

# GREEN TAXES

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The Institute for Local Self-Reliance (ILSR) is a nonprofit research and educational organization that provides technical assistance and information on environmentally sound economic development strategies. Since 1974, ILSR has worked with citizen groups, governments and private businesses in developing policies that extract the maximum value from local resources.

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# Green Taxes

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In the past 25 years we have substantially increased taxes on labor and modestly increased taxes on income while allowing pollution and resource depletion to remain largely untaxed. The result is that we have created a tax system that encourages resource depletion and discourages investments in machinery and labor. A worldwide discussion is taking place about how to move away from taxing "goods" like investments and employment, that is, activities we would like more of, and toward taxing "bads", like pollution, that we would like to discourage.

Pollution taxes have been embraced by a growing number of mainstream economists and policy makers. Stanford economist Lawrence Goulder calls such taxes "corrective taxes" because they correct the distorting price signals now given to resource depletion. Ex Federal Reserve Chairman Paul Volcker and former Council of Economic Advisors Chairman Martin Feldstein have suggested using a carbon tax to reduce the federal deficit.<sup>1</sup> The Ford Motor Company and the GAP have supported a proposed carbon tax in California that would have replaced a portion of the state's retail sales tax.<sup>2</sup>

Green taxes are not new. In the last 15 years such taxes have been used for two primary purposes:

- *to generate revenue to pay for damages created from past pollution and for measures to reduce future pollution*
- *to change behavior*

A third type of green tax discussed below has been gaining visibility. It combines a significant pollution tax with a major restructuring of the tax system to make the overall economy more efficient. This process is called "tax shifting".

## Green Taxes Designed to Finance Remediation and Prevention Measures

These taxes are used to generate revenue to pay for the damages and cleanup costs from pollution and to pay for measures to reduce future pollution.

### • Minnesota Solid Waste Tax.

In 1989, Minnesota extended the 6.5 percent sales tax to garbage services and in 1990, raised \$24.3 million. A portion of this money has been used to finance recycling and waste minimization programs and to provide loans and grants for recycling businesses. Another portion goes to close down polluting landfills.<sup>3</sup> Minnesota also collects a 2 cent per pound tax on toxic chemicals listed on the Toxic Release Inventory.

### • California Tobacco Tax.

In 1987, by initiative, Californians approved Proposition 99, The Cigarette and Tobacco Products Surtax. The initiative imposed an additional 25 cent tax over and above the existing tax of 10 cents per pack. It went into effect in January 1989. In 1990 it raised \$543 million. These funds are used to finance aggressive public education programs and nicotine addiction treatment programs as well as to pay for health costs associated with tobacco use.<sup>4</sup>

### • Iowa Pesticide and Fertilizer Tax.

In 1987 Iowa passed the Groundwater Protection Act which imposes a tax of 1/10th of 1 percent on gross sales for pesticides at the retail level and 1/5th of 1 percent of gross sales on the manufacturers of pesticides. It also imposes a 75 cents per ton tax on nitrogen fertilizer. These three taxes raised \$3.2 million in 1993. Thirty five percent, or \$1 million went to the Leopold Center for Sustainable Agriculture at Iowa State University to promote economic and environmentally sustainable agriculture.<sup>5</sup>

## Green Taxes Designed to Change Behavior

A growing number of green taxes are designed to change behavior. They are often high enough to make it attractive for customers to use more environmentally benign products and practices.

• **Quantifying Electricity Generation Environmental Costs.**<sup>6</sup> Almost a dozen state utility regulatory commissions have quantified the environmental costs of electric generation. These environmental costs range from 1.2 to 8.6 cents per kWh, depending on the type of plant and the type of fuel. In all states utilities must include these environmental costs when choosing the least expensive source of additional electricity. In some states, like Wisconsin, utilities must take these externalities into account but do not need to be guided by them in making their final decision regarding investments or purchase contracts.

In 1991, the Minnesota legislature required the Public Utilities Commission(PUC) to include environmental costs when comparing the costs of alternative energy sources. In 1993 the legislature altered the 1991 law and required the PUC to establish interim values by March 1, 1994.<sup>7</sup> In February 1994 the PUC established such values. They embrace a wide range of possible values.

These values will be used to compare potential sources of new electric power generation. These values would add .8-1.6 cents per kWh to the price of coal generated electricity. The PUC is presently initiating a contested case hearing to establish permanent environmental values.

### Interim Externality Values

Pollutant	Range (\$/Ton)
SO <sub>2</sub>	\$0-300
NO <sub>x</sub>	\$68.80-3960
VOCs	\$1180-1200
PM10	\$166.60-2380
CO <sub>2</sub>	\$5.99-13.60

• **Ontario's Automobile Feebates.**<sup>8</sup> The only existing significant feebate program was enacted by

the Province of Ontario.<sup>9</sup> Initially the program was a tax on gas guzzlers only, similar to that in existence in the United States. In 1991 the New Democratic Party doubled the existing gas guzzler tax and widened its application. Fierce opposition led to a major revision in June 1991. At that time a \$100 rebate for the most fuel efficient cars was added.

