Some Comments on Gasoline Taxes

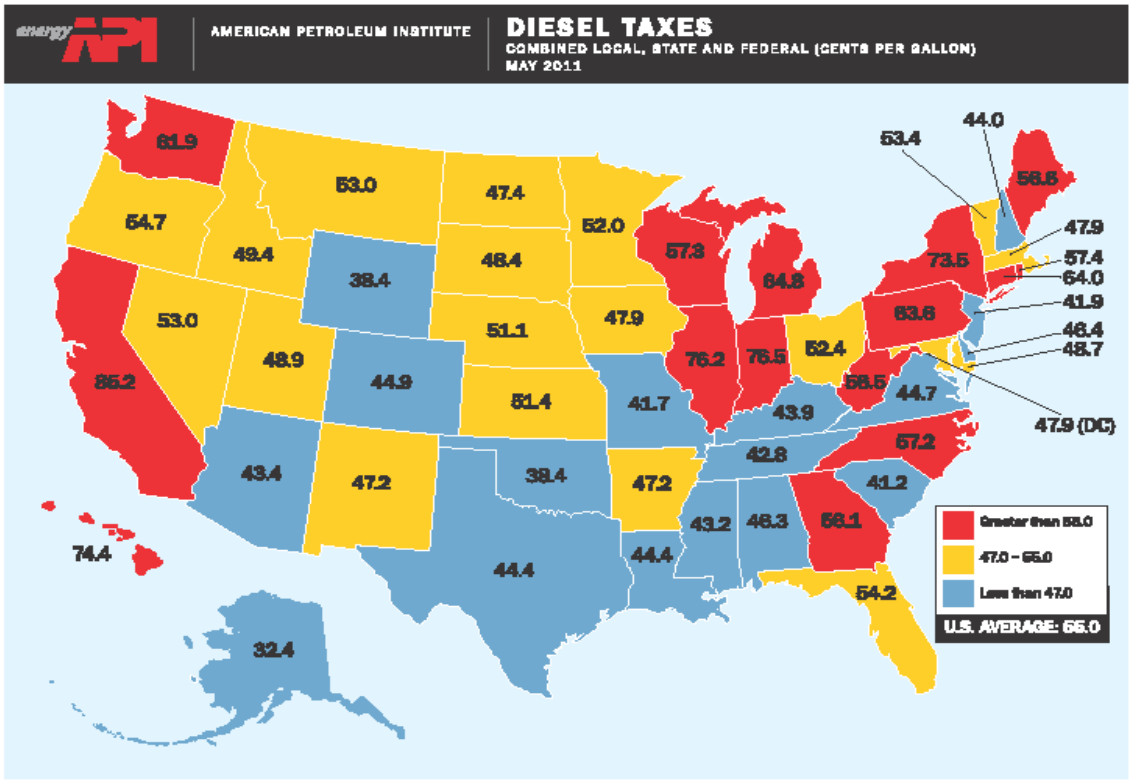
This brief paper discusses a few points about gasoline taxes, their purpose and their use to reach environmental goals. The key question is: should the U.S. raise federal tax rates on gasoline to improve their chances of reaching environmental outcomes? My view is that gasoline taxes should definitely be raised, as much as $1 from 18.4 cents per gallon. The government revenue should be targeted to environmental and infrastructure improvements. Finally, rebates should be used for those who are harmed unusually by this tax.

Introduction

Countries use taxes for several reasons, among them to influence behavior. For gasoline the government's goals are to raise revenues and to conserve energy. Americans pay a federal gas tax of 18.4 cents for every gallon of fuel they pump into their vehicles. The gas tax has remained level since 1993, when President Bill Clinton signed the Omnibus Budget Reconciliation Act increasing the gas tax by 30 percent or 4.3 cents, up from 14.1 cents a gallon, to reduce the federal deficit.[1] Almost all of the revenue from the federal gas tax goes into the Highway Trust Fund, which pays for highway and bridge maintenance and new road construction across the nation.

Figures 1 and 2 show the tax rates for each state. Note that some states, such as for diesel in Alaska at 32.4 cents per gallon, have very low rates while California has a diesel tax of 85.2 cents per gallon; they have 26.4 cents and 68.9 for each gallon of gasoline respectively.[2]

Figure 1: Diesel Taxes in the U.S.



