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## **Mandates, Tax Credits, and Tariffs: Does the U.S. Biofuels Industry Need Them All?**

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## **Executive Summary**

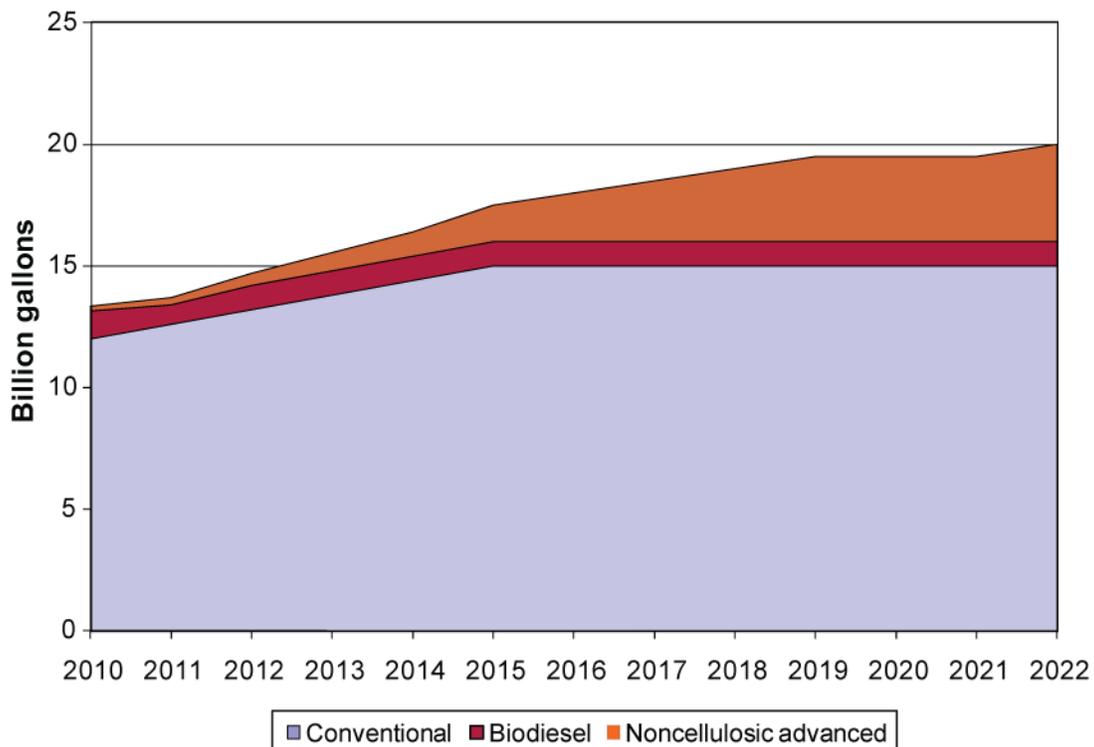
Expanded mandates under the Renewable Fuel Standard provide ethanol and biodiesel producers a guaranteed future market at volumes that exceed what they have produced in the past. Despite having these mandates in place, biofuel producers continue to support tax credits and ethanol import tariffs. An examination of how the new mandates will be implemented shows that biofuel producers will receive little or no additional benefit from tax credits. Ethanol import tariffs will continue to provide U.S. corn ethanol producers a cost advantage over imported Brazilian sugarcane ethanol until at least 2013 when the demand for sugarcane ethanol to meet the noncellulosic advanced biofuel mandate starts to increase.

**Keywords:** biodiesel, biofuel tax credit, biofuels mandates, corn ethanol, ethanol import tariffs, fuel subsidies, sugarcane ethanol, Renewable Identification Numbers.

# Mandates, Tax Credits, and Tariffs: Does the U.S. Biofuels Industry Need Them All?

by Bruce A. Babcock

The Environmental Protection Agency’s finding that corn ethanol, soy-based biodiesel, and sugarcane ethanol meet required greenhouse gas reduction thresholds for conventional biofuels, biodiesel, and advanced biofuels, respectively, is good news for the U.S. biofuels industry and potentially good news for Brazil. Figure 1 shows why. By law, U.S. consumers will be using at least 20 billion gallons of biofuels made from noncellulosic feedstocks by 2022. With a high degree of confidence, we know what mix of biofuels will meet these mandates. The conventional biofuels mandate, which reaches 15 billion gallons in 2015, will be met almost entirely with corn ethanol. Biodiesel made from soybean oil and waste grease and fats will meet the biodiesel mandate, which reaches one billion gallons in 2012.<sup>1</sup> And sugarcane ethanol from Brazil will meet at least a portion of the noncellulosic advanced biofuels mandate, which grows from 200 million gallons in 2010 to one billion gallons in 2014, and to four billion gallons in 2022. These volumes mean increased demand for biofuels, which results in increased demand for corn, soybeans and other oilseeds, and sugarcane.



