By Email/E-Docket Submission
The Honorable Gina McCarthy
Administrator
Docket ID No. EPA–HQ–OAR–2013–0479; FRL-9900-90-OAR
U.S. Environmental Protection Agency
Mailcode: 2822T
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460

January 28, 2014

Re: US Environmental Protection Agency's "2014 Standards for the Renewable Fuel Standard Program,"
78 Fed. Reg. 71732 (November 29, 2013)
EPA-HQ-OAR-2013–0479; FRL-9900-90-OAR

Dear Administrator McCarthy,

The Clean Air Task Force (CATF) is a non-profit environmental organization that works to protect the earth's atmosphere by improving air quality and reducing global climate change through scientific research, public advocacy, technological innovation, and private sector collaboration. CATF appreciates the opportunity to provide these comments on the Environmental Protection Agency's "2014 Standards for the Renewable Fuel Standard Program," 78 Fed. Reg. 71732 (November 29, 2013).

CATF submits these comments in addition to a separate set of more general comments filed in conjunction with three other public interest organizations: National Wildlife Federation, Natural Resources Defense Council, and Union of Concerned Scientists.

I. SUMMARY OF COMMENTS

In these comments, CATF respectfully urges EPA to finalize its proposal to reduce the 2014 volume requirements for cellulosic biofuels, advanced biofuels, and total renewable fuels, and to keep the requirement for biomass-based diesel at the level mandated for 2013. The reductions proposed by EPA are not only an appropriate response to the practical

constraints related to the E10 blend wall, they are also appropriate in light of the negative environmental impacts associated with conventional biofuels, especially corn ethanol.

Part II of the comments below offers support for EPA's assessment that the blend wall necessitates reductions to both the advanced biofuel mandate and the implied mandate for corn ethanol, while Part III provides environmental and socio-economic justifications for the proposed reductions. Part IV outlines EPA's obligation to utilize the criteria listed at CAA §211(o)(7)(F) when it adjusts the annual volume requirments for 2016 and beyond. Finally, in the event that EPA finalizes a rule that relies solely on its authority under CAA §211(o)(7)(D)(i) (an approach that CATF does not endorse here), Part V urges the Agency to reduce the overarching 2014 volume requirements for advanced biofuels and total renewable fuels by the maximum extent allowable.

II. EPA MUST REDUCE THE 2014 TOTAL RENEWABLE FUEL REQUIRMENT BELOW THE STATUTORY TARGET

In a set of controversial rulings issued by EPA in 2010 and 2011, the Agency determined that older cars (defined as those with a model year older than 2001) cannot safely run on gasoline blended with 15% ethanol, commonly known as E15.[1] Consequently, with so many cars incapable of utilizing E15, the percentage of ethanol that can be blended into standard gasoline has maxed out at 10 percent, resulting in what is known as the E10 blend wall.

The crux of the problem is simple: on its face, the RFS requires gasoline refiners to use more ethanol than can be mixed into gasoline, given the current demand for E10. In a 2013 white paper, the House of Representatives Committee on Energy and Commerce referred to the blend wall, or "the limit at which ethanol can be readily added to the gasoline supply in order to comply with the RFS," as "[c]hief among the challenges posed by the RFS."[2] The total annual volume requirements that Congress wrote into Section 211(o)(2)(B) of the Clean Air Act were designed to promote precipitous growth in US biofuel consumption, from 4.7 billion gallons in 2007 to 18.15 billion gallons in 2014 to 36 billion gallons in 2022. Congress may have expected that the requirement would be met by a mixture of different biofuel types, but as of 2013 ethanol was used cto omply with around 85% of the overall mandate.[3]

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[1] 75 Fed. Reg. 68094 (November 4, 2010) (approving the use of E15 in model year 2007 and newer light duty cars and trucks and rejecting its use in model year 2000 and older vehicles); 76 Fed. Reg. 4662 (January 26, 2011) (approving the use of E15 in vehicles with model years from 2001 through 2006).

