

**TABLE 1:
EFFLUENT FEES**

| Regulated Substance | Country | Rate | Use of Revenues |
|----------------------------|-----------------------------|--|---|
| CO | Czech Republic ¹ | \$22/ton permitted; \$33/ton above | State Environmental Fund |
| | Estonia ² | \$0.27/ton permitted; \$1.36/ton above | Estonian Environmental Funds national (50%); county (50%) |
| | Lithuania ³ | \$1.75/ton | Municipal environmental funds (70%); General budget (30%) |
| | Poland ⁴ | \$22/ton | National, regional and municipal environmental funds |
| | Russia ⁵ | \$0.02/ton permitted; \$0.09/ton above | National and regional environmental funds |
| | Slovakia ⁶ | \$20/ton | Slovak Environmental Fund |
| CO ₂ | Denmark | \$42/m ³ , diesel, kerosene, gas oil \$38/ton, coal \$17/ton, LPG \$0.03/m ³ , natural gas \$0.02/kWh, electricity | General budget |
| | Finland | \$38/m ³ , leaded and unleaded gasoline \$43/m ³ , diesel and kerosene \$39/ton, coal \$0.02/m ³ , natural gas \$0.003 - \$0.006/kWh, electricity | General budget |
| | Netherlands | \$45/m ³ , gas oil and kerosene \$54/m ³ , LPG \$0.05/m ³ , natural gas \$0.02/kWh, electricity | Corporate and income tax relief |
| | Norway | \$59/m ³ , mineral oil \$59/ton, coal \$0.11/m ³ natural gas (only applied to offshore oil and gas activities) | General budget |
| | Sweden | \$106/m ³ leaded and unleaded gasoline \$131/m ³ diesel, kerosene, gas oil \$127/ton LPG \$135/m ³ heavy fuel oil \$114/ton coal \$0.03/m ³ natural gas \$0.02/kWh electricity | General budget |

| Regulated Substance | Country | Rate | Use of Revenues |
|---------------------|---|--|---|
| SO ₂ | Bulgaria ⁷ | \$0.02/kg | National environmental fund (70%) and polluter's municipality (30%) |
| | Czech Republic ¹ | \$30/ton permitted; \$45/ton above | State Environmental Fund |
| | Denmark | All fuels, electricity taxed in proportion to resulting SO ₂ emissions, \$1.60/kg of SO ₂ | General budget |
| | Estonia ² | \$2/ton permitted; \$95/ton above | Estonian Environmental Funds national (50%); county (50%) |
| | Finland | \$30/m ³ of diesel or gas oil | General budget |
| | France ⁸ | \$32/ton of direct emissions | Pollution reduction (75%); research (25%) |
| | Hungary ⁹ | \$2.40/ton | Central Environmental Protection Fund (70%); local government budgets (30%) |
| | Italy | \$62/ton of direct emissions | Reduction of environmental impacts |
| | Japan | n.a. | Compensation of individuals with chronic breathing problems attributable to pollution |
| | Lithuania ³ | \$46/ton | Municipal environmental funds (70%); general budget (30%) |
| | Norway ¹⁰ | Fuels taxed in proportion to resulting SO ₂ emissions, \$0.01 per liter of fuel per 0.25% sulfur content | General budget |
| | Poland ⁴ | \$83/ton | National, regional and municipal environmental funds |
| | Russia ⁵ | \$1.22/ton permitted; \$6.10/ton above | National and regional environmental funds |
| | Slovakia ⁶ | \$33/ton | Slovak Environmental Fund |
| | Spain - Galicia | Industrial energy products taxed on sum of SO ₂ and NO _x emissions; rate is \$35/ton, emissions between 1,001 and 50,000 tons; \$39/ton above 50,000 tons. | Regional budget |
| Sweden | Liquid fuels \$3.33/m ³ for each 0.1% by weight of sulfur content; coal and other solid or gaseous fuels \$3.70/m ³ . | General budget | |

| Regulated Substance | Country | Rate | Use of Revenues |
|-----------------------------------|--|---|--|
| NO _x | Bulgaria ⁷ | \$0.05/kg | National environmental fund (70%) and polluter's municipality (30%) |
| | Czech Republic ¹ | \$30/ton permitted; \$45/ton above | State Environmental Fund |
| | Estonia ² | \$4/ton permitted; \$216/ton above | Estonian Environmental Funds national (50%); county (50%) |
| | France | \$27/ton, based on direct measurement of emissions | Pollution reduction (75%); research (25%) |
| | Hungary ⁹ | \$4/ton | Central Environmental Protection Fund (70%); local government budgets (30%) |
| | Italy | \$123/ton of direct emissions | Reduction of environmental impacts |
| | Lithuania ³ | \$67/ton | Municipal environmental funds (70%); General budget (30%) |
| | Poland ⁴ | \$83/ton | National, regional and municipal environmental funds |
| | Russia ⁵ | \$1.02/ton permitted; \$5.08/ton above | National and regional environmental funds |
| | Slovakia ⁶ | \$27/ton | Slovak Environmental Fund |
| Sweden | Combustion and incineration plants pay \$5/kg of NO _x | Redistributed to payees (plants) in proportion to energy produced | |
| Combined industrial air emissions | Latvia ¹¹ | \$1.65 to \$440/ton, depending on emissions hazard class | National, regional and local general budgets |
| | China | Varies with pollutants, including SO ₂ , H ₂ S, NO _x , HCl, CO, H ₂ SO ₄ , Pb, Hg, dust. | Grants, low-interest pollution control loans (80%); local monitoring and administration (20%) |
| BOD load | Bulgaria | \$0.11/kg | National environmental fund (70%); polluter's municipality (30%) |
| | Colombia | Río Negro basin only, rate n.a. | Wastewater treatment plants (50%); industrial clean technology equipment (30%); research, administration (20%) |
| | Estonia ² | BOD ₅ \$77/ton permitted; \$386/ton above | Estonian Environmental Funds national (50%); county (50%) |