**Figure 1. Mandated biofuel volumes**

<sup>1</sup> One billion gallons is the minimum biodiesel mandate from 2013 onward. The EPA may increase this mandate through future rulemaking.

Despite these mandates being finalized, the U.S. biofuels industry continues to argue that they need additional subsidies and continuing protection from imports. The biodiesel industry has pushed hard to renew the \$1.00-per-gallon biodiesel tax credit that expired at the end of 2009, and the corn ethanol industry continues to argue that it needs protection against imported ethanol. Currently, importers of ethanol pay a 2.5% ad valorem tariff plus a fixed 54¢-per-gallon tariff on imported ethanol. In addition, the corn ethanol industry is gearing up to wage a large lobbying campaign to keep their 45¢-per-gallon ethanol tax credit.

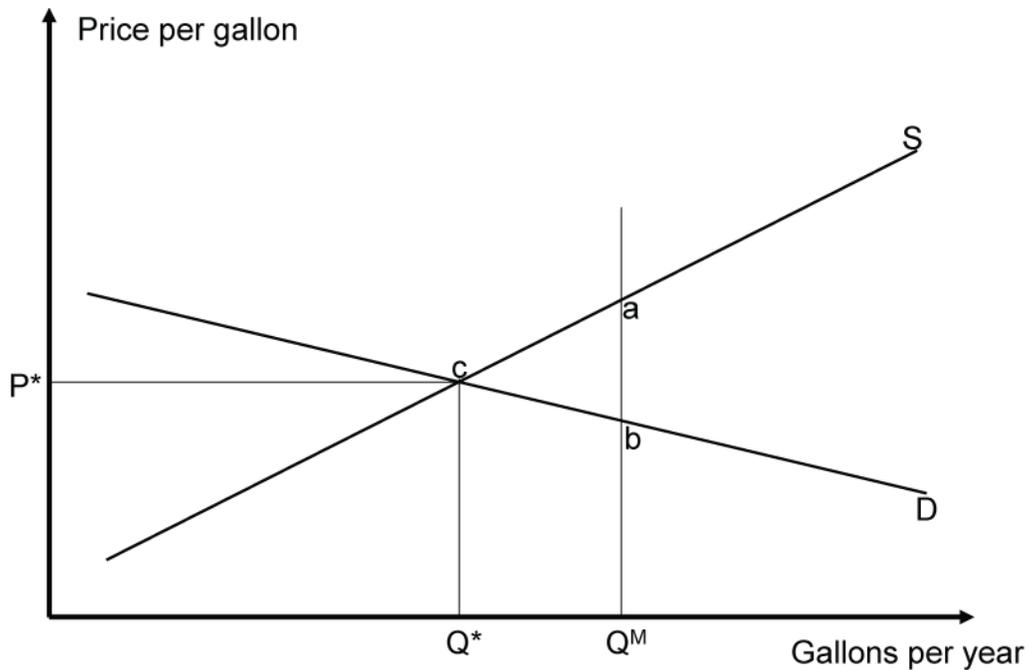
It is puzzling why the biofuels industry continues to defend these subsidies when it has its mandates in place. Tax credits cost taxpayers more than \$5 billion per year, and import tariffs convey the message that the ethanol industry is so uncompetitive that it needs protection against foreign competition. It would seem that there would be major political benefits from simply giving up all subsidies and import tariffs and for the industry to rely solely on the mandates. However, given the amount of political capital that the biofuels industry is spending on maintaining the tax credits and import tariffs, there must be some benefit that they see in maintaining these difficult-to-defend policies. To see if there are significant industry benefits from these policies requires a bit of economic analysis that sheds light on how the mandated volumes in Figure 1 will be enforced and the impact that the tax credits and import tariffs have given these enforcement mechanism.

