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and the

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Domestic Renewable Fuels

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Thank you for the opportunity to testify. My name is Scott Faber and I am the Senior Vice President for Government Affairs at EWG.

EWG applauds the Senate Committee on Environment and Public Works and the Subcommittee on Clean Air and Nuclear Safety for reviewing the Renewable Fuel Standard.

To date, the RFS has failed to deliver the "good" biofuels that could help meet many of our environmental and energy challenges. Instead, the RFS has delivered too many "bad" biofuels that increase greenhouse gas emissions, pollute air and water, destroy critical habitat for wildlife and drive up the price of food. The corn ethanol mandate of the RFS, once promoted as a tool to combat climate change, has instead raised greenhouse emissions, exacerbated air and water pollution challenges and inflated the price of staple foods.

Since it was expanded in 2007, the corn ethanol mandate has contributed to plowing up more than 23 million acres of US wetlands and grasslands in order to plant crops – an area the size of Indiana. EWG recently analyzed the annually updated satellite data that the US Department of Agriculture uses to track land use and documented this rapid destruction of wetlands and grasslands.[1] In places where the loss of wetlands is most extensive, corn accounts for the largest share of this conversion.[2] Other studies have also

[1] EWG, (2012) Plowed Under. http://static.ewg.org/pdf/plowed_under.pdf.
[2] EWG, (2013) Going Going Gone. http://static.ewg.org/pdf/going_gone_cropland_hotspots_final.pdf

documented this dramatic change to the American landscape.[3] By accelerating conversion of wetlands and grasslands to grow crops, the RFS has driven up greenhouse gas emissions by releasing carbon stored in the soil[4] and by boosting fertilizer applications.[5]

The Environmental Protection Agency's own analysis has shown that lifecycle greenhouse gas emissions of corn ethanol were higher than those of gasoline last year (2012) and will still be higher in 2017.[6] Of the 33 identified corn ethanol production pathways, only three decreased emissions in 2012 and only nine are expected to meet the greenhouse gas reduction standard for corn ethanol in 2017.[7]

What's more, new research suggests that the RFS will not achieve long-term greenhouse gas reductions. Researchers calculated that the cumulative greenhouse gas emissions caused by corn ethanol between 2010 and 2044 will be about 1.4 billion tons –300 million tons more than from an energy-equivalent amount of gasoline.[8] That means the cumulative lifecycle greenhouse gas emissions from corn ethanol would be 28 percent higher than those from gasoline.

These studies contradict earlier research – based on hypothetical corn ethanol production in 2022 – that suggested that the 30-year lifecycle greenhouse gas emissions from corn ethanol would be lower than those from an energy-equivalent amount of gasoline.[9] EPA presumed investments and technological upgrades, such as fuel switching, that are speculative at best, since most corn ethanol is not subject to the greenhouse gas reduction standards of the RFS.

In addition to increasing greenhouse gas emissions, corn ethanol also drives up emissions of many other air pollutants, including sulfur dioxide, particulate matter, ammonia, nitrogen oxides and ozone.[10] In 2011, the National Academy of Sciences found that "overall production and use of ethanol was projected to result in increases in the pollutant concentration . . . Those projected air-quality effects from ethanol fuel would be more

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[3] E.g. Wright and Wimberly (2012), *Recent Land Use Change in the Western Corn Belt threatens Grasslands and Wetlands.*

[4] Clearing forest, pasture or wetland for new cropland to produce biofuels results in decomposition of organic carbon and elevated GHG emissions, creating a "carbon debt" which may take many years for biofuel consumption to "pay down." See EPA (2011), *Biofuels and the Environment: Triennial Report to Congress*, at 5-9.

[5] Fertilizer applications increase emissions of nitrous oxide, a far more potent greenhouse gas than carbon dioxide. In 2011, nitrous oxide accounted for about 5% of all US GHG emissions, and nitrous oxide molecules stay in the atmosphere for an average of 120 years.
See EPA: http://epa.gov/climatechange/ghgemissions/gases/n2o.html.

[6] See Docket No. EPA-HQ-OAR-2005-0161-3173.5

[7] *Id.*

[8] Clean Air Task Force (2013), Corn Ethanol GHG Emissions Under Various RFS Implementation Scenarios, included in CATF Comments on EPA RFS 2013 Volume Adjustment. [Hereinafter CATF]

[9] CATF at 3.

