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# Alcohol Fuels Tax Incentives

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## Summary

Prior to January 1, 2005, alcohol fuel blenders qualified for a 5.2¢ tax exemption against the excise taxes otherwise due on each gallon of blended mixtures (mixtures of 10% ethanol, and 90% gasoline). This exemption, which was scheduled to decline to 5.1¢ on January 1, 2005, reduced the gasoline excise tax for "gasohol," from 18.4¢ to 13.2¢/gallon. The reduction was realized at the time when the gasoline tax was otherwise imposed: typically when the fuel was loaded from the terminal onto trucks for distribution. The 5.2¢ exemption could also be claimed later, i.e., when blenders filed their income tax return, as a 52¢ excise tax credit per gallon of alcohol used to make a fuel mixture (which was also scheduled to decline to 51¢ in tandem with the exemption on January 1, 2005). This credit, however, was not as valuable as the exemption because 1) it was taxable as income, 2) was not available instantaneously as the fuel was blended — blenders had to wait until their income tax returns were filed to reduce their tax liability by the amount of the credit, and 3) the tax credit was not refundable — it was only available to the extent of tax liability. Because the primary benefits from alcohol fuels were realized through an exemption rather than a tax credit, revenue losses from the exemption (or reduced excise taxes) accrued to the Highway Trust Fund (HTF).

The American Jobs Creation Act of 2004 (P.L. 108-357) restructured the basic tax subsidies for alcohol fuels: 1) the blender's *income* tax credits were eliminated and 2) the blender's excise tax *exemption* was replaced by an "instant" excise tax credit of the same amount — 5.1¢/gallon of a 90:10 mixture, which is also equivalent to 51¢ *per gallon of ethanol* in the mixture. These tax reforms went into effect on January 1, 2005. As before, the excise tax credit is claimed against the 18.4¢ per gallon excise tax on gasoline, so that the actual excise tax paid and remitted to the Treasury is 13.3¢ — the tax is reduced by 5.1¢/gallon just as with the exemption. When income tax effects are considered, however, the new excise tax credit has a greater economic or subsidy value than the exemption before it because income tax deductions are taken at 18.4¢ rather then 13.3¢. In other words, by labeling the tax reduction as an *excise tax credit* rather than an *excise tax exemption*, the tax law treats the blenders as paying the full excise tax of 18.4¢/ gallon rather than 13.3¢ per gallon. At a 25% marginal income tax rate, the additional 5.1¢ deduction is valued at 1.7¢/gallon of a blend or 17¢/gallon of ethanol, which means that the total after-tax subsidy for alcohol fuel mixtures is effectively 68¢/gallon of ethanol rather than the nominal rate of 51¢.

By nominally increasing the excise tax on gasohol by 5.1¢/gallon, an extra $1,500 million in FY2006 is projected to be allocated into the HTF from the general fund, which implies that HTF expenditures, and budget deficits can be expected to be higher than under the exemption. In addition to the alcohol fuel mixture excise tax credit there are three other federal tax subsidies that are available for the production and use of alcohol transportation fuels (but are little used). Comprehensive energy policy legislation H.R. 6, as passed by the Senate, includes a renewable fuels standard that would, by 2010, more than double both the use of ethanol and the revenue loss from the new alcohol fuels tax incentives.

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## Introduction

President Carter's 1978 Energy Tax Act introduced the excise tax exemption for alcohol fuel blends (at 100% of the gasoline tax, which was then 4¢/gallon) to achieve energy and, more recently, certain environmental and agricultural policy objectives.[1] In 2004 this exemption, which was 5.2¢/gallon and was scheduled to decline to 5.1¢ on January 1, 2005, reduced the gasoline excise tax for "gasohol," from 18.4¢ to 13.2¢/gallon. The reduction was realized at the time when the gasoline tax was otherwise imposed: typically when the fuel was loaded from the terminal onto trucks for distribution. The 5.2¢ exemption could also be claimed later (i.e., when blenders filed their income tax return) as a 52¢ excise tax credit per gallon of alcohol used to make a fuel mixture, which was also scheduled to decline to 51¢ in tandem with the exemption on January 1, 2005. From 1978-2004, this exemption from the motor fuels excise taxes provided the major subsidy to the ethanol fuel industry — without the exemption the ethanol fuels industry would either not exist or be substantially smaller.[2]

The exemption, however, which effectively lowered the excise tax on the blended fuel, reduced revenues for the Highway Trust Fund by an estimated $14, 000 million through FY2004. As a consequence, the Congress enacted the American Jobs Creation Act of 2004 (P.L. 108-357), also known as the "Jobs Bill," which restructured the basic tax subsidy for alcohol fuels. It replaced the excise tax exemption with a new excise tax credit: the "alcohol fuel mixtures excise tax credit." Although, the two incentives are equivalent in gross, before-tax terms — they are both equal to 51¢ per gallon of ethanol — interactions between the excise tax credit and the income tax system increase the value of the incentives under this restructured or reformed system. In addition to the new "alcohol fuel mixtures excise tax credit," current federal tax law provides for a small ethanol producer credit, and several other tax incentives that, although little used, might further benefit alcohol fuels in the future.