[2] US House of Representatives Committee on Energy and Commerce, *Renewable Fuel Standard Assessment White Paper: Blend Wall / Fuel Compatibility Issues* 1 (2013) ("House E&C Blend Wall White Paper") (http://energycommerce.house.gov/sites/republicans.energycommerce.house.gov/files/analysis/20130320RFSWhitePaper1.pdf)

[3] Assuming the following volumes for 2013: corn ethanol (13.8 billion gallons); sugarcane ethanol (500 million gallons); biomass-based diesel (2.55 billion ethanol gallons (EV)); non-ethanol advanced biofuel

Congress also proceeded under the assumption that gasoline consumption would continue to steadily increase, as it had in the decades that preceded the December 2007 enactment of the Energy Independence and Security Act (EISA), which dramatically expanded the RFS program. In fact, gasoline consumption in the United States hit a plateau in 2007 and has been decline since. As Americans consume fewer gallons of gasoline, gasoline refiners have fewer places to put all of the ethanol being mandated by the RFS. As EPA points out, the US Energy Information Administration (EIA) projected in 2007 that annual demand for gasoline would reach 18.68 Quad Btu by 2014, which in turn would have allowed refiners to blend 15.43 billion gallons of ethanol into E10. By 2013, however, EIA had reduced those projections to 15.94 Quad Btu and 13.17 billion gallons, respectively.[4]

To further complicate matters, automakers have warned that the use of gasoline blends that contain more than 10% ethanol could void warranties. Moreover, many gasoline retailers have been reluctant to sell higher blends, particularly E15, due to concerns about the likelihood of misfueling, the possibility that they could be held liable for engine damage, and the cost of installing specialized tanks and pumps.[5]

Nevertheless, the annual volume targets set forth in EISA are, on their face, designed to push even more ethanol into a US gasoline market that has virtually nowhere to put it. The volume of ethanol that can be safely consumed each year may grow as the number of drivers that use E15 or even higher blends like E85 increases—but few analysts expect that to happen quickly or dramatically.[6] Therefore, unless the RFS volume requirements are adjusted either administratively or legislatively, "the evidence suggests that it will not be possible for the nation as a whole to remain in compliance with the targets in the RFS."[7]

Several provisions in the Clean Air Act authorize EPA to make adjustments to the annual volume requirements, but the provision that is most readily available—CAA §211(o)(7)(D)(i)—does not explicitly allow the Agency to make the deep reductions that are necessary to avoid the blend wall. Section 211(o)(7)(D)(i) states that

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(51 million gallons (taking the average of EPA's data for 2012 and EPA's mean projection for 2014); and non-ethanol non-advanced (7 million gallons (taking the average of EPA's data for 2012 and EPA's mean projection for 2014)). *See* 78 Fed. Reg. at 71762 *et seq*.

[4] 78 Fed. Reg. at 71758/3.

[5] *See, e.g.*, Global Automakers Responses to House Energy and Commerce Committee's Stakeholder Questions Regarding the Renewable Fuel Standard (April 5, 2013) (http://energycommerce.house.gov/sites/republicans.energycommerce.house.gov/files/analysis/rfs/WP1-Responses-4.pdf); Phillips 66 Response to Committee on Energy and Commerce Questions for Stakeholders (April 5, 2013) (http://energycommerce.house.gov/sites/republicans.energycommerce.house.gov/files/analysis/rfs/WP1-Responses-6.pdf).

[6] *See, e.g.*, Scott Irwin and Darrel Good, *E85 Pricing and Recent Consumption Trends*, FARMDOC DAILY (June 13, 2013) (http://farmdocdaily.illinois.edu/2013/06/e85-pricing-recent-consumption-trends.html).

[7] House E&C Blend Wall White Paper at 3.

