

# Index

- Access to waste reduction technology, IO4-105
- Acrylonitrile, and reduction of hazardous wastewater, 28, 29, 89, 90
- ADC Telecommunications, 220
- Air and water regulatory programs, 53, 61; see *also* Clean Air Act, Clean Water Act
- Air Force, 189, 190
- Air pollutants, 135, 140, 151-152, 154, 172-175, 186; see *also* Air and water regulatory programs; Clean Air Act
- Alabama, 188, 204
- Alternative Technologies Division (HWERL), 183-185
- Amoco Chemicals Corp., 79
- Army, 189, 190
- Aromatic hydrocarbons, 127
- Auditing waste reduction, 92-94, 114-117, 184
- Austria, waste reduction efforts by, 19, 239, 240, 241
- Best available technology economically achievable (BAT), 130, 177, 178, 179, 180
- Best conventional pollutant control technology (BCP), 177, 180
- Best practicable control technology currently available (BPT), 177, 180
- Bordon Chemical Co., 81, 91
- Bureau of Mines, 121, 183, 193, 194
- Cadmium  
 case study of, 132, 133-137  
 industrial use of, 133  
 industry-level information on, 137  
 legislation and regulations pertaining to, 133, 134, 135-136  
 national materials balance for, 136-137  
 substitutes for, 134-135  
 transport and transformation of, in the environment, 135
- California, 35, 159, 198, 201, 202, 205, 206, 207-208, 209, 211, 212, 214, 219-220, 221, 222
- California Hazardous Waste Reduction, Recycling, and Treatment Research and Demonstration Act, 206, 213, 222
- Canada, waste reduction efforts by, 19, 239
- Capital investment, in waste reduction technology, 30, 31, 32
- Carbon adsorption, of solvents, 87-88
- Carrier Air Conditioning Co., 78-79
- Case studies, of waste reduction, 85-86, 91-92, 132-141, 166, 167, 191
- Caustic soda, recycling of, 79
- Center for Environmental Management (Tufts University), 188
- Centers for Excellence (EPA), 185
- Changing process technology, in waste reduction, 22, 28
- Chemical Manufacturers Association, 152
- Chemicals  
 EPA regulation of, 181  
 Office of Toxic Substances inventory of, 181  
 proposed Federal survey of, 54-55, 72, 182  
 State inventories of, 123-124  
 stripping, waste reduction technology and, 80  
 Toxic Substances and Control Act and, 122, 180-181  
 see *also specific chemicals*
- Chesapeake Bay, toxic substances in, 18
- Clean Air Act (CAA), 9, 11, 45, 46, 53, 65, 66, 92, 99, 103, 118, 120, 134, 135, 139, 140, 146, 147, 148, 149, 150, 168, 169, 172-175
- Clean Water Act (CWA), 9, 11, 12, 45, 46, 53, 65, 92, 99, 103, 118, 120, 130, 134, 139, 146, 147, 148, 149, 150, 168, 169, 170-171, 173, 176-180
- Cleo Wrap, 82
- Code of Federal Regulations*, 180
- Comprehensive Environmental Response, Compensation, and Liabilities Act (CERCLA), see Superfund
- Congressional Budget Office (CBO), 106
- Connecticut, 35, 201, 202, 204, 205, 212, 215, 221
- Cooling water, 90
- Council on Environmental Quality, 146-147
- Cross-media approach to waste reduction, 18, 51, 62, 124, 146, 147-148
- Daly-Herring Co., 81
- Data and information, see *under* Waste reduction
- Defense Environmental Leadership Project (DELP), 190, 191
- Defense Logistics Agency (DLA), 190
- Denmark, waste reduction efforts by, 240, 241
- Department of Commerce (DOC), 175, 193
- Department of Defense (DOD), 16, 27, 57, 97, 182, 189-191
- Department of Energy (DOE), 182, 189, 191-192
- Department of Labor (DOL), 183, 192; see *also* Occupational Safety and Health Administration
- Distillation/condensation, of solvents, 87-88

- Diversified Printing Corp., 79  
Domestic Sewage Exclusion, under RCRA, 170-171  
Donnelley Printing Co., 79  
Dow Chemical, 80, 83  
Du Pont, 26, 78
- Eaton Corp, 91  
Economic considerations, of waste reduction, 5-6, 7-8, 14, 16, 18, 33, 38, 48, 50, 59-61, 63, 64, 65, 68-69, 70, 72, 83, 84-85, 93, 94, 96, 100-102, 103, 104, 116, 117, 153, 168, 169, 179, 183, 184-188, 191, 192, 209-210, 213-215  
Effluent guidelines, under Clean Water Act, 177  
End-of-pipe waste management, 62, 71, 83, 99, 113, 159, 176, 180, 186  
End products (Approach 5), 82-83, 84, 86, 95  
Environmental control media programs, analysis and comparisons of, 168-182  
Environmental Fund (Europe), 238, 240  
Environmental protection, under pollution control culture, 151-152  
Environmental Protection Act (Sweden), 240, 241  
Environmental Protection Agency (EPA), 5, 12, 14-18, 21, 27, 36, 39, 40, 45-73, 101, 119-123, 130-137, 140-141, 145-166, 169-186, 228  