| Regulated Substance | Country | Rate | Use of Revenues |
|-------------------------------------|---------------------------|--|--|
| | Lithuania ³ | BOD ₇ \$75/ton | Municipal environmental funds (70%); General budget (30%) |
| | Malaysia | BOD from palm oil industry; current rates n.a. | n.a. |
| | Philippines | BOD in Laguna de Bay watershed, rates n.a. | Water quality management, monitoring & enforcement (80%); local government budgets (20%) |
| | Poland ⁴ | BOD ₅ \$172 to \$1,722/ton, depending on source | National, regional and municipal environmental funds |
| | South Korea ¹² | n.a. | n.a. |
| TSS | Bulgaria ⁷ | \$0.04/kg | National environmental fund (70%); polluter's municipality (30%) |
| | Colombia | Río Negro basin only, rate n.a. | Wastewater treatment plants (50%); industrial clean technology equipment (30%); research, administration (20%) |
| | Estonia ² | \$39/ton permitted; \$386/ton above | Estonian Environmental Funds national (50%); county (50%) |
| | Lithuania ³ | \$15/ton | Municipal environmental funds (70%); General budget (30%) |
| | Poland ⁴ | \$74/ton | National, regional and municipal environmental funds |
| | South Korea ¹² | n.a. | n.a. |
| Combined industrial water emissions | China | Varies with pollutants. | Grants, low-interest pollution control loans (80%); local monitoring and administration (20%) |
| | France ¹³ | Varies by river basin | Water pollution control |
| | Germany ¹⁴ | \$42 per "pollution unit" | Water quality management |
| | Latvia ¹¹ | \$1.65 to \$27,600/ton, depending on effluent hazard class | National, regional and local general budgets |
| | Netherlands | Varies by flow and load | Water quality policy |
| | Slovakia ⁶ | Varies by effluent load and quantity (not quality) of receiving waters | Slovak Environmental Fund |
| Nitrogen and Phosphorous | Denmark | N \$3.10/kg; P \$17.30/kg discharged to surface waters | General budget |

| Regulated Substance | Country | Rate | Use of Revenues |
|---|------------------------|---|--|
| | Estonia ² | N \$65/ton permitted; \$320/ton above P \$115/ton permitted; \$580/ton above discharged to surface water, ground water or soil | Estonian Environmental Funds national (50%); county (50%) |
| | Lithuania ³ | N \$75/ton; P \$260/ton | Municipal environmental funds (70%); General budget (30%) |
| Landfill, incinerator or hazardous waste | Denmark ¹⁵ | \$53/ton, landfill waste \$41/ton, incinerator waste \$393/ton, hazardous waste | General budget |
| | Estonia ² | \$0.06 to \$54/ton permitted; \$0.32 to \$27,000/ton above for waste dumping or burying, depending on hazard class | Estonian Environmental Funds national (50%); county (50%) |
| | Finland | \$18/ton, landfill waste | n.a. |
| | Latvia ¹¹ | \$0.14/m ³ , non-toxic waste disposal \$0.83/m ³ , toxic waste disposal \$28/m ³ , highly toxic waste disposal | National, regional and local general budgets |
| | Netherlands | \$16/ton, landfill waste \$34/ton, combustible waste disposed of in landfill | General budget |
| | Poland ⁴ | \$1.60 to \$21.50/ton waste disposal, depending on hazard class | National, regional and municipal environmental funds |
| | United Kingdom | landfill tax, \$17/ton on “active” waste; \$3/ton on inert waste | General budget |

Note: CO is carbon monoxide, SO₂ is sulfur dioxide, and NO_x is nitrogen oxide; BOD is an acronym for biological oxygen demand and TSS is an acronym for total suspended solids. BOD load is the total amount of oxygen that a given amount of effluent will use in biochemical oxidation, during a period of three days at a temperature of 30EC (86EF). Conversion of all currencies to \$US made using U.S. Federal Reserve historical bilateral exchange rates for December of the year in which data were gathered, available at <http://www.bog.frb.fed.us/releases/H10/hist>.

- Charges from medium and large industrial enterprises in the Czech Republic go to the State Environmental Fund, while charges from small enterprises become part of municipal government budgets. The Czech Republic has established effluent fees for 90 air and 5 water pollutants, though only a few are listed here.
- In Estonia, exceeding a permit is not illegal, so long as an enterprise is able to pay the additional effluent fee. Estonia has established effluent fees for 139 air and 8 water pollutants, though only a few are listed here.
- Lithuania assesses fines on all air and water pollutants, but rates are available only for those listed here.
- Poland’s effluent charges are divided among national, regional and municipal environmental funds in specified percentages that vary by substance. For example, NO_x charges are divided between the national (90%) and municipal (10%) funds, while most other air emissions are divided among the national (36%), regional (54%) and municipal (10%) funds. Poland assesses fees on 62 air and 6 water pollutants, though only a few are listed here.
- Russia assesses fees on more than 100 air and more than 100 water pollutants, though only a few are listed here.
- Slovakia assesses fees on 123 air and five water pollutants, though only a few are listed here.
- Bulgaria assesses fees on 16 air and 27 water pollutants, though only a few are listed here.

