



June 11, 2008



The Honorable Jeff Bingaman  
Chairman  
Committee on Energy and Natural Resources  
United States Senate  
Washington, DC 20510-6150

Dear Mr. Chairman:

Thank you for your May 12, 2008, letter concerning the current and projected impacts of biofuels on food and gasoline prices, among other issues. We emphatically agree with the suggestion in your press release of May 15 concerning this letter that "it's wise for folks to catch their breath and get better educated on the complexities before charging ahead with changes." We appreciate your leadership in this matter as well as this opportunity to address the current debate over the role of biofuels in our Nation's energy portfolio.

All of us recognize that high food prices and high gasoline prices are important "pocketbook" issues for American consumers. We also recognize the national and economic security importance of reducing our dependence on imported oil as well as the urgency of developing new, cleaner fuels to reduce greenhouse gas emissions. Our biofuels policy makes important contributions to each of these goals.

The food and fuel pricing issues about which you have raised questions are complex. We would again caution, therefore, against hasty judgments driven by highly questionable, agenda-driven calculations, some of which have been featured prominently in the popular press. Many analysts both within and outside of government are currently working to model these questions, and the one certainty is that our data will improve substantially in the months ahead.

It is clear, however, that biofuels are already moderating gasoline prices. That impact is likely to grow substantially as more biofuels come to market. Our preliminary analysis further suggests that current biofuels-related feedstock demand plays only a small role in global food supply and pricing. Moreover, the impact of biofuels on U.S. consumers is even smaller since the farm price of commodities accounts for less than twenty percent of U.S. consumers' food costs.

Our shared vision is a sustainable domestic biofuels industry centered in rural America. To that end, both our agencies as well as the Federal Biomass Research and Development Board, co-chaired by the Department of Agriculture's Under Secretary for Rural Development Tom Dorr and the Department of Energy's Assistant Secretary of Energy Efficiency and Renewable Energy Andy Karsner, are collaborating to build an integrated

biofuels action plan. In order to achieve these goals, continued private sector investment is needed. Creating a stable, predictable policy environment for investors, as Congress did with the expanded Renewable Fuels Standard, is essential to scaling our biofuels use and deploying next-generation biofuels. Efforts to repeal that mandate would hinder progress toward reducing our dependence on imported oil and reducing greenhouse gas emissions.

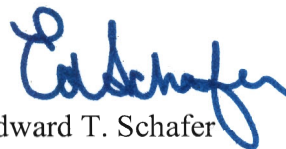
At the same time, our agencies are committed to collecting and presenting accurate data, projecting potential impacts, and initiating the necessary and appropriate actions to ensure the sustainable growth of biofuels. To that end, both of our agencies have significantly ramped up our analytical efforts to ensure that we proceed with caution but also determination. Our agencies will continue to work closely with the Environmental Protection Agency as we undertake our respective responsibilities under Title II of the Energy Independence and Security Act of 2007.

Enclosed please find responses to each of your questions. If you have any additional questions, please contact either of us or Ms. Lisa E. Epifani, DOE's Assistant Secretary for Congressional and Intergovernmental Affairs, at 202-586-5450, or Ms. Linda Strachan, Agriculture's Assistant Secretary of Agriculture for Congressional Relations, at 202-720-7095.

Sincerely,



Samuel W. Bodman  
Secretary of Energy



Edward T. Schafer  
Secretary of Agriculture

Enclosure

# **Responses to Questions From Senator Bingaman**

Prepared by the  
U.S. Department of Energy and the  
U.S. Department of Agriculture  
Washington, D.C.  
June 2008

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**1. How has increased U.S. ethanol and biodiesel consumption affected domestic agriculture, and domestic food prices?**

In 2007, the expansion in ethanol and biodiesel consumption is estimated to have increased the Consumer Price Index (CPI) for all food by 0.10–0.15 percentage point. In other words, ethanol and biodiesel consumption accounted for approximately 3–4 percent of the overall rise in retail food prices. During the first 4 months of 2008, the all food CPI increased by 4.8 percent, with increased ethanol and biodiesel consumption accounting for only about 4-5 percent of the total increase while other factors accounted for 95-96 percent of the increase.

