RENEWABLE FUELS ASSOCIATION

Economic and GHG Impacts of EPA's 2014-2016 Proposed Rule

June 8, 2015

On May 29, EPA released its proposed rule for 2014-2016 renewable volume obligations (RVOs) under the Renewable Fuel Standard (RFS). Despite its lack of statutory authority to do so, EPA proposed cutting the RVO for conventional renewable fuel from the statutory levels by 1.15 billion gallons (bg) in 2014, 1.6 bg in 2015, and 1.0 bg in 2016.[1] If finalized, these cuts would have severe economic and environmental consequences in 2015 and 2016. In summary:

- Gasoline prices will rise **4.1-6.5 cents per gallon**, meaning Americans will spend nearly **$15 billion more on gasoline** in 2015 and 2016—or **$46 per American citizen** over the two years.
- Gasoline consumption will increase by nearly 1.8 billion gallons, further enriching multinational oil companies to the tune of almost $3.2 billion.
- Ethanol sales fall by 2.6 billion gallons, decreasing revenue to the ethanol industry and rural America by some $3.8 billion.
- Greenhouse gas (GHG) emissions from gasoline increase by **nearly 10 million metric tons**, equivalent to adding **2.1 million cars** to the road or starting up **3 coal-fired power plants**.
- Overall, if EPA's proposal is finalized, it would amount to a **$22 billion windfall** for the oil industry in 2015 and 2016, and higher gas prices and dirtier air for American consumers.

INCREASED GASOLINE PRICES

Cutting ethanol consumption by **1.6 bg** in 2015 will increase demand for gasoline by an estimated **1.1 bg** (Table 1). According to Louisiana State University, that bump in demand for gasoline will increase gasoline prices by **6.5 cents per gallon** *across the board* in 2015. As a result, American drivers will spend **$9 billion** more on gasoline purchases in 2015. Further, oil refiners will keep **$2.4 billion** in their pockets through avoided purchases of ethanol, while also saving roughly **$300 million** on infrastructure investments.

The impacts of EPA's proposal are similar in 2016 (Table 2). Reducing ethanol consumption by 1.0 bg increases gasoline demand by at least 680 million gallons. Increased demand for gasoline will raise prices by 4.1 cents per gallon, meaning

[1] This brief analysis examines only the proposed reductions to the RVOs for conventional renewable fuel, which have historically been satisfied with corn ethanol. EPA's proposal to reduce the RVOs for advanced biofuels would, if finalized, have additional impacts on GHG emissions and fuel prices; however, proposed changes to the advanced biofuel RVOs are outside the scope of this analysis.

consumers will spend a total of $5.6 billion more on gasoline purchases. Refiners will avoid spending $1.43 billion on ethanol, and will forgo additional infrastructure investments.

TABLE 1. Financial Impacts of EPA Proposal in 2015			
2015 Reduction in Ethanol Blending	*Billion gals.*		1.60
Ethanol price [1]	*$/gal.*	$	1.47
Oil industry avoided purchases of ethanol	***Billion $***	**$**	**2.35**
Increase in Gasoline Consumption [2]	*Billion gals.*		1.09
RBOB price [3]	*$/gal.*	$	1.79
Oil industry revenue from increased gasoline sales	***Billion $***	**$**	**1.95**
Increase in retail gasoline price due to reduced ethanol blending [4]	*$/gal.*	$	0.065
Aggregate increased expenditures on gasoline [5]	***Billion $***	**$**	**9.02**
Oil industry avoided investment on ethanol infrastructure [6]	***Billion $***	**$**	**0.30**
TOTAL FINANCIAL BENEFIT TO OIL INDUSTRY IN 2015	***Billion $***	**$**	**13.62**

1. *Base 2015 ethanol price is based on the average of year-to-date 2015 CME nearby futures contracts ($1.51), as of 6.5.15, adjusted using price elasticity of -.25 from Marzoughi and Kennedy.*
2. *Conservatively assumes 0.68 gal. of gasoline replaces 1.0 gal. ethanol. It should be noted that ethanol is primarily used by refiners for its octane value, not its BTU content. Thus, this analysis likely understates the increase in gasoline prices that would result from removing ethanol from the gasoline supply.*
3. *Baseline 2015 RBOB price is based on the average of year-to-date 2015 NYMEX futures contracts ($1.74), as of 6.5.15, adjusted to reflect estimated gasoline price elasticity of .3 from Marzoughi and Kennedy.*
4. *Based on Marzoughi & Kennedy (2012)*
5. *Based on projected 2015 gasoline demand of 138.7 billion gallons (EIA STEO, May 2015)*
6. *$300 million is midpoint between $200 and $400 million (based on CARD Policy Brief 13-PB 13)*