The Senate version of H.R. 6, the Energy Policy Act of 2005, proposes to not only expand the small ethanol producer credit, but to introduce a renewable fuels

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[1] The Energy Tax Act of 1978 (P.L. 95-618), was one part of President Carter's National Energy Plan, intended to address what was perceived as severe problems in the country's energy markets.

[2] More recently, regulatory subsidies for ethanol fuels — the federal oxygenates and reformulated fuels requirements under the Clean Air Act — as well as numerous state subsidies have been added, which have also increased the market for ethanol fuel. Still, the excise tax exemption has provided much of the economic stimulus to the industry.

standard (which is effectively an ethanol standard), a requirement that gasoline suppliers (refiners and blenders) blend at least 8 billion gallons of renewable fuels per year in producing gasoline. Such a requirement, if enacted, would more than double the amount of ethanol blended with gasoline above the current projected baseline level of ethanol use, and significantly increase federal tax revenue losses.

This report explains the provisions of the new alcohol fuels mixtures tax credit and compares the tax benefits under the new credit with the tax benefits under the old exemption. An example illustrates the mechanics of the new credit and compares it with the old exemption. The second section examines the revenue and Highway Trust Fund implications of the new tax incentive both with and without a renewable fuels standard. The final section discusses the remaining three tax subsidies for alcohol fuels, which, although little used, are nevertheless part of the current federal tax laws and might be used in the future.

## The Alcohol Fuel Mixtures Excise Tax Credit

Under the new alcohol fuels mixtures tax credit, §40 of the Internal Revenue Code (IRC), gasohol blenders may claim a 51¢/gallon tax credit for alcohol used to produce a qualified mixture (a mixture of alcohol and gasoline, or a mixture of alcohol and any other special motor fuel).[3]

Unlike most tax credits, which are claimed against income tax liability (because the income tax otherwise owed is reduced or "credited" by the amount of the credit), the new alcohol mixtures credit is claimed against the motor fuels (gasoline) excise tax. However, both approaches reduce the effective excise tax burden on each gallon of ethanol used to make a 90:10 gallon of a mixture by the same amount — 5.1¢/gallon of a blend or 51¢/gallon of ethanol — regardless of whether the reduction is called a tax credit or excise tax exemption. This new excise tax credit, which became effective on January 1, 2005, will replace the old excise tax exemption as the basic tax incentive claimed on most sales of fuel ethanol — it will provide the biggest subsidy to the industry.[4]

As under the previous exemption, to qualify for the full 51¢ tax credit, the alcohol must be at least 190 proof (95% pure alcohol, determined without regard to any added denaturants or impurities). The credit is 37.78¢ per gallon if the ethanol is between 150 and 190 proof; no credit is provided for alcohol below 150 proof. This mixture credit is available only to the blender, who must not only produce the mixture but must either use the mixture as a motor fuel in a trade or business or sell it for use as a fuel. The blender may be the producer, the terminal operator, or the

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[3] The "Jobs Bill" also introduced a parallel or equivalent system of incentives for biodiesel. Section 40A of the IRC also provides for excise tax credits against the 24.4¢/gallon tax on diesel fuel for mixtures of biodiesel. This *excise tax credit* is 50¢/gallon of recycled biodiesel and $1.00/gallon for virgin agri-biodiesel. Section 40A also provides a 50¢/gallon income tax credit ($1.00 for agri-biodiesel) for use or retail sale of pure 100% biodiesel.

[4] Moreover, the proposed renewable fuels mandate — a new regulatory subsidy — will, if enacted in H.R. 6, also provide a larger benefit than the tax subsidy.

wholesaler, distributor, or marketer. Technically, both ethanol and methanol qualify for the exemption as long as they are not derived from petroleum, natural gas, coal, or peat. In practice, however, virtually all fuel alcohol is ethanol produced from corn; very little, if any, methanol is produced from wood and other biomass (or renewable) sources because it is generally uneconomic.[5] Currently most methanol is produced from natural gas, is too expensive as a blended motor fuel and does not qualify for the tax breaks.