Increased demand for biofuel feedstocks has benefited corn and soybean producers. Higher prices have encouraged production increases and some switching of acreage from soybeans to corn. More dried distiller grains are available for feed, but higher grain prices are also prompting adjustments by livestock producers. In future years, production adjustments by livestock and dairy producers in response to higher feed costs resulting from the expansion in ethanol and biodiesel consumption could add a total of 0.6–0.7 percentage point to the CPI for all food.

Commodities prices, both agricultural and nonagricultural, have risen sharply in recent years for a number of reasons unrelated to biofuels development. For agricultural commodities, higher incomes, population growth, and depreciation of the dollar are increasing the demand for food; drought and dry weather have lowered production and reduced stocks; and some countries have imposed export restrictions. All these factors contribute to higher commodity prices. In addition, record prices for gasoline and diesel fuel are increasing the costs of producing, transporting, and processing food products.

**2. Has increased ethanol and biodiesel consumption in the United States contributed to increased global prices for agricultural goods? And, if so, to what extent?**

As discussed in Question 1, many factors are contributing to rising global prices for agricultural goods. From April 2007 to April 2008, in the absence of any growth in biofuel production in the United States, we estimate that the International Monetary Fund (IMF) global food commodity price index would have risen by 40.6 to 42 percent as opposed to 45 percent.

It should be noted that the impact on consumers of increased commodity prices, including increases driven by ethanol and biodiesel production, is subject to considerable uncertainty. The IMF global food commodity price index is often quoted as an indicator of the change in global food prices. The IMF global food commodity price index includes a bundle of agricultural commodities, including cereals such as wheat, corn (maize), rice, and barley as well as vegetable oils and protein meals, meat, seafood, sugar, bananas, and oranges. In the United States, however, the farm price of commodities accounts for approximately 20 percent of the retail food cost to consumers. This percentage will vary from country to

country depending on diet and the proportion of staples versus highly processed food consumed. It is unclear how the list of commodities and the prices used in the IMF index relate to the foods purchased and the prices paid for food items by consumers in less developed countries.

**3. How might increased biodiesel consumption, as required by EISA beginning in 2009, affect domestic and international food prices?**

The estimated increase in the price of soybean oil due to EISA would increase the CPI for all food by about 0.20–0.30 percentage point if fully passed on to consumers in the form of increased prices for foods containing soybean oil and other oils that compete with soybean oil. This increase is likely to occur over a several-year period since the EISA mandates a phased increase of biodiesel consumption beginning in 2009/10.

The estimated increase in the price of soybeans and soybean oil under the EISA would increase the IMF global food commodity price index by 1–2 percent.

**4. How has increased ethanol and biodiesel consumption affected gasoline and diesel prices?**

Biodiesel use has had a negligible effect on diesel fuel prices since biodiesel fuel production is so small compared to total diesel fuel use.

Without ethanol, gasoline prices would be higher. Even during the period in which MTBE was being phased out (2006) and ethanol prices were very high, had ethanol not been available, gasoline prices would have been even higher. After the Renewable Fuel Standard (RFS), established in the Energy Policy Act of 2005<sup>1</sup>, ethanol use has helped to reduce the price of gasoline to the consumer. Ethanol use has exceeded the requirements of the RFS, demonstrating that refiners and gasoline marketers have an economic advantage to use more ethanol than is required by law.

Table 1 (Appendix IV) shows the estimated reduction of gasoline demand due to the use of ethanol. We estimate that in 2008 we will use 9 billion gallons of ethanol. Without ethanol, we would have to use 7.2 billion more gallons of gasoline (5% more gasoline) in order to maintain current levels of travel. We would only meet the demand for more gasoline without using ethanol mixtures by bidding up the price of gasoline.

In addition, ethanol is less costly than the refiner's average mix of gasoline components. The cost of ethanol to refiners (after accounting for the \$0.51/gallon ethanol blender's tax credit) has been lower than the production cost of conventional gasoline.<sup>2</sup> This explains why ethanol

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<sup>1</sup> The Energy Policy Act of 2005 also eliminated the reformulated gasoline oxygenate requirement.