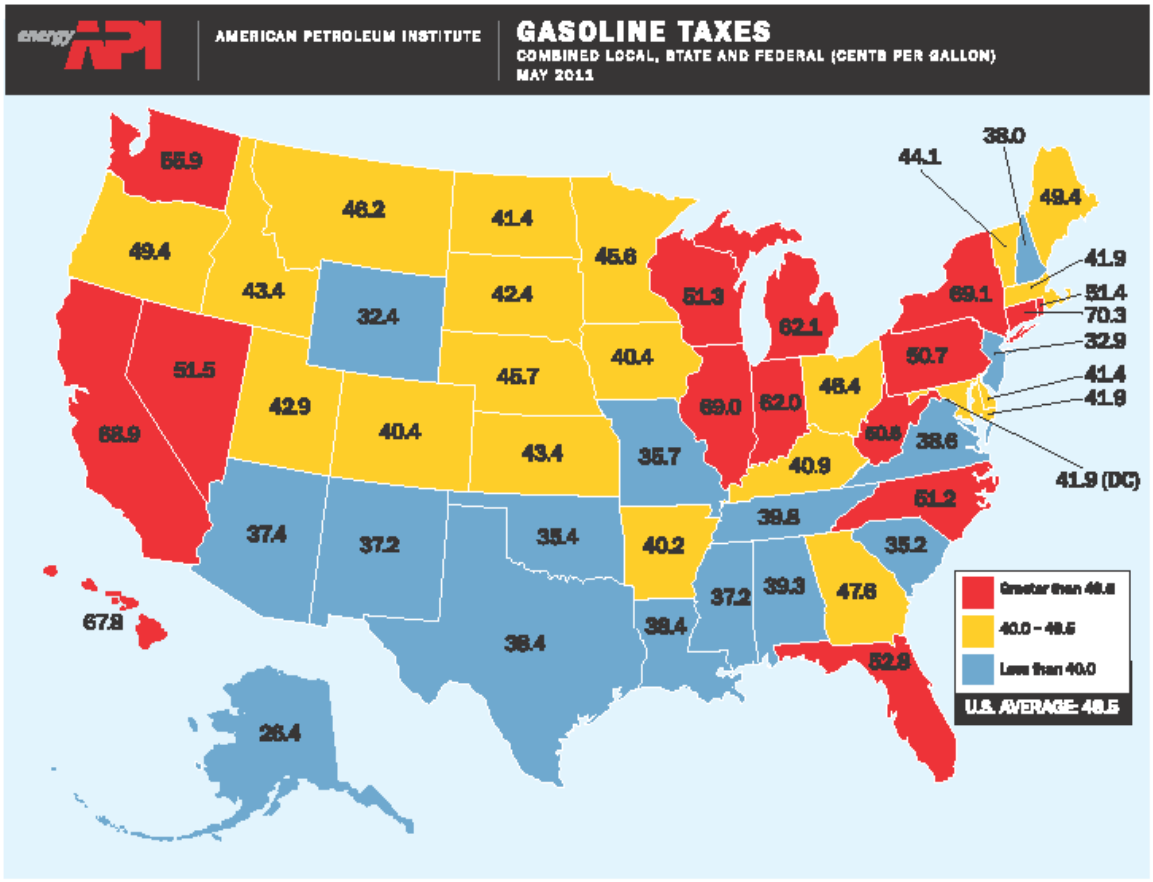


Figure 2: Gasoline Taxes in the U.S.

In 1932 President Herbert Hoover imposed the first gas tax, at 1 cent a gallon, in an effort to balance the federal budget. The gas tax was set to expire in June 1933, but the National Industrial Recovery Act extended the tax and increased it to 1.5 cents. The Revenue Act of 1934 rescinded the half-cent increase, according to the Federal Highway Administration. The Revenue Act of 1941 made the gas tax permanent and increased it to 1.5 cents a gallon to help pay for the country's defense buildup.

The Revenue Act of 1951 increased the gas tax to 2 cents, according to the Highway Administration, as a revenue source during the Korean War. President Ronald Regan increased the tax to 9 cents a gallon from 4 cents under the Surface Transportation Assistance Act of 1982. President George H.W. Bush increased the gas tax by 5 cents, to 14 cents a gallon, under the Omnibus Budget Reconciliation Act of 1990. The legislation used part of the new revenue for deficit reduction. President Clinton then increased the gas tax by 4.3 cents per gallon bringing it to 18.4 cents, under the Omnibus Budget Reconciliation Act of 1993. The increase was entirely for deficit reduction, with no money going to the Highway Trust Fund. Later, under the Taxpayer Relief Act of 1997, Congress redirected the 4.3-cents gas tax increase to the Highway Trust Fund.

Should Congress increases gas taxes again? Some - including leaders of the American auto industry - say Congress should increase the gas tax to as much as $1 gallon to encourage consumers to begin buying more fuel-efficient cars.[3]

> "You know what I'd rather have them do - this will make my Republican friends puke - as gas is going to go down here now, we ought to just slap a 50-cent or a dollar tax on a gallon of gas," Akerson told the newspaper. "People will start buying more Cruzes and they will start buying less Suburbans."[4]

Bill Ford Jr., of Ford Motor Company, has also called for an increase in the gas tax, calling it a "responsible thing to do" to discourage Americans from driving gas guzzlers "If the federal government really wants to encourage this kind of behavior - and they should - then that's a way they can clearly help," Ford has said.