### **Supply and Demand for Biofuels**

The place to begin is a simple supply and demand diagram of the ethanol industry. The supply and demand for ethanol is represented in Figure 2 by S and D. Given the installed capacity that we have in place, there would be some volume of ethanol produced even if all government programs supporting the industry were eliminated. This level of production is found at point c where supply equals demand. The market price and quantity of ethanol are denoted by  $P^*$  and  $Q^*$ .

Now consider what happens when quantity  $Q^M$  is mandated. Because  $Q^M$  exceeds  $Q^*$ , ethanol producers must be paid a price that exceeds  $P^*$ . Otherwise they will not produce the required amount. This price is given by point a, where the mandated volume intersects the supply curve. Ethanol consumers must pay a price that is less than  $P^*$ . Otherwise they will choose not to consume the required volume of ethanol. This price is given by point b, which is where the mandate intersects the demand curve. As shown, the mandate creates a gap equal to  $a - b$  between the required producer price and the required consumer price. This price gap must be closed or the mandate will not be met.

The mandated volumes in Figure 1 are enforced by the EPA through the market for biofuel RINs (Renewable Identification Numbers). Gasoline producers and importers are assigned a number of RINs that they must give to the EPA each year. Because each gallon of biofuels has a RIN associated with it, producers and importers can obtain RINs by buying biofuels and keeping the RIN. Alternatively, they can enter the RIN market and buy the RIN from somebody else. Sellers of RINs are companies who buy biofuels but

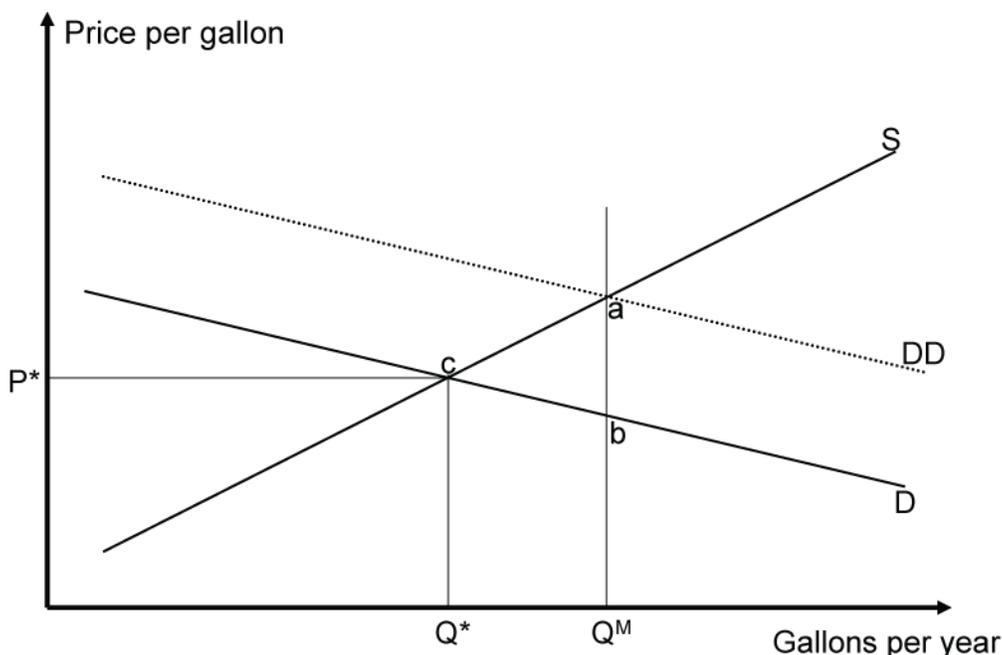


**Figure 2. Supply and demand for ethanol**

who have no obligation to meet an EPA requirement or who buy more biofuels than they need to fulfill their EPA requirement. The market for RINs works because the demand for RINs increases when the quantity of biofuels purchased is insufficient to meet the mandate. An increased demand for RINs increases the RIN price, which improves the relative attractiveness of buying biofuels instead of RINs. An example shows why.