As did the exemption before it, the new federal tax credit for alcohol fuels also applies to certain fuel additives called oxygenates, provided they are produced from renewables such as corn and not from fossil fuels such as natural gas. ETBE is a compound derived from a chemical reaction between ethanol and isobutylene (a byproduct of both the petroleum refining process and natural gas liquids).[6] In this reaction, the ethanol is chemically transformed and is not present as a separate chemical in the final product. In 1995, the IRS ruled that blends of ETBE (ethyl tertiary butyl ether) and gasoline would also qualify for the reduced partial excise tax exemption. In effect these rulings ensured that the oxygenate required under the Clean Air Act would also qualify for the tax subsidies. Allowing ETBE to qualify for this tax exemption was intended to further stimulate the production of ethanol. Allowing ETBE to qualify for the federal tax subsidies reduces the growth of MTBE (methyl tertiary butyl ether), its main competitor. ETBE costs more to produce and therefore, without the tax subsidies, could not otherwise compete with the less costly MTBE. The recent banning and phasing-out of MTBE by many states (California, New York, and Connecticut, and others) reduces the competitive advantage of MTBE and also increases the demand for ethanol as an oxygenate.[7]

**The Credit for Methanol.** The mixtures credit is also available for methanol blended with gasoline at the rate of 60¢ per gallon of methanol — the equivalent of 6.0¢ on 90:10 blends — if the alcohol is at least 190 proof, and 45¢ if the methanol is between 150 and 190 proof. No credit is available for either ethanol or methanol that is less than 150 proof. As noted above, the alcohol in methanol cannot be produced from any fossil fuels — it must be produced from organic or biomass materials.

## How the New Tax Credit Works

As already discussed, the new alcohol fuels mixtures excise tax credit is claimed against the excise tax, primarily the gasoline excise tax — it reduces the excise tax otherwise owed and remitted to the federal government. So, despite the reforms of

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[5] Although blends of gasoline with biomass — derived methanol would also qualify under the tax code, such blends are disqualified under the Clean Air Act because of the associated increase of emissions of ozone — forming pollutants.

[6] Natural gas liquids are those components of wellhead gas — ethane, propane, butanes, pentanes, natural gasoline, condensate, etc. — that are liquefied at the surface in lease separators, field facilities, or gas processing plants.

[7] Currently, nineteen states have either banned, limited, or are phasing-out MTBE. See CRS Report RL32787, *MTBE in Gasoline: Clean Air and Drinking Water Issues*, by James McCarthy and .

the alcohol fuels tax incentives in 2004, the basic incentive — the 51¢/gallon tax credit — is still connected with the gasoline excise tax (and other motor fuels excise taxes); understanding how the tax credit works requires a brief explanation of the structure of the current federal excise taxes on motor fuels.

**The Structure of Motor Fuels Excise Taxes.** Virtually all transportation fuels are taxed under a complicated structure of tax rates and exemptions that vary by type of fuel (gasoline, diesel, propane, etc.) and transportation mode or how the fuel is used (cars, trains, buses, airplanes, etc.). Gasoline used in highway transportation — the fuel used more than any other — is taxed at a rate of 18.4¢ per gallon, composed of: an 18.3¢ Highway Trust Fund rate, which generates most of the revenue for the federal highway trust fund (HTF); and a 0.1¢ rate that is earmarked for the Leaking Underground Storage Tank Trust Fund (LUST).[8] Diesel fuel for highway use — the fuel used mostly by trucks — is taxed at 24.4¢ per gallon, also consisting of two components: a 24.3¢ rate that is allocated into the HTF, and 0.1¢ that goes into the LUST fund. In addition, special motor fuels (gasoline substitutes), jet fuel, railway diesel fuel, motorboat fuel, and virtually every other transportation motor fuel that is not specifically exempt, are also subject to tax.[9] Compressed natural gas (CNG) has, since 1993, been subject to an excise tax of 48.54¢ per MCF (thousand cubic feet) — marking the onset of the taxation of gaseous transportation fuels.[10]

**Excise Tax Exemption.** The tax subsidies for alcohol fuels were restructured — the excise tax exemption became an excise tax credit — under the American Jobs Creation Act of 2004 (P.L. 108-357), enacted on October 22, 2004. The reforms became effective on January 1, 2005.