TABLE 2. Financial Impacts of EPA Proposal in 2016			
2016 Reduction in Ethanol Blending	*Billion gals.*		1.00
Ethanol price [1]	*$/gal.*	$	1.43
Oil industry avoided purchases of ethanol	***Billion $***	**$**	**1.43**
Increase in Gasoline Consumption [2]	*Billion gals.*		0.68
RBOB price [3]	*$/gal.*	$	1.79
Oil industry revenue from increased gasoline sales	***Billion $***	**$**	**1.22**
Increase in retail gasoline price due to reduced ethanol blending [4]	*$/gal.*	$	0.041
Aggregate increased expenditures on gasoline [5]	***Billion $***	**$**	**5.64**
Oil industry avoided investment on ethanol infrastructure [6]	***Billion $***	**$**	**0.30**
TOTAL FINANCIAL BENEFIT TO OIL INDUSTRY in 2016	***Billion $***	**$**	**8.59**

1. *Base 2016 ethanol price is based on the average of 2016 CME futures contracts ($1.433), as of 6.5.15.*
2. *Conservatively assumes 0.68 gal. of gasoline replaces 1.0 gal. ethanol. It should be noted that ethanol is primarily used by refiners for its octane value, not its BTU content. Thus, this analysis likely understates the increase in gasoline prices that would result from removing ethanol from the gasoline supply.*
3. *Baseline 2016 RBOB price based on average of year-to-date 2015 NYMEX futures contracts ($1.79), as of 6.5.15.*
4. *Based on Marzoughi & Kennedy (2012)*
5. *Based on projected 2016 gasoline demand of 137.8 billion gallons (EIA STEO, May 2015)*
6. *$300 million is midpoint between $200 and $400 million (based on CARD Policy Brief 13-PB 13)*

INCREASED GHG EMISSIONS

The use of *more* gasoline and *less* ethanol in 2015 and 2016 would conservatively increase greenhouse gas emissions from the transportation fuels sector by **9.8 million metric tons**. According to EPA, that's like adding the annual GHG emissions from **2.1 million cars** or **three coal-fired power plants**.[2]

TABLE 3. GHG Impacts of EPA Proposal		EISA Statute (2015+2016)	EPA Proposal (2015+2016)	Difference
Ethanol Consumption	*Mil. Gals.*	30,000	27,400	(2,600)
Ethanol Energy Content [1]	*MJ/Gal.*	81.5	81.5	
Corn Ethanol Emissions [1]	*gCO2e/MJ*	62.0	62.0	
Total Ethanol Emissions	*Mil. Met. Tons CO2e*	151.6	138.5	(13.1)
Gasoline Consumption [2]	*Mil. Gals.*	246,500	248,270	1,770
Gasoline Energy Content [1]	*MJ/Gal.*	119.5	119.5	
Gasoline Emissions [3]	*gCO2e/MJ*	94.0	94.1	0.1
Total Gasoline Emissions	*Mil. Met. Tons CO2e*	2,768.9	2,791.8	22.9
Total Finished Gasoline Emissions [Ethanol + Gasoline]	*Mil. Met. Tons CO2e*	**2,920.5**	**2,930.3**	**9.8**

[1] GREET1_2013 (Argonne Natl. Laboratory, Dept. of Energy); INCLUDES ILUC EMISSIONS FOR CORN ETHANOL; See Wang et al., Environ. Res. Lett. 7 (2012) 045905
[2] EIA forecasts demand for finished gasoline (i.e., blended with ethanol) will total 138.7 billion gallons in 2015 and 137.8 billion gallons in 2016, for a two-year total of 276.5 billion gallons. Unblended (i.e. without ethanol) gasoline demand in "EISA Statute" case is therefore calculated as 276.5 bg – 30 bg of ethanol required by statute = 246.5 bg. "EPA Proposal" case assumes the 2.6 bg of lost ethanol blending is replaced with 1.77 bg gasoline
[3] Base estimate from GREET1_2013 (Argonne); Estimate under EPA Proposal assumes the incremental 1.77 bg of gasoline has average carbon intensity of 107 gCO2e/MJ (representing marginal oil sources), taking the wtd. avg. up by 0.1 g/MJ

[2] EPA GHG Equivalencies Calculator. http://www.epa.gov/cleanenergy/energy-resources/calculator.html