare earths, 284, 286, 289,

Rare earth elements, 130, 230, 283, 284, 285,

Rare earth metals, 114, 198, 230, 280, 284, 289,

Rare earth minerals, 100, 114, 129, 105, 198, 284, 286, 289, 463,

Rathi, Akshat, 231, 232,

Rationalization, 233,

Rats, 295, 298,

Ravens, 219,

Ready for 100, 424-425,

Rebound effect, 213, 235,

Recycled lead, 286,

Recycled paper, 275-276,

Recycling, 247, 253-270, 272-295, 297, 300, 351, 420,

Recycling facilities, 267-268, 287,

Red-cockaded woodpeckers, 46,

Red Energy, 411,

Red-winged blackbird, 337,

Red wolves, 350,

Reduce, 300, 303, 336, 352, 360,

Redwoods, 346, 444, 472,

Reeds, 449,

Refractory lining, 273,

Refuse, 300,

Regenerative farmer, 453,

Regulations, 106, 118, 244, 286, 339,

Religion, 11,

Remote controls, 226,

RENCO Group, 174,

Renewables, 31, 39, 45,53, 62, 64-65, 68, 71, 76, 79, 82, 153, 240, 246, 336, 365, 367,
369, 373, 375, 383, 393, 411, 424, 425, 430,

Renewable energy, 29, 39, 42-43, 52, 65, 66, 75, 82, 111, 112, 152, 154, 191, 206, 207,
238, 240, 245, 247, 282, 336, 366,
370, 373, 376, 378, 384, 411, 428, 437, 438,

Renewable Energy World, 429,

Rennet, Ira, (CEO RENCO Group), 174,

Reproductive failure, 25,

Reservoirs, 188-189, 191, 195, 197, 228, 380, 384, 385, 386, 388, 389, 390, 392, 393,
397, 398,

Resist, 300,

Resorcinol, 176,

Resource, 103, 229, 249, 304, 306, 314, 315, 320, 333, 334, 338,
367, 442, 463,

Restore, 300, 396, 400, 457,

Reuse, 293, 300,

Reventaz'on Dam, 388,

Reverse electroplating, 267,

Reykjanes peninsula, 403, 404,

Rhodamine, 405,

Rhode Island, 268, 373,

Richard I, King of England, 382,

Right whales, 411, 472,

Rio Parana', 390,

Riparian areas, 398,

River, 99, 119, 126, 160, 188, 189, 193, 195, 213, 251, 260, 288,
289, 294, 300, 305, 312, 313, 324, 328, 329, 340, 344, 352,
354, 380, 381, 382, 384, 387, 390, 394, 395, 396, 397, 398,
399, 400, 401, 407, 415, 420, 441, 442, 444, 445, 455,

Riverbanks, 452,

River otters, 399,

Roads, 108, 110, 131, 120, 140, 177, 210, 232, 283, 305, 316,
318, 328, 329, 342, 343, 344, 345, 346, 347, 348, 349, 350,
352, 354, 374, 375, 376, 387, 402, 403, 458,

Robert the III, 382,

Robert the Bruce, 382

Robotics, 99, 229,

Roadcuts, 296,

Roadkill, 346, 347, 348,

Rocin River, 395,

Rock, 10, 13, 14, 158, 409,

Rocky Mountain Power, 371,

Roman Empire, 96, 251,

Rome, 13, 14, 318,

Romm, Joe, 236,

Roosevelt, Franklin D., 470,

Rosen, Robert, 9,

Ross Lake, 392,

Royal Society for the Protection of Birds (RSPB), United Kingdom, 141-142, 450,

Rubidium, 405,

Ruminant, 451, 453, 454, 456,

Runoff, 352, 353,

Russia, 17, 46, 221, 440, 463,

Rutgers, 375,

RWE Power,, (Germany), 203,

Sable, 456,

Sacrifice zone, 356,

Safety, 287, 350,

Safranin, 405,

Sage grouse, 136, 470,

Saint-Gobain recycling facility, 264,

Salal, 217,

Salamander, 344,

Salar de Uyuni, 159, 168,

Sale, Kirkpatrick, 16, 17-18,

Salmon, 17, 140, 142, 188, 190, 195, 209, 218, 219, 251, 296, 300, 309, 311, 312, 319,
327, 328, 329, 343, 352, 356, 380,
381, 382, 391, 397, 398, 399, 400, 411, 444, 445, 457, 470,
471, 472,