Before the restructuring of the alcohol fuels tax incentives in 2004, the most important tax incentive for alcohol fuels — the one most responsible for the development of the alcohol fuels market — was the partial exemption from the otherwise standard excise tax rates on gasoline, diesel, and other transportation fuels. This exemption was 5.2¢ per gallon in 2004 and scheduled to decline to 5.1¢ beginning on January 1, 2005, before it is was replaced by the "alcohol mixtures excise tax credit." Thus, mixtures of 90% gasoline and 10% alcohol (typically called gasohol) were taxed at 13.2¢ per gallon — they were exempt from 5.2¢ of the tax [11]

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[8] The LUST fund finances the cost of cleaning up spills from underground fuel storage tanks. All taxable transportation fuels are assessed the 0.1¢ LUST fund tax except for liquefied petroleum gas or propane.

[9] A variety of off-highway fuel uses (e.g., farming), business uses (e.g., construction equipment), and government uses (e.g., police departments and school districts) are tax exempt.

[10] Before 1993, only liquid fuels were subject to the various transportation fuels taxes — fuels that were liquid at the time they entered into the tank of the vehicle. The Omnibus Budget Reconciliation Act of 1993 (P.L. 103-66) introduced a tax on CNG.

[11] Also from Jan. 1, 1993 to Dec. 31, 2004, mixtures of 7.7% or 5.7% alcohol (either ethanol or methanol) received a prorated exemption: 7.7% ethanol blends qualified for a 4.004¢ exemption (they are taxed at 14.396¢ per gallon); and 5.7% ethanol blends qualify for a

(continued...)

In all these cases, the exemption equated to 52¢ *per gallon of ethanol,* for 2004, which is the same as a 52¢/gallon income tax credit.[12]

## Example

**Table 1** compares the net, after-tax value of the new 51¢/ gallon alcohol fuel mixture excise tax credit (column 3) as it is applied on 90:10 blends (90% gasoline, 10% ethanol), with the old 5.1¢/gallon excise tax exemption (column 2) on those same blends. For perspective, these are compared with the tax on a gallon of pure gasoline. The example assumes the ethanol is 190 proof. Subsidy value is measured in terms of its effects on the marginal costs of supplying fuel relative to the unsubsidized shift in the marginal cost curve under the 18.4¢/gallon gasoline tax. The model is described in the Appendix in greater detail.

Note first that there is no difference between the new excise tax credit and the old excise tax exemption in the actual excise tax paid or remitted to the Treasury (row 3): whether the reduction in taxes per gallon of a 90:10 blend is provided by the an excise tax exemption and or excise tax credit, the amount actually paid to the Treasury is 13.3¢/gallon. There is a difference, however, in the subsidy value between the two ways of reducing the excise taxes. In particular, **Table 1** shows that the new alcohol fuels excise tax credit has a higher subsidy value than the excise tax exemption in effect under the pre-2005 tax law. As the sixth row, third column shows, the net-after tax subsidy value of the new excise tax credit *per-gallon of a 90:10 blend* is 6.8¢/gallon as compared to 5.1¢/gallon under the exemption. Thus, the value of the excise tax credit is 1.7¢ greater, or 33.3% greater, than the value of the exemption. Per gallon of ethanol the subsidy value would be 10 times that amount or 68¢/gallon, rather than 51¢/gallon.

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[11] (...continued)
2.964¢ per gallon exemption (they are taxed at 15.436¢ per gallon). The 5.7% and 7.7% blends correspond, respectively, to the 2.0% and 2.7% oxygen content standard for gasoline sold in ozone nonattainment areas and carbon monoxide nonattainment areas under the Clean Air Act (CAA), as amended in 1990. The CAA requires that all gasoline sold in the winter months in the 40 carbon monoxide (CO) non-attainment areas contain at least 2.7% oxygenate. Oxygenates add oxygen to gasoline and make the fuel burn more completely and more cleanly. This part of the program began on Nov. 1, 1992. The CAA also requires that all gasoline sold in 9 ozone non-attainment areas be reformulated gasoline, containing at least 2% oxygenates. Reformulated gasoline involves a more complex and extensive change to the chemical properties of fuel to 1) reduce emissions of volatile organic compounds (which form ozone), 2) reduce emissions of toxic compounds (such as formaldehyde), and 3) keep emissions of nitrogen oxide from increasing.

[12] Alcohol blended with diesel fuel or any one of the other special motor fuels is also partially exempt from tax. The exemption for "gasohol" blends also applies to blends of diesel and biomass — derived alcohol and blends of a special motor fuel and biomass — derived alcohol, whether ethanol or methanol.