8. France taxes sulfur hydrogen and hydrochloric acid emissions at the same rate as sulfur dioxide.
9. Hungary's air emissions fines vary according to height of emissions and the factor by which permitted levels are exceeded. The charges listed here are "base fines," or those assessed when actual emissions exceed permitted levels by a factor of 1.00-2.00. Hungary has established fines for 150 air and 32 water pollutants, though only a few are listed here.
10. Gasoline and fuels with sulfur content less than 0.05% (includes most auto diesel used in Norway) are excluded from Norway's SO₂ tax.
11. Latvia assesses fees on seven air and ten water pollutants, though only a few are listed here.
12. South Korea's effluent fees are assessed on emissions exceeding 30 percent of maximum allowable limit; penalty fees, assessed on emissions above the allowable maximum, equal the expense of treating actual volume of emitted pollutants. South Korea assesses fees on 10 air pollutants and 15 water pollutants, though only two are listed here.
13. In 1993, rates ranged from \$16/kg of suspended solids in the Loire-Bretagne river basin to \$446/kg of soluble salts in the Seine-Normandie basin. See Cadiou and Duc (1994).
14. In Germany, water pollution units are determined by flow and load; the per unit charge can be reduced by pollution control equipment investment.
15. Average rate; Danish waste disposal charge depends on type of waste.

SOURCES: Speck (1998); Gornaja, Kraay, Larson and Türk (1997); Bruneniks, Kozlovska and Larson (1997); Sem•nien•, Bluffstone and „ ekanavi..ius (1997); Yang et al. (1998); Kozeltsev and Markandya (1997); Stepanek (1997); Morris, Tiderenczl and Kovács (1997); Anderson and Fiedor (1997); Owen, Myjavec, and Jassikova (1997); Matev and Nivov (1997); Wuppertal Institute (1996); Organization for Economic Cooperation and Development (1997c); World Bank (1997a, 1997b); Panayotou (1998); and World Bank (1999).

**TABLE 2:
DEPOSIT-REFUND SYSTEMS**

| Regulated Products | Country | Jurisdiction/ Size of Deposit or Description |
|-------------------------------|--|---|
| Specified Beverage Containers | Australia | South Australia / 3¢ (aluminum cans) to 13¢ (glass bottles) |
| | Austria | National / 40¢ (reusable plastic bottles) |
| | Barbados | Local / glass containers |
| | Belgium | National / beer, soft drink containers |
| | Bolivia | Local / glass and plastic containers |
| | Brazil | Regional / glass and aluminum containers |
| | Canada | Newfoundland / 4¢ deposit, 2¢ return; Nova Scotia / 7¢ deposit, full return on refillables, 4¢ return on non-refillables; Quebec / 4¢; British Columbia, Alberta, Yukon / deposit n.a. (specified containers) |
| | Chile | Local / glass and plastic containers |
| | Colombia | Local / glass containers |
| | Czech Republic | National / 9 to 15¢ (glass bottles); 15 to 30¢ (PET bottles) |
| | Denmark | National / 18¢ to 70¢ (glass bottles) |
| | Ecuador | Local / glass containers |
| | Finland | National / 9¢ (small bottle); 46¢ (liter bottle); 18¢ (can) |
| | Iceland | National / various containers |
| | Jamaica | Local / glass containers |
| | Japan ¹ | National / \$2.40 per case (glass bottles) |
| | Mexico | Local / glass containers |
| | Netherlands | National / up to 28¢ (glass bottles); 50¢ (PET bottles) |
| | Norway | National / glass and PET bottles, up to 28¢ |
| | Sri Lanka | National/7¢ (glass bottle) |
| | Sweden | National / 33¢ (glass bottles); 8¢ (cans); 60¢ (PET bottles) |
| | Switzerland | National / various containers; operated by private sector |
| | Taiwan ² | National / 8¢ (PET bottles) |
| United States ³ | Connecticut, Delaware, Iowa, Maine, Massachusetts, New York/ 5¢; Vermont 5¢ & 15¢; Oregon, 3¢ & 5¢; Michigan 5¢ & 10¢; California, 2.5¢ & 5¢ | |

| Regulated Products | Country | Jurisdiction/ Size of Deposit or Description |
|---------------------------|---------------|--|
| | Venezuela | Local / glass containers |
| Auto Batteries | United States | Arizona, Connecticut, Idaho, Minnesota, New York, Rhode Island, Washington, Wisconsin / \$5.00; Michigan / \$6.00; Arkansas, Maine / \$10.00 |
| | Mexico | Old battery must be returned to purchase new battery |
| Scrap Autos | Sweden | National/ \$160 deposit paid on new car purchase; \$185 returned when consumer renders old car being replaced |
| Small Chemical Containers | Denmark | National |
| Tires | South Korea | National/5¢ to 50¢, depending on size |
| Plastic Shopping Bags | Italy | National / 5¢ per bag |
| Packaging Waste | France | National / Eco-emballages; operated by private sector |
| | Germany | National / Duales System; operated by private sector |
| Flourescent Light Bulbs | Austria | National / \$1.20 per bulb |
| Refrigerators | Austria | National / \$10 to \$100 |

1. Japan's deposit fee for glass bottles includes approximately 60¢ for the bottles, and 80¢ for the case or container.
2. Taiwan's deposit-refund system for PET bottles pays 8¢ to consumers bringing bottles to collection locations, and 2¢ for collectors bringing bottles to recycling centers.
3. Oregon's rate for refillables is 3¢. California's deposit for containers smaller than 24 oz. is 2.5¢, and 5¢ for containers 24 oz. and larger.

NOTE: Conversion of all currencies to \$US made using U.S. Federal Reserve historical bilateral exchange rates for December of the year in which data were gathered, available at <http://www.bog.frb.fed.us/releases/H10/hist>.