> For any calendar year for which the projected volume of cellulosic biofuel production is less than the minimum applicable volume established under paragraph (2)(B), as determined by the Administrator based on the estimate provided under paragraph (3)(A), not later than November 30 of the preceding calendar year, the Administrator shall reduce the applicable volume of cellulosic biofuel required under paragraph (2)(B) to the projected volume available during that calendar year. For any calendar year in which the Administrator makes such a reduction, the Administrator may also reduce the applicable volume of renewable fuel and advanced biofuels requirement established under paragraph (2)(B) by the same or a lesser volume.

CATF respectfully urges EPA to make fullest possible use of this authority. As we have written in previous comments on EPA's proposed volume adjustments, EPA must make corresponding reductions to the 2014 RFS volume requirements for advanced biofuels and total renewable fuel when the Agency reduces the 2014 volume requirement for cellulosic biofuel. If EPA allows additional volumes of non-cellulosic advanced biofuels or conventional biofuels to make up for the shortfall of cellulosic biofuels in 2014 or in any subsequent year, it would exacerbate a host of challenges including the blend wall (addressed here) and environmental problems associated with conventional biofuels (addressed more fully in Part III).

By itself, however, CAA §211(o)(7)(D)(i) does not provide EPA with enough authority to avoid a collision between the RFS and the blend wall. According to Scott Irwin and Darrel Good of the University of Illinois, EPA cannot adequately address the RFS's implied ethanol mandate for 2014 solely by reducing this year's volume requirement for advanced biofuels. Irwin and Good write that "[i]f EPA rules include only a write down of the advanced mandate," the implications would include:

- "Problems with implementing the [RFS] due to the expanding gap between the implied mandate for renewable biofuels (ethanol) and the E10 blend wall" in 2014 and 2015. Specifically, "RIN stocks are exhausted by the end of 2014," causing a new linkage between D6 RIN prices and D4 RIN prices, "with both at considerably higher levels than in late 2013."[8]
- "Large quantities of biodiesel and/or E85 are required in 2015 to fill the renewable gap." If obligated parties rely primarily on E85, US drivers would have to consume 2.6 billion gallons of the fuel by 2015—a 2500% increase over the 2013 consumption level. If biodiesel was relied upon instead, biodiesel consumption would have to increase by 600 million gallons over EPA's proposed 2015 target, to 2.8 billion gallons. An increase of that magnitude would significantly affect the market for soybeans and other feedstocks, write Irwin and Good. "Feedstock consumption in the mainly biodiesel compliance scenario skyrocket in 2015,

[8] Scott Irwin and Darrel Good, *Potential Impact of Alternative RFS Outcomes for 2014 and 2015*, FARMDOC DAILY (December 4, 2013) (price data from December 2013) (http://farmdocdaily.illinois.edu/2013/12/Potential-Impact-Alternative-RFS-2014-2015.html).

reaching 21 billion pounds or over half of all fats and oils produced presently in the U.S."[9]

Each of these outcomes is cause for alarm. First, annual volume targets that essentially require obligated parties to exhaust the existing pool of banked RINs would make RFS compliance more expensive and more difficult. As EPA writes, "[C]arryover RINS act as a buffer, and allow the regulated parties to address unforeseen circumstances that could limit the availability of RINs, and to address renewable fuel supply circumstances that differ from those assumed in the process of generating projected volume ranges[.]"[10] One needs to look no further than the drought that affected much of the US Corn Belt in 2012 to find an example of the sort of "unforeseen circumstances that could limit the availability of RINs." Similarly, recent history has shown that accurately projecting biofuel production levels for a given year is a challenge that EPA, US EIA, and many other analysts have not mastered. Consequently, we agree with EPA that it is "important to the viability of the market that some reasonable amount of carryover RINs continue to be available," and that a "standard-setting process that included an assumption that the carryover RIN balance would be reduced to zero would be contrary to the original intention of the provision for providing a degree of flexibility through carryover RINs."[11]

Second, there is little likelihood that E85 consumption could grow fast enough over the next two years to absorb the excess ethanol that the RFS would push into the market. Irwin and Good predict that in an E85-dominated compliance scenario, E85 use would have to increase by an order of magnitude between 2013 and 2015—from an estimated 100 million gallons in 2013[12] to around 2.6 billion gallons in 2015.[13]

Third, and perhaps most troubling, the biodiesel-dominated compliance scenario threatens an array of environmental problems that are detailed more fully in Part III.

