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Carbon Taxes

"Tax What You Burn, Not What You Earn"

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Carbon taxes reward people when they conserve energy, providing many benefits.

Abstract

Carbon taxes are based on fossil fuel carbon content and therefore tax carbon dioxide emissions. In July 2008 British Columbia introduced the first carbon tax in North America. This paper evaluates this tax. This tax reflects key carbon tax principles: it is broad, gradual, predictable, and structured to assist low-income people. It begins small and increases gradually, allowing consumers and businesses to respond with increased energy efficiency. Revenues are returned to residents and businesses in ways that protect the lowest income households. Like most new taxes, the carbon tax has been widely criticized. Much of this criticism is technically incorrect or exaggerated. Consumers have many possible ways to conserve energy and therefore reduce their tax burden. Since lower-income households tend to consume less than average amounts of fuel and receive targeted rebates, most low-income households will benefit overall. This tax supports economic development by encouraging energy conservation which keeps money circulating within the regional economy. If other jurisdictions follow British Columbia's lead, its impacts and benefits will be large.

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Introduction

North American (United States and Canada) policy generally favors low energy prices, with low taxes, production subsidies and other types of energy industry support. As a result, North Americans are energy rich: an average worker can purchase more fuel per hour of labor than at almost any other time or place. In response North Americans have developed energy intensive lifestyles and industrial practices. We consume more energy per capita than most other times and places and fail to implement energy conservation practices common elsewhere.

Cheap energy policies may once have been sensible to stimulate heavy industry development such as domestic vehicle production but leave a legacy of energy inefficiency that now imposes economic, social and environmental harm. People who are energy rich become poor in other ways: inefficient energy consumption impoverishes consumers, transfers wealth from North America to foreign energy producers, and creates environmental risks such as climate change. Cheap energy results in automobile dependent transport systems and sprawled land use patterns, increasing traffic problems such as congestion, road and parking facility costs, accidents, inadequate mobility options for non-drivers, and health problems due to inadequate physical activity.

To reduce these problems North America needs innovative solutions that increase overall energy and economic efficiency by extracting more productivity and consumer welfare per joule of energy consumed. Such solutions do exist. This paper describes one of the best, a tax reform called *carbon taxes*.

Carbon taxes are based on fossil fuel carbon content and therefore tax carbon dioxide emissions (CTC, 2007). They differ from current North American fuel excise taxes, which are applied primarily to motor vehicle fuels to finance highways and other transportation services. Because carbon taxes are intended primarily to internalize fuel consumption's environmental costs and encourage energy conservation, there is no particular requirement for how revenues should be used. They can reduce other taxes, finance rebates, or provide new public services such as energy conservation programs. If revenues are returned to residents and businesses, resulting in no significant increase to total government income, the taxes are considered *revenue neutral*, called a *tax shift*. Many economists advocate tax shifting to help achieve strategic policy objectives; they raise taxes on *bads*, such as pollution emissions, and reduce taxes on *goods*, such as labor and investments (Barrett and Hoerner 2002; Toman, Griffin, Lempert 2008).

British Columbia's 2008 budget includes the first true revenue neutral carbon tax in North America (BC 2008). It started 1 July 2008 at $10 per tonne of carbon dioxide equivalent and increases $5 per tonne annually for the next four years. Table 1 illustrates the resulting carbon tax rate for various fuels. Revenues are returned to individuals and businesses through various tax cuts and rebates, including a $100 per resident Climate Action Dividend distributed June 2008, and special rebates for low income households.

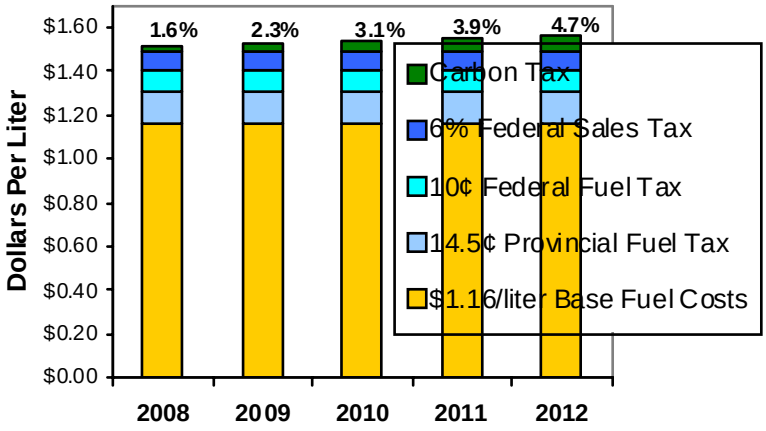
Table 1 **British Columbia Carbon Tax Rates For Various Fuels**

Fuel	Unit	2008	2009	2010	2011	2012
Tax Per	Tonne of Carbon	$10	$15	$20	$25	$30
Regular Gasoline	cents/liter	2.33¢	3.50¢	4.66¢	5.83¢	6.99¢
Diesel	cents/liter	2.69¢	4.04¢	5.38¢	6.73¢	8.07¢
Jet fuel	cents/liter	2.61¢	3.92¢	5.22¢	6.53¢	7.83¢
Propane	cents/liter	1.54¢	2.31¢	3.08¢	3.85¢	4.62¢
Natural gas	dollars/gigajoules	$0.50	$0.74	$0.99	$1.24	$1.49
Coal – low heat	dollars/tone	$17.77	$26.66	$35.54	$44.43	$53.31
Coal – high heat	dollars/tone	$20.77	$31.16	$41.54	$51.93	$62.31

This table shows British Columbia's carbon tax rates for various fuels.