President Obama worked with automakers, regulators and environmentalists and proposed new fuel economy standard for automakers beginning 2017 through 2025. The proposal could mandate miles-per-gallon efficiency increases from between 3 to 6 percent every year, beginning at 35.5 mpg and ending with a standard as high as 62 mpg in 2025. More than a dozen members of Congress including U.S. Sen. Dianne Feinstein, a Democrat from California, has said that the 62-mpg target is "technically feasible and cost-effective for consumers."

The tax needs to be raised.[5] Our infrastructure needs improvement and our environmental outcomes need to improve. Taxes are political hot potatoes and most politicians will not touch this issue. Also, public perception of the tax is an issue — specifically, what Americans know (or don't) about how often it gets raised. There may be widespread agreement, among people of all demographics and political parties that the federal gas tax goes up every year (unrelated to state gas taxes, which vary). Even people who closely follow infrastructure/transportation news believe this.

One survey from June 30 through July 2, 2009 involved 800 adults, with a +3.46% margin of error showed some interesting results. 60 percent of the respondents believed the federal gas tax was raised annually. Geographic location didn't make much of a difference — 61% believed this incorrect statement in the Northeast, 58% in the South, 54% in the Midwest, and 67% in the West.[6]

Other results of the poll made this lack of education on the tax even more striking: When asked, "Thinking about your experience with transportation infrastructure in your area today…in general, how would you rate the condition of and your experience with traffic congestion?" 31% answered "very poor." A majority also answered that traffic congestion was not "a fact of life" — in other words, people believe something can be done about it. A majority (55%) also responded that our country's infrastructure is outdated, unreliable, and inefficient. On the statement, "Transportation infrastructure funding decisions are based more on politics than need?" a whopping 62% said they strongly agree.

"So in other words, we know that our infrastructure needs money, and that our lives could be improved by investment in it. We know that the principle way to raise money for infrastructure is through taxes, and that politicians are making infrastructure decisions based on political gain rather than public good. But what we don't know is that we're objecting to the raising of a tax that hasn't been raised in almost 20 years, and could do wonders for all the troubles we've identified."[7]

Fuel taxes today fund the vast majority of the federal government's investment in infrastructure projects. Due to dwindling fuel tax receipts, Congress has had to transfer billions of dollars from the General Fund to the Highway Trust Fund to maintain our current level of federal involvement. The lack of investment in our crumbling bridge, highway, and transit systems is a missed opportunity for the creation of thousands of well-paying jobs and long term economic growth for our Nation. Senator Voinovich said, "I believe Americans are willing to pay a higher gas tax to create jobs, improve our infrastructure and better our climate. And many of my conservative colleagues do not consider that gas tax as a tax, but as a user fee." So if Democrats are supposedly in favor of raising the tax, and many Republicans aren't opposed to it, then what's the holdup?

Table 1 shows tax rates on gasoline in various countries. This table shows that the U.S. is far lower than its counterpart nations. Why are the rates higher and should the U.S. raise its rates.

Table 1: February 2011 Monthly Motor Fuel Reported by States.
Motor Fuel Tax Rates for Selected Countries[8]

Created On: 5/25/2011	(CENTS PER GALLONS)	February 2011 Reporting Period
COUNTRY	**GASOLINE**	**DIESEL**
Belgium	449	327
France	437	334
Germany	455	352
Italy	416	333
Japan	467	305
Netherlands	502	327
United Kingdom	492	497
United States[9]	40	46

Market mechanisms can be used to restore market efficiency from market failure. In general, market failures, in environmental terms, are from negative externalities, public goods, and the tragedy of the commons. Each of these ways of thinking about environmental problems points towards an approach to solving them. One natural solution is to get the prices right, by using government policies to make firms and individuals pay for the environmental damage they cause. Once the negative externalities are internalized, they will be incorporated into the prices of goods and services, and market outcomes will again be efficient. Government policies are filling in for the missing demand for environmental quality – surmounting free-riding problems. Or, we could advocate establishing property rights over resources that had previously been open to all – thereby overcoming the tragedy of the commons.[10]

Positive externalities are external benefits generated from production and exchange and enjoyed without payment by members of society. For example, a company that invests in pollution control, the surrounding community benefits without paying directly for the benefit. Negative externalities are external costs generated from production and exchange and borne without compensation by members of society. For example, when firms can avoid costly clean up by polluting, they create an external cost – the harms created by their pollution – that is shared by many in society.