Suppose that the wholesale price of ethanol is \$2.00 per gallon but the wholesale price of gasoline is only \$1.50. With these prices, the demand for ethanol would be quite low. However, if with every \$2.00 gallon of ethanol a buyer obtains a RIN with a value of \$0.25 per gallon, then ethanol is more attractive because the net cost of ethanol would be \$1.75 per gallon. If the RIN price is \$0.75 per gallon, then the demand for \$2.00 ethanol would be quite high because the net cost of using ethanol to meet fuel demand would be only \$1.25 per gallon. The RIN price will eventually settle at a level at which the demand for ethanol is just great enough to meet the Renewable Fuel Standard. That is, the market price for RINs will equal the price gap shown in Figure 2.

The market for RINs is an effective and efficient way to enforce the mandates. Motor fuel producers who find that biofuel is too difficult to access or to blend buy RINs instead. Fuel producers who have ready access to biofuels and find it profitable to blend biofuels sell their excess RINs. By making RINs tradable, the mandates are met at the lowest possible cost. Of course, those fuel producers who dislike biofuels would prefer not to have to buy RINs because the price of RINs is, in essence, a tax on their business. The market for RINs is not the only way to close the price gap caused by a mandate. Instead of a tax, motor fuel producers could be subsidized to use  $Q^M$ . Figure 3 shows how.



**Figure 3. Using a tax credit to meet the mandate**

Suppose that motor fuel producers were told they would receive a payment of 50¢ per gallon for each gallon of ethanol that they purchased. This offer would immediately increase the value of a gallon of ethanol by 50¢ above the free-market value of ethanol. The free-market value is represented by the market demand curve *D* in Figure 3. The 50¢ increase in value causes a 50¢ vertical increase in the demand curve. Instead of 50¢, suppose the payment offer was set at the price gap *a – b* from Figure 1. The impact of this subsidy offer is shown in Figure 3 as a movement in the demand curve *D* to position *DD*. The intersection of this new demand curve with the supply curve occurs at point *a*. This means that the ethanol producer receives a high enough price to produce the required quantity. The motor fuel producer can meet the lower demand price *b* because taxpayers are covering the additional costs through the payment. This shows that an alternative way of meeting the mandate is to use tax credits to subsidize motor fuel producers.

Biofuel producers receive the same price for their product whether motor fuel producers are taxed through the RIN market or subsidized through tax credits as long as the tax credit exactly equals what the RIN price would be without a tax credit. Of course it would be just a coincidence if the tax credit were set at exactly this level. If market demand is high because of high gasoline or diesel prices, then the tax credit could push ethanol demand higher than  $Q^M$ . Low oil prices could result in tax credits being too low, resulting in a quantity less than  $Q^M$ .

When both mandates and tax credits are in place, then the quantity can go above  $Q^M$  but never below. When the tax credit pushes the quantity above mandated levels, then the price that producers receive for their ethanol increases above point *a* in Figure 3. This increases profits to ethanol producers. If the quantity is at  $Q^M$  with both in place, then

the only impact that tax credits have is to lower RIN prices, benefitting gasoline and diesel producers but not biofuel producers.

### **Are Both Tax Credits and Mandates Needed?**

This simple supply and demand framework provides possible explanations for why biofuel producers want to keep the biofuel tax credit. The first explanation is that biofuel producers want to push demand beyond mandated levels when demand for their product is high, which occurs when oil prices are high. This explanation is consistent with the biofuels industry's opposition to a variable tax credit that would provide higher subsidies when oil prices are low and low subsidies when oil prices are high. Advocates of a variable tax credit argued that it made no economic sense to subsidize an industry when market demand for its product was already high.

A second explanation is that the biofuels industry supports the tax credit to curry favor with gasoline and diesel producers, who prefer being paid to use biofuels rather than having to pay a tax to avoid using them. This explanation is a bit Machiavellian because the biofuels industry has historically cast big oil as a primary opponent of biofuels. Perhaps by supporting a subsidy for their opponent, the biofuels industry hopes to defuse opposition to mandates.

A third explanation is that the biofuels industry does not believe that the mandates will be maintained in the future so tax credits are needed as an insurance policy. The likelihood that the mandates will be eliminated seems low. The Bush administration passed them, the Obama administration finalized them, and members of Congress from rural areas know that crop prices would be much lower were it not for the biofuels. Of course, the explanation could be as simple as the biofuels industry not trusting or believing economic analysis.

Whatever the explanation, it's important for the biofuels industry to understand the actual gains it might obtain from the tax credit as the industry weighs whether its political capital is being expended on the issue with the highest possible returns. Congress needs to understand the actual impacts of the tax credit as they determine whether this use of taxpayer funds generates any national benefits.