Environmental Quality Assessors, 212  
Environmental research and development centers, State, 186-188  
Europe  
    multilateral organizations in, 238  
    waste reduction efforts by, 19-20, 238-241  
    waste reduction efforts compared to United States, 19-20  
European Council of Chemical Manufacturers' Federations, 238  
European Seminar on Clean Technologies, 238  
Exxon Chemical Americas, 81, 89
- Federal chemical survey, proposed, 54-55, 72, 182  
Federal Government, see U.S. Congress; U.S. Government; and *specific Federal agencies, programs, and legislation*  
Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), 147, 174, 181  
*Federal Register*, 157, 159, 178  
Federal Water Pollution Control Act, see Clean Water Act  
Financial statements, reporting requirements for, 62-64
- Florida, 204  
France, waste reduction efforts by, 19, 239, 240, 241
- Gallium arsenide (GaAs), 96  
General Accounting Office, 151, 181  
Georgia, 35, 201, 202, 209, 212, 213, 220, 221  
Grants programs, for waste reduction, 59-61, 64, 70, 184, 185-186, 213-219, 221  
Great Britain, waste reduction efforts by, 19, 239
- Hazardous and Solid Waste Amendments of 1984, see *under* Hazardous wastes and Resource Conservation and Recovery Act  
Hazardous Communication Standard, 192-193  
Hazardous Materials Management and Resource Recovery Program (HAMMARR) (University of Alabama), 187-188  
Hazardous Materials Transportation Act, 134, 139  
Hazardous substances, 11, 24, 54-55, 62, 93, 114-116, 118, 119, 121, 123, 132-141, 167, 182; see *also* Hazardous wastes  
Hazardous Waste Engineering Research Laboratory (HWERL), 183-185, 209  
Hazardous wastes  
    acrylonitrile and reduction of, 28, 29  
    approaches to reducing, 78-85  
    classification of, 62  
    composition of, 125  
    Federal policymaking and, 118-124  
    generic reduction of, 87-91  
    health effects of, 66-67  
    identification of sources of, 115-116  
    identification of types of, 114-115  
    lack of data on, 21, 113-114  
    land, disposal of, 34, 46, 49, 54, 105, 153, 167, 170-171, 183, 227, 228  
    measurement of waste reduction and, 23-24, 125-127  
    multimedia approach to, 4, 11, 18, 34, 50-51, 61, 62, 65  
    pollution control regulations and, 145-154  
    problems with definitions of, 3, 10-11, 101, 149, 155, 170  
    public attitudes toward, 100  
    and RCRA Amendments, 45-47, 102-103, 148, 149, 162, 163  
    statutory definitions of terms used for, 149  
    surveys of State facilities for, 168  
    taxation of, 56-57, 72  
    and waste reduction definitions, 8-10  
    see *also* Pollution control; Waste minimization; Waste reduction

- Hazardous wastewater, acrylonitrile and reduction of, 28, 29
- Health effects data  
on cadmium, 135-136  
on trichloroethylene, 138, 140
- Highlights of the Hazardous and Solid Waste Amendments of 1984: The New RCRA Requirements, 162, 163*
- Hill Air Force Base, 80
- Illinois, 35, 107, 188, 201, 202, 207, 212, 221
- Illinois Hazardous Waste Research and Information Center, 188, 207
- Impact analyses, for waste reduction, 53-54
- In-process recycling (Approach 1), 78-79, 83, 84, 86, 95, 96, 105, 106, 227
- In-process solvent recovery, 87-88
- Incremental implementation of mandatory waste reduction, 56
- Industrial Chemical Survey (New York), 54, 124
- Industrial Waste Elimination Research Center (Illinois Institute of Technology and University of Notre Dame), 185
- Industry  
air pollutant regulations for, 174-175  
attitudes and opinions affecting, 100  
compliance to waste minimization regulations by, 166-167  
government procurement policies and, 57-58  
government regulation as risk for, 29-32, 58  
illustration of pollution control in, 150  
implementation of waste reduction and compliance with pollution control regulations by, 24-25  
lack of data as a barrier to action by, 24  
new waste reduction legislation and, 60-61  
OTA survey of waste reduction methods in, 27, 28, 34, 45, 47, 69, 78, 84, 86, 101, 106, 168, 227-237  
potential for adverse effects on, by policy options, 72  
potential for waste reduction opportunities in, 79, 80, 81, 82, 83, 90, 95; see *also* Case studies  
problems with measuring waste reduction data in, 20-24  