In the absence of government intervention, firms will ignore the external costs of their actions when making outcome decisions. The market outcome is not efficient because the true social marginal cost of production (which includes the marginal damage from pollution) is greater than the private marginal cost. A tax on pollution equal to the marginal damage at the socially efficient level of production will achieve the socially efficient outcome. The efficient tax is known as a Pigouvian tax – a tax that internalizes the externality. It forces the producers and consumer of polluting goods to incorporate the full costs of their actions, including the external costs from pollution and so on, into their output and consumption decisions. With the tax in place, the market outcome will be efficient. No other government intervention such as telling firms how much to produce is necessary.

Some economists feel that taxes are distortionary – like the sales or income taxes. Yet, for the Pigouvian tax the distortion arises from lack of government intervention. The tax is corrective not distortionary – it

eliminates deadweight loss, rather than introducing it. By incorporating the external cost into the price of the good, a tax gets the price right and restores efficiency.

So the idea is to internalize the full costs of doing business and reassign them to the marketplace. Doing this would create an economy where business firms prosper by being responsible both socially and environmentally[11]. Automobiles clearly have profound environmental consequences as noted in the assignment write-up, including CO_2 emissions, nitrous oxide, traffic congestion, cost of accidents, etc.

> --Firms would prosper by competing to be more environmentally friendly. The taxes would provide all participants with accurate information about full costs and to correct distortions in the market. [12]
>
> --The social-cost supply curve will become operational in the market since firms are now paying both marginal private cost and marginal external cost.
>
> --Profit-maximizing firms will now have an incentive to look for ways to reduce the Pigouvian tax element of their production costs. One way to do so would be to lobby for removal of the regulation. Firms would accomplish this by making changes to their production processes and no longer emit pollution, for example.
>
> --Precisely measuring external costs and the vagaries of the political process result in imperfect outcomes. Pollution taxes can take the form of per unit (excise) tax on inputs such as coal or outputs such as electricity that generate pollution.[13]

The OECD[14] lists the extensive environmental taxes that are part of its countries tax systems. Revenues from these taxes have been on a slight downward trend in relation to GDP, although the number of environmentally related taxes has been increasing in recent years. The decline in revenue partly reflects the drop in demand for fuel in response to recent high oil prices and other factors, which in turn has led to a reduction in total revenues from taxes on energy products.[15]

CO2 taxes have existed for a number of years in a few countries, such as Sweden. More recently, countries such as Iceland and Ireland have decided to introduce CO2 taxes as part of their fiscal consolidation measures, and CO2 taxes are also under consideration in France and Japan, for example, as well as several emerging economies. Still, the scope for expanding the use of green taxes in OECD countries remains considerable.[16]

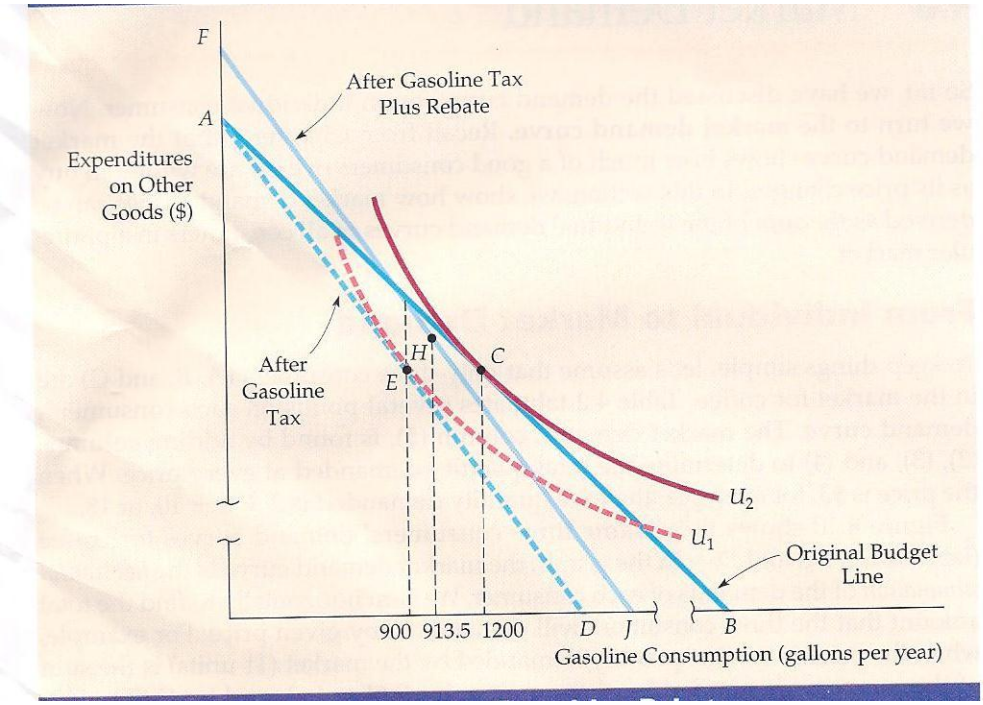
Some researchers have tried to quantify these various externalities and compute the optimal gasoline tax.[17] They found that the Pigouvian tax reflecting marginal external costs would be eighty-three cents per gallon in the United States. They break the total down among four externalities as follows: six cents for carbon dioxide emissions, eighteen cents for local air pollution, thirty-two cents for congestion, and twenty-seven cents for accidents. The small number for carbon dioxide emissions is surprising; it largely reflects the fact that there is less carbon in gasoline that expected. Automobiles make a large contribution to global warming simply because of the sheer number of cars being driven and the amount of fuel consumed; on a per-gallon basis, the external costs due to global warming are fairly small. The six cents/gallon estimate corresponds to marginal damages of twenty-five dollars per ton of carbon, which lies in the center of the range of estimates in the economics literature. Note that even doubling or quadrupling this number would still amount to a fairly small tax in cents per gallon terms.