<sup>2</sup> Based on OPIS data for spot prices of ethanol (after rebate) and conventional gasoline.

demand has been higher than required by the RFS. We estimate that, if we had not been blending ethanol into gasoline, gasoline prices would be between 20 cents per gallon to 35 cents per gallon higher<sup>3</sup>.

**5. What price levels for gasoline and diesel fuel would be expected if biofuels were removed from the market, both in the short- and long-term?**

This question can be interpreted in two ways: (a) What would happen to gasoline prices if the RFS were relaxed or eliminated? (b) What would happen to gasoline prices if there were a disruption in the supply of renewable fuels?

- a) If we assume the mandates are relaxed, the short-term price effect would likely be minimal given the near-term supply economics for the renewable fuels and petroleum. Over 8 billion gallons of ethanol production is in place, and an additional 6 billion is under construction. We can therefore expect that 13 billion gallons of ethanol will be available to the market as long as these plants can recover their variable cost of production and have the regulatory certainty of a continued market. The RFS will not require this much corn ethanol until 2012, although it will, by 2012, require 2 billion gallons of advanced biofuels, not made from corn. Consequently, we do not expect that the RFS could appreciably raise gasoline prices until after 2012 when the requirements for advanced biofuels become significantly higher. After 2012, the price effect of ethanol will depend on several factors including oil prices and the availability of ethanol tax credits.
- b) If we assumed a supply disruption of ethanol, we would expect a fairly large increase in the price of gasoline until ethanol supply were re-established or new market equilibriums were achieved. We do not have an estimate of how large this price increase would be. Because this is a hypothetical scenario, without a well-defined physical cause, it is difficult to produce with a meaningful price-impact estimate.

**6. What effects are biofuels expected to have on gasoline and diesel markets as consumption increases to meet the targets laid out in EISA?**

Unless crude oil prices moderate dramatically, we expect that the ethanol use will reduce gasoline prices through 2012. Impacts after 2012 depend on a number of assumptions including the rate of technology development for the second generation renewable fuels, the supply and demand of transportation fuels and crude oil, the market mechanisms that develop to ensure increasing market demand for renewable fuels, the investment in second generation renewable fuel production capacity, the availability of flexible fuel vehicles, infrastructure for renewable feedstock and fuel transportation and distribution, and whether Clean Air Act RFS fuel waivers are issued.

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<sup>3</sup> This estimate relies on data on the current price difference between ethanol and gasoline and the elasticity of supply for petroleum. Consequently a range is presented.

# **Appendix**



## Appendix I

### *Further Detail on Question 1: How has increased U.S. ethanol and biodiesel consumption affected domestic agriculture, and domestic food prices?*

The amount of corn converted into ethanol and soybean oil converted into biodiesel in the United States is projected to nearly double from the 2005/06 marketing year (September 1, 2005–August 31, 2006) to the current 2007/08 marketing year (September 1, 2007–August 31, 2008). The growth in biofuels production has coincided with rising grain and oilseed prices. From 2005/06 to 2007/08, the average farm price of corn more than doubled, and the price of soybeans nearly doubled, with both reaching new record highs.

While increased biofuels production is partially responsible for the increase in corn and soybean prices, many other factors have also contributed to the sharp increase in prices for these commodities. Some of these factors include:

- Higher incomes, population growth, and depreciation of the dollar are increasing the demand for processed foods and meat in rapidly growing developing countries such as India and China. These shifts in diets are leading to major changes in international trade. For example, U.S. corn exports are projected to reach a record of 2.5 billion bushels in 2007/08 despite record high corn prices.
- Drought and dry weather have affected grain production in Australia, Canada, Ukraine, the European Union, and the United States in 2007/08. These weather events have helped to deplete world grain stocks. The tight stocks situation is leading to increasing concerns that prices could move sharply higher if this year's harvest falls below expectations. These concerns are causing some importers to purchase for future needs, pushing prices higher.
- Many exporting countries have put in place export restrictions in an effort to reduce domestic food price inflation. By reducing supplies available for world commerce, these actions have exacerbated the surge in global commodity prices.
- Record high prices for diesel fuel, gasoline, natural gas, and other forms of energy affect costs throughout the food production and marketing chain. Higher energy prices increase producers' expenditures for fertilizer and fuel, driving up farm production costs and reducing the incentive for farmers to expand production in the face of record high prices. Higher energy prices also increase food processing, marketing, and retailing costs. These higher costs, especially if maintained over a long period, tend to be passed on to consumers in the form of higher retail prices.