SOURCES: U.S. Environmental Protection Agency (1992); Organization for Economic Cooperation and Development (1993a, 1993c, 1995a, 1995b, 1997a, 1998b, 1998e, 1999a, 1999b); Huber *et al.* (1997); Smitheman and Cooper (1997); Steele (1999); and Rhee (1994).

**TABLE 3:
USER CHARGES**

| Country | Item Taxed | Rate | Use of Revenues |
|----------------|---|---|---|
| Austria | Motor fuels | Varies by fuel type | Public transport investments |
| | Annual vehicle use | (kW-24)*\$.47/month, plus 20% for cars without catalytic converter | Partially earmarked for public transport subsidies |
| | Natural gas Electricity | \$.05/m ³ \$.009/kWh | Partially earmarked for energy-saving measures and public transport |
| | Landfill waste disposal | \$5 to \$9/ton | Contaminated site cleanup |
| Belgium | Landfill and incinerator waste Hazardous waste | \$4 to \$26/ton \$11 to \$87/ton | National environmental expenditure |
| | Batteries ¹ Disposable beverage containers ¹ Disposable razors Disposable cameras ¹ Packaging of solvents ¹ Packaging of glue ¹ Packaging of inks ¹ Packaging of pesticides ¹ | \$.58/battery \$.44/container \$.29/razor \$8.73/camera \$.15/5 liters \$.73/10 liters \$.73/2.5 liters \$.73/5 liters | Regional environmental expenditure |
| | Surplus manure | Based on kg of phosphate and nitrogen | Funds manure transport and disposal |
| Denmark | Batteries | NiCd \$.94 to \$5.66 Lead \$1.89 to \$3.77 | Funds collection and recycling of old batteries |
| | Tires | \$1.26/tire (new or used) \$.63/tire made of recycled material | Funds tire collection and recycling |
| Finland | Tires | \$2.50 to \$50/tire | Funds tire recovery and recycling ² |
| | Lubricant oils and greases | \$.05/kg | Funds treatment of oil wastes |
| | Hazardous waste | \$336/ton | Funds waste processing |
| | Nuclear power generation | \$2.40 to \$3.20/MWh | Funds waste processing |

| Country | Item Taxed | Rate | Use of Revenues |
|-------------|---|---|---|
| France | Lubricant oils, oil products | \$27/ton | Funds collection, recycling of used oil and oil products |
| | Conventional waste Industrial & hazardous waste | \$7.20/ton, landfill disposal \$7.20/ton, treated; \$14.40/ton, stored | Funds research, treatment and equipment for contaminated site cleanup |
| | Automobile use of bridges to islands | \$3.58/vehicle ³ | Funds protection of island environments |
| | Use of inland waterways | Varies | Finances inland waterways authority |
| Italy | Lubricant oils | \$.03/kg | Funds collection, reuse and dumping costs |
| Kenya | Gasoline | \$34/m ³ | Finances road maintenance |
| | Diesel | \$17/m ³ | |
| Netherlands | Surplus manure | \$.13 to \$.26/kg ⁴ | Funds manure transport, storage and processing |
| South Korea | Toxic substance containers Cosmetics containers Batteries Anti-freeze containers Flourescent light bulbs Chewing gum Disposable diapers | 1¢/container over 500 ml 0.2¢ to 0.7¢/container 0.2¢/battery (all types) 2¢/container 0.6¢/bulb 0.25% of sale price 0.1¢/diaper | Funds waste disposal |
| | Commercial operations and tourism within national parks | n.a. | Finances Korea National Park Authority (40%) |
| Spain | Pollutant spills into coastal waters | Varies with content and quantity of spill | Funds spill cleanup and sea quality improvement. |
| Sweden | Fertilizers | \$0.22/kg N for N > 2%; \$3.70/g Cd for Cd > 5 g/ton of phosphorous | Finances environmental improvements in agriculture |
| | Tires | \$1.50, automobiles; \$37, trucks; \$9.30 tractors | Finances recovery and recycling of used tires ⁵ |
| | Batteries | Lead, \$4.90; NiCd, \$5.70 Alkaline and HgO, \$2.80 | Covers used battery collection and disposal costs |
| Switzerland | Motorway use (cars & trucks) Leaded gasoline Unleaded gasoline Diesel fuel | Varies by weight, distance \$588/m ³ \$529/m ³ \$552/m ³ | Finances road construction and other road-related expenditures |

| Country | Item Taxed | Rate | Use of Revenues | |
|---------------|---|---|--|-----------------------------|
| United States | Motor fuels | \$.183/gal | Highway Trust Fund/ Mass Transit Account | |
| | Annual use of heavy vehicles | \$100-\$500/vehicle | | |
| | Trucks & trailers (excise tax) | 12% | | |
| | Auto and truck tires | \$0.15/lb (> 40 lbs) \$4.50 + \$0.30/lb (> 70 lbs) \$10.50 + \$0.50/lb (> 90 lbs) | | |
| | Noncommercial motorboat fuels | \$.183/gal | | Aquatic Resource Trust Fund |
| | Inland waterways fuels | \$.233/gal | | Inland Waterways Trust Fund |
| United States | Non-highway recreational fuels and small-engine motor fuels | \$.183/gal gasoline \$.243/gal diesel | National Recreational Trails Trust Fund and Wetlands Account of Aquatic Resources Trust Fund | |
| | Sport fishing equipment | 10% (outboard motors, 3%) | Sport Fishing Restoration Account of Aquatic Resources Trust Fund | |
| | Bows and arrows | 11% | Federal Aid to Wildlife Program | |
| | Firearms and ammunition | 10% | | |

1. Belgium exempts these products from the tax when organized deposit-refund or collection system exists and minimum recycling or collection targets are achieved.
2. Finland's tire recycling is managed by a private company. Rates are lower for tires made of recycled materials.
3. Maximum rate.
4. The Netherlands' manure charge is based on amount of manure produced per hectare: \$.13/kg for amounts between 125 and 200 kg/ha; double that amount for amounts greater than 200 kg/ha.
5. In Sweden, manufacturers, importers and sellers of tires are required to ensure that used tires are reused, recycled, or disposed of in an environmentally friendly manner.

