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IMPACT OF WAIVING THE RENEWABLE FUEL STANDARD PROVISIONS OF EISA 2007 ON RETAIL GASOLINE PRICES

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Concerns over the impact of increasing grain and oilseed prices on the nation's livestock, dairy and poultry industry and on retail food prices have given rise to calls to suspend the Renewable Fuels Standard (RFS) provisions of the Energy Independence and Security Act of 2007 (EISA 2007). On April 25, 2008 Texas Governor Rick Perry requested a 50 percent waiver from the RFS mandate for ethanol produced from grain. The RFS provisions of the EISA 2007 require that nine billion gallons of renewable fuels, primarily ethanol, be used in 2008. This waiver would remove 4.5 billion gallons of ethanol from the nation's gasoline supply and would result in a sharp short-term increase in retail gasoline prices that would have a significant adverse impact on consumers, particularly in an environment of record high gasoline prices.

The removal of 4.5 billion gallons of ethanol from the gasoline pool would force refiners to find an additional 3.1 billion gallons of finished gasoline to meet consumer driving requirements. Given the high short-term inelasticity of demand for gasoline the anticipated shortfall of 2.4 percent in the gasoline supply would result in a short-term increase in retail gasoline prices of 31.1 percent. Using the national average price of gasoline, all grades, of $3.653 per gallon for the week of April 28, 2008 as a base, this waiver would increase retail pump prices by $1.138 per gallon to $4.791 in the near-term.[1] This translates into an additional annual cost of $1,033 for each American household.

This estimate was arrived at by applying a price flexibility estimate to the change in finished gasoline supply that would result from removing the gasoline equivalent of 4.5 billion gallons of ethanol production from the market to estimate the expected short-term price impact. This price impact was then applied to the April 28, 2008 weekly average price of gasoline, all grades for the U.S.

Price flexibility is the percentage change in the price of a commodity associated with a one percent change in quantity, keeping all other factors constant.[2] The concept of price flexibility is particularly useful in a situation where supply is inelastic, that is, current production cannot be easily changed. Given current world crude oil inventories and refinery capacities the gasoline

[1] EIA Weekly Retail and Gasoline and Diesel Prices. Gasoline, all grades, U.S. average for the week of April 28, 2008. http://tonto.eia.doe.gov/dnav/pet/pet_pri_gnd_dcus_nus_w.htm
[2] For a discussion of the price flexibility concept see chapter 3 of *Agricultural Product Prices* by William G. Tomek and Kenneth L. Robinson. Fourth Edition, 2003. Cornell University Press.

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markets fit this description. The price flexibility coefficient is the reciprocal of the price elasticity of the commodity in question. If demand for the product is inelastic (an absolute value of less than one) the value of the price flexibility coefficient will be greater than one meaning that prices are flexible.

Empirical studies of gasoline demand have shown that the demand for gasoline is inelastic particularly in the short run. This means that relatively large changes in price result in correspondingly small changes in demand. A recent paper published by the University of California Energy Institute (Hughes et. al.) points out that most of the short-run price elasticities for gasoline in the literature were estimated on data for the gasoline markets of the 1970s and early 1980s and fail to recognize structural and behavioral changes in transportation patterns, growth in multiple-income households, and conservation that have occurred more recently.[3] In their study Hughes et. al. estimate and compare price and income elasticities of gasoline demand for two periods: November 1975 through November 1980 and from March 2001 through March 2006, two periods of relatively high gasoline prices. Their estimates of the short-run price elasticity of gasoline demand for the 1975 to 1980 period range between -0.21 and -0.31 and are, as the authors point out, consistent with previous results form the literature. However, the estimated price elasticities for the more recent 2001 to 2006 period are significantly lower, ranging from -0.034 to -0.077 leading the authors to conclude that "…the short-run price elasticity of gasoline demand is significantly more inelastic today than in previous decades. In the short-run, consumers appear to be significantly less responsive to gasoline price increases."[4]

We adopted the upper end of the range of price elasticities for gasoline estimated by Hughes to calculate the price flexibility used in our analysis. Since the price flexibility coefficient is the reciprocal of the price elasticity, the calculated value is 1/-0.077 = -12.987. This suggests that a one percent reduction in gasoline supply would result in a nearly 13 percent short-term increase in retail gasoline prices.[5]

The short-term change in gasoline prices was estimated by multiplying this price flexibility coefficient by the reduction in gasoline supply that would result from removing 4.5 billion gallons of ethanol from the nation's gasoline supply. According to the EIA, total finished motor gasoline supply (domestic production plus imports) in 2007 was 3.194 billion barrels or 127.7 billion gallons.[6] Finished motor gasoline includes gasoline blended with ethanol. While the 50 percent waiver would eliminate 4.5 billion gallons of ethanol, the impact on gasoline supply would be somewhat smaller when the relative energy value of ethanol is considered. The btu

[3] Hughes, Jonathan, Christopher R. Knittel and Don Sperling. "Evidence of a Shift in the Short-Run Price Elasticity of Gasoline Demand". Center for the Study of Energy Markets. University of California Energy Institute. Paper CSEMWP-159. 2007. Available at http://repositories.cdlib.org/ucei/csem/CSEMWP-159.
[4] Hughes et. al. p. 6
[5] In the context of this analysis short-run is defined as up to one year. In this period consumers are relatively unable to make significant changes to consumption patterns and suppliers are unlikely to significantly increase production. Over the long-run the demand for gasoline is more elastic (meaning the absolute value of the price elasticity is closer to one) and the price flexibility is smaller.
[6] http://tonto.eia.gov/dnav/pet/pet_sum_snd_d_nus_mbbl_a_cur.htm

content of ethanol is about two-thirds that of gasoline (76,300 btu/gal for ethanol compared to 116,090 for gasoline).[7] Considering this, 4.5 billion gallons of ethanol are the gasoline equivalent of 3.063 billion gallons. Removing this amount of ethanol would reduce the supply of gasoline by 2.4 percent and would force refiners to "find" an additional 3.1 billion gallons of finished motor gasoline.

Multiplying the change in gasoline supply by the estimated price flexibility (-2.4% X -12.987) suggests that short-term gasoline prices would increase 31.1 percent. Using the average U.S. retail price of gasoline (all grades) for the week of April 28, 2008 of $3.653 per gallon as the base, a 31.1 percent increase translates to a price of $4.791, or a difference of $1.138 per gallon. In other words, a 50 percent waiver of the RFS would force the average American household to pay an additional $1,033 per year at the gasoline pump.[8]

[7] Low heating (LHV) from USDOE EERE Alternative Fuels & Advanced Vehicles Data Center. http://www.eere.energy.gov/afdc/fuels/properties.html

[8] 21,252 vehicle miles per household per year (2001 estimate from the National Household Travel Survey) divided by 23.4 miles per gallon (from EIA) = 908 gallons per year X $1.138 = $1,033 per household.