Estimating the effects of increased ethanol and biodiesel consumption on domestic agriculture and domestic food prices necessitates segmenting the portion of the increase in corn and soybean prices due to the expansion in ethanol and biodiesel consumption and the increase in corn and soybean prices due to other factors. Various analytical approaches were used to estimate the

effects of increased ethanol and biodiesel consumption on corn and soybean prices. Table 1 (below) compares actual and estimated corn and soybean prices over the period 2005/06–2007/08, assuming corn used for ethanol and soybean oil used for biodiesel production in the United States remained unchanged from the amount used in the 2005/06 marketing year.

Under the alternative scenario, lower corn and soybean oil use lowers the prices of corn and soybeans. In addition, changes in relative returns for corn and soybeans cause producers to switch from planting corn to planting soybeans. Lower corn and soybean prices could also result in increased plantings and lower prices for other crops and lower feed costs to livestock producers.

The recent increase in corn and soybean prices appears to have little to do with the run-up in prices of wheat and rice. Corn and soybean prices began increasing during the fourth quarter of 2006. By this time, producers had already planted the 2007 winter wheat crop. Rice and spring wheat plantings could have been affected by increasing corn and soybean prices, but weather problems, low stocks, and strong global demand likely had a much greater impact on wheat and rice prices than increasing corn and soybean prices in 2007/08. In 2008, U.S. wheat producers indicate they intend to plant more acreage to wheat, while rice acreage is projected to remain flat, suggesting that higher corn and soybean prices have not greatly altered wheat and rice producers' planting decisions.

**Table 1. Estimated Effects of Increased Ethanol and Biodiesel Consumption on Corn and Soybean Prices**

	2005/06	2006/07	2007/08
<b>Corn Price (\$/Bu.)</b>			
Actual	2.00	3.04	4.25
Alternative <u>1</u> /		2.80	3.60
<b>Soybean Price (\$/Bu.)</b>			
Actual	5.66	6.43	10.00
Alternative <u>1</u> /		6.25	8.25
<b>Soybean Oil Price (cents/lb.)</b>			
Actual	23.41	31.02	52.00
Alternative <u>1</u> /		30.35	45.25
<b>Soybean Meal Price (\$/ton)</b>			
Actual	174	205	315
Alternative <u>1</u> /		201	274

1/Assumes the amount of corn used for ethanol and soybean oil used for biodiesel production in the United States remained unchanged from the amount used in the 2005/06 marketing year. This scenario was selected to depict the effects of increased ethanol and biodiesel consumption on corn and soybean prices and does not represent a specific policy scenario.

In 2007, the Consumer Price Index (CPI) for all food increased by 4.0 percent, up from 2.4 percent in both 2004 and 2005. In 2007, the retail price of eggs increased by 29.2 percent, retail dairy product prices rose by 7.4 percent, retail poultry prices posted a 5.2 percent gain, and retail beef prices increased by 4.4 percent. It is very unlikely that retail prices for dairy products, beef, poultry, and eggs were greatly affected by higher corn and soybean prices in 2007.

Higher corn and soybean prices increase livestock and dairy producers' feed costs. The increase in feed costs, with no offsetting increase in livestock prices, reduces livestock producers' margins. Livestock producers react to these lower margins over time by reducing the breeding herd. In the short term, higher feed costs lead to an increase in livestock slaughter and lower livestock prices. For milk and eggs, higher feed costs may have lowered production somewhat in 2007, partially contributing to the increase in retail prices for these food products. However, other factors, such as low returns in 2006, strong demand, abnormally high international prices, especially for dairy products, and increasing use of eggs for hatching to expand broiler production likely contributed to the bulk of the increase in retail food prices for these commodities in 2007.