[10] Wagstrom and Hill (2011), *Air Pollution Impacts of Biofuels* [Hereinafter Wagstrom]; *See also* Gasparatos and Stromberg (2012), Socioeconomic and Environmental Impacts of Biofuels: Evidence from Developing Nations, Cambridge University Press, England.

damaging to human health that those from gasoline use."[11] In particular, experts have found that, compared to the lifecycle emissions from gasoline, corn ethanol results in significantly greater emissions of particulate matter, which can contribute to respiratory illnesses and heart disease.[12] As a result, the corn ethanol mandate is complicating state and local efforts to meet pollution standards for particulate matter. Additionally, EPA concluded that the 2007 expansion of the RFS will also raise ozone levels.[13] Overall, the increase in emissions caused by the RFS are, according to the National Academy, "projected to lead to increases in population-weighted annual average ambient [particulate matter] and ozone concentrations, which in turn are anticipated to lead to up to 245 cases of adult premature mortality."[14]

Corn ethanol also contributes to significant water quality and quantity challenges. As the number of acres dedicated to corn production has increased – from an average of 79 million acres between 2000 and 2006 to 90 million acres, on average, between 2007 and 2012 – farmers have applied far more nitrogen fertilizer.[15] Nitrogen that washes off farm fields contributes to poor water quality, increasing water treatment costs and creating low-oxygen "dead zones." As the National Academy noted, "the increase in corn production has contributed to environmental and surface effects on surface and ground water, including hypoxia, harmful algal blooms and eutrophication."[16] Water used to irrigate corn and to operate ethanol refineries also depletes aquifers and streams. According to various studies compiled by the Academy, on a well-to-wheel basis producing a gallon of gasoline consumes far less water than producing a gallon of corn ethanol.[17]

Fortunately, some second-generation biofuels hold far more promise than corn ethanol.[18] Produced from crop wastes or other byproducts, some of these fuels do not contribute to the conversion of land or increase the use of farm chemicals.[19] Because greenhouse gas emissions from transportation account for 28 percent of GHG emissions – the second largest source – low-carbon biofuels must be part of any strategy to reduce the carbon intensity of liquid fuels.[20]

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[11] National Academy of Sciences (2011), *Renewable Fuel Standard: Potential Economic and Environmental Effects of US Biofuels Policy*, at 246. [Hereinafter NAS].
[12] Tessum, et al. (2012), *A Spatially and Temporally Explicit Life Cycle Inventory of Air Pollutants from Gasoline and Ethanol in the United States*; *See also* Cook, et al., (2010) *Air Quality Impacts of Increased Use of Ethanol under the United States' Energy Independence and Security Act; See also* Wagstrom
[13] Environmental Protection Agency, Renewable Fuel Standard Program (RFS 2) Regulatory Impact Analysis (2010) at 602.
[14] NAS at 206.
[15] Testimony of Joseph Glauber, Chief Economist, USDA, before the Subcommittee on Energy and Power of the House Committee on Energy and Commerce, June 26, 2013. [Hereinafter Glabuer] Corn acres reached 97.2 million acres in 2012.
[16] NAS at 10.
[17] *Id*. at 227.
[18] Some second-generation biofuels are reaching the marketplace, including biofuels derived from grasses, wood waste, crop wastes (such as corn stover and corn cobs) and municipal solid waste.
[19] Tilman, et al. (2009), *Beneficial Biofuels – The Food, Energy, and Environmental Trilemma; See also* Wagstrom and Hill.
[20] http://www.epa.gov/climatechange/ghgemissions/sources/transportation.html.

Unfortunately, the marketplace is saturated by corn ethanol, blocking the commercial development of promising second-generation fuels. While corn ethanol refiners currently have the capacity to produce more than 14.9 billion gallons, gasoline refiners can only blend 13.3 billion gallons of ethanol into the fuel supply. This is commonly known as the "blend wall."[21] Expected declines in fuel consumption, driven largely by fuel efficiency standards, will further reduce the amount of ethanol that can be blended into gasoline.

To allow second-generation biofuels to gain a foothold, Congress must reform the RFS to reduce the prominence of corn ethanol and to accelerate the development of "drop-in" fuels that are compatible with existing engines and infrastructure. At a minimum, Congress should "level the playing field" by demanding that all ethanol production meet the same high greenhouse gas reduction standards. Accelerating development of promising second-generation fuels, especially drop-in fuels, is critical to reducing the carbon intensity of the overall fuel supply, but this is not happening quickly enough to offset the negative environmental impacts of conventional biofuels. To date, the RFS, as currently designed, is not providing sufficiently powerful incentives to develop these second-generation fuels.[22]