Figure 1 illustrates the magnitude of the carbon tax on gasoline for the next five years, assuming that the base price and other taxes continue at their current rates. It is relatively small overall, starting at 1.6% and rising to 4.7% of total fuel prices.

Figure 1 **Taxes As A Portion of Total Fuel Prices**



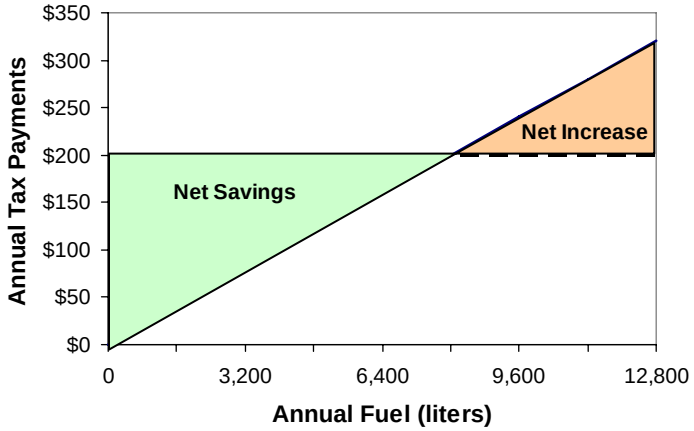
This figure illustrates the magnitude of British Columbia's carbon tax as a portion of total fuel prices, assuming that base fuel prices and taxes continue at their current rates.

This reflects key tax shifting principles (Durning and Bauman 1998):

- *Broad coverage*. The tax applies to all fossil fuels, based on their carbon content. This makes it credible and efficient to administer compared with taxes that vary depending on where or by whom fuel is consumed.
- *Gradual and predictable implementation.* The tax will increase gradually and predictably so consumers and businesses can take higher future energy costs into account when making long-term decisions, such as vehicle purchases and building locations.
- *Revenue-neutrality.* Revenues generated by the tax are returned to individuals and businesses through reductions in other taxes.
- *Protection for lower-income households.* Tax reductions and rebates are structured to aid lower-income households and other disadvantaged groups.

Although often regarded as a cost increase, revenue-neutral carbon taxes actually offer households and businesses a new opportunity to save money if they conserve energy. Those that consume average amounts of energy see no overall change (each dollar in taxes is offset by a dollar in tax savings), but those who conserve gain financially overall. For example, a two-person household that receives $200 in tax reductions and rebates saves overall if it purchases less than about 8,000 liters (2,100 gallons) equivalent of fuel annually, as illustrated in Figure 2. The more energy conserved the more money saved. As the tax rate increases in the future so will savings per unit of fuel conserved.

Figure 2 **Conserving Fuel Provides Net Savings** (2.5¢ per liter average tax rate)

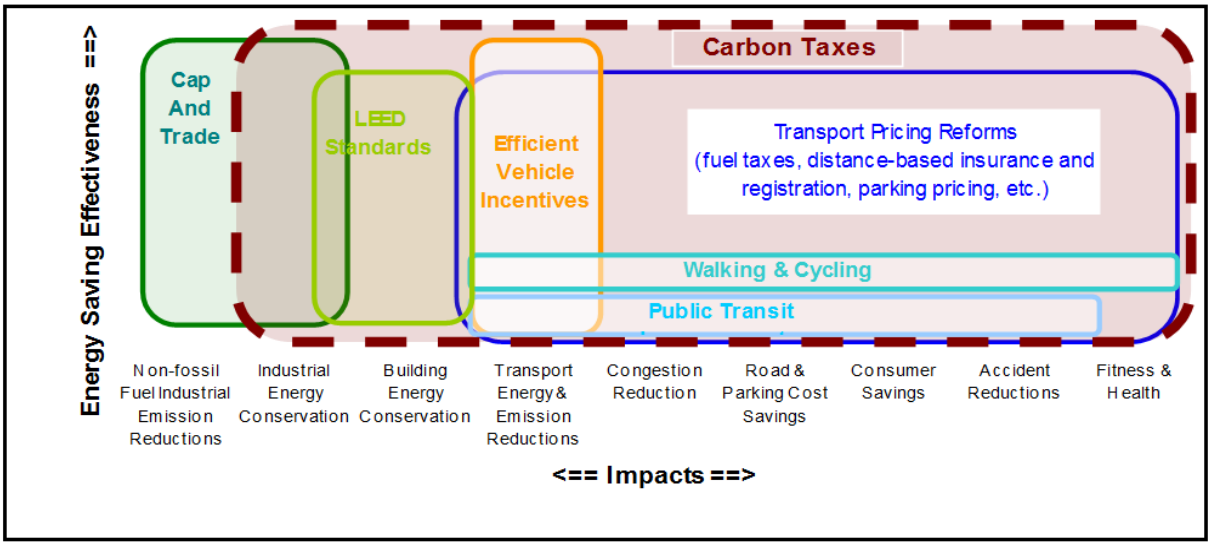


This graph illustrates savings that result from reduced their fuel consumption. As the tax rate increases, so will the rebates and therefore potential energy conservation savings.