The impact of the tax has been inconclusive. Since the tax went into effect in 1991 Ontario customers have been buying smaller, more fuel efficient cars. Sales of fuel efficient cars as a percentage of total car sales had been flat from 1983 to 1990 but then rose from 2.6 percent in 1990 to 5.3 percent in 1991 to 7.4 percent in 1992. However, the recession and the 13 cents per gallon increase in the provincial gasoline tax in July 1991 makes it difficult to evaluate the importance of the energy inefficiency tax itself. Complicating the issue further is the fact that the tax itself comprises less than 1 percent of the sales price of the car and it is not advertised. There is no sticker on the car explaining the tax. Thus it is difficult to maintain that the customer is making a decision based on the tax.<sup>10</sup>

• **Minnesota Contaminated Property Tax.** Property contaminated by past pollution has a reduced market value and therefore pays lower property taxes. To maintain tax revenues and to provide an incentive to land owners to clean up their property, the Minnesota legislature in 1993 enacted Chapter 375, Article 12. It imposes a contamination fee that is triggered when a reduction in property taxes is awarded due to contamination. The tax is two tiered. If no cleanup plan exists the tax equals the contamination value times the property tax class rate for the property. If a plan is approved the tax equals the contaminated value times 50 percent of the property tax class rate for the property. Once the cleanup is completed the tax disappears.

• **Federal Tax on Ozone Depleting Chemicals.** In 1989 the U.S. Congress enacted a tax on eight ozone depleting chemicals as part of its Omnibus Budget Reconciliation Act. It extended this tax to 12 additional chemicals and raised the tax on the original 8 chemicals in the National Energy Policy Act of 1992. The Clean Air Act established caps on most chlorofluorocarbons (CFCs), with a phase out occurring around the year 2000. The tax on CFCs was \$1.37 a pound in 1990 and 1991, about twice the then current product price. Recycled CFCs were exempted from the tax.

The tax was raised in 1990 and again in 1992. The tax rises to \$3.10 per pound in 1995 and then rises by 45 cents per pound per year thereafter. The tax is proportional to the chemical's potential for depleting the ozone layer.

### Tax on Ozone Depleting Chemicals

Year	OBRA 89 Rates	OBRA 90 Rates	NEPA 92 Rates
1990	\$1.37		
1991	\$1.37	\$1.37	
1992	\$1.67	\$1.37	
1993	\$2.65	\$1.67	\$3.35
1994	\$2.65	\$3.00	\$4.35
1995	\$3.10	\$5.35	

Although the concept behind the tax was to encourage the rapid phase out of CFCS, the tax also has generated large amounts of revenue: \$360 million in 1990 and over \$1 billion in 1994. Andrew Hoerner of the Center for Global Change argues that in the early years the tax and not the cap on production has been the primary driving force for U.S. ozone reduction. A dramatic 290,000 metric ton reduction in CFC 11 equivalence has occurred below the national ceiling.<sup>11</sup>

- **Minnesota Groundwater Protection Act.**

This 1989 law prohibited the use of once-through water systems in the Twin Cities after 2010 and immediately raised the price of using once-through water 200 fold for commercial users and 50 fold for non-profits and schools.<sup>12</sup>

- **Air Pollutants Tax.**

Minnesota has imposed air emissions fees since 1985. The Clean Air Act of 1990 allows states to impose a charge per ton of regulated pollutants in order to finance the regulatory program. The Clean Air Act expressly prohibits fees on carbon monoxide emissions. The Minnesota legislature in 1991 authorized such charges to cover "direct and indirect costs...to develop and administer" the program. The Minnesota Pollution Control Agency imposes a uniform charge of \$18.92 per ton of emissions on five air pollutants: sulfur dioxide, nitrogen oxide, volatile organic compounds,(VOCs), particulate matter less than ten microns in diameter(PM10), and lead.<sup>13</sup>

There is no emission fee for the 189 pollutants identified as "hazardous air pollutants" by

Congress in the 1990 Clean Air Act Amendments. The PCA is examining the possibility of imposing environmental charges on these known air toxics. It is also examining the possibility of imposing variable rates. British Columbia has established variable environmental fees assessed on the basis of potential environmental harm.

### Contaminant Fees for Air Emission Permits or Approvals<sup>14</sup>

Contaminant	Fee Per Ton Discharged
Ammonia	\$11.30
Asbestos	\$11.30
Carbon Monoxide	\$0.30
Chlorine & Chlorine Oxides	\$7.60
Fluorides	\$453.60
Hydrocarbons	\$11.30
Hydrogen Chloride	\$7.60
Metals	\$453.60
Nitrogen Oxides	\$7.60
Phenols	\$11.30
Sulfur & Sulfur Oxides	\$8.80
Total Particulate	\$11.30
TRS	\$378.00
VOCs	\$11.30
Other Contaminants	\$11.30