problems with RCRA waste minimization amendments in, 15, 45-47  
proposed approaches to waste reduction in, 78-83  
proposed mandatory waste reduction in, 55-56  
proposed research and development in, 57  
research and development in, 182-194  
size, and corporate structure influences on, 97-98
- State waste reduction programs and, 197-223  
status of clean water pretreatment standards in, 178  
technology and information available to, 98-99  
U.S. policy options, and, 37-41, 45-73  
use of cadmium in, 133  
use of trichloroethylene in, 138  
use of water in, 89-91  
voluntary waste reduction in, 32-33, 38-39, 40, 45, 55, 71, 73, 94  
waste minimization plans in, 166-167  
waste reduction auditing in, 93-94  
waste reduction decisionmaking in, 92-103  
waste reduction efforts by, 4-5, 12-16, 24-33, 45-47, 49-50, 60, 166-168  
waste reduction information needs by, 114-117  
ways to promote waste reduction in, 13
- Industry/University Cooperative Research Center for Hazardous and Toxic Wastes (New Jersey Institute of Technology), 186-187, 188
- Information and technology transfer, 31, 113-141, 182-194, 212-213, 215
- Information and waste reduction, see *under* Waste reduction
- Inks, waste reduction technology and, 82, 105
- Innovation waivers  
under Clean Air Act, 175  
under Clean Water Act, 178
- International considerations, 113-20, 57, 238-241
- Inventory approach to waste reduction, 55
- Investment-uncertainty barrier, to waste reduction, 84-85
- Japan, waste reduction efforts by, 19, 239
- Joint Logistics Commanders' Hazardous Waste Minimization Ad Hoc Working Group [JLC Working Group] (DOD), 189, 190-191
- Kentucky, 213
- Lancey International, 79
- Large businesses, OTA industry survey and, 227, 228
- Legislation  
on cadmium, 133, 134, 135-136  
definitions of hazardous waste terms by, 149  
example of problems with, in California, Z06  
new, proposed for waste reduction, 61-62  
on pollution control, 145-149  
on trichloroethylene, 138, 139, 140  
Superfund reauthorization, 122-123  
see *also* U.S. Congress: U.S. Government; *and specific acts of legislation*

- Ling, Joseph T., 7  
Liquid processes, of waste reduction, 88-89  
Literature, on waste reduction, 86, 91-92, 99, 116, 167  
Loan programs, for waste reduction, 212, 215  
Local governments, waste reduction efforts by, 14, 50, 59, 172, 198
- Management, in waste reduction technology, 30, 31  
Manifest system, for waste minimization, 155-156, 157, 158, 159, 164, 172  
Maryland, 124  
Mass balance calculations, 115, 121, 126, 127  
Massachusetts, 201, 204, 205, 207, 208, 211, 212, 221  
Massachusetts Source Reduction Program, 211  
Materials handling, in plant operations, 81  
Materials Safety Data Sheets (MSDS), 99, 121, 193  
Materials substitution, 193  
Measurement criteria, 125-127  
Measurement, of waste reduction, 20-24, 124-130  
Mechanical processes, of waste reduction, 88-89  
Merck, Sharp & Dohme, 87  
Michigan, 107, 204  
Mine waste, EPA report to Congress on, 171  
Minnesota, 35, 106, 107, 165, 197, 198, 201, 202, 204, 205-207, 208, 209, 210, 212-213, 214, 215, 220, 221, 222, 223, 241  
Minnesota Hazardous Waste Reduction Grants, 213  
Minnesota technical assistance program (MnTAP), 205-207, 208, 209, 214, 220, 221, 222  
Minnesota Waste Management Board, 204, 214, 220  
Monsanto, 83, 89, 125  
Multimedia approach to waste reduction, 4, 11, 50-51, 61, 62, 65, 72, 73, 103, 152-154, 207, 216
- National Ambient Air Quality Standards (NAAQS), 172-175  
National Bureau of Standards, 183, 193-194  
National Emission Standards for Hazardous Air Pollutants (NESHAP), 172-175  
National inventory of chemicals, 122-123, 124  
National materials balance  
for cadmium, 136-137  
for trichloroethylene, 140-141  
National Research Council, 24  
National Science Foundation, 183, 193  
Navy, 189, 190  
Netherlands, waste reduction efforts by, 19, 240, 241  
New Jersey, 106, 107, 122, 124, 165, 204, 205, 207  
New Jersey Department of Environmental Protection, 222  
New Jersey Hazardous Waste Facilities Siting Commission, 207, 222  
New Jersey Industrial Chemical Survey, 122, 124  
New Jersey Source Reduction and Recycling Task Force, 222  
New source performance standards (NSPS), 172-174, 177  
New York, 35, 106, 108, 197, 198, 201, 202, 205, 207, 212, 215, 220, 241  
New York Industrial Financing Program, 215  