NOTE: Conversion of all currencies to \$US made using U.S. Federal Reserve historical bilateral exchange rates for December of the year in which data were gathered, available at <http://www.bog.frb.fed.us/releases/H10/hist>.

SOURCE: Barthold (1994); Speck (1998); Organization for Economic Cooperation and Development (1997a); Ayoo and Jama (1999); and Rhee (1994).

**TABLE 4:
INSURANCE PREMIUM TAXES**

| Country | Item/Action Taxed | First Enacted/Modified | Rate | Use of Revenues |
|---------------|---------------------------------------|--------------------------|---|--|
| Belgium | Ionizing radiation | 1994 | n.a. | Fund for Risks of Nuclear Accidents |
| Finland | Oil imports | 1970s | \$0.43/ton ¹ | Oil Pollution Compensation Fund |
| United States | Chemical production | 1980/1986 | \$.22 to \$4.88/ton | Superfund (CERCLA) |
| | Petroleum production | 1980/1986 | \$.097/barrel crude | |
| | Corporate income | 1986 | 0.12% ² | |
| | Petroleum and petroleum products | 1989/1990 | \$.05/barrel | Oil Spill Liability Trust Fund |
| | Petroleum-based fuels, except propane | 1986/1990 (expired 1995) | \$.001/gal | Leaking Underground Storage Trust Fund |
| | Coal production | 1977/1987 | \$1.10/ton underground \$.55/ton surface | Black Lung Disability Trust Fund |
| | Surface coal mining and reclamation | 1977 | Varies with specific case | Repayment of performance bonds |

1. Rate is twice as high for tankers without double hulls.
2. Rate is 0.12% of "alternative minimum taxable income" that exceeds \$2 million.

NOTE: Conversion of all currencies to \$US made using U.S. Federal Reserve historical bilateral exchange rates for December of the year in which data were gathered, available at <http://www.bog.frb.fed.us/releases/H10/hist>.

SOURCES: Barthold(1994); Speck (1998); and Organization for Economic Cooperation and Development (1997a).

**TABLE 5:
SALES AND VALUE-ADDED TAXES**

| Item/Action Taxed | Country | Rates | Use of Revenues |
|--|---|---|------------------------|
| Motor fuel, other energy products (excise taxes) | Austria ¹ | Gas oil: heating, \$81/m ³ ; industrial, \$332/m ³ | General budget |
| | Belgium ² | Gasoline: leaded, \$648/m ³ ; unleaded, \$580/m ³ Gas oil: heating, \$6/m ³ ; industrial, \$22/m ³ | General budget |
| | China | Gasoline: \$3.44/m ³ Diesel Oil: \$1.72/m ³ | General budget |
| | Denmark ³ | Gasoline: leaded, \$632/m ³ ; unleaded, \$530/m ³ Gas oil: heating, \$267/m ³ ; industrial, \$267/m ³ | General budget |
| | Finland ⁴ | Gasoline: leaded, \$709/m ³ ; unleaded, \$620/m ³ Gas oil: heating and industrial, \$22/m ³ | General budget |
| | France ⁵ | Gasoline: leaded, \$737/m ³ ; unleaded, \$688/m ³ Gas oil: heating and industrial, \$91/m ³ | General budget |
| | Germany ⁶ | Gasoline: leaded, \$648/m ³ ; unleaded, \$588/m ³ Gas oil: heating and industrial, \$48/m ³ | General budget |
| | Greece ⁷ | Gasoline: leaded, \$454/m ³ ; unleaded, \$397/m ³ Gas oil: heating, \$150/m ³ ; industrial, \$275/m ³ | General budget |
| | Ireland ⁸ | Gasoline: leaded, \$242/m ³ ; unleaded, \$198/m ³ Gas oil: heating and industrial, \$25/m ³ | General budget |
| | Italy ⁹ | Gasoline: leaded, \$672/m ³ ; unleaded, \$618/m ³ Gas oil: heating, \$452/m ³ ; industrial, \$136/m ³ | General budget |
| | Kenya | Gasoline: premium, \$100/m ³ ; regular, \$194/me; diesel, \$98/m ³ | General budget |
| | Luxembourg ¹⁰ | Gasoline: leaded, \$426/m ³ ; unleaded, \$371/m ³ Gas oil: heating, \$6/m ³ ; industrial, \$20/m ³ | General budget |
| | Netherlands ¹¹ | Gasoline: leaded, \$732/m ³ ; unleaded, \$656/m ³ Gas oil: heating and industrial, \$55/m ³ Uranium-235, \$17/g used in nuclear power generation | General budget |
| | Norway ¹² | Gasoline: leaded, \$575/m ³ ; unleaded, \$542/m ³ | General budget |
| | Portugal ¹³ | Gasoline: leaded, \$591/m ³ ; unleaded, \$555/m ³ Gas oil: heating, \$117/m ³ ; industrial, \$324/m ³ | General budget |
| Spain ¹⁴ | Gasoline: leaded, \$465/m ³ ; unleaded, \$427/m ³ Gas oil: heating and industrial, \$91/m ³ | General budget | |
| Sweden ¹⁵ | Gasoline: leaded, \$527/m ³ ; unleaded, \$446/m ³ Gas oil: heating and industrial, \$92/m ³ | General budget | |