III. EPA MUST INCREASE THE SHARE OF ENVIRONMENTALLY-BENEFICIAL BIOFUELS

While EPA relies mainly on the complications associated with the blend wall to justify its proposed decision to reduce the implied corn ethanol mandate, there are compelling environmental reasons for taking this action, including some that the Agency has identified in the proposal. The environmental benefits of reducing the amount of corn ethanol that can qualify for RINs in 2014 in order to increase the share of more environmentally-beneficial biofuels within the RFS program are outlined in this section.

[9] *Id*.
[10] 78 Fed. Reg. at 71767/2.
[11] 78 Fed. Reg. at 71767/2-3.
[12] 78 Fed. Reg. at 71759/3 ("If this trend continues through the end of 2013, total E85 production could reach 100 million gallons in 2013").
[13] Irwin and Good (December 4, 2013).

As described above, EPA's implementation options are significantly constrained now that the United States gasoline market has reached the E10 blend wall. Because there are no safe and/or credible scenarios in which the market could absorb the volume of ethanol that would be eligible for RINs if EPA were to pursue the full 2014 statutory target for total renewable fuel (18.15 billion gallons), the annual RFS mandates must be reduced. EPA has appropriately proposed to take fuller advantage of the authority provided at CAA §211(o)(7)(D)(i), by reducing the overarching advanced and total renewable volume requirements by nearly the same amount it reduces this year's cellulosic volume requirement. Making the reductions allowed under section 211(o)(7)(D)(i) are not enough to stay clear of the blend wall, however: full implementation the remaining RFS volume targets—particularly the implied 14.4 billion gallon corn ethanol mandate—would push more ethanol into the market than the market can bear. EPA cannot effectively keep US ethanol consumption below the blend wall unless the implied corn mandate is reduced. Simply put, corn ethanol consumption must be curtailed.

A. Proposal Would Preserve Market Space for Better Performing Advanced Biofuels

The Agency is correct that its proposed decision to reduce the amount of RINs that would be available in 2014 for corn ethanol is necessitated by the blend wall—but the proposed reductions are justified for other reasons, as well. First, by restricting the amount of corn ethanol that can be used to comply with the RFS in 2014, EPA preserves headroom in the market for other biofuels that provide better environmental performance. By ensuring that there is space for advanced biofuels in the US fuel mix, EPA's proposal is consistent with environmental and market development objectives that Congress identified when it passed EISA. Congress wanted to reduce the negative environmental impacts associated with the transportation sector; as detailed below, analyses conducted by EPA and others indicate that the production and consumption of corn ethanol exacerbates those impacts.

Accordingly, the Agency's determination that reductions to the implied corn ethanol mandate—and not just to the advanced biofuels requirement—must "play a role in addressing the ethanol blendwall" is both reasonable and consistent with "Congress's goal in the RFS program of continued growth in the advanced biofuel category."[14] The trajectory of the actual RFS mandates, in which the annual volume requirements for advanced biofuels gradually but convincingly overtake those for corn ethanol, illustrate Congress's clear interest in promoting a future biofuel industry built primarily around climate-beneficial advanced feedstocks, especially cellulosic fuels. That interest would be undermined by a volume rule that attempts to address the blend wall solely by shrinking the market for advanced biofuels.

B. Proposal Would Limit Future Damage Caused by Corn Ethanol

Second, EPA's proposal to modestly constrain corn ethanol will benefit both the environment and economically vulnerable communities, irrespective of the effect the

[14] 78 Fed. Reg. at 71754/2.