Salitre, 388,

Salt, 158, 159, 199,

Salt cavern, 201-202, 203,

Salt marshes, 439, 458,

Salvos del Guaiara' National Park, 389,

Salween River, 390,

Sand, 96-97, 103, 276, 354, 355, 413, 414, 441,

Sanctuary, 418, 419,

Sand lance, 398,

Sandpipers, 409,
San Francisco, 339,
Santiago, 395,
Sao Paolo, 385,
Sardines, 398,
Sardinia, 432,
Saving Iceland, 403,
Sawmills, 392,
Scala, (la scala naturae), 9,
Scarce chaser, 450,
Science Alert, 384,
Scientific management, 219-220, 329, 330,
Scotland, 136, 145, 146, 382, 411,
Scottish wildcat, 145, 413,
Scrap, 268, 269, 271, 272, 274, 288, 293,
Scrap Metal, 288,
Scrapyards, 268-269,
Sea, 355, 382, 407, 414,
Seabirds, 414,
Seagrass beds, 300, 439, 458,
Sea lion, 217,
Seals, 409, 410,
Sea mammals, 409,
Sea mink, 471,
Seal-skin floats, 218,

Seattle, 264-265, 309, 316, 318, 334, 335, 339, 341, 355, 392, 439,
Seattle City Light, 392,
Seaweed, 217, 356, 439, 442,
Secretary of State, 419,
Selenium, 121, 126, 227, 281,
Semiconductor, 227, 228, 280,
Semi-trucks, 316, 318,
Seoul, 471,
Sequestering carbon, 453, 457,
Serengeti, 391,
Seshan, Suprabha, 418,
Sete Quedas, (Seven Falls), 389, 390,
Seth Quedas National Park, 389,
Seven Falls, (Sete Quedas), 389, 390,
Sewage, 340, 441, 442,
Shark, 411,
Shawnee, 432,
Shear, 410,
Shells, 409,
Shellfish, 398,
Shipping, 46, 47, 105, 176, 286, 287, 288, 318, 339, 390,
Shipping containers, 105, 267,
Ships, 105, 116, 267, 292, 316, 318, 347
Shoshone Cedars, (Swamp Cedars), 110,
Shredders, 267-268,
Shrimp, 398,

Shrubs, 219,
Sicily, 318,
SIEPAC, 389,
Sierra Club, 64, 411, 424,
Sierra Pacific Industries, 330,
Silica tetrachloride, 98,
Silicon, 92, 96, 98-99, 102-103, 227,
 Polysilicon, 98-99,
Silicon chip, (die), 227,
Silicon dioxide (quartz), 96, 97, 270,
Silicon (metallurgical), 97-98,
Silicon wafer, 227-228,
Silphium, 471,
Silt, 409, 441, 449,
Silver, 92, 109, 228, 231,
Simard, Suzanne, 50,
Sinew, 218,
Singapore, 17, 237, 290, 355,
Site C, 387,
Skagit Gorge, 392,
Skagit River, 392,
Skunk cabbage, 217,
Skyscrapers, 296, 309, 354,
Slag, 270, 352, 360,
Slavery, 5, 14, 120, 239, 312,

Slaves, 5, 6, 7, 86, 122, 163, 255,

Slugs, 219, 298, 299, 346,

Smartphone, 423,

Smelters, 96, 101, 102, 103, 104, 255, 404,

Smith, Luke, 454,

Smiths Ian Environmental Research Center, 462,

Snails, 356, 396, 409,

Snake, 346,

Snake River, 399,

Snow goose, 409,

Sobradinho Dam, 389,

Socialists, 246,

Sociopocene, 415,

Sodium ethyl xanthate, 125,

Sodium hydroxide, 231, 267,

Soil, 3, 4, 7, 8, 109, 195, 201, 215, 217, 223, 268, 287, 294, 295, 300, 313, 315, 320, 328,
334, 350, 352, 355, 359, 360, 374,
397, 406, 413, 424, 432, 442, 444, 447, 448, 451, 452, 453,
454, 456,

Soil4Climate, 455,

Soil carbon accreditation, 455,

Soil erosion, 352,

Soil organic matter, 453, 455,

Solar, 30-31, 35, 40-41, 52, 59, 63, 67-69, 71-72, 87-88, 91, 95-96, 100, 104, 105,
130, 151, 184, 186, 192, 196, 197,
203, 244, 247, 265, 283, 286, 292, 321, 326, 341, 356, 367,
369, 375, 383, 413, 419, 420, 430, 437, 439,