## Table 1. Comparison of the Net, After-Tax Subsidy Value of the New Mixtures Tax Credit With the Old Excise Tax Exemption

| | No Credit or Exemption | Old Excise Tax Exemption | New Alcohol Fuel Mixtures Excise Tax Credit |
|---|---|---|---|
| | 100% Gasoline | 90:10 Blends | |
| Nominal (Statutory) Excise Tax Per Gallon | $0.184 | $0.184 | 0.184 |
| Reduction in Tax Liability Per Gallon | 0 | $0.051/gallon exemption | $0.051/gallon excise tax credit |
| Total Excise Taxes Paid to the Treasury | $0.184 | $0.133 | $ 0.133 |
| Increases in Marginal Cost of Supply | $0.184 | $0.133 | $0.116 |
| Difference in Marginal Cost Per Gallon Relative to the Non-Subsidized Gasoline Tax | 0 | - $0.051 | - $0.068 |
| Value of the Subsidy/Gallon of 90:10 Blend | 0 | $0.051 | $0.068 |
| Value of the Subsidy/Gallon of Ethanol | 0 | $0.51 | $0.68 |

**Notes:** *Value of tax subsidy includes the tax benefits from the deductibility of the excise taxes against income tax liability — a higher excise tax results in greater tax deductions and a smaller tax. This figure assumes a 25% marginal income tax rate. See the Appendix for more detail.

The higher subsidy value under the excise tax credit is due to the deductibility of excise taxes as an expense against the income tax. The 2004 reforms changed the terminology of a tax subsidy: Rather than claiming an instant *exemption* of 5.1¢/gallon, blenders can now claim an instant *credit* of 5.1¢/gallon. However, the substitution of a tax credit for an equivalent exemption means that blenders are treated nominally as paying the full 18.4¢/gallon excise tax; they will get higher income tax deductions, which increases the effective amount of the new tax credit. Assuming a marginal income tax rate of 25% — the rate usually assumed by the Joint Tax Committee and other analysts — the value of the new tax credit increases by 1.7¢ per gallon (or by 33.3%). Thus, the effective value of the tax credit is not 51¢/gallon but 68¢/gallon.

## Revenue and Highway Trust Fund Implications

From FY1932, when it was first enacted, until FY2003, the gasoline tax has generated over $400,000 million in gross tax revenues; billions more have been generated from the tax on diesel and other special highway motor fuels.[13] Net revenues have been about 25%, or about $100,000 million, less due to the deductibility of the excise taxes as a cost of doing business, leaving a net total of about $300,000 million.

In FY2003, the year for which the latest data are available, the gasoline tax alone generated $20,100 million in tax revenues for the Highway Trust Fund; $8.6 billion more were generated from the excise tax on diesel; and millions more were generated from the excise taxes on other highway motor fuels. In total, the HTF collected $33,700 billion in excise tax receipts in FY2003, about 90% from motor fuels taxes and most of that from the gasoline tax.[14] These totals include receipts generated from the taxation of gasoline blended with alcohol, almost all ethanol, which totaled in gross terms about $4,100 million in FY2003 (about $3,000 million net due to about $1,000 million in income tax offsets).

But, while the excise tax on gasoline alcohol blends generated billions in tax revenue, the lower tax rate due to the exemptions (a tax rate of 13.1¢ in 2003 due to an exemption of 5.3¢; a tax rate of 13.2¢ in 2004 due to an exemption of 5.2¢) meant that these blends did not generate as much revenue for the HTF as they would have otherwise had the ethanol blends been taxed at the same rate as pure (unblended) gasoline. From 1978, when the excise tax exemption for alcohol fuels was first enacted, to FY2004, it is estimated that the exemption cost the federal treasury approximately $14,000 million in foregone federal revenues in net terms (i.e., gross excise tax receipts less income tax receipts). Gross receipts (i.e, losses to the HTF) would have been about $18,600 million. For FY2003, for example, had ethanol blends been taxed at 18.4¢/gallon (instead of the actual 13.1¢/gallon because the exemption was 5.3¢/gallon), gross revenues for the HTF would have been about $1,400 million higher. The net revenue loss was $350 million or 25% less, again because the lower tax rate implied a smaller income tax offset.

The above effects on the HTF exclude additional losses in receipts due to a tax code provision, enacted in 1990 and repealed by the 2004 jobs bill, which allocated 2.5¢ of the taxable portion of the excise tax on ethanol blends (the 13.1¢ in 2003) to remain in the general fund. IRC §9503 (b) provided that part of the taxable portion of the tax on gasohol blends (the 13.1¢ for 90:10 blends, the 14.342¢ for 92.3:7.7 blends, and the 15.422¢ for 94.3:5.7 blends) was not allocated to the HTF in 2003, but was instead allocated into the general fund. More specifically, for the 90/10

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[13] Brian Francis, *Gasoline Excise Taxes, 1933-2000,* Statistics of Income Bulletin; Internal Revenue Service, *Federal Excise Taxes Reported to or Collected by the IRS, Alcohol and Tobacco Tax and Trade Bureau, and Customs Service: 1997-2004,* Table 21.