New York Industrial Materials Recycling Program, 207  
Nonregulatory framework, of State waste reduction programs, 211-212  
Nonregulatory options, 131, 132  
North Carolina, 34, 35, 36, 108, 197, 198, 201, 202, 205, 207, 209, 211, 212, 213, 214, 215, 218-219, 220, 222, 223, 241  
North Carolina Department of Natural Resources and Community Development (DNRCD), 216-217  
North Carolina Pollution Prevention Pays Program (NC3PP), 36  
evolution of, 216  
financial assistance under, 218  
future of, 218-219  
research and education under, 217-218  
technical assistance under, 217  
North Carolina Science and Technology Board, 217  
North Carolina Technological Development Authority, 218  
Norway, waste reduction efforts by, 19, 239-240, 241
- Oak Ridge National Laboratory (Tennessee), 191, 192  
Occupational Safety and Health Act (OSHA), 12, 66, 99, 121, 134, 139, 150, 181  
Occupational Safety and Health Administration, 183, 189, 192-193  
Off-the-shelf equipment, 99, 101-102  
Office of Exploratory Research (EPA), 185  
Office of Research and Development (ORD), 47-48, 57, 183, 209, 223  
Office of Solid Waste (OSW), 47, 48, 64, 145, 153, 161-164, 183

- Office of Technology Assessment (OTA)  
 analysis of waste reduction audits by, 93-94, 99  
 analysis of waste reduction in the Federal Government, **145-194**  
 analysis of waste reduction literature, 86, 116  
 case studies reviewed by, 132-141, 167  
 classification of types of waste reduction by, 115, 117-118, 180  
 industry survey by, 27, 28, 34, 45, 47, 69, 78, 84, 86, 101, 106, 168, 227-237  
 industry survey questionnaire used by, 230-234  
 Industry Workshops held by, 227  
 issues and findings of, 20-41  
 summary and findings of, 3-41  
 results of State waste reduction survey, 199-200  
 survey of State waste reduction programs by, 197-223  
 and waste reduction policy options, 48-73  
 Office of the Secretary (DOD), 190, 191  
 Office of Toxic Substances (OTS), 136, 181  
 Office of Waste Reduction, proposed in EPA, 5, 40, 58, 64, 69  
 Office of Water Regulations and Standards (OWRS), 135  
*Operating Guidelines FJ' 1987 (EPA)*, 126  
 Operations and Production in waste reduction technology, 31, 77-78, 95  
 Organisms, replacement of, 87  
 Organization for Economic Cooperation and Development (OECD), 238
- Pollutants, see Air pollutants; Pollution control; Water pollutants; *and specific pollutants*
- Pollution control  
 air quality criteria for, 173  
 beginnings of, 146-147  
 Clean Air Act and, 172-175  
 Clean Water Act and, 176-180  
 cross-media shifts and, 146, 147-148  
 current system of, 148  
 evolution of a culture of, 145, 146  
 efforts by industry, 3, 4, 5, 24, 32, 55, 171-175  
 efforts by States, 3, 34, 69, 197-223  
 environmental protection under culture of, 151-152  
 Federal waste minimization policy and, 156  
 government spending on, versus waste reduction, 153  
 illustration of, in industry, 150  
 primacy of waste reduction and, 7-19, 46, 104  
 proposed Office of Waste Reduction and, 64, 69  
 RCRA and, 145-154, 168-172  
 regulation, and industrial implementation of waste reduction, 24, 32, 49-50, 51, 58, 102  
 regulations for air pollutants, 172-175  
 regulations for water pollutants, 176-180  
 and regulatory concessions for waste reduction compliance, 64-69  
 regulatory measures, 3-6, 7-8, 18, 21, 37, 48, 50, 55, 58, 61, 64-69, 100, 116, 118, 145-154  
 usefulness of current information on, 119  
 and waste reduction definitions, ~  
 see also Hazardous wastes; Waste minimization; Waste reduction
- Pollution Control Financing Guarantee (PCFG), 187
- Pollution prevention, 7-19, 58, 145-147, 152-154, 156, 173, 192, 197
- pollution prevention pays program, North Carolina (NC3PP), 36, 216-219
- Polyethylene, 103
- Polyvinyl chloride (PVC), 12, 127, 134
- Pre Manufacturing Notice (PMN), 181
- Preliminary Assessment Information Report (PAIR), 122
- Prescriptive approach to waste reduction, 32-33, 38, 55, 56, 71, 178, 180
- Pretreatment standards for clean water in industry, 178
- ~ of ~st(ion), 7-19, 34\* 46 104-152, 207
- Private organizations, grants program and, 60

- Process chemistry, mass balance calculations and, 126
- Process inputs (Approach 4), 82, 83, 84, 96, 95
- Process-specific waste reduction data, 127, 128
- Process technology, 27-29, 30, 67, 77, 90, 95-97, 103