Agency's action has on other biofuel types' market access. For a host of reasons that CATF and other public interest organizations have detailed in previous submissions to EPA, the production and use of corn ethanol can exacerbate socio-economic and environmental challenges. A few of those challenges, including corn ethanol's negative contributions to global food insecurity and global climate change, are summarized here.

Corn ethanol and food insecurity. In comments that CATF and other groups submitted to EPA last year, we detailed how corn ethanol production negatively affects food security, especially when it occurs at the scale mandated by the RFS:

> The diversion of a large and increasing share of US corn to ethanol production has drawn particular attention—deservedly so, since corn is one of the key staple food crops in the world and the primary source of calories and nutrients for nearly 1 billion people worldwide. Corn is also one of the most widely used feed crops for animals, so its availability and price have direct impacts on the price of dairy products, eggs, and meat. The US is at once the world's largest producer and exporter of corn, so changes in US corn supply and use quickly affect prices worldwide.
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> There is widespread agreement that biofuels expansion worldwide is a major contributor to increases in agricultural commodity prices through the direct diversion of food and feed crops to fuel uses and through competition for land to grow energy-related crops. Most estimates of the share of food price increases that should be attributed to biofuels expansion are in line with those summarized in a recent report from the National Academy of Sciences. Researchers synthesized the conclusions of 11 studies that examined the 2007/8 food price spikes, finding that between 20% and 40% of the increase in commodity prices was attributable to biofuels expansion internationally. National Research Council, *Renewable fuel standard: Potential Economic and Environmental Effects of US Biofuel Policy.* 2011. This conclusion is consistent with the majority of studies in the field, including studies that incorporate data from 2009-11. *See* Wise, Timothy A. (2012). *The Cost to Mexico of US Corn Ethanol Expansion.* Global Development and Environment Institute Working Paper No. 12-01.
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> There is broad consensus that US ethanol expansion has been an important contributor to global food price increases, by accelerating the consumption of corn feedstocks and intensifying competition for land in the US and internationally. Growth in the amount of US corn used to produce ethanol has accelerated dramatically over the past 12 years. At 13.8 billion gallons, US

> ethanol production [in 2013] is nearly 9 times what it was in 2000, while the share of US corn going to ethanol has risen from 5% to over 40%.[15]

EPA's proposal to reduce the implied corn ethanol mandate for 2014 by a little more than a billion gallons would not address the larger concerns about the effect of policies like the RFS on global food insecurity, but it is consistent with the growing consensus among anti-hunger groups, international human welfare institutions, and economists that governments need to rethink the scale of such policies.[16]

Corn ethanol and climate impacts. Because the RFS has worked mainly as a corn ethanol mandate, it follows that its impact on climate can be assessed in large part by measuring the GHG emissions associated with corn ethanol. In its 2010 Renewable Fuel Standard Implementation Rule, EPA concluded that the lifecycle GHG emissions (over 30 years) from corn ethanol would be 21% lower than an energy equivalent volume of gasoline (thus just meeting the legislated requirement of a 20% reduction). That number does not give an accurate portrayal of corn ethanol's GHG performance to-date, however, because the Agency based its determination on a lifecycle analysis of hypothetical corn ethanol production in 2022. EPA's approach gave corn ethanol the benefit of the doubt by assuming the widespread use of state-of-the-art production systems and techniques that were not commonly used in 2010.

More problematically, the 2010 analysis conducted by EPA ignores much of the land use change impacts from current production. Indirect land use change happens when biofuel production levels ramp up; it ceases when production levels off. When existing farmland is used to cultivate biofuel feedstocks instead of food or feed, the resulting decrease in food and feed production causes prices to increase. Higher prices encourage farmers around the world to clear more land for agriculture, and the process of land-clearing releases soil- and plant-carbon into the atmosphere. Once a biofuel policy stops expanding, though, the incentive it creates to clear more land should taper off as well.