Solar cells, 96,

Solar energy, 71, 72, 91, 151, 238, 291, 342, 366, 373, 417, 430,

469,

Solar-energy-harvesting facilities, 238, 291, 366, 373, 430, 469,

Solar industry, 35, 87, 88, 89, 90, 95, 265,

Solar panel, 30, 40, 88, 92-93, 98, 100, 104, 105, 130, 184, 201, 227, 253, 265, 266, 278,
280, 281, 282, 284,

Solar power, 29, 52, 73, 105, 169, 207, 313, 367,

Solar power plants, 368,

Solar Power Tower, 94, 199,

Solar waste, 104,

Solid oxide, (SO), 180,

Songbirds, 413, 445, 456, 469,

Sorensen, Peter Birch, (chair of the Danish Government Climate Council), 245,

Source rock, 351,

South Africa, 396, 426,

South African apartheid, 426,

South America, 169, 286, 338,

South China Morning Post, 281,

South Korea, 223, 237, 302, 463,

Southeast Asia, 169, 237, 286, 390,

Southern Coastal Plain, 46-47,

Southern wetland forest, 46,

Soviet Union, 236, 439,

Soybeans, 339,

Soy farming, 393,

Sphagnum moss, see moss

Spider, 299,

Species, 2, 248, 251, 305, 337, 343, 344, 345, 347, 348, 349, 390, 391, 396, 398, 403, 408, 410, 411, 415, 416, 418, 433, 441, 449, 450, 451, 454, 457, 465, 350, 352, 359, 363, 384,

Spokane, Washington, 399,

Spotted sandpipers, 399,

Sprawl, 305,

Spring Valley wind-energy-harvesting facility, 108, 140,

Squirrels, 294, 472,

Stainless steel, 271,

Stalatin, Joel, 453,

Starfish, 409,

State Grid, 249,

Steam engine, 212, 213,

Steel, 97, 113, 115-117, 123, 199, 200, 201, 210, 237, 254, 255, 266, 267, 269, 270, 271, 272, 273-274, 275, 283, 289, 290, 291, 292, 332, 339, 342, 351, 352, 354, 359, 376, 377, 385, 403, 420,

Steel scrap, 270,

Steelhead, 381, 400,

Stephenson, Wes, 24, 465,

Stockholm, 339,

Storms, 417,

Stormwater, 343, 360,

Strait of Juan de Fuca, 372,

Streams, 300, 328, 329, 340, 344, 352, 356, 380, 394, 397, 400, 456,

Streetlights, 234,

Striped bass, 410,

Strip malls, 296, 337,

Strip-mining, 200, 339,

Strontium, 406,

Strychnine, 251,

Sturgeon, 444, 445,

Styrene, 216,

Styrofoam, 297,

Subdivisions, 296, 344, 378,

Subsidies, 30-31, 35-37, 39-40, 87-88, 90, 163, 210, 378, 425, 429, 438, 443, 455, 469,
470, 472,

Substations, 368, 376, 377,

Suburban sprawl, 305, 306,

Suburbs, 340,

Sulfonate, 182,

Sulfur, 171, 172, 198, 275, 356,

Sulfur dioxide, 103, 172, 182, 276, 316, 404,

Sulfur oxide, 316,

Sulfur hexafluoride, 100, 201,

Sulfuric acid, 125, 158, 169, 231,

Sullivan, Zoe, 393,

Sumacs Biosphere Reserve, 395,

Sun, 407,

Supercapacitors, 157, 174,

Superconductors, 377, 378,

Supply chain, 335, 336, 360,

Surface water, 455,

Surf smelt, 398,

Sustainable, 4, 82, 226, 246, 247, 255, 266, 291, 297, 302, 303, 305, 306, 307, 308,
310, 311, 312, 314, 324, 327, 331, 332, 334, 336, 338, 339, 341, 356, 378, 395, 412,
424, 440, 443, 464,

Sustainable agriculture, 4,

Sustainable energy, 167,

Sustainable Forest Initiative, (SFI), 331,

Sustainable planning, 302,

Suzuki, David, 112, 141, 280, 338,

Swamp gentian, 217,

Sweden, 46, 231, 232, 262-263, 293, 394,

Switzerland, 394,

Sydney, 317,

Syrian elephant, 251,

Taber, Jay, 426,

Tadpoles, 26, 450,

Tailings pond, 126, 230,

Taiwan, 237,

Taiwanese, 307,

Tamworth sows, 450,

Tanzania, 458,

Tapajos dam, 393,

Tarbell, Ida, 221,

Tarmac, see asphalt

Tar Sands, (Alberta, Canada), 241, 243, 426, 443,

Taylor, Frederick Winslow, (*The Principles of Scientific Management*),
219-220, 221, 222, 233, 329,