### Contaminant Fees for Effluent Permits or Approvals<sup>15</sup>

Contaminant	Fee Per Ton Discharged
Ammonia	\$69.30
AOX	\$184.00
Arsenic	\$184.00
BOD	\$13.90
Chlorine	\$184.00
Cyanide	\$184.00
Fluoride	\$69.30
Metals	\$184.00
Nitrogen and Nitrates	\$27.70
Oil and Grease	\$46.20
Other Petroleum Products	\$46.20
Other Solids	\$9.20
Phenols	\$184.00
Phosphorus and Phosphates	\$69.30
Sulphates	\$2.70
Sulphides	\$184.00
Surfactants	\$46.20
Suspended Solids	\$9.20
Other Contaminants	\$9.20

### Tax Shifting

Recently the debate about green taxes has included the issue of tax shifting, that is, of using green taxes as a means to restructure national tax systems. This debate is most vigorous and visible in Europe where there are strong environmental political parties and high unemployment. As European President Jacques Delors declared in Copenhagen in June 1993, "Taxation of natural resources allows us to reduce the excessive load on taxing productive labor, thereby increasing Europe's international competitiveness."<sup>16</sup>

In most industrialized countries, the majority of increased taxes in recent years has fallen on labor. There have also been modest increases in taxes on capital while there have been virtually no tax increases on pollution or natural resources depletion.<sup>17</sup> The result, economists argue, is fewer jobs and more pollution. In almost all countries the non-wage cost of labor has increased dramatically since 1970 even while net wages to labor have fallen. For example, gross labor costs in France went from 54 percent to 60 percent while net labor income fell from 37 to 34 percent.<sup>18</sup>

A number of studies have evaluated the macro economic impact of a tax on carbon equal to \$100 a ton.<sup>19</sup> Most studies conclude that there would be a 1-3 percent reduction in GNP.<sup>20</sup> However, these

studies do not assume offsetting tax reductions elsewhere in the economy nor do they assume that the money raised would be directed toward improving efficiency.

The World Resources Institute argues that current taxes on capital and labor undermine economic efficiency. A tax on capital raises the cost of capital and thus discriminates against technological innovation. A tax on labor raises the cost of labor and thus reduces employment. Displacing these taxes with pollution taxes would improve the productivity of the economy. "Unlike many other sources of federal revenue, a carbon tax would generate overall economic efficiency gains, regardless of how the revenues from the tax are used", says Dower and Repetto.<sup>21</sup>

A high carbon tax coupled with reduced tax rates on income and profits, according to the World Resources Institute, could generate a possible gain of 45-80 cents per dollar of tax shifted.<sup>22</sup> The gain comes not only from improved economic efficiency but from reduced investment in infrastructure and in reduced operating costs due to higher energy efficiency and in reduced environmental damage.

A vigorous discussion is occurring throughout Europe about how to achieve the greatest economic efficiency and equity from tax shifting. Sophisticated models have shown that reducing the personal income tax might stimulate short term spending but has modest long term benefits. A better result might occur by directing the environmental tax revenues to expanding investment tax credits. However, that lowers the cost of new capital investments relative to labor and thus could increase unemployment. Also higher growth could actually increase carbon dioxide emissions. A reduction in payroll taxes could help labor and an increase in investments in energy efficiency and renewables could reduce the linkages between growth and pollution.

The Danish government recently examined the impacts on their economy if they were to increase their carbon dioxide tax by about \$25 per ton.<sup>23</sup> The conclusion was that if the revenue generated were returned through income tax reductions there would be a loss in production and a rise in unemployment but if the revenue generated were returned by reducing business' social security reductions employment and production would both rise.

## Effects of a \$25.50 per ton increase in Denmark's CO2 tax on the Danish Economy

### *Returned through income tax reductions*

	1997	2001	2005	Long
Employment ('000s)	0	-8	-1	0
Production (%)	-0.1	-0.5	-0.2	-0.2

### *Returned through employer social security reductions*

	1997	2001	2005	Long
Employment ('000s)	2	4	3	0
Production (%)	0.1	0.2	0.1	0.2

A modest form of tax shifting has been suggested by a bill introduced in California by Assemblyman Tom Bates. AB 1725 would have imposed a tax of \$3 per ton of carbon dioxide (\$11 per ton of carbon). This tax would equal the revenue lost by phasing out a .5 percent temporary sales tax. Thus tax revenues to the state would remain the same while the tax shifted from retail business to pollution.

## Competitiveness

A question frequently raised regarding all taxes, including green taxes, is whether they would undermine the competitiveness of domestic industry. This question has been raised with regard to national green taxes in Europe, where countries operate under the Single Europe Treaty which forbids taxing imports within Europe, and with regard to state taxes in the United States, where the Constitution prohibits states from imposing taxes on interstate commerce. Countries and states prefer to introduce green taxes cooperatively, not unilaterally.