Accordingly, EPA's 2010 decision to determine biofuels' GHG performance by analyzing their lifecycle emissions under hypothetical production conditions in 2022 has the practical consequence of ignoring much of the land use change associated with the mandated ramp-up in corn ethanol production between 2010 and 2015.[17] Moreover, EPA did not have to

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[15] CATF *et al*, Comments on EPA's Proposed Rule: RFS Pathways II and Technical Amendments to the RFS 2 Standards, 78 Fed. Reg. 36042, at 3-4 (Filed July 15, 2013) (http://www.catf.us/resources/filings/biofuels/20130715-CATF%20et%20al%20Comments%20on%20Corn%20Butanol%20Proposal_Filed.pdf).

[16] *See id*. at 4-9.

[17] Under EISA, the implied corn mandate grows from 10.5 billion gallons per year in 2010 to 15 billion gallons in 2015, at which point it levels off. From 2015 to 2022, no more than 15 billion gallons of corn ethanol can be used to satisfy the RFS's annual volume requirements. Consequently, corn ethanol produced during 2010-2015 (while production capacity is still ramping up) has much higher lifecycle emissions than corn ethanol produced in 2022 (seven years after production of corn ethanol is supposed to level off).

rely on its 2022 analysis, as it had also calculated the lifecycle greenhouse gas emissions for corn ethanol produced in 2012 and 2017. EPA's analysis looked at 33 different ways to produce corn ethanol and found that in 2012 all 33 pathways would result in higher lifecycle GHG emissions than an energy-equivalent volume of gasoline. In 2017, 15 of the pathways were projected to produce higher lifecycle emissions than gasoline, and another nine failed to achieve the 20% reduction threshold that EISA requires of non-grandfathered producers of renewable fuel.[18]

Given that EPA had conducted lifecycle GHG emission analyses that were much more relevant to the issue of corn ethanol's actual (rather than hypothetical) environmental performance, CATF and other environmental organizations questioned the Agency's decision to rely on the 2022 analysis, as did the National Research Council (NRC) in a 2011 report. According to the NRC,

> EPA found corn-grain ethanol, regardless of whether the coproduct is sold wet or dry, to have life-cycle GHG emissions higher than gasoline in 2012 or 2017 unless it is produced in a biorefinery that uses biomass as a heat source. EPA calculated its 21-percent GHG reduction as a weighted average of projected biorefinery and corn production efficiencies that could be realized in 2022. Thus, according to EPA's own estimates, corn-grain ethanol produced in 2011, which is almost exclusively made in biorefineries using natural gas as a heat source, is a higher emitter of GHG than gasoline. Nevertheless, corn-grain ethanol produced at the time this report was written still qualified for RFS2 based upon EPA's industry-weighted average of projected 2022 industry. The discrepancy between how RFS2 is implemented (under the assumption of 21-percent reduction of GHG emissions by corn-grain ethanol compared to gasoline) and EPA's own analysis suggests that RFS2 might not achieve the intended GHG reductions.[19]

In fact, the RFS does *not* achieve the intended GHG reductions. Using the 30-year lifecycle analysis that EPA conducted for corn ethanol produced in 2012 (instead of the analysis for 2022), CATF calculated the cumulative lifecycle GHG emissions from corn ethanol produced during the ramp-up period (2010-2015). CATF carried its analysis though 2044 to capture a full 30 years of emissions from each year-class of new ethanol (i.e., the 30-year lifecycle for ethanol added in 2015 ends in 2044). In 2044, cumulative GHG emissions from corn

[18] The comparative emissions data, which come directly from an EPA chart in Docket No. EPA-HQ-OAR-2005-0161-3173.5, are discussed in more detail in CATF's comments on EPA's 2013 RFS volume adjustment proposal. CATF, Comments on Environmental Protection Agency Regulation of Fuels and Fuel Additives: 2013 Renewable Fuel Standards–Proposed Rule, 78 Fed. Reg. 9282 (Filed April 5, 2013) at 22-25 ("CATF Comments on RFS 2013 Volume Proposal") (http://www.catf.us/resources/filings/biofuels/20130405-CATF_Comments_on_EPA_RFS_2013_Volume_Adjustment_78FedReg9282.pdf).