[14] Three of the six separate excise taxes that finance the HTF are imposed on highway motor fuels. The other three excise taxes, which generated $3.1 billion in tax receipts in FY2003, are: the retail excise tax on heavy trucks, tractors, and trailers, the tax on truck tires, and the heavy vehicle use tax.

blends, the law in 2003 provided that 3.1¢ of the 13.1¢ tax remain in the general fund; for blends containing less than 10% ethanol, 2.5¢ remains in the general fund and is not allocated into the HTF. For 2003 about $700 million was allocated to the general fund instead of the HTF under this provision. Thus the total HTF revenue loss resulting from the alcohol fuels exemption was about $2,100 million for FY2003.

## Revenue Effects of the New Alcohol Fuels Mixtures Tax Credit

The substitution of a tax credit for an exemption against the excise taxes will increase revenues to the HTF, and reduce revenues by the same amount for the general fund. Based on current projections by both the Office of Management and Budget (OMB) and the Joint Committee on Taxation, foregone revenues from the excise tax credit is projected to be about $1,5000 million for FY2006. **Table 2** shows the two revenue loss projections.

### Table 2. Projections of Revenue Losses to the General Fund (and Increases to the HTF) from the New Alcohol Fuels Mixtures Excise Tax Credit ($millions)

| Year | OMB Projections | JCT Projections |
|---|---|---|
| 2004 | $1,450 | $1,100 |
| 2005 | $1,490 | $1,400 |
| 2006 | $1,550 | $1,400 |
| 2007 | $1,590 | $1,400 |
| 2008 | $1,620 | $1,500 |
| 2009 | $1,650 | $1,500 |
| 2010 | $1,680 | $1,500 |

**Sources**: Executive Office of the President. Office of Management and Budget. *Budget Document of the United States: Analytical Perspectives, FY2006,* p. 323; Joint Committee on Taxation. *Estimates of Federal Tax Expenditures for Fiscal years 2005-2009.* (JCS-1-05), Jan. 12, 2005.

However, because the income tax offset or deductibility takes place at the 18.4¢ rate, the net income offsets are higher relative to the non-subsidized full gasoline tax rate — there are additional net revenue loss due to this higher income tax deduction. At the assumed 25% marginal income tax rate, these offsets are estimated at 1/4 of the gross revenue losses in **Table 2**. Thus, for FY2006, using the OMB estimated gross revenue losses of $1,550 million, income tax offsets (i.e., foregone income tax receipts into the general fund) are estimated at $387.5 million.

## Revenue Losses Under the Proposed Renewable Fuels Standard

Combined with the renewable fuels standard (RFS) proposed in the Senate's comprehensive energy policy bill, the new tax credit for alcohol fuels mixtures is projected to raise revenue losses significantly over those baselines already projected by the OMB. This is illustrated in **Table 3**. As shown in column (3), revenue losses from the new excise tax credit are projected to more than double by 2010 if the RFS under the Senate's version of H.R. 6 is enacted.

### Table 3. Projected Ethanol Use and Corresponding Revenue Losses to the General Fund (and Increases to the HTF), Baseline vs. the Renewable Fuels Standard (RFS), FY2006-2012

| | Baseline OMB Data | | Renewable Fuels Standard | | |
|---|---|---|---|---|---|
| Year | Baseline Ethanol Use (mil. gals.) | Baseline Revenue Losses ($mil.) | Ethanol Use Under Senate's RFS (mil. gals.) | Revenue Losses Under Senate's RFS ($mil.) | RFS Revenue Losses Over Baseline ($mil.) |
| 2006 | 3039 | 1550 | 4000 | 2040 | 490 |
| 2007 | 3118 | 1590 | 4700 | 2397 | 807 |
| 2008 | 3176 | 1620 | 5400 | 2754 | 1134 |
| 2009 | 3235 | 1650 | 6100 | 3111 | 1461 |
| 2010 | 3294 | 1680 | 6800 | 3468 | 1788 |
| 2011 | N.A. | | 7400 | 3774 | |
| 2012 | N.A. | | 8000 | 4080 | |

**Sources**: Author's calculations based on OMB data and data in H.R. 6. OMB data is from Executive Office of the President, Office of Management and Budget, *Budget Document of the United States: Analytical Perspectives, FY2006,* p. 323;

# Other Possible Tax Subsidies for Alcohol Fuels

Although the new alcohol fuels mixtures excise tax credit will, as the exemption before it, become the major tax incentive for ethanol fuels, there are also others.