Technic, 5, 7

Technology, 5, 6, 7, 12, 16, 39, 95, 104, 161, 183, 199, 203, 205, 206, 207,
210, 216, 223, 226, 236, 246, 250, 253, 265, 281,
284, 324, 359, 362, 363, 366, 370, 402, 405, 407, 408, 411,
412, 414, 420, 421, 423, 424, 436, 442, 455, 467,

Teflon, 180,

Televisions, 296, 303, 423,

Tellurium, 130, 227, 284,

Teratogens, see birth defects

Terbium, 283,

Te'r'raba-Sierpe wetlands, 388,

Terra Genesis International, 454,

Tesla, 163, 164, 165, 166, 167, 168, 209, 215,

Tetrafluoroborate, 175,

Tetrafluoroethylene, 182,

Tetrahydrofuran, 176,

Texas, 283, 368, 369, 371,

Textiles, 293-294,

Thailand, 288, 390,

Thallium, 216, 223,

The Green New Deal, 469, 470,

The Guardian, 101, 278, 345, 462,

The Independent, 384, 438,

The Nature Conservancy, 465,

The Shock Doctrine: The Rise of Disaster Capitalism, 429,

The tree of life, 310,

Thermal-energy storage, 199, 445,

Thimbleberries, 472,

ThinkProgress, 42,
Thisavros pumped storage facility, 194, 195,
Three Gorges Dam, 394, 395,
ThreeFifty, 350.org, 30, 41,
Thrushes, 299,
Tibet, 158, 160, 394,
Tidal energy, 411,
Tidal power, 411,
Tidal stream generation, 410,
Tidal turbines, 410,
Tides, 407, 408, 409, 410,
Tiger salamander, 344,
Tillage agriculture, 453,
Tillerson, Rex, 419,
Timber, 142, 327, 330, 331, 338, 356, 443, 444,
Time, 384,
Tin, 265, 267,
Tin cans, 267,
Tinnitus, 149,
Tinsley Field, 406,
Tires, 336, 343,
Titanium, 276,
TNT, 2,
Toad, 403,
Tolowa, 433,

Tomlinson, Norris, 332, 333, 334,

Tonle' Sap, 391,

Topsoil, 444,

Tornados, 282,

Toronto, 317,

Tortoises, 46-47, 94-95, 190, 251, 300, 341, 420,

Touch screen, 284,

Toxic, 1, 96, 104, 119, 125, 153, 159, 169, 176, 254-255, 267, 268, 275, 276, 281, 286,
287, 293, 294, 295, 312, 340, 343,
350, 351, 360, 377, 381, 398, 405, 406, 421, 441,

Toxic components, 235,

Toxic runoff, 268,

Toxic tailings, 13,

Toxic tailings sludge, 118,

Toxic waste, 99, 119, 339, 352,

Toxins, 182, 227, 258, 278, 293, 342, 343, 352, 359,

Traditional food practices 147,

Trafficking, 121,

Trains, 103, 105, 120, 157, 194, 212, 316, 317, 318, 336, 347,
355, 356, 359,

Train tracks, 296, 355,

Transformers, 93, 377,

Transistors, 216, 224,

Transmission lines, 93, 189, 368, 370, 371, 372, 373, 374, 376, 377, 380, 389,

Transmission tower, 374, 375, 376, 377,

Trans Mountain, 242,

Transportation, 53, 207, 264, 271, 291, 316, 319, 343, 362, 376,

Transportation systems, 316,

Traps, 305,

Trash, 262-263, 293, 344,

Travel, 307, 308,

Travel energy, 307-308,

Trawlers, 339,

Treehugger, 384,

Trees, 23, 25, 47, 48, 49, 50, 51, 53, 110, 145, 146, 182, 189, 218, 232, 294, 295, 296,
308, 309, 310, 320, 327, 330, 333,
334, 353, 357, 358, 389, 392, 432, 444, 448, 449, 452, 456,
457, 469, 472,

Tree, Isabella, 447, 448, 449, 450,

Trifluoroacetic acid, (TFA), 181,

Trout, 190,

Trucks, 55, 116, 120, 121, 157, 193-194, 232, 233, 258, 266, 267,
269, 292, 296, 316, 318, 322, 327, 336, 342, 351, 363, 403,