To estimate the effects of higher farm commodity prices due to growth in ethanol and biodiesel consumption in the United States on retail food prices, we assume that all of the increase in farm commodity prices is passed on to consumers through higher retail food prices. In 2007, the expansion in ethanol and biodiesel consumption is estimated to have increased the CPI for all food by 0.10–0.15 percentage point, or the expansion in ethanol and biodiesel consumption accounted for about 3–4 percent of the increase in retail food prices. During the first 4 months of 2008, the all food CPI increased by 4.8 percent, with increased ethanol and biodiesel consumption accounting for about 4–5 percent of the increase in retail food prices. Over time, livestock and dairy producers will adjust to higher feed costs by reducing production. In future years, production adjustments by livestock and dairy producers in response to higher feed costs resulting from the expansion in ethanol and biodiesel consumption could add a total of 0.6–0.7 percentage point to the CPI for all food.

## Appendix II

**Further Detail on Question 2:** *Has increased ethanol and biodiesel consumption in the United States contributed to increased global prices for agricultural goods? And if so, to what extent?*

The International Monetary Fund's (IMF) global food commodity price index is often quoted as an indicator of the change in global food prices. The IMF global food commodity price index includes a bundle of agricultural commodities including cereals such as wheat, corn (maize), rice, and barley as well as vegetable oils and protein meals, meat, seafood, sugar, bananas, and oranges. A complete list of the commodities included in the index, the percentage change in each commodity price, and the estimated contribution of each commodity to the overall percentage change in the food price index from April 2007 to April 2008 are presented in Table 1 (below). It is unclear how the list of commodities and the prices used in the IMF index relate to the foods purchased and the prices paid for food items by consumers in less developed countries.

**Table 1. Contribution to the IMF Food Commodity Price Index, April 2007 to April 2008. <sup>1/</sup>**

Food Commodity	Weight	April 2007 to April 2008	Contribution to Overall Change
		Percentage Change	Percentage Points
Food	100	45.0	45.0
Cereals			
Wheat	10.9	82.7	9.0
Corn (Maize)	8.1	61.7	5.0
Rice	3.6	215.0	7.7
Barley	2.2	51.0	1.1
Vegetable oils and Protein Meals			
Soybeans	7.5	78.6	5.9
Soybean Meal	4.6	69.3	3.2
Soybean Oil	3.2	80.9	2.6
Palm Oil	6.2	67.9	4.2
Sunflower Oil	0.5	223.5	1.2
Olive Oil	1.3	-4.8	-0.1
Fish Meal	1.6	-8.1	-0.1
Groundnuts	1.5	66.6	1.0
Rapeseed Oil	2.0	87.1	1.7
Meat			
Beef	7.2	-11.8	-0.9
Lamb	1.3	16.9	0.2
Swine Meat	5.6	-6.5	-0.4
Poultry	4.7	5.0	0.2
Seafood			
Fish	15.2	7.2	1.1
Shrimp	3.7	-23.0	-0.8
Sugar			
Free Market	2.8	30.5	0.9
United States	0.2	-1.8	0.0
EU	1.2	-0.4	0.0
Bananas	2.3	49.9	1.2
Oranges	2.5	42.7	1.1

<sup>1/</sup>Estimated from the International Monetary Fund (IMF) 8 price indices and 49 actual price series. The prices are available from the IMF web site at <http://www.imf.org/>

The IMF global food price commodity price index increased by an estimated 45 percent from April 2007 to April 2008. Sunflower oil and rice exhibited the largest price changes, with prices for both commodities increasing by over 200 percent. Prices for wheat, soybeans, soybean oil, palm oil, and rapeseed oil also exhibited relatively large price increases. Prices for wheat and soybeans increased by 82.7 and 78.6 percent, respectively, while the prices for beef and swine meat actually fell by 11.8 and 6.5 percent, respectively.