## Tax Credits for Pure Alcohol Fuels

An income tax credit is also available for straight (or "neat") alcohol (known as E85 or, in the case of methanol, M85) used as fuel — fuels that contain a minimum of 85% alcohol, and are thus not mixtures. The amounts of tax credits is 60¢/gallon of either ethanol and methanol. This credit is available only to the user directly (who

must use it in a trade or business), or to the seller who must sell it at retail to the ultimate user (as long as it is placed in the fuel tank of the buyer's vehicle). In all these cases, the alcohol may be either ethanol or methanol but must not be produced from fossil fuels, effectively limiting the tax credit to ethanol from corn. The market for these straight, or neat fuels, is very small. The credit for straight alcohol fuels was not amended by the jobs bill.

## Small Ethanol Producer Tax Credit

Current law provides for an income tax credit of 10¢ per gallon ($4.20 per barrel) for up to 15 million gallons of annual ethanol production by a small ethanol producer, defined as one with ethanol production capacity of 30 million gallons per year or less (about 2,000 barrels per day). This credit, which was enacted as part of the Omnibus Budget Reconciliation Act of 1990 (P.L. 101-508), is strictly a production tax credit available only to the manufacturer who sells the alcohol to another person for blending into a qualified mixture in the buyer's trade or business, for use as a fuel in the buyer's trade or business, or for sale at retail where such fuel is placed in the fuel tank of the retail customer. Casual off-farm production of ethanol does not qualify for this credit. The small ethanol producer credit is limited in the same way as the blender's tax credit. The amount of the credit is reduced to take into account any excise tax exemption claimed on ethanol output and sales. The 2004 "Jobs Bill" allowed the flow- or pass-through of the small ethanol producer credit to the patrons of a cooperative, thus allowing farmer cooperatives that produce ethanol to also benefit from the provision.[15]

## Income Tax Deduction for Alcohol-Fueled Vehicles

Individuals or businesses that purchase alternative fuel vehicles (AFVs) can claim a tax deduction from adjusted gross income for the incremental costs of new vehicles and upgrades to existing conventionally fueled vehicles. The maximum tax deduction for cars is $2,000, but for trucks it can go as high as $50,000. A tax deduction is also available, up to $100,000, for investments in any equipment needed in dispensing the alternative fuels — for storing and dispensing the clean fuel and otherwise refueling clean fuel burning vehicles. For both of these tax incentives, alternative fuels are defined as compressed natural gas, liquefied petroleum gas, liquefied natural gas, hydrogen, and electricity, and they include 85% (neat) alcohol fuels, ether, or any combination of these produced from biomass. The deduction is reduced by 75% in 2006 — the $2,000 deduction would become $500 — for clean

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[15] Under IRC§521 farmers cooperatives are exempt from income taxes as long as any cooperative income flows through to the patrons as "patronage dividends" — basically net income (profits) are allocated back to the cooperative patrons (members), and in effect, federal tax law treats cooperatives as partnerships (rather than corporations). Prior to the 2004 "Jobs Bill," the only credits that were allowed to be passed through to the patrons were the rehabilitation credit, the energy credit, and the reforestation tax credit. The 2004 amendments added the small ethanol producer credit to the list of credits allocable to the patrons, which effectively reduces each patron's dividends by a proportionate share of the credits based on the patron's share of ethanol production or total business done with the cooperative (or some other allocation criteria).

fuel vehicles (or refueling property) purchased during 2006, and by 100% thereafter i.e., it is eliminated after December 31, 2006. This deduction is currently little used.

## Section 29 Production Tax Credit

An income tax credit is also available for the production of a broad variety of fuels derived from various alternative energy resources (such as oil from tar sands or shale, gas from coalbeds, brine or tight formations, synthetic fuels, etc.). This is the alternative fuels production tax credit, also known as the §29 tax credit (because it is part of Internal Revenue Code section 29), which in 2004 was $6.47 per barrel of oil equivalent. Certain types of alcohol fuels — either ethanol or methanol produced synthetically from coal or lignite — could qualify for this non-refundable tax credit. Alcohol fuels produced from biomass do not qualify for this credit, although gas produced from biomass does qualify. There is little if any production of liquid synthetic fuels from coal in the United States so that, based on current information, this credit is not claimed on alcohol fuels used in transportation.[16]

[16] For a more detailed description and an analysis see CRS Report 97-679, *Economic Analysis of the §29 Tax Credit for Unconventional Fuels* .