Green taxes would not impose a competitive disadvantage if imposed on the household sector or on that portion of the business sector that does not export its products or services. The most significant impact would occur on energy intensive, exporting industries. Muller and Hoerner examined the impact of a \$7.50 per ton carbon tax on the most energy intensive industry. They found that at the four digit Standard Industrial Classification (SIC) Code level the heaviest burden would fall on Portland cement

manufacturers but cement tends not to trade in international markets and is only slightly traded on the interstate level because of its high transportation costs relative to its modest value. Nitrogenous fertilizers and a few primary metal industries such as aluminum and steel would experience price increases in excess of 0.5 percent.

The authors conclude, "Overall, the competitive impact of a modest state-level carbon tax would appear to be limited to a handful of industries and to be small even for those industries it hits hardest."<sup>24</sup>

To cope with competitiveness issues Europe's carbon taxes either exempt heavy industry or create a two tiered structure for business and households. In 1991 Sweden, for example, introduced a \$30 per ton tax on carbon dioxide emissions. Energy intensive industries were exempted. Household and non-manufacturing industries paid rates four times higher on average than mining, manufacturing and agriculture industries.<sup>25</sup>

### **\$7.50 Per Ton Carbon Tax as Percentage of Annual Shipping Value by Industry for Energy Intensive Four Digit SIC Industries.<sup>26</sup>** (based on 1988 shipping and energy use)

SIC Industry Code	Carbon Tax as % of Shipping Value
3241 Cement Hydraulic	9.833%
3334 Primary Aluminum	1.731%
2873 Nitrogenous Fertilizers	0.795%
3312 Blast Furnaces & Steel Mills	0.740%
2631 Paperboard Mills	0.472%
2819 Industrial Inorganic Chemicals	0.446%
2821 Paper Mills	0.418%
2869 Industrial Organic Chemicals	0.294%
2911 Petroleum Refining	0.147%
2821 Plastics Materials & Resins	0.089%

• **Denmark's Carbon Dioxide Tax.** In 1992 Denmark introduced a carbon dioxide tax. The charges are twice as high for households as for businesses: \$14.30 per ton of CO<sub>2</sub> vs. \$7.15. Denmark offers refunds to energy intensive

businesses. For firms engaged in export, refunds of the tax are possible depending on the ratio of the tax relative to the value added in production. For industries where the tax amounts to more than 3 percent of the value added, a total tax refund is possible. However, Denmark permits such refunds only if "reasonable" energy efficiency investments are undertaken. These investments must be specified in energy audits carried out by consultants certified by the Danish Energy Agency.<sup>27</sup>

Finland and Denmark also have a cap on the amount of carbon taxes a firm that competes internationally must pay. A carbon tax introduced into the Maryland House of Delegates in 1992 included a tax cap of \$250,000 per enterprise regardless of whether the business were engaged in export.

- **Sweden's NOx Tax.** Since January 1, 1992 Sweden has imposed an environmental charge on NOx emissions from large combustion plants. The fee is \$2.18 per pound, measured as NO<sub>2</sub>. The revenue from the charge is returned to the plants in proportion to their energy production. This refund policy allowed the tax to gain business support yet the refund policy still encourages NOx reductions. The average cost of reducing one kilogram of NOx is \$1.20 while the tax is \$2.18 per pound.<sup>28</sup>

- **Ozone Depleting Chemicals Tax.** The U.S. Congress designed the tax on ozone depleting chemicals(ODC) to minimize adverse impacts on U.S. manufacturers. Imports of ODCs are subject to the same tax while any tax paid on exports of such chemicals is rebated. The Internal Revenue Service(IRS) taxes imported goods based the average consumption of ozone depleting chemicals in the manufacture of comparable domestic goods. If the IRS has no comparable product on its list it will tax that product 5 percent.

These measures protected the domestic market from predatory tactics by foreign producers who did not pay the tax and allowed exports to compete on a level playing field in other nations that have not adopted a tax. However, the rebate of the tax on exports eliminates the environmental price signal.

Can a state that imposes a carbon tax on in-state producers also impose the same tax on out-of-state producers? Most states already require companies engaged in interstate commerce to distinguish

between in-state and out-of-state sales as part of the process of allocating the firm's total income between the states. A firm could be given a credit in an amount equal to the carbon tax paid times the percentage of all sales which are out-of-state sales. For diversified firms, the credit would have to be calculated by product line so that the tax liability caused by, for example, the in-state production of cement was not reduced as a result of out-of-state sales of software.

Assuming that such a tax could be imposed at a reasonable cost, do states have the Constitutional authority to do so? Muller and Hoerner have explored some of the legal precedents.<sup>29</sup> Recent decisions by the General Agreement on Tariffs and Trade(GATT) may pose an obstacle to imposing environmental taxes on imports. A recent GATT panel decision ruled that the U.S. violated GATT by banning the import of tuna caught by fishing techniques that slaughter dolphins. The panel concluded that the U.S. Congress could impose environmental standards on its own fishing fleets but could not impose such standards on foreign fishing fleets. Such a decision would appear to be relevant to any environmental tax imposed on foreign production techniques.<sup>30</sup>

## Equity

Although there are many kinds of environmental taxes, carbon taxes have gained the most attention. One reason is that they are directly related to the amount of carbon dioxide emissions, which in turn its directly related to greenhouse gas emissions and global warming. Energy taxes do not tend to discriminate between fuels.<sup>31</sup>

A \$10 per ton carbon tax would have a significant impact on the price of coal but a very nominal impact on the price of electricity or gasoline. A \$100 per ton carbon tax would more than double the price of coal while increasing the price of gasoline by 20 percent and the price of electricity by about 50 percent.