### **Impacts of Import Tariffs**

Before the EPA finalized the new mandates, imported sugarcane ethanol from Brazil competed directly with domestically produced corn ethanol. They received the same price. They both could be used by gasoline and diesel producers to meet the old mandates. And both qualified for tax credits. Because U.S. and Brazilian ethanol competed directly for the same market, the import tariff directly increased the profitability of the U.S. corn ethanol industry by increasing the cost to U.S. fuel producers of using Brazilian ethanol.

But the EPA ruling that sugarcane ethanol qualifies as a noncellulosic advanced biofuel means that corn ethanol and sugarcane ethanol are now differentiated products. Though they may be chemically identical, they are no longer economically identical. Brazilian

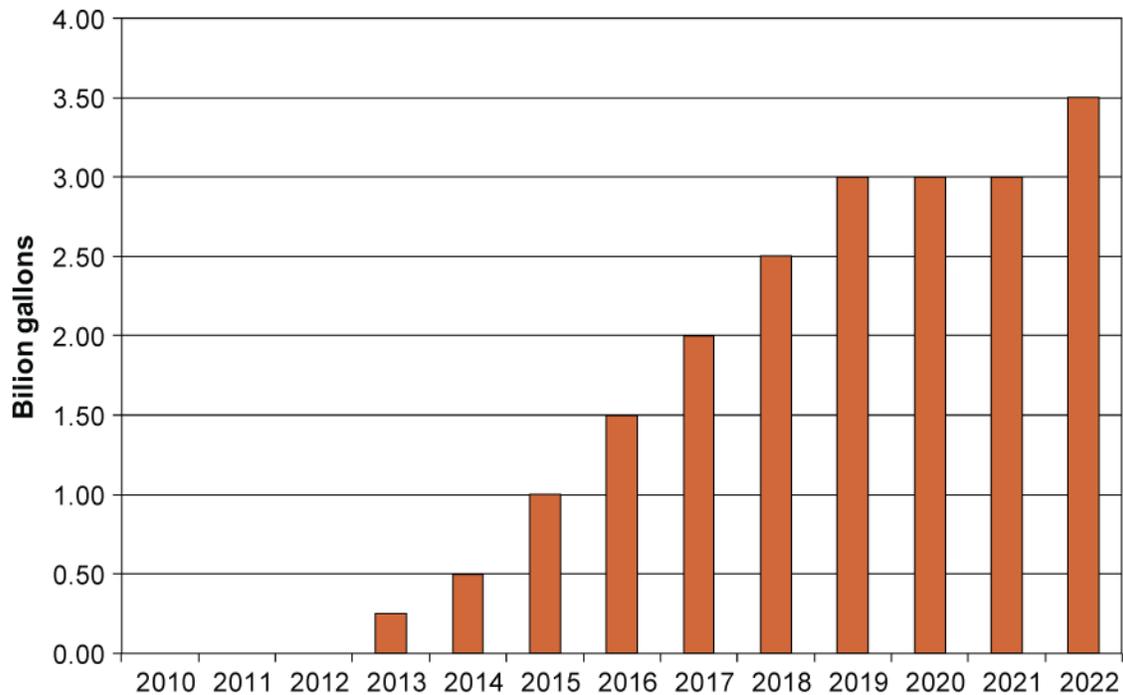
ethanol can be used to meet the advanced biofuels mandate whereas corn ethanol cannot. Because advanced biofuels will be scarcer in supply relative to their mandate, their price will eventually be higher. This means that Brazilian ethanol will be imported to meet the advanced biofuel mandate first. Only if there is an excess supply of Brazilian ethanol available after meeting Brazil's internal demands and the U.S. demand for advanced biofuels will Brazilian ethanol then become a competitor to corn ethanol.

In essence, Congress and the EPA have created a U.S. biofuel mandate specifically for Brazil. This means that domestic gasoline producers will have to pay enough for Brazilian ethanol to induce Brazil to export enough to meet the mandate. Under this scenario, the only impact of the import tariff is to increase the price that domestic gasoline producers pay for Brazilian ethanol. As long as there is no alternative supply of domestically produced, noncellulosic advanced biofuels, there will be no benefit to the U.S. biofuels industry from maintaining the import tariff. The question the U.S. biofuels industry needs to ask is whether another biofuel will emerge that can meet this mandate. If so, then the import tariff may benefit the industry.