- Process technology and equipment (Approach 2), 79-80, 83, 84, 86
- Process water, reducing the use of, 89-91
- Product/process redesign, 95-97
- Production correlation, of waste reduction data, 125
- Production technology, 77-78
- Publicly operated treatment works (POTWs), 12, 170-171, 176, 177
- Recycling regulations, 171-172; see *also* Waste recycling
- Regulatory concessions
- costs and benefits of, 68-69
  - examples of, 67-68
  - State Waste Reduction Boards and, 69-71
  - for waste reduction, 64-71
- Regulatory options, 131
- Reporting procedures, for waste minimization, 155, 157, 158, 159, 164-165, 172
- Research and development (R&D), in waste reduction technology, 30, 31, 39, 40, 52, 57, 77, 83, 99, 173, 182-194, 227, 228
- Research Centers Program (EPA), 185
- Research Grants Office (EPA), 185-186
- Resource Conservation and Recovery Act (RCRA), 3, 5, 9, 10, 11, 17, 21, 24, 33, 89, 92, 124, 134, 139, 180, 182, 186, 189
- effect of 1984 Amendments on States, 165-166
  - EPA concern about flexibility in, 66
  - highlights of new requirements under the 1984 Amendments, 162, 163
  - and information collection, 120
  - land disposal bans under, 170-171
  - pollution control and, 145-154, 168-172
  - proposed to strengthen requirements of, 52-53
  - recycling regulations under, 171-172
  - State waste reduction programs and, 201-219, 221-223
  - survey on hazardous wastes under, 152
  - waste minimization under, 15, 45-47, 49, 52, 102-103, 105, 113, 132, 154-166, 167, 172, 192
  - waste reduction forecasts and, 106
- Saco, Maine, 198
- Safe Drinking Water Act, 12, 134, 139, 147, 150, 168, 169
- Santa Cruz County, California, 198
- Scovill, Inc., 82
- Securities and Exchange Commission (SEC), and reporting on waste reduction financial statements, 62-64
- Small Business Administration (SBA), 188, 187
- Small Business Innovation Research (SBIR) Program, 185, 186
- Small Business Innovative Development Act of 1982, 186
- Small Business Investment Act, 187
- Small Business Ombudsman Office (EPA), 209
- Small Business/Small Quantity Generator Initiative Program, 223
- Small businesses
- OTA industry survey and, 227, 228
  - as target firms in State waste reduction programs, 207-208
  - versus large businesses, 208
  - waste reduction funding assistance for, 186, 187
- Small quantity generators (SQGS), 159, 172, 208-209, 212
- Solvents
- commercial equipment for recovery of, 87-88
  - in-process recovery of, 87-88, 105
  - replacement of organic, 87
  - recycling of, 89
  - scrubbing of, 88
  - trichloroethylene, 137-138
- Source reduction, 160, 172
- Standard Industrial Classifications (SIC), 86, 227
- Stanadyne Co., 22, 81, 125
- State Waste Reduction Boards, proposed, 5, 40, 58-59, 69-71
- States
- biennial reporting of waste minimization by, 164-165, 222
  - budget size of waste reduction programs in, 209-210
  - chemical inventories by, 123-124
  - definitions of waste reduction provided by, 205
  - effect of RCRA Amendments on, 15, 185-186
  - effectiveness of waste reduction programs in, 219-221
  - existing waste reduction programs and planning efforts by, 197, 198-201
  - facility siting and, 104
  - Federal cooperation in waste reduction programs in, 197, 221-223
  - financial assistance by, 213-215
  - funding for small businesses in, 209
  - funding for small quantity generators in, 209

- generalizations about waste reduction programs in, 201-215  
 grants program in, 59-61, 213-219, 221  
 information and technical assistance by, 212-213  
 information collection by, 215  
 information related to waste reduction in, 106-108, 132  
 loan programs in, 212, 215  
 multi-media approach to waste reduction in, 207, 216  
 nonregulatory framework of waste reduction programs in, 211-212  
 North Carolina Pollution Prevention Pays Program as example of State programs, 36, 216-219  
 OTA industry survey and, 228  
 OTA survey of State waste reduction programs, 197-223  
 pollution control efforts by, 3, 34, 69, 197-223  
 potential waste reduction programs in, 204  
 proposed Office of Waste Reduction and, 64, 69  
 RCRA and, 201-219, 221-223  
 research and development activities in, 186-188  
 results of OTA survey, 199-200  
 siting issues in, 204  
 surveys of hazardous waste facilities in, 168  