## Price Impact of Carbon Taxes



Unit	\$10/Ton	\$100/Ton
Barrel of Oil	\$1.00	\$10.00
Ton of Coal	\$6.00	\$60.00
1000 Cu. Ft. of Natural Gas	\$0.15	\$1.52
Gallon of Gasoline	\$0.02	\$0.20
kWh (Coal Fired)	\$0.003	\$0.03

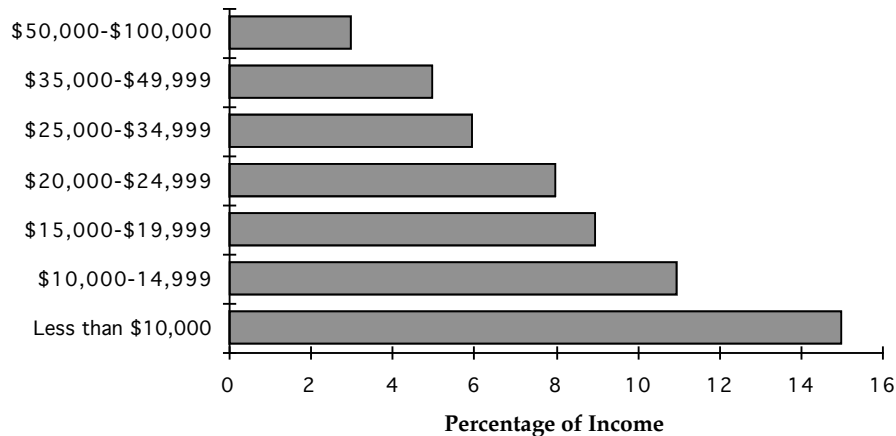
For purposes of illustration, a \$6 per ton tax on carbon would translate into an increased tax of \$43.12 per low income household in Minnesota.

### Impact of a \$6 Per Ton Carbon Tax on Low Income Households

Fuel	Annual Consumption	Additional Tax
Gasoline	655 Gallons <sup>32</sup>	\$12.12
Electricity	7505 kWh <sup>33</sup>	\$15.00
Natural Gas <sup>34</sup>	160 Mcf <sup>35</sup>	\$16.00
Total		\$43.12 <sup>36</sup>

Any form of pollution tax is regressive. It falls more heavily on low income households. Poor households spend more than 15 percent of their income on energy while households earning over \$50,000 a year spend less than 3 percent.

Energy Expenditures as % of Income



These estimates are based on statewide averages and may be high. One third of low income households, for example, do not own cars and thus their gasoline consumption would be lower than that given above. Low income households tend to use less electricity than the average household. The electricity figure assumes coal fired electricity, but 40 percent of Minnesota's electricity is generated by non coal fuel sources.

energy conservation programs it would amount to \$75 million. Thus the low income community as a whole would receive an annual net benefit of about \$53 million. If 15 percent of the carbon tax revenues were used for low income conservation programs it would constitute a hold harmless or break even program for low income community.

One way to deal with the inequities resulting from an across the board carbon tax would be to return a significant portion of the revenue to the low income community for energy efficiency. Assuming 514,000 low income households in Minnesota, the amount generated by a \$6 per ton carbon tax from low income households throughout Minnesota would be \$22.16 million. If 50 percent of the carbon tax revenues were used for

For those who take advantage of the program, the benefit would be greater because the money would lower energy use over 10-25 years depending on the energy conservation investment. A \$2,000 investment per household would reduce heat, electricity and water expenditures by \$100-200 per year or more. As these savings are realized, the impact of the carbon tax is proportionately lowered too.

As of 1991 low income energy efficiency programs in Minnesota were serving about 20,000 homes per year, although by far the largest amount of spending was used for the 10,000 homes served by the weatherization program. At current rates, the weatherization program would need 50 years to serve all low income households. To date low income energy efficiency programs have found it difficult to even keep up with the increased number of households in need.

Assuming a \$2,000 investment per home, the \$75 million from the carbon tax would serve an additional 37,500 homes per year. In addition to existing low income programs, this would allow the entire low income household population to be served within about 10 years.

Two recently proposed state carbon taxes have specifically targeted a certain percentage be used for low income energy efficiency programs. In January 1992 a \$3.75 per ton carbon tax was introduced in the Maryland Senate. It would have raised \$100 million a year. Twenty one million dollars of those revenues were targeted for low income weatherization and energy assistance programs.<sup>3233343536</sup>

In April 1992 Minnesota State Senator Steve Morse introduced the Sustainable Energy Transition Act. The \$6 per ton tax would have raised about \$150 million a year. About 15 percent of this was targeted to low income energy programs.<sup>37</sup>

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NOTES

<sup>1</sup> Television interview with Paul Volcker, with Charlie Rose, *The Charlie Rose Show* June 22, 1992; M. Feldstein, "The Case for a World Carbon Tax", *Wall Street Journal*. June 4, 1992. Cited by Frank Muller and J. Andrew Hoerner, *Greening State Energy Taxes: Carbon Taxes for Revenue and the Environment*. Center for Global Change. November 1993.