The researchers point out that taxing gasoline is not necessarily the best possible policy. The most costly externalities – local air pollution, congestion, and accidents – depend on the number of miles driven, rather than on the amount of gasoline consumed. Taxing gasoline, therefore, is an imperfect proxy for taxing miles driven. The authors estimate that replacing the gasoline tax with a mileage tax would increase social welfare

substantially. Their argument illustrates the general principle that the choice of what to regulate may be just as important as the choice of how to regulate.

> One popular idea is to use a rebate program. Assume that the price elasticity of gasoline is about -0.5[18] Also assume that a low-income person uses about 1200 gallons of gasoline per year, that gasoline costs $1 per gallon (for simplicity sake) and that the consumer's annual income is $9000.[19] The following Figure 3 shows the gasoline tax impact. The original budget line is AB and the consumer maximizes utility by consuming the market basket at C (on curve U_2) buying 1200 gallons of gasoline and spending $7800 on other goods. If the tax is $.50 per gallon price will increase by 50 percent shifting the new budget line to AD (we assume of course that the higher price is paid totally by consumers). With a price elasticity of -0.5 consumption will decline 25 percent from 1200 to 900 gallons, as shown by the utility maximization point E on indifference curve U_1 (for every one percent increase in the price of gasoline, quantity demanded drops by .5 percent).
>
> The rebate program partially counters this effect. Suppose that because the tax revenue per person is about $450 (900 gallons x $.50 per gallon) each consumer receives a $450 rebate. How does this impact gasoline consumption? The effect can be shown by shifting the budget curve upward by $450 to line FJ, which is parallel to AD. How much gasoline does our consumer buy now? Income elasticity of demand for gasoline is approximately 0.3. Because $450 represents a 5-percent increase in income ($450/$9000 = 0.05) we would expect the rebate to increase consumption by 1.5 percent (0.3 x 5 percent) of 900 gallons, or 13.5 gallons. The new utility maximizing consumption choice at H reflects this expectation. Despite this rebate program, the tax would reduce gasoline consumption by 286.5 gallons, from 1200 to 913.5. The income effect of the rebate program is dominated by the substitution effect because the income elasticity of demand for gasoline is relatively low, and the program with a rebate does indeed reduce consumption.
>
> We would need to resolve many issues to put a real tax rebate program into effect. Incoming tax receipts and rebate expenditures would vary from year to year, making it difficult to plan the budgeting process. For example, the tax rebate of $450 in the first year of the program is an increase in income. During the second year, it would lead to some increase in gasoline consumption among the low-level consumers that we are studying. With increased consumption, however, the tax paid and the rebate received by this individual will increase in the second year. As a result, it may be difficult to predict the size of the program budget.
>
> Figure 3 revels that the gasoline tax program makes this particular low-income consumer slightly worse off because H lies just below indifference curve U_2. Some low-income consumers might actually benefit from the program if they consume less gasoline on average than the group of consumers whose consumption determines the selected rebate. On average, however, the tax will make consumers worse off.
>
> Why do such a program then? Because other goals are in play – national security, conservation, and other environmental outcomes are desired outcomes. If consumers are worse off with the tax then they will have an incentive to use less gasoline.

Figure 3: Effect of gasoline tax with a rebate. A gasoline tax is imposed when the consumer is initially buying 1200 gallons of gasoline at point C. After the tax takes effect, the budget line shifts from AB to AD and the consumer maximizes his preferences by choosing E, with a gasoline consumption of 900 gallons. Yet, when the proceeds of the tax are rebated to the consumer, his consumption increases somewhat, to 913.5 gallons at H. Despite the rebate program, the consumer's gasoline consumption has fallen, as has this level of satisfaction.[20]



The following table is a summary of three approaches to taxing gasoline: Carbon tax, consumer tax and industry tax. Each is analyzed according to various characteristics. This chart is adapted from various policy analyses.[21]