 target firms for waste reduction programs in, 207-208  
 technical assistance programs (TAPs) in, 205-207, 208, 209, 212-213, 214, 220, 221, 222  
 waste reduction definitions by, 205  
 waste reduction efforts by, 5, 7, 11, 14, 15, 16, 33-37, 49, 50, 51, 60, 69-71, 105, 106-108, 118, 162-163, 168, 172, 186-188, 197-223  
 waste reduction grants programs in, 213-214  
 waste reduction program needs by, 223  
 waste reduction regulation attempts by California and Massachusetts, 206, 211-212  
 see also State Waste Reduction Boards and *specific States*  
 Substance-specific waste reduction data, 125-126, 128, 129  
 Superfund, 3, 11, 12, 47, 49, 54, 56-57, 61, 63, 102, 116, 118, 121, 122-123, 124, 134, 139, 147, 149, 168, 169, 170, 182, 210  
 Surveys, of waste reduction, 27, 28, 34, 45, 47, 69, 78, 84, 86, 101, 106, 167-168, 197-223, 227-237  
 Sweden, waste reduction efforts by, 19, 241  
 Tax rebates or credit for waste reduction, 57, 59, 228  
 Taxation of hazardous wastes, 56-57, 72  
 Technical assistance programs (TAPs), in States, 205-207, 208, 209, 212-213, 214, 220, 221, 222  
*Technologies and Management Strategies for Hazardous Waste Control*, 152, 155  
 Technology  
   availability to industry, 98-101  
   diffusion of and access to, 104-105  
   waste reduction definitions and, 7-109  
   waste reduction limitations in, 27-29, 166  
   see also Information and technology transfer  
 Tennessee, 35, 172, 201, 203, 209, 213, 221  
 Tennessee Valley Authority (TVA), 108, 182-183, 189, 192  
 Testing, in waste reduction technology, 30, 31  
 Thomas, Lee M., 148  
 Thread mercerization, to recycle caustic soda, 79  
 3M, 7, 37, 79, 82-83, 99  
 Toxic Substances Control Act (TSCA), 120, 121-122, 147, 149, 150, 168, 169, 174, 180-181, 193, 239  
 Toxic Substances Registry (Maryland), 124  
 Training, in waste production technology, 31  
 Treatment, storage, and disposal facilities (TSDFs), 117, 120, 157, 158, 159, 160, 164, 165, 172  
 Trichloroethylene (TCE), 11, 12, 128  
   environmental emissions of, 141  
   hazardous characteristics and health effects of, 138, 140  
   industrial use of, 138  
   industry-level information on, 141  
   legislation and regulations pertaining to, 138, 139, 140  
   national materials balance for, 140  
   release of, into the environment, 141  
   substitutes for, 138  
   transport and transformation of, in the environment, 138-139  
 Uniform Hazardous Waste Manifest, 157, 164  
 United Kingdom, see Great Britain  
 University Hazardous Substance Research Centers, 185  
 United Nations Economic Commission for Europe (ECE), 238  
 U.S. Congress  
   EPA mine wastes report to, 171  
   EPA waste minimization study for, 156, 160

- policy options of, 37-41, 48-71  
 and RCRA Amendments, 45-47, 154-156, 170  
 reasons for no waste reduction action by, 49-50  
 recommendations for waste reduction efforts by, 4-5  
 Toxic Substances and Control Act and, 180  
 waste minimization and, 154-160, 161-162  
 waste reduction policy of, 5, 10, 13  
 see *also* U.S. Government and *specific government agencies, programs, and legislation*
- U.S. Government  
 change in procurement policies of, 57-58  
 collection of waste reduction data by, 129-130  
 cooperation in State waste reduction programs, 197, 221-223  
 costs of environmental regulation by, 7-8  
 European waste reduction efforts compared to, 19-20  
 grants program by, 58, 59-61  
 information and technology transfer in, 182-194  
 information needs for policymaking by, 118-124  
 information needs for waste reduction action by, 130-132  
 lack of waste generation data and, 24, 113, 119-121  
 and measurement of waste reduction, 20-24  
 new waste reduction legislation by, 58, 61-62  
 policy options for, 37-41, 45-73  
 pollution control regulation by, 146-154  
 problems with current efforts, 51-52  
 and proposed Office of Waste Reduction, 5, 40, 58, 64  
 and proposed State Waste Reduction Boards, 5, 40, 58-59, 69-71  
 regulatory concessions for compliance by, 58, 64-69  
 reporting requirements for financial statements by, 58, 62-64  
 research and development activities of, 182-194  
 spending by, on pollution control versus waste reduction, 153  
 and State programs in waste reduction, 5, 33-37, 40, 58-59, 69-71  
 State waste reduction budgets and, 209-210  