Accelerating the development of second-generation fuels could also reduce price and volatility of commodity prices. Between 2005 and 2012, annual corn ethanol production grew from less than 4 billion gallons to almost 14 billion. As a result, the share of corn diverted from food and feed supplies rose from 14 percent to more than 40 percent.[23] Expanding corn production has only partially offset the rapid growth in demand for corn ethanol, resulting in significantly higher corn prices for feed. Although many factors have contributed to price increases, experts estimate that corn ethanol accounted for more than one-third of the surge in corn prices from 2006 to 2009.[24] Other economists have estimated that average corn prices were 30 percent greater between 2006 and 2010 than they would have been had corn ethanol production remained at 2005 levels.[25]

Higher corn prices hurt consumers – especially low-income consumers who spend a larger share of their disposable income on food – by increasing the cost of basic staples. When the price of a bushel of corn increases by $1, the price of eggs increases by 5.5 percent, and the price of milk increases by 2.1 percent.[26] The surge in ethanol use accounted for as much as 15 percent of the rise in domestic food prices between April

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[21] "Corn Ethanol Challenged." *Living on Earth* Interview with Wallace Tyner, Purdue University, February 2013.
[22] The Energy Information Administration has repeatedly reduced its predictions for cellulosic biofuel production by 2022: from less than 3 billion in 2012, to less than 1 billion gallons in January 2013, to less than 500 million gallon in April 2013.
[23] World Agricultural Outlook Board, USDA, World Agricultural Supply and Demand Estimates (2013).
[24] Babcock and Fabiosa (2011) *the Impact of Ethanol and Ethanol Subsidies on Corn Prices: Revisiting History*. CARD, Iowa State University.
[25] Carter (2012). *The Effects of the US Ethanol Mandate on Corn Prices.* [Hereinafter Carter]
[25] National Research Council, *op. cit.,* p. 147.
[26] Hayes (2009). *Biofuels: Potential Production Capacity, Effects on Grain and Livestock Sectors, and Implications for Food Prices and Consumers.*

2007 and April 2008.[27] The Congressional Budget Office found that the growth in ethanol production "has exerted upward pressure on the price of corn, and ultimately, on the retail price of food, affecting both individual consumers and federal expenditures on nutritional support programs."[28] In one year, ethanol production drove up federal spending on nutrition programs by up to $900 million, CBO reported.[29]

Although corn farmers benefit from higher corn prices, higher feed costs harm livestock producers and meat processors. The cost of corn for use in food production has increased by 193 percent since 2005.[30] For poultry producers alone, average annual feed costs have increased by $8.8 billion.[31] Rising demand for corn also drives up the price of wheat and other crops. [32] As wheat supply decreased in 2012, its price increased by approximately 50 percent.[33] These increases in the cost of basic commodities are inevitably passed on to consumers in the former of higher retail prices.

Blending more ethanol into gasoline may also harm many vehicle engines. According to AAA, more than 90 percent of the vehicles on the road today, including most 2001-2013 models, are not approved to use gas containing 15 percent ethanol, or E15.[34] Ford, Chrysler, Toyota and other automakers have explicitly warned consumers that filling up with E15 will void their vehicle warranties, and some companies have already placed warning labels on gas caps and instructions in owners' manuals not to use it.[35] In response to a 2011 congressional inquiry, vehicle manufacturers were nearly unanimous in voicing concern that E15 will cause engine damage, void warranties and reduce fuel efficiency.[36] AAA has also said that engine testing by the Department of Energy was not structured to measure E15's impacts on reduced engine life and fuel pump failure. The Association expects it will take another decade before the bulk of the U.S. vehicle fleet will be E15 compatible.[37] Meanwhile, many consumers are unaware that higher ethanol blends may harm their engines. A recent poll by AAA found that 95 percent of those surveyed had not heard of E15, prompting the nation's largest auto club to call for suspending all sales of E15.[38]