Table 2: Three types of taxes and some commentary.	Carbon Tax	Consumer Taxes	Industry Taxes
Description	Works like other taxes except is used to reduce consumption and production (Pigouvian taxes or "sin taxes.") Many argue that Pigouvian taxes are efficient in that they force consumers and producers to pay for the cost of polluting. Without the tax these goods would be overproduced and over consumed because society pays for the health and property damages of pollution, but the producers and consumers do not directly feel an increase cost burden.	Changes the amount of consumption by changing the price of what is being bought. A gasoline tax is an example of this, but more importantly, so are tax credits and deductions for alternative fuel sources. Encourages demand for products that use less gasoline and emit less carbon into the atmosphere; encourages investment into these developing technologies. These credits may decrease government revenues, but a system called "feebates" (systems of government imposed fees and rebates that	While consumer tax incentives work on the demand-side of the economy, industry tax incentives are their counterpart in the supply-side of the economy. The goal here is to change producer behavior. In contrast to a straight carbon tax which is paid by both consumers and producers, an industry tax is used to change the ways in which a good or service is produced. Investment tax credits give tax breaks to industries that invest in new energy efficient technologies. Accelerated depreciation credits allow

Table 2: Three types of taxes and some commentary.	Carbon Tax	Consumer Taxes	Industry Taxes
		are used to shift market purchasing preferences toward an economically, socially or politically desired goal) has little effect upon government budgets. This system gives credits to consumers who use less energy while increasing tax rates on those who use more carbon fuel. This effectively persuades consumption in a desirable direction, yet is "revenue neutral" from a tax standpoint.	industries to take a tax break in one lump sum when they buy new capital instead of taking it bit by bit over the lifetime of the new machinery.[22] These taxes may be implemented in industries that are involved in production and refining but have limited use in retail sectors because technology is not as extensively employed in, say, gasoline retail markets.
Cost of Implementation	New source of government revenue and could be used to reduce the budget deficit.	The only costs of a feebate system would be administrative, but these costs are nothing to ignore especially with no historical track record.	High: Giving industries tax credits will put further pressure on an already strained government budget. An industry feebate system could avoid this but it hasn't been part of the dialogue to date.
Implementation	Have existed for long time in the form of gasoline taxes or other sin taxes like alcohol or tobacco. Countries have lots of experience with this type of tax.	There have been many studies regarding consumer behavior in response to taxation, but very little real world experience of taxes used solely for this purpose.	Tax credits have a long history in the US and have been thoroughly studied.
Environmental Impact	Taxes can be adjusted to limit consumption of certain energy sources but there will not be strong push toward new sources and technologies.	Not only can certain energy sources be discouraged, but investment into new technologies and new sources can be promoted.	In the short-run consumers may still depend on energy imports until new innovations appear on the market.
Foreign Energy Usage	Only mildly impactful on this factor.	New technologies are the best prospect for relieving the US from reliance on foreign energy sources.	The immediate energy consumption effects may not be felt but industry innovation is the key to reducing long-term dependence on foreign energy.
Political Toxicity	High – people do not like taxes and neither do politicians.	Feebates are more palatable than a regular tax, but the public would still need some	Consumers may not be too concerned with giving industries tax breaks that

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		convincing.	benefit the economy and our environment, and industries always welcome tax breaks
Barriers to Future Use	Not politically popular' oil lobby very strong[23]	California and Maryland legislatures both approved feebate legislation in the early 1990's, however the first Bush administration determined that only the federal government has authority to enact fuel legislation.[24] Therefore legislation has to be enacted at the Federal level. Federal politicians tend to find a cap and trade system more favorable than new tax legislation.[25]	Increasing tax credits necessarily means decreasing tax revenues. There will be either objections to an increasing the budget deficit or to higher taxes to offset the loss in revenue. Raising taxes is never politically viable so in order to balance the budget funds will need to be diverted from other areas. Government sectors where this money is potentially available, such as the highway fund, health care, social security, education, and defense are all closely guarded by powerful lobbies.
Pros	Costs are internalized – individuals and industries pay for the increased risk of harm to society Could make markets more efficient by incorporating a cost that has been previously excluded from production and consumption Government gains a new revenue source that could be used to reduce other taxes, pay off government debt, research clean air technology, or for other uses. Carbon taxes are easy to apply to individuals as well as businesses.[26]	A byproduct of changing consumer behavior is that investors will follow market forces and spur R & D into new energy technologies[27] Give the government a fiscal policy option that can be used solely to change consumer behavior without increasing the government deficit or increasing overall taxes[28] Taxes can be phased in and incrementally adjusted to achieve a desired level of fuel and energy consumption.	Industries not only produce energy, but they use it to produce other goods. Different taxes can be used to create incentives for more efficient and clean energy use in the production of these goods [29] Investments into large-scale technologies, such as new and innovative power plants, are extremely expensive and tax incentives are a viable policy alternative to direct government provision.[30] For many industries the government can choose between an investment tax credit or an accelerated depreciation allowance depending upon what is ideal and what technology is to be invested in. Specific technologies can then be