<sup>2</sup> Letter from Chris Calwell. Natural Resources Defense Council. July 1, 1993.

<sup>3</sup> Landfill Taxes. Minnesota Statutes. Section 115A.923. Enacted in 1989. Initial 50 cents per cubic yard tax boosted to \$2 per cubic yard in 1990. \$3.06 million raised in fiscal year 1988, \$2.8 million in 1989, \$3 million in 1990. Hazardous Waste Generation Tax. Minnesota Statutes. Section 115B.22. Enacted in 1983. Long term containment without treatment is taxed at a rate of 32 cents per gallon of liquid or \$32 per cubic yard of solid. Long term containment after treatment is taxed at 16 cents per gallon of liquid or \$16 per cubic yard of solid. Land treatment is taxed at \$32 per cubic yard. Other treatment is 8 cents per gallon of liquid or \$8 per cubic yard of solid. Collected \$1.36 million in fiscal year 1988, \$749,000 in 1989, \$553,000 in 1990.

<sup>4</sup> During its first few years, Proposition 99 took in almost \$700 million a year. In 1995 it will bring in about \$446 million. The breakdown of surtax revenue distribution is as follows: 20 percent to health and education services, 35 percent to hospital services, 10 percent to physician services, 5 percent to research, 5 percent to public resources, and 25 percent unallocated. The revenues are dropping 3 to 3.5 percent per year as cigarette smoking declines. The legislation allowing the state to spend the 25 cents a pack additional tax expired in June 1994. There is a vigorous debate about how to divide up this revenue. "The debate is between those who want to spend the money on health care for the poor and those who want to protect the innovative and controversial anti-smoking program." *Los Angeles Times*. June 27, 1994.

<sup>5</sup> Sixty five percent goes to demonstration projects as well as to the testing and closure of public and private wells, and to research the health effects of contamination. A report by Iowa State reveals that in recent years, Iowa's use of pesticides has been below that of surrounding states. Minnesota also has a tax on pesticides and fertilizers. The law, enacted in 1987(Chap. 18B.26 Subd. 3a) has been revised several times. In 1994 pesticide sellers pay 2/5 of 1% of gross sales within the state as a registration/application fee. In fiscal year 1993 the total amount raised was \$4.6 million. This dropped to \$4.3 million in fiscal year 1994 and is projected to drop to \$4.0 million in fiscal year 1995. The revenue is deposited in the Pesticide Regulatory Account. Of the amount collected each year, \$600,000 is credited to pesticide collection programs in which old and used pesticide containers are collected and disposed. The remaining money is used by the Minnesota Department of Agriculture for administration, etc. An additional 1/5 of 1% tax is levied on pesticides and fertilizer use. This funds the Agricultural Chemical Responsibility and Reimbursement Account, which funds cleanup of agricultural chemical spills. In FY 1993 \$1.95 million was raised. To our knowledge, no part of either account is specifically designated to reduce future use of pesticides or fertilizers.

<sup>6</sup> Many would argue that adding the environmental costs of electric power generation to the price charged for electricity is not a tax but rather, an internalization of the full costs of power production. We agree. A similar argument can be made regarding most green taxes. Utility electricity analyses differ in that they are very rigorous examinations often conducted in a quasi-judicial proceeding, whereas the level of most green taxes are arrived at in a more qualitatively oriented legislative arena. In this report we analyze both taxes which might be viewed as simply requiring the product or service to pay its true costs and those that impose a price penalty over and above full environmental costs.

<sup>7</sup> Laws of Minnesota 1993. Chapter 356. Section 3.

<sup>8</sup> *The Tax for Fuel Conservation*. Resource Futures International. November 3, 1993.

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<sup>9</sup> In 1990, the California legislature passed a pollution tax to encourage efficient cars. California State Senate Bill No. 431. The program would have imposed a heavy tax on gas guzzlers and provided rebates on gas sippers, but the tax was based on the grams of pollutants emitted per mile. The bill was vetoed by the Governor.

<sup>10</sup> Another question that arises from the Ontario feebate experiment is whether the energy savings were worth the political costs. Broad environmental taxes, especially on vehicles, generate significant opposition. One commentator notes that the net 1992 revenues to Ontario were \$28.5 million from the fuel inefficiency tax while retail tax revenues on new passenger car sales generated \$445 million and \$1.8 billion was generated from provincial gasoline taxes.

<sup>11</sup> J. Andrew Hoerner. *Tax Tools for Climate Protection: The U.S. Ozone Depleting Chemicals Tax*. February 1994. Center for Global Change. University of Maryland.