The price of corn increased by 61.7 percent from April 2007 to April 2008. Combining the change in corn prices with the corn weight of 8.1 percent, the change in corn prices contributed 5.0 percentage points to the estimated 45 percent increase in the global food commodity price index. Soybeans, soybean oil, and soybean meal exhibited larger price increases and play a much larger role in the global food commodity price index, a combined weight of over 15 percent. The combined effects of the increase in soybean, soybean meal, and soybean oil prices contributed 11.7 percentage points to the estimated 45 percent increase in the IMF global food commodity price index from April 2007 to April 2008.

In order to estimate the impact of the increased production of U.S. biofuels on global food prices, one needs to estimate the direct and indirect effects of the increased use of corn and soybeans on individual commodity prices. Last month, CEA testified before the Senate Foreign Relations Committee about corn-based ethanol’s impact on global food prices using this strategy. The analysis below continues in this spirit, but it considers a broader category of factors and costs and a slightly different time period. Here the analysis is updated to the 12 months ending in April, and the analysis considers a broader mix of biofuels—focusing on corn-based and soybean oil-based biofuels.

Table 2 (below) presents the estimated effects of ethanol and biodiesel production in the United States on global prices for corn (maize), soybeans, soybean meal, and soybean oil as well as the impact on the IMF global food commodity price index. It is important to point out that the price impacts reflect greater ethanol and biodiesel production and not only ethanol.

The estimated impacts on global food prices are consistent with the estimates in response to Question 1. We estimate that the percentage increase in price of corn from April 2007 to April 2008 would have been 23 percent lower in the absence of any growth in biofuel production in the United States. Based on this analysis, we estimate that the price of corn would have increased by 47.5 percent assuming no growth in biofuel production in the United States, down from the actual increase of 61.7 percent, from April 2007 to April 2008.

**Table 2. Effects of growth in biofuel production in the United States on global food commodity prices.**

	With Biofuels	Without Biofuels
	Percentage Change	Percentage Change
April 2007 compared to April 2008		
Food	45.0	40.6
Corn (Maize)	61.7	47.5
Soybeans	78.6	54.2
Soybean Meal	69.3	51.2
Soybean Oil	80.9	61.5

The growth in biofuel production in the United States also has pushed up soybean, soybean meal, and soybean oil prices. We estimate the percentage increase in the prices of soybeans, soybean meal, and soybean oil from April 2007 to April 2008 would have been about 25 to 30 percent lower in the absence of any growth in biofuel production in the United States. Assuming no growth in biofuel production, the price of soybeans, soybean meal, and soybean oil in the global food commodity price index would have increased by 54.2, 51.2, and 61.5 percent, respectively, down from actual increases of 78.6, 69.3, and 80.9 percent, respectively, from April 2007 to April 2008.

The effects of biofuel production in the United States on global price for agricultural goods is estimated by combining the individual commodity price impacts with their relative weights in the IMF global food commodity price index. Assuming no growth in biofuel production in the United States, the IMF global food commodity price index would have increased by 40.6 percent compared to the actual increase of 45 percent, from April 2007 to April 2008. Lower corn prices contributed 1.2 percentage points, lower soybean, soybean meal, and soybean oil prices contributed 3.2 percentage points to the total reduction in the global food commodity price index.

However, combining soybeans, soybean meal, and soybean oil in the same index overstates the impact of biofuels on global prices. Soybeans are processed into soybean meal and oil and by including the effects of biofuels on the prices of all three commodities we magnify the impacts of biofuels on the global price index. If we exclude the impact of biofuels on soybean meal and oil prices, the IMF global food commodity price index would have increased by 42 percent assuming no growth in biofuels production compared to the actual increase of 45 percent, from April 2007 to April 2008.

### Appendix III

***Further Detail on Question 3: How might increased biodiesel consumption, as required by EISA beginning in 2009, affect domestic and international food prices?***

Under pre-EISA policies, USDA had projected that soybean oil use for biodiesel would be 4.2 billion pounds in 2009/10 and average 4.4 billion pounds over 2013–2018. EISA requires the use of 500 million gallons of biomass-based diesel fuel by 2009; 650 million gallons by 2010; 800 million gallons by 2011; and 1 billion gallons of biomass-based diesel fuel by 2012. This would raise soybean oil consumption for biodiesel by about 70 percent by 2011/12.