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[27] Congressional Budget Office (2009). *The Impact of Ethanol Use on Food Prices and Greenhouse-Gas Emissions.*
[28] *Id.* at iii.
[29] *Id.* at vii.
[30] Govenor of Arkansas Mike Beebe in a letter to EPA Administrator Jackson, August 13, 2012.
[31] Testimony of Mike Brown, President, National Chicken Council, before the EPA public hearing for the 2014 Standards for the Renewable Fuel Standard Program, December 5, 2013. Rising costs have forced the turkey industry to shed 750 jobs in 2013.
[32] Griffen and Soto (2012). *US Ethanol Policy: The Unintended Consequences*
[33] American Bakers Association in response to the House Committee on Energy and Commerce White Paper on Agricultural Sector Impacts, April 29, 2013.
[34] AAA, "Statement by Bob Darbelnet, President and CEO of AAA." November 2013.
[35] "E15 gas brings conflict to pumps." *Star Tribune*. April 2012; *See also* the National Marine Manufacturers Association [Hereinafter NMMA]: http://multibriefs.com/briefs/nmma/E15.pdf
[36] See automakers responses to Rep. Sensenbrenner here: http://sensenbrenner.house.gov/uploadedfiles/e15_auto_responses.pdf
[37] Testimony of Robert L. Darbelnet, President and CEO, AAA, before the Subcommittee on Energy and Power of the House Committee on Energy and Commerce, July 23, 2013.
[38] AAA. "New E15 Gasoline May Damage Vehicles and Cause Consumer Confusion." November 2012.

In addition, use of higher ethanol blends may damage many boat engines. None of the 17 million boat engines currently in commerce were designed, calibrated or certified to be compatible with any gasoline fuel containing more than 10 percent ethanol.[39] EPA has not permitted the sale and use of E15 for boats, but 95 percent of all recreational boats use fuel purchased at traditional gas stations, increasing the risk of misfueling.[40] The U.S. Coast Guard has warned that increasing the ethanol content in gasoline would exacerbate the risk of fires and explosions in vessels and pose safety issues for boaters who operate in harsh environments, sometimes miles from shore.[41] These concerns were echoed in a 2011 report to Congress in which the Coast Guard concluded that studies of ethanol's effects on marine engines raise environmental, performance and safety issues that have yet to be resolved.[42]

Small engine manufacturers are also concerned about the impact of higher ethanol blends. According to extensive testing by manufacturers and DOE, the use of higher ethanol blends on small non-road engines lowers engine life, reduces fuel economy and may cause the engine to fail emissions requirements.[43] Most small engines tested on E15 performed worse and ran higher operating temperatures, which increase wear and tear, and with it, the need for frequent maintenance.[44] Moreover, most tested engines behaved "poorly" or "erratically," according to DOE's report, with incidents of unstable speeds and stalling.[45]

Finally, most fuel dispensing and storage equipment is incompatible with E15 and would not comply with federal safety standards, according to the Government Accountability Office.[46] Compatible dispensers can cost upwards of $20,000, while replacing an underground storage tank can easily exceed $100,000 per location.[47] These are significant costs for retailers in order to sell a fuel for which demand is uncertain.[48]

Even as corn ethanol has increased environmental and consumer costs, it has done little to enhance American energy security. Gasoline consumption continues to decline as a result of tougher vehicle fuel economy standards, slower economic growth and higher fuel prices – not increased ethanol use.[49] Lower gasoline demand, in combination with increases in domestic production, are primarily responsible for recent and projected

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[39] *Id.*
[40] See NMMA: http://capwiz.com/nmma/issues/alert/?alertid=62685606
[41] Rear Admiral Kevin S. Cook in a letter to EPA's Office of Air & Radiation, July 2, 2009.
[42] USCG (2012). *Survey of Published Data and Reports on Blended Fuels in Marine Applications*
[43] Testimony of Todd Teske, President, Chairman & CEO, Briggs & Stratton Corporation, before the Subcommittee on Energy and Power Committee of the House Committee on Energy and Commerce, July 19, 2013.
[44] *Id. at 4*
[45] *Id.*
[46] GAO (2011) *Challenges to the Transportation, Sale and Use of Intermediate Ethanol Blends.*
[47] Testimony of Joseph H. Petrowski, CEO, The Cumberland Gulf Group before the Subcommittee on Energy and Power of the House Committee on Energy and Commerce, July 23, 2013
[48] *Id.*
[49] Testimony of Adam Sieminski, Administrator, EIA, before the Subcommittee on Energy and Power Committee of the House Committee on Energy and Commerce, June 26, 2013.

reductions in foreign energy imports.[50] Strengthening U.S. energy security by expanding corn ethanol production is simply not feasible because of the amount of corn required to displace a significant amount of gasoline.[51]

In conclusion, the rapid expansion of corn ethanol production has increased greenhouse gas emissions, worsened air and water pollution, driven up the price of food and feed and may damage many engines. By contrast, some second-generation biofuels could significantly reduce greenhouse gas emissions without creating new environmental challenges, increasing food prices or requiring costly engine and infrastructure improvements. So long as corn ethanol saturates the marketplace for ethanol, the incentive to develop these promising new fuels will be limited.

[50] *Id.* at 7-8.
[51] Carter at 5