<sup>12</sup> The Act, administered by the Division of Waters of the Department of Natural Resources, requires that a conversion plan be submitted by users by January 1, 1992. The once-through systems must be converted within the design life of the equipment based on the ASHRAE service life for primary system components. This ranges between 19-24 years and 1990 is used as the base year to determine the remaining service life for a system. Once-through water for heating and cooling systems for commercial users is \$200 per million gallons with no maximum fee. The fee for non profits and school districts is 5 cents per 1000 gallons until 1993(\$50 per million gallons), rising to 10 cents in 1993 and to 15 cents in 1997. The current fee for water not appropriated for once through systems or for other uses is \$50 for up to 50 million gallons, or \$1 per gallon and rises to a maximum of \$4.50 per million for use above 400 million gallons, according to the Division of Waters.

<sup>13</sup> Total emissions are about 45,000 tons a year and the estimated revenue for 1994 is \$6.4 million. These fees are imposed on stationary not mobile sources. Minnesota Pollution Control Agency. *The Feasibility of Using Fees to Control Toxic Air Emissions*. Prepared for the U.S. Environmental Protection Agency. June 1994.

<sup>14</sup> *British Columbia Waste Management Act*. Regulation 304/87. Section 33,35 O/C 1701.87. Schedule B.

<sup>15</sup> *Ibid*. Schedule C.

<sup>16</sup> Lorenz Jarass and Gustav Obermair. *More Jobs, Less Pollution: A Tax Policy for an Improved Use of Production Factors*. Workshop on Transatlantic Fiscal Reform and the Environment. Amsterdam. June 6, 1994.

<sup>17</sup> Levies on natural resources and environment(car ownership, energy and alcohol and tobacco) in the United States was 6.9 percent of national income in 1970 and dropped to 5.0 percent in 1990. The proportion of U.S. national income paid to in fees on natural resource exhaustion and environmental damage was 4-6 percent of national income, about the same as in the Netherlands, France, Germany, Italy and Japan. Jarass and Obermair, *op. cit*.

<sup>18</sup> The United States is an anomaly among industrialized countries in that gross labor costs declined slightly from 69 to 68 percent from 1970 to 1990. Yet net labor income declined more dramatically, from 55 percent to 51 percent of national income during the same time period.

<sup>19</sup> Carbon taxes are sometimes given in the form of a tax per ton of carbon dioxide and sometimes as a tax per ton of carbon. To convert to dollars per ton of carbon emitted, assuming complete combustion, multiply the tax per ton of carbon dioxide by 3.667. Thus a \$10 per ton tax on carbon dioxide would be equivalent to a \$36.67 per ton tax on carbon. A \$100 tax per ton of carbon translates into a \$27.30 tax per ton of carbon dioxide emissions.

<sup>20</sup> *Washington Post National Weekly Edition*. October 1990. The Post cites a Congressional Budget Office study concluding that GNP in the year 2000 would be 1 percent lower if a \$100 per ton carbon tax were imposed. Alan Manne of Stanford and Richard Richels of the Edison Electric Institute assume that a much higher tax would be needed to reduce carbon dioxide emissions significantly. They calculate that the reduced productivity would reduce the GNP by 3 percent or \$300 billion a year. *New York Times*. October 3, 1990.

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<sup>21</sup> Roger Dower and Robert Repetto, *Use of the Federal Tax System to Improve the Environment*. U.S. House of Representatives. Committee on Ways and Means. Long Term Strategy Hearings on the Environment. March 6, 1990.

<sup>22</sup> Robert Repetto, Roger C. Dower, et. al. *Green Fees: How a Tax Shift Can Work for the Environment and the Economy*. World Resources Institute. Washington, D.C. November 1992.

<sup>23</sup> Since Denmark has a population about that of Minnesota and is heavily involved in international and intra-European trade the results may be useful in a Minnesota context.

<sup>24</sup> Frank Muller and J. Andrew Hoerner, "The Promise of State Carbon Taxes: Opportunities and Policy Issues", *State Tax Notes*. March 8, 1993.

<sup>25</sup> For example, coal is taxed at \$97 per ton for households versus \$24 per ton for business and natural gas at \$82 per 1000 cubic meters versus \$21 for business.