 waste reduction decisionmaking and, 94-95  
 waste reduction efforts and regulatory measures by, 4-7, 11-12, 14, 15-18, 21, 26, 29-33, 37-41, 45-73, 94-97, 102-103, 118, 145-194
- USS Chemicals, 127
- Vapor losses, prevention of, 89
- Volatile organic compounds (VOC), 137, 147, 151, 152, 175
- Voluntary approach to waste reduction and waste minimization, 32-33, 38-39, 40, 45, 55, 71, 73, 94, 102, 103, 145, 159, 161, 166-168, 211
- Washington, 59, 204
- Waste-end taxes, 56-57
- Waste generation, see Hazardous wastes; Waste reduction
- Waste management, 9-10, 17-19, 31, 33, 34, 38, 46, 49, 50, 62, 86, 94, 98, 100-101, 103, 104, 105-106, 116, 152, 155, 157, 167, 168-172, 182, 192, 197, 201, 204-205, 227; see *also* Pollution control; Waste minimization
- Waste minimization  
 Air Force plans for, 189, 190  
 Army plans for, 189, 190  
 corporate plans for, 166-167  
 defined, 9, 14, 105, 152, 160, 164, 166, 167  
 Department of Energy plans for, 189, 191-192  
 Department of Defense plans for, 189-191  
 EPA implementation of, 48, 161-166, 183-186  
 EPA study of, 156, 160  
 as low-priority issue, 161-162, 183  
 manifest system for, 155-156, 157, 158, 159, 164, 172  
 Navy plans for, 189, 190  
 Oak Ridge National Laboratory plans for, 191, 192  
 Office of the Secretary (DOD) plans for, 190, 191  
 oversight of, 161, 162-164  
 permits, condition of, 156, 157, 158, 159, 165-166, 172  
 under RCRA, 15, 45-47, 49, 52, 102-103, 105, 113, 132, 145, 153, 154-166, 172, 192  
 reporting procedures for, 155, 157, 158, 159, 164-165, 172  
 State waste reduction programs and, 204-207  
 Tennessee Valley Authority efforts on, 189, 192  
 regulations and requirements, 154-160  
 surveys of, 167-168  
 U.S. Congress and, 154-160, 161-162  
 voluntary nature of Federal program for, 94, 159, 166-168  
 see *also* Hazardous wastes; Pollution control; Waste reduction
- Waste recycling, 9, 10, 17, 19, 27, 34, 65, 87-88, 89, 91 171-172, 184, 187, 206, 227
- Waste reduction  
 alternative methods of, 105-106

- analysis of feasible techniques for, 116  
 auditing, 92-94, 114-117, 184  
 building toward an ethic on, 145-154  
 case studies of, 85-86, 91-92, 132-141, 166, 167, 191  
 classes of, 27; see *also* End products; In-process recycling; Plant operations; Process inputs; Process technology and equipment  
 Clean Air Act and, 174-175  
 Clean Water Act and, 178-180  
 collection of data on, 127, 128-130  
 comparison of alternatives with waste management options, 116  
 comparison of European and U.S. efforts in, 19-20  
 constraints and incentives affecting decisions on, 94-95  
 corporate waste minimization plans and, 166-167  
 cross-media approach to, 18, 51, 62, 124, 146, 147-148  
 current EPA plans for, 47-48  
 data and information for, 21, 22, 113-141  
 economic considerations, 5-6, 7-8, 14, 16, 18, 33, 38, 48, 50, 59-61, 63, 64, 65, 68-69, 70, 72, 83, 84-85, 93, 94, 96, 100-102, 103, 104, 116, 117, 153, 168, 169, 179, 183, 184-188, 191, 192, 209-210, 213-215  
 effectiveness of State programs in, 219-221  
 efforts and regulation by U.S. Government, 4-7, 11-12, 14, 15-18, 21, 26, 29-33, 37-41, 45-73, 94-97, 102-103, 105, 118, 145-194  
 efforts by Austria, 19, 239, 240, 241  
 efforts by Canada, 19, 239  
 efforts by Denmark, 19, 240, 241  
 efforts by Europe, 19-20, 238-241  
 efforts by France, 19, 239, 240, 241  
 efforts by Great Britain, 19, 239  
 efforts by industry, 4-5, 12-16, 24-33, 45-47, 49-50, 60, 166-168, 197-223  
 efforts by Japan, 19, 239  
 efforts by local governments, 14, 50, 59, 172, 198  
 efforts by Norway, 19, 239-240, 241  
 efforts by States, 5, 7, 11, 14, 16, 15, 33-37, 49, 50, 51, 60, 69-71, 105, 106-108, 118, 162-163, 168, 172, 186-188  
 efforts by Sweden, 19, 241  
 efforts by West Germany, 19, 240, 241  
 efforts by The Netherlands, 19, 240-241  
 environmental compliance and, 102  
 establishment of targets for, 56  
 evaluation of the progress and success of measures in, 117  
 existing programs and planning efforts by States in, 197, 198-201  
 expanding literature on, 85-86  
 facility siting bias and, 104  
 Federal and State cooperation in, 197, 221-223  
 financial aid to small businesses, 186, 187  
 formulas for measuring, 23  
 generalizations about State programs in, 201-215  
 generic opportunities in, 87-91  