Critics often imply that the tax will result in an equal number of winners and losers, and that winning is simply a matter of luck, but people make frequent decisions that affect their energy consumption, particularly over the long run when choosing vehicles and appliances, home and job locations, and home weatherization investments.

Such taxes are particularly beneficial because they have greater effectiveness and scope than most other energy conservation and emission reduction strategies, as illustrated in Figure 3. Cap-and-trade programs generally only reduce large industry emissions. LEED standards only reduce buildings-related emissions. Incentives to purchase more efficient and alternative fuel vehicles, such as CAFE standards and feebates, reduce emissions per vehicle-mile but by reducing per-mile vehicle operating costs they tend to increase total vehicle traffic (a *rebound effect*) which increases problems such as congestion, facility costs, accidents and sprawl (Litman 2005). Although improving mobility options, such as nonmotorized travel and public transit, individually provide relatively modest energy savings, such strategies provide additional benefits such as congestion reductions, facility cost savings and reduced accidents. Carbon taxes support almost all types of emission reductions (excepting reductions in non-fossil-fuel emissions, such as cement production and landfill methane), and by reducing total vehicle traffic, provide greater total benefits than most other strategies.

Figure 3 **Effectiveness and Scope of Emission Reduction Strategies**



Cap-and-trade programs generally only support large industrial emission reductions. LEED standards support building energy conservation. Efficient vehicle incentives reduce energy consumption per vehicle-mile, but by stimulating additional vehicle travel exacerbate traffic problems. Transportation pricing reforms (fuel taxes, distance-based insurance and registration fees, parking pricing, etc) reduce energy consumption and traffic impacts. Nonmotorized and public transit improvements provide relatively modest energy savings but many additional benefits. Carbon taxes support most forms of energy conservation and provide additional benefits by reducing total vehicle traffic.

Carbon taxes are efficient and flexible because they support many energy conservation and emission reduction strategies, allowing households and businesses to choose the combination that works best for them, including more fuel efficient vehicles, more accessible locations and destinations, more efficient modes, more resource-efficient goods (such as recycled products), building weatherization, and shifts to alternative fuels (Toman, Griffin, Lempert 2008). Most households and businesses can implement some of these strategies, depending on their abilities and preferences. Carbon taxes help achieve various economic, social and environmental objectives (congestion reductions, facility cost savings, accident reductions, reduced sprawl, improved mobility for non-drivers, etc.), rather than just energy conservation and emission reductions, and so help achieve true sustainable development (Litman and Burwell 2006).

Carbon taxes support and are supported by other energy conservation strategies. For example, vehicle manufactures can offer more fuel efficient models, public transit agencies can improve transit service, and developers can build more walkable, smart growth neighborhoods, b without adequate financial incentives consumers will continue to purchase inefficient vehicles, buses will have few passengers, and households will choose homes in automobile-dependent, sprawled locations. As a result, it is best to implement carbon taxes together with other appropriate policies and programs which together encourage energy efficiency and emission reductions.

Described differently, carbon taxes can do more than just increasing *vehicle fuel efficiency*, they increase overall *transport system efficiency* by encouraging use of efficient modes and creating more accessible land use patterns, providing the following co-benefits (Litman 2007; Ripley 2008):

- *Reduced traffic congestion.* Higher fuel prices help reduce traffic volumes and speeds and therefore congestion on major urban highways, particularly on corridors with high quality, grade separated public transit services (CBO 2008).
- *Road and parking facility cost savings.* Reduced motor vehicle traffic reduces the need to maintain and expand road and parking facilities, providing savings to governments, businesses and consumers.
- Increased traffic safety and reduced vehicle insurance costs. Grabowski and Morrisey (2004) estimate that each 10% fuel price increase reduces traffic fatalities 2.3%, with larger impacts on younger drivers, who tend to be more sensitive to fuel prices. Sivak (2008) found that a 2.7% decline in vehicle travel caused by fuel price increases and a weak economy during 2007-08 resulted in much larger 17.9% to 22.1% month-to-month declines in traffic deaths, probably due to disproportionate reductions in vehicle travel by lower income drivers (who tend to be young and old, and therefore higher than average risk) and speed reductions to save fuel.
- More efficient land use development (reduced sprawl). Rising fuel prices are causing households to choose *smart growth* locations, which provides savings and benefits to consumers, businesses, governments and the environment (Cortright 2008).
- Increased support for mobility options, including more social acceptance of walking, cycling, ridesharing and public transit travel; more political support for improving alternative modes; more demand for taxi and delivery services; and more employer acceptance of commute options such as flexible work schedules and telework.
- Air, noise and water pollution reductions, increasing urban community livability.
- Improved public fitness and health. Rising fuel prices encourage people to shift from driving to alternative modes, including walking and cycling. Since most transit trips include walking links, increased transit travel also tends to increase walking activity.
- Increased reliance on local, regional and domestic producers and reduced dependence on imported production.

These impacts and benefits tend to increase over the long-term as households, businesses and governments respond to higher fuel prices and increased demand for energy efficient options when making long-term planning and investment decisions, such as how to design streets and buildings, how much to invest in alternative modes, where to locate homes and services. Long-term (more than five year) impacts are generally about three times higher than short-term impacts (Litman 2008a). The monetized value of these co-benefits is huge, totaling many millions or billions of dollars annually in most jurisdictions. Yet, these co-benefits are often ignored when experts evaluate potential energy conservation strategies (Litman 2007). As a result, carbon taxes and other strategies that reduce vehicle travel and encourage use of alternative modes provide far greater benefits than indicated by most current studies.