| Item/Action Taxed | Country | Rates | Use of Revenues |
|--|---|---|-----------------|
| | United Kingdom ¹⁶ | Gasoline: leaded, \$819/m ³ ; unleaded, \$731/m ³ Gas oil: heating and industrial, \$49/m ³ | General budget |
| Motor fuels, other energy products (VAT) | Austria | 20% | General budget |
| | Belgium | 21%; except coal and other solid fuels (12%) | General budget |
| | Denmark | 25% | General budget |
| | Finland | 22% | General budget |
| | France | 20.6%; 5.5% on fixed charge portion of utility bills | General budget |
| | Germany | 16% | General budget |
| | Greece | 18%; natural gas and coal are exempt | General budget |
| | Ireland | 21% motor fuels; 12.5 % other energy products; fuels for public transport are exempt | General budget |
| | Italy | 19%, except coal (9%) and electricity (10%) | General budget |
| | Kenya | \$34/m ³ industrial diesel and fuel oil; \$52/m ³ LPG | General budget |
| | Luxembourg | 15% motor fuels, except unleaded gasoline (12%); 12% gas oil, kerosene and coal; 6% LPG | General budget |
| | Netherlands | 17.5% | General budget |
| | Norway | 23% | General budget |
| | Portugal | 17% motor fuels and kerosene; 12% electricity; 5% natural gas | General budget |
| | Spain | 16% | General budget |
| | Sweden | 25% | General budget |
| Switzerland | 6.5% | General budget | |
| United Kingdom | 17.5%, except domestic heating fuels (5%) | General budget | |
| New automobiles | Austria | [(fuel consumption per 100 km - 3 liters) * 2% of net price] ; electric cars are exempt | General budget |
| | Belgium | \$73 - \$5,800/vehicle, based on engine power | General budget |
| | China | Sedans, cross-country vehicles and minibuses: 3% to 8%, depending on cylinder volume | General budget |
| | France | Varies with engine power | Regional budget |
| | Germany | \$21 - \$30 | General budget |

| Item/Action Taxed | Country | Rates | Use of Revenues |
|----------------------------|---------------|---|-----------------|
| | Greece | Varies with cubic capacity; vehicles with anti-pollution technology subject to reduced rate | General budget |
| | Ireland | 13.3 - 28 %, depending on cubic capacity | General budget |
| | Italy | \$91 - \$236, depending on type and size of vehicle | General budget |
| | Netherlands | Varies with vehicle type, weight, and fuel type | General budget |
| | Norway | Varies with weight, horsepower and piston displacement | General budget |
| | Portugal | \$1.47 - \$12 per 100 cc | General budget |
| | Spain | 7% of sale price | General budget |
| | United States | \$1,000 - \$7,700/ auto exceeding fuel efficiency maxima | U.S. Treasury |
| Pesticides | Belgium | \$.06/g of specified contents | General budget |
| | Denmark | 3% - 37% of retail price, varies by toxicity | General budget |
| | Finland | 2.5% of total annual sales | General budget |
| Fertilizers | Sweden | \$0.16/kg Nitrogen; \$0.30/kg Phosphorous | General budget |
| Chlorinated solvents | Denmark | \$0.31/kg of tetrachlorethylene, trichloroethylene, and dichloromethane | General budget |
| VOC | Switzerland | \$0.73/kg | General budget |
| Lubricant oils | Denmark | \$0.28/liter | General budget |
| | Sweden | \$0.14/liter | General budget |
| Non-refillable containers | Finland | \$0.80/liter | General budget |
| | Sweden | \$0.04 - \$0.42/container | General budget |
| Ozone-depleting substances | Australia | \$1,225/ton CFCs; \$55/ton methyl bromide | General budget |
| | Denmark | \$4.70/kg CFCs or halons | General budget |
| | United States | \$4.35/pound | U.S. Treasury |
| New tires | United States | \$.15 - \$.50/pound | U.S. Treasury |

Note: VAT is an acronym for value-added tax, and VOC is an acronym for volatile organic compounds. Conversion of all currencies to \$US made using U.S. Federal Reserve historical bilateral exchange rates for December of the year in which data were gathered, available at <http://www.bog.frb.fed.us/releases/H10/hist>.

1. Austria also assesses excise taxes on heavy fuel oil, LPG and kerosene, at varying rates. Gas oil for cogeneration is taxed at the same rate as domestic heating oil. Austria's motor fuel excise taxes are excluded here because revenues are used for public transport expenses and can therefore be considered user charges. See Table 3.

2. Belgium also assesses excise taxes on diesel, LPG and kerosene, at varying rates. In addition to excise taxes, most motor fuels and other energy products are subject to an energy tax of \$10 to \$15/m³, the revenues from which are earmarked for a social security fund.
3. Denmark also assesses excise taxes on heavy fuel oil, LPG, kerosene, coal, natural gas, and electricity, at varying rates. Partial rebates are available for gas stations with vapor recovery systems.
4. Finland also assesses excise taxes on diesel and kerosene, at varying rates.
5. France also assesses excise taxes on diesel, LPG, kerosene and heavy fuel oil, at varying rates.
6. Germany also assesses excise taxes on diesel, LPG, kerosene and heavy fuel oil, at varying rates.
7. Greece also assesses excise taxes on diesel, LPG, kerosene and heavy fuel oil, at varying rates.
8. Ireland also assesses excise taxes on diesel, LPG, kerosene and heavy fuel oil, at varying rates.
9. Italy also assesses excise taxes on diesel, LPG, kerosene, heavy fuel oil, natural gas and electricity, at varying rates.
10. Luxembourg also assesses excise taxes on diesel, LPG, kerosene and heavy fuel oil, at varying rates.
11. The Netherlands also assesses excise taxes on diesel, LPG, kerosene and heavy fuel oil, at varying rates. All fuels are also subject to a general energy tax, which ranges from \$13/m³ for leaded and unleaded gasoline to \$18/m³ for LPG.
12. Norway also assesses excise taxes on diesel and electricity, at varying rates, although manufacturing enterprises are exempt from the tax on electricity.
13. Portugal also assesses excise taxes on diesel, LPG, kerosene, heavy fuel oil and electricity, at varying rates.
14. Spain also assesses excise taxes on diesel, LPG, kerosene and heavy fuel oil, at varying rates.
15. Sweden also assesses excise taxes on diesel, LPG, kerosene, heavy fuel oil, coal, natural gas and electricity, at varying rates.
16. The United Kingdom also assesses excise taxes on diesel, LPG, kerosene and heavy fuel oil, at varying rates.