Table 2: Three types of taxes and some commentary.	Carbon Tax	Consumer Taxes	Industry Taxes
			promoted.
Cons	Costs are internalized: Industries and individuals directly pay for the increased risk of harm to society.[31] Makes markets more efficient by incorporating a cost that has been previously excluded from production and consumption. May lead to inefficiencies in the market. The US has little experience taxing carbon. Industry would bear some of the burden and would resist implementation of the tax. Would be regressive in practice, for example adversely affecting those who have a hard time paying for gasoline as it is now.	As with any tax, there will be a loss in profits and consumer benefit because markets will not be able to operate as efficiently as before the tax.[32] There has not been much experience with a feebate system to date[33]	About 26 % of energy production is conducted by non-utility, privately owned sources. These sources cannot be covered by most accelerated depreciation allowances under existing law.[34] Some technological investments may be so costly that direct government provision may be the only way to develop them.[35] A system similar to feebates (a system of government imposed fees and rebates that are used to shift market purchasing preferences toward an economically, socially or politically desired goal) can be implemented for industries, but little theoretical work has been done in this area. Tax credits increase government budget deficits unless offset with new or higher taxes.

Here are some often cited examples of these taxes.[36]

- **Example of Carbon Tax: New Zealand's Bold Attempt:** In 2005 New Zealand planned to become the first country in the world to introduce a true carbon tax, imposing an almost three dollar ($3) a week charge upon citizens or an eleven dollar ($11) charge per ton of carbon emitted. While the tax was acknowledged to raise government revenues by almost $36 million a year, promoters cited tax breaks in other areas that would level the burden upon citizens. Unfortunately this tax, designed to reduce greenhouse gas emissions and set to come into effect in April 2007, was derailed in December 2005 due to rising oil prices which officials held had already partly achieved the intended effect of the tax in the transport. Worries that the depreciation in emissions would not justify the tax burden, New Zealand demonstrated the classic policy concerns entangled in a carbon tax. Another example is Denmark, Finland, Norway and Sweden have had a form of carbon taxes in place since the 1990s, but the tax has not led to large declines in emissions in most of these countries – in the case of Norway, emissions have actually increased by 43 percent per capita. Juxtaposed against these negative results are Denmark's reduction in emissions of 15 percent. A combination of

subsidized alternative energy and innovation plus a return of tax funds to industry to encourage environmental innovation spelled success for Denmark.

- **Example of Consumer Taxes: Classic Incentives: California and Solar Powers:** California's Million Solar Roofs Program: As part of Governor Arnold Schwarzenegger's California has set a goal to create 3,000 megawatts of new, solar-produced electricity by 2017 – moving the state toward a cleaner energy future and helping lower the cost of solar systems for consumers. Consumer tax incentives provide the drive behind this program, as the California Public Utilities Commission, through its California Solar Initiative, provides incentives over the next decade for existing residential homes and existing and new commercial, industrial, and agricultural properties. Additionally, the California Energy Commission manages a 10-year, $400 million program to encourage solar in new home construction through its New Solar Homes Partnership. Incentives start at $2.50 per watt, and additionally offer a pay-for-performance structure for high performing installations. To learn more, click here. Consumer demand influences investment into new technologies and technological improvements. Energy efficient consumption will be become more attainable as these R&D investments bear fruit. An upward spiral between consumers and investment can result in cleaner and more efficient energy use. Consumer tax incentives can be a driving force to significant changes in energy consumption and investment. While a system of feebates is an elegant theoretical model for this change, there is little real world experience with it. This increases the political risk associated with taxes used solely to influence consumer behavior. Without significant public support the US may have to watch as others nations for provide a blueprint for such a system.

- **Example of Industry Tax Incentives:** In Denmark a carbon tax scheme for all industries was introduced in 1996, with revenues earmarked aiding in labor expenses and subsidizing investments in energy innovation. The tax burden upon Denmark's industry is thus revenue neutral while providing benefits for the companies that are energy-efficient. It further creates market incentives to those companies that have done nothing yet about emissions. Additionally, Sweden, which introduced a carbon tax system based on ton measurements in 1991 cites the tax as heavily influential in energy consumption behavior as plant owners were incentivized to switch to biofuels. Some technologies will not be researched nor investments made without government intervention, but this intervention means either higher taxes or a budget deficit. Industry tax incentives are a great way to increase investment into new and expanded energy efficient and clean technologies, but they come at a large cost to the government. An educated society may make such a cost politically feasible and may even be willing to pay for the industry tax incentives.