To estimate the effects on soybean oil and soybean prices, we derived price multipliers from a recent analysis of the EISA by the Food and Agricultural Policy Research Institute (FAPRI). In estimating the effects of the EISA on biodiesel use and soybean prices, the FAPRI analysis shows that for a 10-percent increase in soybean oil use for biodiesel, soybean oil prices were estimated to rise by about 4 percent, while soybean prices were estimated to rise by about 1 percent (see Table 1, below). Based on these values, it is estimated that increased biodiesel consumption could cause soybean oil prices to rise by about 32 percent over pre-EISA baseline levels by 2012/13. Similarly, it is estimated that soybean prices would rise by about 7 percent relative to pre-EISA baseline levels.

The estimated increase in the price of soybean oil would increase the CPI for all food by about 0.20–0.30 percentage points if fully passed on to consumers in the form of increased prices for foods containing soybean oil and other oils that compete with soybean oil. The total increase of 0.20–0.30 percentage points in the CPI for all food could occur over a several-year period, especially as the EISA mandate increases biodiesel consumption beginning in 2009/10. The estimated increase in the price of soybeans and soybean oil under the EISA would increase the IMF global food commodity price index by 1-2 percentage points.

**Table 1. Effects of the EISA Biodiesel Mandate on Soybean and Soybean Oil Prices**

	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Soybean oil used for biodiesel:	Million pounds								
Pre-EISA 1/	4200	4250	4250	4350	4400	4400	4400	4400	4400
EISA	5400	6300	7200	7500	7500	7500	7500	7500	7500
	28.6%	48.2%	69.4%	72.4%	70.5%	70.5%	70.5%	70.5%	70.5%
Soybean oil price:	Dollars per pound								
Pre-EISA 1/	0.385	0.383	0.383	0.383	0.383	0.385	0.385	0.385	0.385
EISA 2/	0.435	0.466	0.503	0.508	0.504	0.507	0.507	0.507	0.507
	12.9%	21.7%	31.2%	32.6%	31.7%	31.7%	31.7%	31.7%	31.7%
Soybean price:	Dollars per bushel								
Pre-EISA 1/	8.90	8.75	8.80	8.80	8.80	8.85	8.90	9.95	9.00
EISA	9.15	9.17	9.41	9.44	9.42	9.47	9.53	10.65	9.63
	2.9%	4.8%	6.9%	7.2%	7.0%	7.0%	7.0%	7.0%	7.0%

1/ USDA Agricultural Projections to 2017. Long-term Projections Report OCE-2008-1. February 2008.

2/ Food and Agricultural Policy Research Institute. "The Energy Independence and Security Act of 2007: Preliminary Evaluation of Selected Provisions." FAPRI MU #01-08. January 2008. Page 14, Table 6.

## Appendix IV

*Further Detail on Question 4: How has increased ethanol and biodiesel consumption affected gasoline and diesel prices?*

**Table 1. Petroleum Consumption Reduction Attributed to Ethanol Use**  
(thousand barrels per day)/(billion gallons/yr)

	2007	2008 (estimated)
<b>Ethanol Demand</b>	446/6.8	~590/9.0
<b>Gasoline Displacement <u>1/</u></b>	357/5.5	~472/7.2

1/ The methodology and references for deriving the fuel economy penalty for 10 percent ethanol/gasoline blends (E10) is based on the average of two technical analyses of consumption and emission effects performed on 1989 and 2001-2003 vintage vehicles. The first study conducted as part of the Auto/oil Air Quality Research Program indicated a 2.6 percent fuel economy decrement for E10 gasoline blends. The second study conducted by the Coordinating Research Council on 2001-2003 vintage vehicles indicated a 1.4 percent fuel economy decrement for E10 gasoline blends. Averaging the two studies results in a 2.0 percent fuel economy decrement for E10. Converting from fuel economy space (miles per gallon) to consumption space (gallons per mile) results in a 2.041 percent consumption penalty for E10 blends.