SOURCES: Ayoo and Jama (1999); Barthold (1994); Zou and Yuan (1998); Speck (1998); and Organization for Economic Cooperation and Development (1997a, 1998b).

**TABLE 6:
ADMINISTRATIVE CHARGES**

| Country | Item/Action Taxed | First Enacted/ Modified | Rate | Use of Revenues |
|----------------|---|------------------------------------|---|---|
| Australia | Ozone-depleting substances | n.a. | \$6,100 administration fee, \$1,200 license fee | Covers cost of licensing and administration |
| Finland | Pesticides | n.a. | \$990 one-time registration charge (new pesticides) | Covers cost of registration |
| France | Use of inland waterways | n.a. | Varies by waterway and type of craft | Earmarked for financing of inland waterways authority |
| Malaysia | Palm oil industrial effluent discharges | 1978 | \$2.54 annually per enterprise | Covers license-processing costs |
| Sweden | Pesticides | 1984 | Inspection charge, plus 15.5% of wholesale price | Finances administrative costs of biocide registry |
| United Kingdom | Water pollutant discharges | 1992 | \$840 one-time application charge, annual charge \$650 per pollution unit | Finances national water discharge licensing policy |
| United States | Water Pollutant Discharges | 1972 | Varies by substance | State administrative cost of National Pollution Discharge Elimination System, Clean Water Act |
| | Criteria Air Pollutants | 1990 | Varies by implementing state | State administrative cost of state clean air programs under Clean Air Act |

NOTE: Conversion of all currencies to \$US made using U.S. Federal Reserve historical bilateral exchange rates for December of the year in which data were gathered, available at <http://www.bog.frb.fed.us/releases/H10/hist>.

SOURCES: U.S. Office of Technology Assessment (1995); Speck (1998); and World Bank (1997b).

**TABLE 7:
TAX DIFFERENTIATION**

| Item/Action Taxed | Country | Provision and Differentiated Rate |
|---|----------------|--|
| Motor Fuels Excise Tax Reductions and Exemptions ¹ | Belgium | Tax exemptions for motor fuels used in development of environmentally friendly products, rail carriage of passengers and goods |
| | Denmark | Tax rebate of \$.005/liter for gas stations with vapor recovery, full exemption for public transport |
| | Norway | Exemption for use of vapor recovery unit |
| | United States | Reduced rates for natural gas (\$.07/gal); methanol (\$.06/gal); and ethanol (\$.054/gal) |
| | United Kingdom | Reduction of \$33/m ³ for diesel with low sulfur content |
| Motor Fuels VAT Reductions and Exemptions ¹ | Austria | Reduced rate for public transport services (10%) |
| | Belgium | Reduced rate for public transport services (6%) |
| | Denmark | Exemption for public transport services |
| | Finland | Reduced rate for public transport services (6%) |
| | France | Reduced rate for public transport services (5.5%) |
| | Germany | Reduced rate for urban public transport (7%) |
| | Greece | Reduced rate for public transport (8%) |
| | Ireland | Exemption for public transport |
| | Italy | Reduced rate for public transport (10%); urban bus/rail transit exempt |
| | Luxembourg | Reduced rate for public transport (3%) |
| | Netherlands | Reduced rate for public transport (6%) |
| | Portugal | Reduced rate for public transport (5%) |
| | Spain | Reduced rate for public transport (7%) |
| | Sweden | Reduced rate for public transport (12%) |
| Income Tax Credits and Deductions | Australia | Deductions for prevention of land degradation |
| | Austria | Deductions for household energy saving measures, purchase of low-noise trucks (double normal capital deduction); exemption for industrial/commercial environmental investments |
| | Belgium | Increased deductions for green investments, energy-saving devices |
| | Colombia | Credits and deductions for reforestation activities |
| | Denmark | Deductions for environmental improvement equipment on small farms |