Carbon Tax Theory

Taxes are generally considered a way to raise revenue but well designed taxes can provide additional benefits to society by affecting consumption, such as reducing tobacco use, alcohol consumption and traffic congestion.

A basic economic principle is that markets are most efficient (they maximize overall benefits) when *prices* (what consumers pay for a good) reflect *marginal costs* (the incremental costs of producing that good). There is a rich vocabulary to describe excessive prices (gouged, gypped, ripped off, etc.) but no comparable vocabulary describing underpricing. However, prices that are too low are ultimately as harmful as those that are too high, since they lead to wasteful consumption of scarce resources and exacerbate problems such as congestion, accidents and pollution. Taxes intended to correct underpricing are called *Pigouvian taxes* (after Arthur Pigou, the Cambridge economist who proposed the concept in the early 1900s).

A carbon tax informs energy consumers of their climate change costs. It increases the costs of carbon-intensive activities and provides financial savings from carbon emission reductions. As described earlier, carbon taxes are more efficient than most other energy conservation and emission reduction strategies because they encourage the widest range of solutions, including selection of more efficient vehicles, home weatherization, increased industrial production efficiency, and reduced motor vehicle travel.

It is difficult to put a dollar value on total climate change costs, but the tax can be calculated based on *control costs*, that is, the unit cost of reducing carbon emissions. The tax can be structured to help achieve a given emission reduction target, such as those established in the Kyoto Protocol (which requires that economically-developed countries reduce their greenhouse gas emissions by an average of 5% below their 1990 levels). In recent years, carbon markets have developed that allow carbon producers to purchase *offsets*, which represent carbon emission reductions provided by energy conservation and carbon capture programs (www.pointcarbon.com). In July 2008, carbon dioxide emissions were trading at €27.65 ($44.27 Canadian) per metric tonne, several times higher than the 2008 BC carbon tax rate but only slightly higher than the 2012 rate. This suggests that BC carbon tax is reasonable in magnitude, given currently available information and a desire to implement predictable and gradual change.

Fossil fuel consumption imposes a number of other external costs, besides carbon emissions, including environmental costs of petroleum production and distribution, economic and security costs of importing fuel, and various external costs of motor vehicle use such as traffic congestion, parking subsidies, accidents, and noise pollution. In North America, vehicle fuel taxes are not even sufficient to cover roadway costs. Although, ideally each of these costs would be internalized with specific, targeted fees (congestion charges, parking fees, distance-based insurance premiums, pollution fees, etc.), until such fees are fully applied, additional fuel taxes can be an appropriate second-best solution ("Fuel Tax Increases," VTPI 2008).

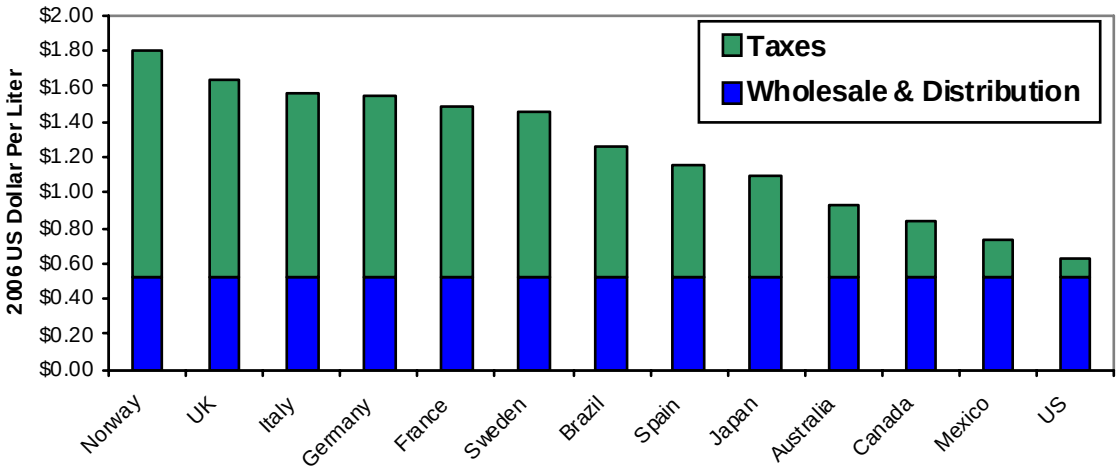
Carbon Tax Criticisms

Some common carbon tax criticisms are evaluated below.

Burdensome

Critics claim that this tax imposes a major burden on consumers and the economy. Yet, BC's carbon tax is small compared with fuel taxes in most other countries, and compared with recent fuel price increases. The United States and Canada have lower fuel prices than most other developed countries, as illustrated in Figure 4. Norway and the UK are particularly interesting examples because during the last few decades they were major petroleum producers yet retained high fuel taxes to encourage energy efficiency.

Figure 4 **2006 Gasoline Prices** (International Fuel Prices 2007)



North American fuel taxes and prices are far lower than those in most developed countries.