<sup>26</sup> *Ibid.*

<sup>27</sup> *Climate Change Policy Initiatives*. 1994 Update Volume 1. Organization for Economic Cooperation and Development. Gross revenues of DKK 2.7 billion were projected. Refunds to energy intensive businesses reduced net revenue to 0.7 billion. The way the Danish carbon dioxide tax is handled is similar in some respects to the way Minnesota's Conservation Improvement Program is handled by Minnesota Power(MP). By state law, regulated Minnesota electric utilities must invest at least 1.5 percent of total revenues in energy conservation. Because only a handful of industrial customers account for over half of MP's electricity sales, MP has developed the Industrial Conservation Project(ICP), a unique program to serve its large customers. MP deposits 1.5 percent of its sales to these customers in a special account. Large customers can use this account to finance energy efficiency programs. Thus, for example, a customer that purchases \$1,000,000 per year in electricity from MP will have deposited \$150,000 per year in its energy conservation account. The ICP contains carry-forward and carry-back provisions which allow participants to design larger projects or leverage capital more effectively to implement improvements. Large power users can carry-forward 1992 and 1993 allocations into 1994 but must spend the three-year budget by the end of the third year, 1994. 1993-1995 allocations must be used by December 31, 1995. Participants can also carry-back up to five years of future allocations, therefore aggregating 5 years of conservation investments in a single project. The energy efficiency plan must be approved by MP and the Department of Public Service based on an extensive cost-benefit analyses. MP will allow funds to be used to make industrial process changes that can save thermal as well as electric energy. If large industrial customers do not use the funds in their account the funds revert to the MP's general Conservation Improvement Program fund. In some respects, the MP plan constitutes a forced energy savings program.

<sup>28</sup> Memo from Christina Olivecrona. KPMG Environmental Consulting. Netherlands. October 22, 1993. Monitoring is done by the manufacturer. Once a year plants send an emission declaration to the Swedish Environmental Protection Agency. Total revenue from the tax in 1992 was \$74 million. Annual average emissions were 35 percent lower in 1992 than in 1990. The 35 percent reduction was expected only by 1995. The charge has provided an economic incentive. Swedish Environmental Protection Agency based on the value of charge and cost of reducing emissions has valued net benefit to be at least \$30 million.

Frank Muller suggests a form of the Swedish NOx tax/refund for a carbon tax. He recommends that a cap be structured as a percentage of the firm's gross sales, maybe 1 percent. State revenue departments by and large already collect gross sales data for firms. This could be translated into an incremental carbon tax. For example. suppose the maximum tax burden is 1 percent of gross sales and the base period for calculations is 1989 to 1992. A steel producer has used sufficient fossil fuels during that base period to pay a carbon tax equal to 2 percent of sales. The firm would be given a credit against the tax equal to its gross sales in the current taxable year times the percentage of the excess tax burden defined as the percentage of the gross sales that the carbon tax would have constituted during the base period less the maximum tax percentage for the steel firm. This would

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be 2 percent less 1 percent, or 1 percent. The firm would still pay the entire carbon tax but would get back half the tax payment in the form of a tax credit. In essence the steel company is paying a tax on its incremental consumption of carbon fuels above half its historic consumption rate. It still has an incentive to improve energy efficiency. Each 1 percent increase in energy efficiency creates a 2 percent reduction in its carbon tax burden.

<sup>29</sup> Frank Muller and J. Andrew Hoerner, *Greening State Energy Taxes: Carbon Taxes for Revenue and the Environment*. Center for Global Change. University of Maryland at College Park. November 1993.

<sup>30</sup> Taxes on CFCs used to make imported goods are specifically allowed to be imposed on both parties and non-parties to the Agreement by the terms of the Montreal Protocol. However, it is conceivable that proposed changes in GATT could make it illegal to impose sanctions on non-signatories to international environmental agreements.

<sup>31</sup> This is not always the case. President Clinton proposed a three tiered Btu tax in 1993. He would have exempted renewable fuels and imposed a higher tax on oil than on coal and natural gas. Sweden's carbon tax exempts biofuels.

<sup>32</sup> Average fuel efficiency in 1990 was 16.5 miles per gallon and average annual vehicle miles driven was 10,800. Minnesota Department of Transportation.

<sup>33</sup> Northern States Power Company. *1991 Annual Report*.

<sup>34</sup> Non-electric.

<sup>35</sup> The average household gas usage for Northern States Power Company customers in 1991 was 122 MCF. *1991 Annual Report*. The average usage for Minnegasco customers was 130 MCF in 1991. Personal conversation with David Kostik. Minnegasco. December 1992. The Center for Energy and Environment estimates their Operation Insulation participants used 149 MCF for a homeowner occupied unit and 190 MCF for a rental unit. Conversations with energy auditors working with the Neighborhood Energy Consortium gathered estimates of 160 MCF per house.

<sup>36</sup> This figure is close to the \$29.25 per year additional expenditures estimated for households below 100 percent of the poverty line in the U.S. by the Department of Energy for a \$6 per ton carbon tax. *Studies of Energy Taxes.*, Energy Information Administration, Department of Energy. Washington, D.C. April 1991.

<sup>37</sup> Some background on the Minnesota carbon tax experience. The Minnesota legislature in 1990 requested a report from the Pollution Control Agency (PCA) and the Department of Natural Resources on carbon dioxide emissions in Minnesota and incentives to reduce them. In 1991 the legislature formally established a tree planting program, Minnesota ReLeaf and requested a further report from the PCA with an implementation plan and recommendations for a fee structure. The PCA recommended a 54 cents per ton of carbon tax to generate revenues for tree planting. In 1992 Senator Morse's bill called for a \$6 tax per ton of carbon emissions. In 1993 a similar bill called for a \$2 per ton tax on carbon.