| Item/Action Taxed | Country | Provision and Differentiated Rate |
|-----------------------------|--|---|
| | Ireland | Deductions for investments in renewable energy (maximum 50% of capital expenditure, investment must be held five years) |
| | Netherlands | Credit (40-52%) for specified corporate energy investments |
| | Russia | Credit (100%) for environmental protection equipment investments |
| | Spain | Deductions (maximum 10% of investment) for investments in environmental protection |
| | United States | Alcohol fuels: methanol (\$.60/gal) and ethanol (\$.54/gal) Business Energy: solar (10%) and geothermal (10%) Non-conventional Fuels: \$3.00/Btu-barrel equivalent of oil Wind Production (1.5¢/kWh) Biomass Production (1.5¢/kWh) Electric Automobiles (10% credit) |
| Other Income Tax Provisions | Australia | Accelerated depreciation for water conservation and capital expenditure on environmental impact studies |
| | Barbados | Income tax rebate for water conservation and solar energy equipment in the tourism sector |
| | Brazil | Income tax rebates for adoption of clean technology |
| | Colombia | Income tax rebates for industrial pollution abatement investments |
| | Ecuador | Income tax relief for investments in mercury recovery in mining |
| | Finland | Accelerated depreciation (maximum 25% of purchase price for four years) for environmental investments |
| | France | Accelerated depreciation : 100% in first year for specified energy-saving equipment; lesser percentages for industrial water pollution, air pollution and noise reduction technologies |
| | Germany | Accelerated depreciation for pollution reduction equipment |
| | Hungary | Reduced rate for manufacturers of environmental products |
| | Japan | Capital allowance for solar energy, pollution prevention and recycling equipment; reduced rate for specified facilities for air, water and noise abatement, asbestos emission reduction, oil desulfurization and waste recycling |
| | Kenya | Capital expenditure for preventing soil erosion or planting permanent crops treated as current expense |
| | Netherlands | Accelerated depreciation for specified environmental technologies |
| | Switzerland | Accelerated depreciation for energy-saving & solar energy investments |
| Tanzania | Capital expenditure for prevention of soil erosion treated as current expenditure. | |

| Item/Action Taxed | Country | Provision and Differentiated Rate |
|-----------------------------------|----------------|---|
| | United States | Van Pools: tax-free employer provided benefits |
| | | Mass Transit Passes |
| | | Utility Rebates: exclusion of subsidies from utilities for energy conservation measures |
| | Venezuela | Income tax relief for industrial pollution abatement investments |
| Sales Tax and VAT Provisions | Australia | Sales tax exemption for recycled paper, solar power equipment and conversion of engines to LPG or natural gas |
| | Brazil | VAT rebates for adoption of clean technology |
| | Colombia | VAT rebates for industrial pollution abatement investments |
| | Denmark | Energy-saving light bulbs exempt from sales tax |
| | Germany | Reduced energy product excise tax (50%) for hydroelectricity |
| | Hungary | Reduced VAT rate for cars with catalytic converters |
| | Portugal | Reduced energy VAT rate of 5% for equipment related to solar or geothermal energy, and for generation of energy from waste |
| | Sweden | Energy VAT reduction for cogeneration plants (50%), exemption for electricity generated by wind power |
| | United Kingdom | Reduced VAT rate of 5% on installation of household energy-saving equipment |
| Tax Exempt Private Activity Bonds | United States | Interest exempt from Federal taxation: mass transit, sewage treatment, solid waste disposal, water treatment, high speed rail |

1. For full motor fuels excise tax and VAT rates in each country, see Table 5. For full rates in the United States and Austria, in which motor fuels taxes are used to finance road investments, see Table 3.

NOTE: Conversion of all currencies to \$US made using U.S. Federal Reserve historical bilateral exchange rates for December of the year in which data were gathered, available at <http://www.bog.frb.fed.us/releases/H10/hist>.

SOURCES: Barthold (1994); Speck (1998); McMorran and Nellor (1994); and Huber *et al.* (1998).

**TABLE 8:
TRADEABLE PERMIT SYSTEMS**

| Country | Program | Traded Commodity | Period of Operation | Environmental and Economic Effects |
|----------------|---------------------------------|--|---|---|
| Canada | ODS Allowance Trading | CFCs and Methyl Chloroform HCFCs Methyl Bromide | 1993-1996 1996-Present 1995-Present | Low trading volume, except among large methyl bromide allowance holders |
| | PERT GERT | NO _x , VOCs, CO, CO ₂ , SO ₂ CO ₂ | 1996-Present 1997-Present | Pilot program Pilot program |
| Chile | Santiago Air Emissions Trading | Total suspended particulates emission rights trading among stationary sources | 1995-Present | Low trading volume; decrease in emissions since 1997 not definitively tied to TP system |
| European Union | ODS Quota Trading | ODS production quotas under Montreal Protocol | 1991-1994 | More rapid phaseout of ODS |
| Singapore | ODS Permit Trading | Permits for use and distribution of ODS | 1991-Present | Increase in permit prices; environmental benefits unknown |
| United States | Emissions Trading Program | Criteria air pollutants under the Clean Air Act | 1974-Present | Performance unaffected; savings = \$5-12 billion |
| | Leaded Gasoline Phasedown | Rights for lead in gasoline among refineries | 1982-1987 | More rapid phaseout of leaded gasoline; \$250 m annual savings |
| | Water Quality Trading | Point-nonpoint sources of nitrogen & phosphorous | 1984-1986 | No trading occurred, because ambient standards not binding |
| | CFC Trades for Ozone Protection | Production rights for some CFCs, based on depletion potential | 1987-Present | Environmental targets achieved ahead of schedule; effect of TP system unclear |
| | Heavy Duty Engine Trading | Averaging, banking, and trading of credits for NO _x and particulate emissions | 1992-Present | Standards achieved; cost savings unknown |
| | Acid Rain Reduction | SO ₂ emission reduction credits; mainly among electric utilities | 1995-Present | SO ₂ reductions achieved ahead of schedule; savings of \$1 billion/year |
| | RECLAIM Program | SO ₂ and NO _x emissions among stationary sources | 1994-Present | Unknown as of 2000 |
| | N.E. Ozone Transport | Primarily NO _x emissions by large stationary sources | 1999-Present | Unknown as of 2000 |

SOURCES: Hahn and Hester (1989); Hahn (1989); Schmalensee, Joskow, Ellerman, Montero and Bailey (1998); Montero, and Sánchez (1999); Klaassen (1999); and Haites (1996). “TP” refers to tradeable permits; ODS, ozone-depleting substances; CFCs, chlorofluorocarbons; and CA, State of California.