Trumpeter swans, 415,

Trump, President, 419,

Tucurui', 385, 393,

Tungsten, 223,

Turbine, 188, 189, 190, 191, 199, 201, 202, 383, 403, 410, 411,
412, 414, 470,

Turkey, 288, 394,

Turtles, 23, 235, 396,

Uber, 165,

Ujarra's, 388,

U.K., 130, 135, 184, 189, 317, 404, 440, 447, 450,

Ukraine, 46,

UV, 324,

Ultraviolet light, 228,

Umicore, 276,

United Arab Emirates, (UAE), 302, 307,

United Nations, 119, 303, 386,

United Nations Environmental Program, 248,

United States, 30, 35, 46, 64, 78, 83, 84, 87, 89, 117, 118, 121, 122, 138, 140,
151, 156, 165, 174, 185, 187, 194, 196, 207,
226, 231, 237, 242, 249,
258, 259, 277, 287, 288, 290, 291,
293, 294, 305, 310, 317, 318, 324, 328, 331, 332, 335, 339,
343, 346, 347, 349, 350, 353, 355, 357, 358, 362, 363, 367,
368, 369, 370, 375, 376, 377, 381, 382, 383, 406, 415, 430,
444, 463, 470,

United States Constitution, 242,

Universities, 425, 426,

University of Washington, 334,

Unsustainable, 287, 435,

Upper Paunglaung Dam, 390,

Uranium, 463,

Urban, 320, 321, 352, 353, 354, 362, 458, 464,

Urban density, 303, 307, 308,

Urban development, 305,

Urban growth, 304,

Urbanization, 306, 311, 315, 321, 349, 361,

Urban Land Institute, 303,

Urban planners, 311, 314,

Urban planning, 302, 306,

Urban sprawl, 305, 430, 436,

Urban sustainability, 339,

U. S. Department of Energy, 151, 285,
U. S. Energy Information Administration, 249,
U. S. Fish and Wildlife Service, 343,
U. S. Geological Survey, 463,
U. S. Government, 357,
U. S. steel industry, 255,
Utah, 105, 368,
Vancouver, 339, 439,
Vancouver groundcone, 217,
Vehicles, 168, 269, 306, 324, 346, 347, 350, 354, 362, 363, 385,
Vera, Frans, 449,
Vermont, 370,
Vertebrate, 346, 347, 433,
Vertical farming, 332, 335,
Vestas, 283,
Vietnam, 288, 355, 430,
Virginia, 453,
Volkswagen, 326,
Vox, 423,
Vultures, 295,
Wadi Faynan, 13-14,
Wafers, 227-228,
Wagon trains, 318,
Walking, 306,
Walleye, 397,

Wall Street, 426,

Walmart, 147, 249,

Walruses, 23,

War, 3, 5, 11, 229, 418, 448,

Washington, (State), 102, 104, 214, 216, 224, 241, 254, 305, 308,
316, 327, 329, 356, 358, 368, 372, 373, 381, 398, 399,

Washington Forest Protection Association, (WFPA), 330, 331,

Washington Post, 343, 461,

Washougal River, 394,

Waste, 45, 98, 253, 259, 272, 275, 276, 279, 281, 282, 291, 293,
297, 323, 344, 359, 408, 413, 433, 441,

Waste management facilities, 277,

Wastewater, 101, 260, 31,

Water, 1, 25, 27, 54, 91, 95, 101, 109, 115, 119, 122, 124, 126, 146, 158, 159,
160, 181, 183, 185-186, 187, 188, 189, 191, 195, 197, 199, 211, 212, 213,
217, 254, 261, 267, 274, 275,
287, 296, 303, 315, 323, 324, 327, 328, 329, 332, 333, 335,
338, 339, 340, 343, 344, 351, 352, 353, 356, 359, 361, 366,
379, 384, 389, 390, 391, 392, 395, 398, 403, 405, 406, 407,
408, 409, 410, 412, 414, 415, 416, 417, 420, 436, 440, 441,
444, 448, 455, 456, 463, 471,

Waterfowl, 469,

Water quality, 339, 340,

Water quantity, 339,

Water pollution, 340, 361, 471,

Watershed, 320, 329, 330, 343, 352, 371, 380, 397, 441,

Water table, 406, 457,

Water violet, 450,

Waterwheels, 392,

Watt, 56,

Wayuu, 148,

Weapons, 7, 458,

Weasels, 452,

Weather, 416, 417, 459,

Weedkillers, 448,

Weizmann, Joachim, (environmental economist), 72,

Western hemlock, 392,

Western red cedar trees, 309, 310, 392,

West Virginia, 439,

Wetlands, 17, 19, 46, 153, 300, 305, 337, 338, 340, 345, 346, 353, 359, 388, 389, 398,
403, 439, 444, 449, 452, 458,