# Technical Appendix

This technical appendix calculates the economic or subsidy value of the new alcohol fuels excise tax credit as compared to the old excise tax exemption and the non-subsidized 100% gasoline. That subsidy value is measured as the difference in marginal costs for a profit-maximizing gasoline supplier.

Pre-income tax profits, with a unit excise tax, such as a gasoline tax, is:

$$(1)\ \pi^b = P \cdot Q - C(Q) - T^1 \cdot Q$$

where P is price, Q is output, C (Q) is a total cost function, and $T^1$ is a unit excise tax.

Maximizing before-tax profits $\pi^b$ with respect to output Q leads to the following condition:

$$(2)\ \delta\pi^b / \delta Q = P - C'(Q) - T^1 = 0$$

which implies that,

$$(3)\ P = C'(Q) + T^1$$

i.e., profit maximization leads the firm to produce at that point where price P is equal to the marginal cost C'(Q) and the excise tax $T^1$. In other words, in a competitive market, a profit maximizing firm facing a unit tax on gasoline faces a higher marginal cost curve by the amount of the tax — the marginal cost curve shifts up (or is higher than the non-taxed marginal costs) by 18.4¢/gallon.

A pure income or profits tax t is completely neutral (it does not affect the profit maximizing level of output) under these conditions, as is shown next.

$$(4)\ \pi^a = [P \cdot Q - C(Q) - T^1 \cdot Q](1 - t)$$

$$(5)\ \delta\pi^a / \delta Q = [P - C'(Q) - T^1](1 - t) = 0$$

which implies that,

$$(6)\ P = C'(Q) + T^1$$

Equation (6) is the same as equation (3) because the (1 - t) term cancels — the equilibrium level of output and price is unaffected by the pure business income tax even with the imposition of a unit tax, such as the 18.4¢ gasoline tax.

Now, however, assume that there are two unit excise taxes, $T^1$ is the excise tax per gallon actually paid, and $T^2$ is the excise tax rate deductible for purposes of the income tax. Then, the after-tax profit function becomes:

$$(7)\ \pi^a = [P \cdot Q - C(Q) - T^1 \cdot Q] - t[P \cdot Q - C(Q) - T^2 \cdot Q]$$

$$(8) = [P \cdot Q - C(Q)](1 - t) - Q[T^1 - t \cdot T^2]$$

Finding the level of Q that maximizes profits lead to the following condition:

$$(9)\ \delta\pi^a / \delta Q = [P - C'(Q)](1 - t) - [T^1 - t \cdot T^2] = 0$$

which reduces to:

$$(10)\ P = C'(Q) + [T^1 - t \cdot T^2] / (1 - t)$$

Where P and C'(Q) are, as before, price and marginal costs, and $[\ T^1 - t \cdot T^2\ ]/(1- t)$ is the shift in the marginal cost curve after allowance for the deductibility of excise taxes as an expense against the income tax.

To illustrate, when a gasoline distributor is paying 18.4¢/ gallon ( $T^1$ = 18.4¢), and deducting the same amount against the income tax ($T^2$ = 18.4¢) then the tax terms in equation (10) become:

$$(11)\ T^1(1 - t) / (1 - t) = T^1$$

Note that because $T^1 = T^2$ the (1 - t ) terms cancel and the shift in marginal cost is simply $T^1$ = 18.4¢. This is also true when a gasoline blender is paying 13.3¢ because of the exemption — the blender is also deducting 13.3¢ against the income tax and the shift or increase in marginal costs equals the amount of the tax, 13.3¢.

However, when $T^1$ and $T^2$ differ, as they do under the new restructured alcohol fuels tax incentives, then the shift in marginal costs is defined by equation (10). Under present law, i.e., since January 1, 2005, $T^1$ = 13.3¢, but $T^2$ = 18.4¢. Thus, assuming the marginal corporate income tax rate is 25% (t = .25), the tax term in equation (10) — the shift or increase in marginal costs — becomes:

(12)13.3¢ - .25 (18.4¢)/ (1 - .25 )

(13) = 13.3¢-4.6¢/.75

(14) = 11.6¢

That represents the increase in marginal costs under the new alcohol fuels excise tax credit (row 4, column 3 in **Table 1**). This is 6.8¢ less than the increase under the gasoline tax, and 1.7¢ less then the increase in costs under the old exemption (the subsidy value is 6.8¢/gallon rather than 5.1¢/gallon)