Ineffective

Critics claim that fuel taxes do little to reduce energy consumption. They are wrong. The price elasticity of gasoline is typically about -0.3 in the short run and -0.7 in the long run, meaning that a 10% price increase reduces fuel consumption 3% in a year or two, and 7% in five to ten years (Lipow 2008; Litman 2008a). Some U.S. studies found lower price responses during the 1990s (Hughes, Knittel and Sperling 2006), when real fuel prices declined and real incomes increased, but more recent research indicates more normal elasticities (CERA 2006; Komanoff 2008). While the current tax rate is modest, raising fuel prices only a few percent, it provides a foundation for larger impacts if needed in the future, and so is suitable for encouraging long-term conservation and emission reductions.

Unnecessary

Critics point out that the carbon tax is small relative to recent fuel price increases. Since it was announced gasoline prices increased about 40¢ (from $1.10 to $1.50), 16 times larger than the initial carbon tax. However, if fuel prices decline during the next few years, consumers may return to inefficient energy habits. British Columbia's carbon tax will encourage consumers and businesses to continue efforts to increase energy efficiency regardless of short-term price fluctuations.

Unfair

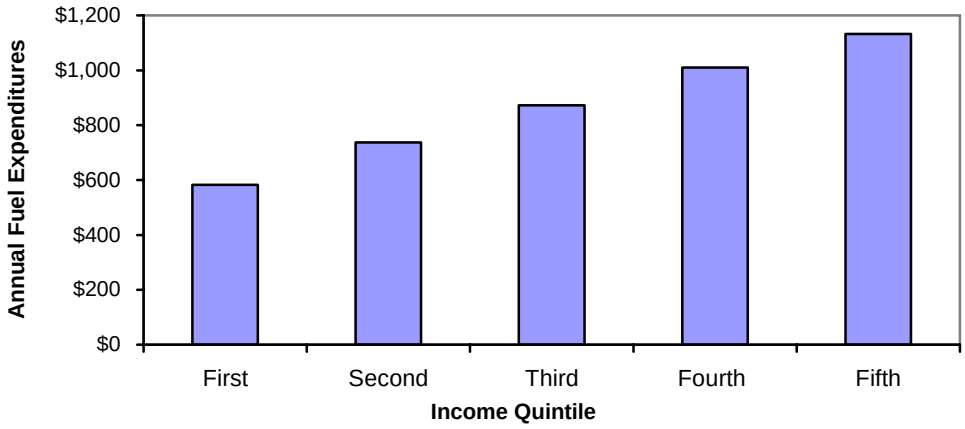
Critics often claim that a carbon tax is unfair to people with energy intensive jobs, locations or lifestyles, such as truck drivers, rural and northern community residents, and recreational motor boaters. However, all these consumers *can* significantly increase their energy efficiency over the long term by weatherizing homes, choosing more efficient vehicles and reducing mileage, and because they are large energy consumers they can provide proportionately large energy savings. Critics claim that rural residents cannot save energy because they lack high quality public transit service, but they can achieve large fuel savings by choosing more efficient vehicles, ridesharing and consolidating trips.

The New Democratic Party (NDP), the official opposition criticized the carbon tax claiming that it burdens consumers rather than industry. This is inaccurate. Industries pay the tax when they consume energy, and taxes on industry are ultimately borne by consumers as higher prices and by investors as lower profits. A separate cap-and-trade system is being developed to encourage reductions in industrial climate change emissions. Since industry represents a minority of British Columbia emissions effective energy conservation and emission reductions require consumer behavior change.

Regressive

Many critics claim that this tax harms low income households. They are wrong. Although fuel price increases may seem regressive (a dollar tax imposes a greater burden on poor rather than wealthy people), lower-income people purchase much less fuel than higher income people, as illustrated in Figure 5. Low-income households will benefit overall from a tax shift that returns revenues as per capita rebates, progressive tax reductions, or new services that benefit lower-income people (Boyce and Riddle, 2007). Described differently, although fuel taxes by themselves are regressive with respect to income, targeted tax reductions, cash rebates and improved services for poor people are extremely progressive, so revenue-neutral carbon taxes can be extremely progressive overall.

Figure 5 **2006 Fuel Expenditures By Income Quintile** (www.bls.gov/cex/home.htm)



Low-income people consume less fuel per capita and so tends to benefit from a tax shift if revenues are returned per capita as rebates, progressive tax reductions or new services benefiting lower-income people.

This tax is even more progressive if implemented with energy conservation policies and programs, such as walking and cycling improvements, increased ridesharing and public transit services, smart growth land use policies, and home insulating programs. Because alternative modes tend to experience economies of scale (for example, as rideshare demand grows the chance of finding a favorable rideshare match increases exponentially, and as public transit demand grows, unit costs of providing high quality service declines), their impacts and benefits increase if middle-class travelers have more incentive to walk, bicycle and use public transit, and makes these modes more socially acceptable. In other words, people who are economically or physically disadvantaged are particularly harmed by an automobile-dependent transportation system and sprawled land use patterns. To the degree that this tax and related policies help increase transport system diversity and land use accessibility, it provides additional benefits to disadvantaged people.