ENDNOTES

[1] T. Murse (2011). Should Congress raise the gas tax? How Much the Gas Tax Costs You? http://usgovinfo.about.com/od/uscongress/a/Should-Congress-Raise-the-Gas-Tax.htm Accessed July 12, 2011.

[2] Motor Fuel Taxes American Petroleum Institute. http://www.api.org/statistics/fueltaxes/

[3] The Gas Tax Increase Argument: General Motors Co. chief executive officer Dan Akerson, for example, told *The Detroit News* June 2011 that Congress should increase the gas tax instead of requiring automakers to boost fuel efficiency in their cars.

[4] D. Shepardon and C. Rogers (2011). GM's Akerson pushing for higher gas taxes. The Detroit News http://detnews.com/article/20110607/AUTO01/106070368/GM-s-Akerson-pushing-for-higher-gas-taxes#ixzz1S5ykkpCl. Accessed July 14, 2011.

[5] M. Lafsky (2011) How Often Is the Gas Tax Raised? Most Americans Have No Clue. January 21. http://www.infrastructurist.com/2010/01/21/how-often-is-the-gas-tax-raised-most-americans-have-no-clue/ Accessed July 14, 2011.

[6] Ibid.

[7] L. (2010) A Republican Senator Thinks the Gas Tax Should Be Raised, and You Should Too from *The Infrastructurist* Legislative News. 16. Aug. Accessed July 14, 2011.

[8] Source for foreign rates is data collected by the U.S. Department of Energy from various sources. Rates were converted to U.S. currency using current exchange rates.

[9] Includes the weighted average of State taxes as shown on Table MF-121T plus the Federal tax.

[10] N.O. Keohane and S.M. Olmstead (2007). Markets and the environment. Washington, DC: Island Press.

[11] C. L. Harper (2008). Environment and society: Human perspectives on environmental issues. Fourth edition. Upper Saddle River, NJ: Pearson: 236.

[12] P. Hawken (1993). The ecology of commerce: A declaration of sustainability. New York, New York: HarperCollins.

[13] The U.S. has had various environmental taxes. For example:
--E-waste recycling fee in the state of California imposes a fee that ranges between $6 and $10 on the retail sale or lease of a new or refurbished video display device that has a screen size of more than 4 inches measured diagonally. The tax is used to fund the recycling of these products, which contains lead and other hazardous materials.
--pesticide and fertilizer tax: The state of Iowa imposes a tax on one tenth of 1 percent on gross sales for pesticides at the retail level, and one-fifth of 1 percent of gross sales on the manufacturers of pesticides. It also imposes a tax of 75 cents per ton on nitrogen fertilizer. The tax is used to fund groundwater protection.

[14] N. Steinbach, V. Palm, M. Cederlund, A. Georgescu, and J. Hass (2009). Environmental taxes. 14th Meeting of the London Group on Environmental Accounting. Canberra 27-30, April. http://unstats.un.org/unsd/envaccounting/londongroup/meeting14/LG14_18a.pdf Accessed July 14, 2011.

[15] Revenues from green taxes have dropped despite increased use (data update – 01/07/2011) 2010 May 27 by Jerome Cukier http://blog.oecdfactblog.org/?p=13 Accessed July 13, 2011.

[16] Ensuring that these taxes help achieve environmental goals is a policy challenge, as this OECD study suggests (pdf)

[17] I.W.H. Parry and K.A. Small (2005). Does Britain or the United States have the right gasoline tax? American Economic Review. Vol. 95:. 1276-1289 | Related Discussion Paper 02-12 http://www.rff.org/Publications/Pages/PublicationsList.aspx?Topic=Energy&PublicationType=Discussion%20Papers&Researcher=1052 Accessed July 13, 2011.

[18] R.S. Pindyck and D.L. Rubinfeld (2001). Microeconomics. Fifth edition. Upper Saddle River, NJ: Prentice Hall. They state that the price elasticity of demand for gasoline varies substantially from the short run to the long run, ranging from -0.11 in the short run to -1.17 in the long run.

[19] This example from Pindyck and Rubinfeld. Ibid.

[20] Ibid, page 115.

[21] Energy Literacy.org (2011). http://energyliteracy.org/policy-carbon-tax.html Accessed July 13, 2011.

[22] Gruber, 2007 cited in energyliteracy.org

[23] The Economist, 2007. cited in energyliteracy.org http://energyliteracy.org/public-policy.html Accessed July 13, 2011.

[24] Langer, 2005 cited in energyliteracy.org http://energyliteracy.org/public-policy.html Accessed July 13, 2011.

[25] Economist, 2007. Op cit.

[26] W.J. Baumol and W.E. Oats, (1988).The theory of environmental policy. 2nd edition Cambridge, UK: Cambridge University Press.

[27] Jaffe, 2005. cited in energyliteracy.org

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