 goals for, 16-17, 62, 63, 109  
 government procurement policies and, 57-58  
 government spending on, versus pollution control, 153  
 grants programs for, 59-61, 64, 70, 184, 185-186, 213-219, 221  
 illustrations of, 85-92  
 imperfect data on, 129-130  
 industry decisionmaking on, 92-103  
 influence of public opinion on, 100  
 information and technology transfer in, 31, 113-141, 182-194, 212-212, 215  
 information available to Federal Government, 119, 120-121  
 information, types of  
   economic, 115, 117, 118, 120, 131  
   health and environmental, 115, 118, 120, 121, 131  
   production, 115, 117, 118, 120, 121, 131  
   regulatory, 115, 118, 120, 131  
   technology, 115, 117-118, 120, 121, 131  
   waste stream, 115, 117, 118, 120, 121, 129, 131, 227, 228  
 international considerations, 19-20, 57, 238-241  
 investment-uncertainty barrier to, 84-85  
 lack of data on, 4, 20-21, 24, 62, 91-92, 103, 104, 113-114, 119-121, 180  
 lack of expertise in estimating, 104  
 literature on, 86, 91-92, 99, 167  
 loan programs for, 215  
 mandatory increased information collection on, 131-132  
 mandatory levels of, 130-131  
 measurement of, 20-24, 124-130  
 model for standards and guidelines on, 178-180  
 multimedia approach to, 4, 11, 50-51, 61, 62, 65, 72, 73, 103, 152-154, 207, 216  
 new EPA office proposed for, 5, 40, 58, 64  
 new legislation proposed for, 60-62  
 nonregulatory framework in States, 211-212  
 objectives, 6-7  
 opportunities and problems with existing media programs, 168-182  
 OTA industry survey of, 27, 28, 34, 45, 47, 69, 78, 84, 86, 101, 106, 168, 227-237  
 percentages, 128-129

- policy options for, see Policy options
- pooling data on, 128-129
- potential sources of research and development for, 193-194
- potential State programs in, 204
- prescriptive approach to, 32-33, 38, 55, 56, 71, 178, 180
- primacy of, 7-19, 34, 46, 104, 152, 206
- problems with assessing costs and benefits of, 31
- problems with definition of and terms used to describe, 3-5, 8-10, 61, 85-86, 155, 161, 164, 201, 205
- problems with forecasting, 103-104, 109
- problems with measurement of, 20-24, 127-128
- process-specific, 127, 128
- product quality and, 83
- proposal to mandate levels of, 55-58, 72
- proposed grants program for, 59-61, 64, 70
- proposed impact analyses of, 53-54
- proposed planning and reporting requirements, 52-53, 61, 62-64
- public and private roles in, 11-16; see *also* Industry; Local governments; States; U.S. Government
- regulatory concessions for compliance to, 64-71
- research and development in, 30, 31, 39, 40, 52, 57, 77, 83, 99, 173, 182-194
- review of current forecasts on, 106
- setting priorities for, 116
- spectrum of approaches to, 78-85
- site-specific, 29-32, 66-67
- State technical assistance programs in, 205-207, 208, 209, 212-213, 214, 220, 221, 222
- substance-specific, 125-126, 128, 129
- surveys of, 27, 28, 34, 45, 47, 69, 78, 84, 86, 101, 106, 167-168, 197-223, 227-237
- technological limitations as obstacle to, 27-29
- technology and, 77-109
- theoretical requirements for measuring, 125-127
- types of, classified, 115, 117-118, 180
- usefulness of current data on, 119-121
- voluntary approach to, 32-33, 38-39, 40, 45, 55, 71, 73, 94, 102, 103, 145, 159, 161, 166-168, 211
- voluntary versus prescriptive approaches to, 32-33, 38, 55, 71, 73, 102, 103, 145, 159, 161
- see *also* Hazardous wastes; Pollution control; Waste minimization
- Waste reduction technology, 77-109, 106; see *also* Information and technology transfer; Technology
- Waste treatment, 17, 18, 19, 30, 46, 62, 65, 183, 206
- Wastewater, 28, 29, 81, 89-91, 129, 146, 147, 186
- Water, use in industry, 89-91
- Water pollutants, 152, 154, 176-180; see *also* Air and water regulatory programs; Clean Water Act; Wastewater
- Water regulatory programs, see Air and water regulatory programs
- West Germany, waste reduction efforts by, 19, 240, 241
- Westat Survey, 120
- Wisconsin, 35, 108, 201, 203, 205, 210, 214, 215
- Wisconsin Waste Reduction and Recycling Demonstration Grant program, 214
- Worker health and safety, regulatory concessions in, 66
- Working Party on Low- and Non-Waste Technology and Re-utilization and Recycling of Wastes (Europe), 238

LIBRARY  
OFFICE OF TECHNOLOGY ASSESSMENT  
CONGRESS OF THE UNITED STATES  
WASHINGTON, D. C. 20510