Inescapable

Critics sometimes claim that, because we live in an energy intensive society the carbon tax is inescapable and therefore a burden to consumers and businesses. They portray consumers as passive victims of energy dependency and resulting energy costs, and cite examples of particular vehicle trips that cannot be avoided ("There is no transit from my home to work") as evidence that they lack energy conservation and vehicle travel reduction options. But people and businesses make frequent decisions that affect their energy consumption, and given suitable incentives they can conserve energy to reduce their fuel costs. For most of the last century real energy costs have declined, causing consumers, businesses and communities to choose energy intensive options, such as larger and more powerful vehicles than are functionally necessary, and more dispersed, automobile dependent land use patterns than economically and environmentally optimal. Changing these patterns can result in substantial energy and financial savings.

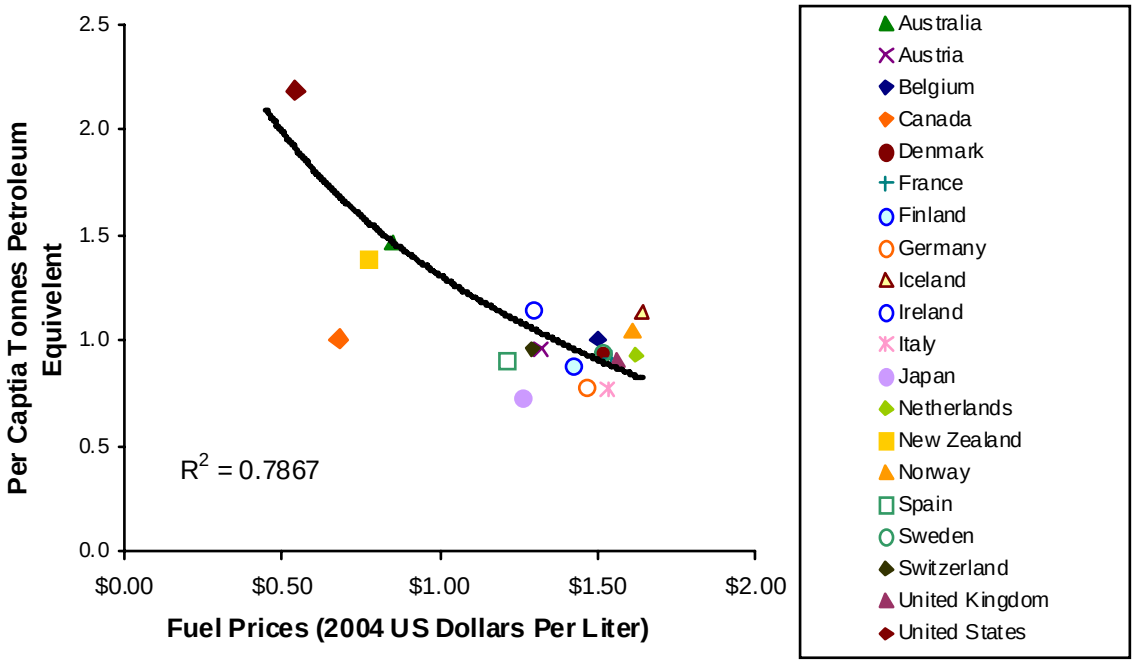
Table 2 **Examples Of Decisions Affecting Energy Consumption**

	Short Term	Long-Term
Individual consumers	Errand frequency Shopping location Errands and commute mode choice Home heating and cooling temperature	Vehicle purchase Home weatherization investments Home design and location Job location
Businesses	Vehicle operation Vehicle routing Building operation Inventory management	Production operations Vehicle purchase Distribution system development Building design and location
Communities	Commute trip reduction requirements School transport management Roadway management	Walking and cycling facilities Public transit investments Public facility location decisions Zoning code reforms Home weatherization subsidies

There are many ways that individual consumers, businesses and communities can conserve energy, reducing their carbon tax burden and providing other benefits.

Americans consume more energy per capita than residents of most other developed countries due in part to lower fuel prices that encourage the purchase of inefficient vehicles, reduced development of alternative modes, and more sprawled land use than would otherwise occur, as illustrated in Figure 6. This indicates the key role fuel prices can play in increasing energy efficiency.

Figure 6 **Fuel Price Versus Per Capita Transport Energy Consumption** (OECD, 2005)



As fuel prices increase, per capita transportation energy consumption declines.

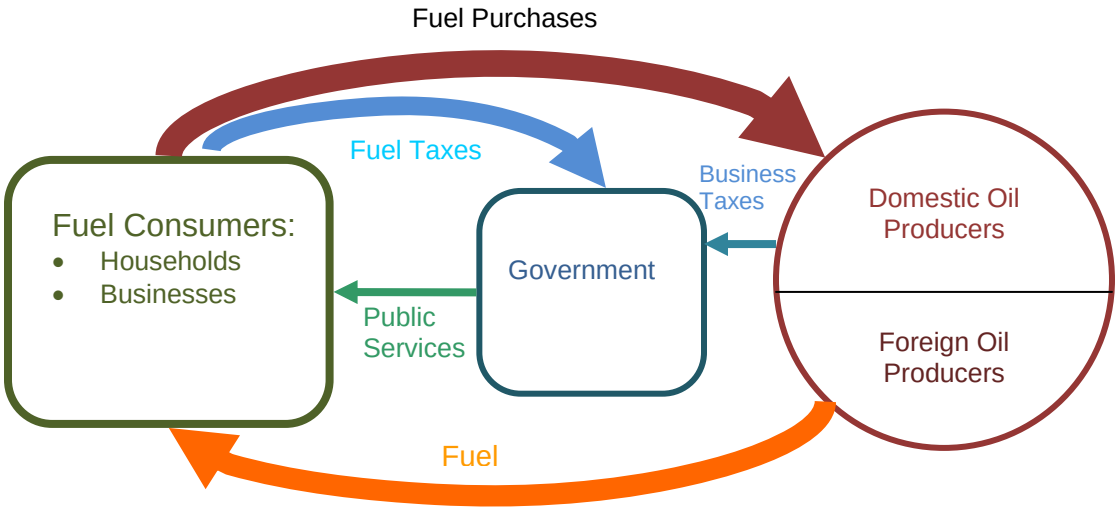
Many energy conservation strategies become more efficient and popular with increased market penetration. For example, shifting to smaller vehicles is safer and more socially acceptable if many consumers shift together. Public transit services enjoy economies of scale. Walking and cycling improvements become more cost effective as more people use these modes. Smart growth policies become more feasible and effective if supported by more community residents. Carbon taxes help achieve all these shifts.