The first place to look for an alternative supply of noncellulosic advanced biofuel is biodiesel. Because the EPA ruled that domestically produced biodiesel qualifies as an advanced biofuel, it could, in theory, both meet its own biodiesel mandate and meet the noncellulosic advanced biofuel mandate. The EPA, in fact, anticipates that biodiesel will meet both mandates. Because biodiesel has a higher energy content than ethanol, it is given a 50% extra credit in meeting the advanced biofuels mandate. Increased biodiesel production therefore can meet both the biodiesel mandate and a portion of the mandate for noncellulosic advanced biofuels.

Figure 4 shows the mandate for noncellulosic advanced biofuels that EPA has created net of the biodiesel production that meets the biodiesel mandate. This net mandate does not become positive until 2013, which means that if biodiesel meets its own mandate, then the 50% extra credit also allows it to meet the mandate for noncellulosic advanced biofuels until 2013. After that, the demand for other advanced biofuels will steadily grow to three billion gallons in 2019.

Figure 4 shows that there will be no demand until at least 2013 for sugarcane ethanol to meet the advanced biofuels mandate if biodiesel meets its own mandate. Thus, Brazilian sugarcane ethanol will compete head to head with U.S. corn ethanol until 2013. The benefit to the U.S. corn ethanol industry from the import tariff will be essentially unchanged until then. Beginning in 2013, there will be new demand for advanced biofuels. The advanced biofuel that can meet the Figure 4 mandate at the lowest cost will do so, and, as noted, the only current viable alternative to Brazilian ethanol to meet this mandate is biodiesel. Given the lack of cost competitiveness of soybean-based biodiesel, it is doubtful that our import tariffs are enough to allow biodiesel production to expand to meet the Figure 4 mandates. Thus, beginning in 2013, if no new low-cost advanced biofuel emerges, then Brazilian ethanol will be imported to meet the volumes shown in Figure 4. At that time, the primary impact of the import tariff will be to increase the cost of meeting this new mandate.



**Figure 4. Mandate for advanced biofuels not met by biodiesel or cellulosic ethanol**

**Summary of Industry Benefits from Subsidies and Import Tariffs**

The last 18 months have taught the U.S. biofuels industry that it is difficult to compete with \$70 crude oil when biofuel volumes are high enough to have a direct impact on their feedstock costs (corn and soybean oil). With passage of the EPA’s final rule on implementation of the new biofuels mandates, the industry will find that it will have a market for its product even if crude oil falls to \$40 per barrel. Enforcement of these mandates through the RIN market will guarantee biofuel producers a price high enough to cover the cost of producing volumes in excess of what has ever been produced before. This price may not be high enough to cover fixed costs of the industry unless new facilities need to be constructed to meet the mandates.

With the mandates in place, the tax credits will have no impact on industry profits or production levels unless oil prices climb high enough that the combination of market demand and the subsidies provided by the tax credit push ethanol production higher than mandated levels. In this case, it may be difficult to defend the tax credits because of their additional impact on corn prices and subsequent impact on the cost of producing meat and milk.

The import tariffs also appear redundant because of the new mandate for noncellulosic advanced biofuels that can be best met by Brazilian sugarcane ethanol. However, the additional credit that biodiesel receives for achieving its mandate implies that Brazilian ethanol will not be needed until 2013 or later to meet the advanced biofuels mandate.

Until that time Brazilian ethanol will continue to compete with U.S. corn ethanol. Thus, the industry will continue to receive benefit from protection against import competition.

However, provision of benefits to the U.S. corn ethanol industry alone does not make import tariffs good public policy. If Brazil has surplus ethanol, elimination of the import tariffs would allow the United States to meet its biofuels mandates at lower cost. The primary impact of eliminating the tax credits would be distributional in that the cost of meeting the mandates would shift from taxpayers to fuel users. Arguably, it is the users of transportation fuels who should be paying for the cost of meeting the national security and greenhouse gas objectives of the mandates, not taxpayers, because it is the demand for fuel that causes oil imports and greenhouse gas emissions. The only justification for using taxpayer funds to meet the mandates is that the unstated objective of the mandates—higher commodity prices—may lead to taxpayer savings in the form of lower farm program payments. The extent to which the mandates actually result in these savings, however, is questionable and the topic for another discussion.

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