Weyerhaeuser, 330, 357,

Whales, 218, 409, 410, 411, 470, 472,

Whale oil, 211,

White shark, 411,

Wild animals, 471,

Wild fish, 400,

Wilding: The Return of Nature to a British Farm, 447,

Wild lands, 303, 324, 402, 430,

Wildlife, 126, 130, 132, 140, 141, 345, 346, 347, 374, 387, 388, 396, 406, 455,
473,

Wild nature, 337, 423, 427,

Wilderness, 345, 404, 427, 430,

Wildlife, 94, 130, 132, 140, 455,

Wild places, 20, 465, 469,

Willamette Valley, 329, 349,

Willows, 449, 452,

Wilson, Robert, (marine biologist), 66-68,

Wind, 31, 35, 52, 59, 63, 67-69, 71, 87, 137, 151, 186, 191, 196,
203, 244, 291, 300, 321, 356, 367, 369, 373, 383, 418, 419,
430, 437, 439,

Wind blades, 113-114,

Wind energy, 108, 111, 131, 139, 141, 146-149, 151, 216, 366, 372, 373, 375, 414, 420,
470,

Wind-energy-harvesting facilities, 146-147, 149, 366, 372, 373, 375, 414, 420, 470,

Wind farms, 108, 151, 207, 414,

Wind foundation, 113,

Windmills, 198, 280, 399, 420, 443,

Wind nacelle, 113,

Wind power, 111, 128, 192, 207, 369, 370, 371, 413,

Wind projects, 146,

Wind tower, 113,

Wind turbine, 100, 108, 110-111, 112-113, 127, 129, 130, 131, 132-134, 136, 139, 140,
143-144, 146, 149, 151, 152, 153, 154, 155, 174, 184, 198, 266, 283, 284, 289,
374, 410, 414,

Windows, 265,

Window glass, 265,

Wires, 92, 99, 124, 228, 229, 262, 314, 377,

Wolves, 17, 127-128, 140, 153, 219, 251-252, 452, 453,

Wood, 21, 47, 48, 51, 53, 55, 57, 103, 114, 172, 193, 239, 240,
257, 261, 308, 314, 320, 327, 331, 332, 334, 338, 351, 357,
358, 359,

Woodland, 449,

Woodland caribou, 349,

Woodpecker, 46, 337,

Wool, 216,

Women, 121, 446, 459,

Workers, 82, 125, 129, 219, 221, 271, 287, 312, 330, 406,

World, 1, 3, 7, 8, 20, 21, 28, 29, 30, 32, 33, 39, 45, 53, 73, 79, 83, 87, 90, 91, 96, 107, 117, 125, 129, 133, 138, 161, 162, 195, 204, 220, 222, 229, 232, 233, 235, 238, 239, 244, 247, 248, 249, 255, 261, 268, 276, 278, 282, 287, 288, 289, 296, 297, 302, 316, 317, 318, 330, 336, 337, 342, 345, 346, 347, 351, 355, 357, 358, 359, 362, 364, 368, 375, 377, 380, 381, 382, 383, 385, 386, 389, 391, 395, 396, 401, 404, 411, 412, 413, 414, 416, 421, 423, 424, 428, 429, 430, 431, 438, 442, 443, 446, 452, 455, 456, 458, 459, 461, 462, 463, 464, 467, 470,

World Bank, 386,

World Commission on Dams, 389,

World Health Organization, (WHO), 169, 173,

World Stee Association, 116,

Worldwatch Institute, 22,

World Wildlife Fund, 411,

Worm, 295,

Wuhan, 471,

Wyoming, 371,

Xerces butterfly, 2,

Yacyreta' Dam, 389,

YAG, yttrium aluminum garnet, (Y₃ Al₅ O₁₂), 228,

Yale University, 285,

Yangtze, 394,

Yarlung Tsangpo River, 394,

Yellowstone, 387, 452, 453,

York, Richard, 211, 238, 240,

Yttrium, 230, 283, 284, 377,

Yukon, 387,

York, Richard, 437,

Zehner, Ozzie, (*Green Illusions*), 88-89, 342,

Zero waste, 359,

Zimbabwe, 401,

Zinc, 227, 250, 256, 268,

Zoomass, 433, 434,