Economically Harmful

Critics claim incorrectly that fuel taxes harm businesses and the economy (Pooley 2009). Although higher fuel *costs* are economically harmful, revenue-neutral tax shifts are an economic transfer that can help the economy by encouraging efficiency and retaining money in the regional economy (Stephens 2008). If revenues are returned to consumers or invested efficiently on improved services such as transport and education, high fuel taxes can benefit the economy overall (Shapiro, Pham and Malik 2008). For example, a carbon tax increases regional economic activity if it reduces traffic congestion and parking costs, and convinces households to conserve fuel and spend the savings on local goods and services such as restaurants and home improvements.

The portion of household devoted to fuel tends to remain constant regardless of price: where fuel taxes are low people consume more fuel per capita, providing more revenue goes to energy producers; where taxes are high people consume less and more revenue goes to public coffers and stays in the local economy, as illustrated in Figure 7. Long-run fuel price elasticities are -0.5 to -0.8 (Lipow 2008; Litman 2008a), so each carbon tax dollar displaces 50-80¢ in fuel expenditures, and in petroleum importing countries reduces the national trade imbalance by a comparable amount.

Figure 7 **Economic Flow**



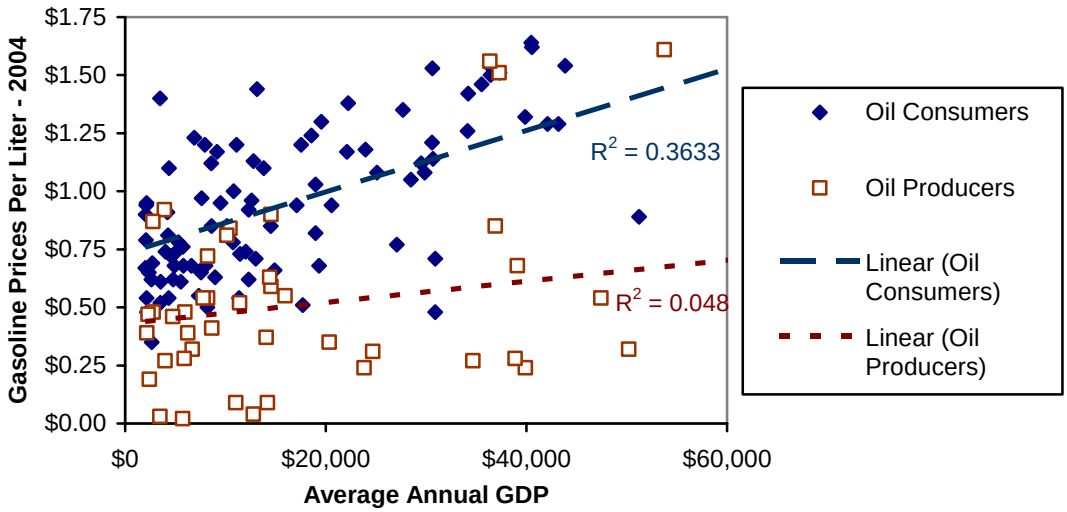
Money flows from consumers to fuel producers and to governments as taxes. Where taxes are low, people consume more fuel, causing more dollars to leave the regional economy. Where taxes are high, people consume less fuel. Carbon tax dollars circulate in the local economy as reductions in other taxes or investments in public infrastructure and services.

Most economically developed countries have much higher fuel taxes than in North America (Metschies 2005), indicating that high fuel taxes need not be economically harmful and provide economic benefits by increasing efficiency and reducing import costs. In 2007 the U.S. spent $293 billion to import energy, nearly $1,000 per capita, accounting for 36% of its total trade deficit (CRS 2008).

Even oil producing countries benefit from domestic energy conservation that increases their energy exports. A particularly good example is Norway, which was a major petroleum producer during the 1980s and 1990s, but maintained high fuel taxes to encourage domestic energy efficiency and to finance economic development programs such as education and healthcare. As a result, Norway has an efficient and diverse economy and a huge investment fund. In contrast, current North American energy policies are comparable to countries such as Saudi Arabia, Venezuela and Nigeria, which squander their oil wealth through low fuel prices, and economic development that relies excessively on resource extraction industries.

Per capita GDP tends to increase with fuel prices, particularly among oil consuming countries, as illustrated in Figure 8. This indicates that high fuel taxes are not economically harmful; they are probably economically beneficial overall by giving consumers incentive to conserve and reduce the transfer of wealth to foreign markets.

Figure 8 **GDP Versus Fuel Prices, Countries** (Metschies 2005)[1]



Economic productivity tends to increase with higher fuel prices, indicating that high vehicle fees do not reduce overall economic productivity.

"Just Implement New Technologies"

Some critics claim a tax is unnecessary, arguing that new, energy saving technologies can solve energy and emission problems. But high fuel prices are the mechanism needed to implement energy saving technologies in the most efficient and beneficial ways, avoiding unintended consequences that result from misapplied technologies. For example, increasing vehicle fuel efficiency without increasing fuel prices tends to stimulate more vehicle travel (a rebound effect) which increases traffic problems such as congestion, facility costs and accidents. Carbon taxes give motorists incentives to choose new, more efficient vehicles *and* reduce mileage, providing additional benefits.

Just implementing new technologies deprives consumers of some energy-saving options that may be best overall. For example, subsidies to develop more efficient and alternative fueled vehicles can help families save fuel when they drive children to school, but fail to help them purchase more accessible homes where children can walk instead of being driven to school. By rewarding any form of fossil fuel conservation, revenue-neutral carbon taxes encourage use of alternative modes and more accessible land use patterns that provide co-benefits such as reduced congestion and crashes, and increased fitness and health that are not provided by new technologies.

[1] Fuel price (www.internationalfuelprices.com), GDP (http://en.wikipedia.org/wiki/List_of_countries_by_GDP_(PPP)_per_capita), petroleum production (http://en.wikipedia.org/wiki/Petroleum); excluding countries with average annual GDP under $2,000.

Better Ways To Spend The Revenue

Some critics argue that carbon tax revenues should be spent on new energy conservation programs (building weatherization, transit service improvements, alternative fuel development, etc.), or other social programs (healthcare, affordable housing, etc.) rather than returned to residents. Certainly, many of these programs are justified, and the provincial government is increasing investments in home weatherization and alternative modes in conjunction with the carbon tax, but it is legitimate to consider their funding separately from carbon tax implementation, which is vulnerable to anti-tax sentiment. Returning revenues to residents may be necessary to make it politically acceptable. If citizens accept the concept of carbon taxes it may eventually become politically feasible to use some revenues to finance new programs, particularly those that help consumers conserve energy. However, it is inappropriate to criticize this new tax for being revenue neutral if that is necessary for it to be introduced.

People who are ideologically anti-government may argue that additional tax revenue will be wasted, which makes a strong case for revenue neutrality (no net increase in government revenue), which can be structured to achieve other economic objectives, such as business tax reductions to support economic development or progressive tax reductions and rebates to achieve equity objectives. On the other hand, some services are provided most effectively by governments, such as low-income home weatherization, walking and cycling facility improvements, and public transit service improvements. This makes a case for using some carbon tax revenues for such programs.

Summary

Climate change, uncertain future energy prices, and other problems caused by high fossil fuel consumption rates justify bold actions to encourage energy conservation and emission reductions. Of these, carbon taxes are among the most effective and efficient.

Such taxes should be broad, gradual, predictable, and structured to benefit low-income households. British Columbia's new carbon tax reflects these principles. It begins small and increases gradually, allowing consumers and industry to respond with many energy saving strategies. Revenues are returned to residents and businesses in ways that protect low income households. Although its impacts are initially modest, the tax provides a foundation for large future emission reductions. It sends an important message: fossil fuels are costly and should be used efficiently.

Carbon taxes encourage consumers and businesses to implement various energy conservation strategies, including choosing more fuel efficient vehicles, reduced vehicle travel, shifts to alternative modes, more accessible land use, building weatherization and renewable energy development. This is more effective, efficient and beneficial than strategies that only encourage a single solution, and by reducing total vehicle travel it provides additional co-benefits including congestion reduction, road and parking cost savings, increased safety and health, and reduced sprawl.

Like most new taxes, the carbon tax has been criticized, but much of this criticism is technically incorrect or exaggerated. Critics portray households and businesses as powerless victims with inflexible energy demands, virtually everybody have ways to conserve energy and therefore can reduce their tax burden, particularly over the long-run as higher future fuel prices affect long-term decisions such as vehicle purchases and home location. Since lower-income households tend to consume less than average amounts of fuel and receive targeted rebates, most lower-income households benefit overall. A revenue-neutral carbon tax tends to support economic development by encouraging efficiency and keeping money circulating within the regional economy.

Energy intensive groups (heavy industries, rural residents, taxi drivers) argue they should be exempt due to the excessive burden the tax imposes on them, but the carbon tax is actually modest as a portion of total fuel costs and because such groups are large energy users their participation is critical: 20% fuel conservation by heavy energy users provides greater benefits than the same reduction by less fuel intensive households and businesses.

This is not to suggest that carbon taxes are the only strategy needed to achieve emission reduction targets, or that BC's carbon tax cannot be improved (Litman 2008b). It is important to develop better technologies and efficient transport options, overcome market barriers, educate consumers, and help lower-income households finance energy conservation investments. These all complement carbon taxes.

British Columbia's carbon tax shows true leadership in recognizing a problem and providing a real solution. If other North American jurisdictions follow, its impacts and benefits will be huge.

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