[19] *See* Lester Lave, *et al*. 2011. *Renewable Fuel Standard: Potential Economic and Environmental Effects of U.S. Biofuel Policy* 221 (Report by the National Research Council Committee on Economic and Environmental Impacts of Increasing Biofuels Production) (internal citations omitted). (http://www.nap.edu/openbook.php?record_id=13105)

ethanol equal about 1.4 billion tons; the emissions from an energy equivalent amount of gasoline equal 1.1 billion tons. In other words, the cumulative lifecycle GHG emissions from corn ethanol are 28% higher than those from gasoline.

(A fuller description of CATF's analysis of EPA's lifecycle GHG emissions data can be found in a 2013 white paper titled "Corn Ethanol GHG Emissions Under Various RFS Implementation Scenarios," as well as in CATF's "Comments on Environmental Protection Agency Regulation of Fuels and Fuel Additives: 2013 Renewable Fuel Standards – Proposed Rule."[20])

Corn ethanol and non-climate environmental impacts. After reviewing EPA's draft report on *Biofuels and the Environment: First Triennial Report to Congress* (2011), CATF, Friends of the Earth, National Wildlife Federation, Natural Resources Defense Council and World Wildlife Federation commented that:

> EPA's finding, described in its draft report, that continued production of corn starch ethanol will have significant negative environmental impacts – including climate impacts – is supported by substantial research. We therefore agree with the Agency's assessment that expansion of ethanol from corn or corn stover is, on balance, harming the environment.
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> The Agency's findings with regard to other biofuels are less robust, however, and the impacts (both positive and negative) from such fuels are considerably smaller in magnitude.[21]

These findings are supported by a more recent analysis by Yang *et al*. (2012).[22] Yang *et al*. used lifecycle analysis methods to compare twelve different environmental impacts, taking into account regional differences among 19 corn-growing states. The twelve impact categories were: global warming, human health cancer, acidification, human health respiratory, human health noncancer, ozone layer depletion, eutrophication, smog formation, ecological toxicity, fossil energy consumption, water use, and land occupation. The authors analyzed E85 made from corn and produced using a dry mill powered by natural gas. Much of their data for ethanol impacts were derived from a Life Cycle Inventory database from the USDA and applies to corn ethanol produced in 2005. The impacts of E85 vary from state to state, mainly based on differences in those states' climate, soil, topography, and transportation logistics. The gasoline calculations were developed

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[20] White paper available at http://www.catf.us/resources/whitepapers/files/20130405-CATF%20White%20Paper-Corn%20GHG%20Emissions%20Under%20Various%20RFS%20Scenarios.pdf.

[21] Environmental Community Comments on the EPA draft report of *Biofuels and the Environment: First Triennial Report to Congress* (Docket ID No. EPA-HQ-ORD-2010-1077) (http://libcloud.s3.amazonaws.com/93/64/9/1361/enviro_comments_of_EPA_Triennial_report_RFS_2-2010.pdf)

[22] Yi Yang *et al*. 2012. *Replacing gasoline with corn ethanol results in significant environmental problem-shifting*. Environ. Sci. Technol. 47 (7): 3671–3678. DOI: 10.1021/es203641p. (http://pubs.acs.org/doi/abs/10.1021/es203641p)

from weighted averages of crude oil data based off the oil's origin and its share in US oil imports. The fuel lifecycles included the following steps: feedstock production, shipment of the feedstock to the refinery, refining/conversion, fuel shipment to the refueling station, and vehicle use. By normalizing and weighting their twelve categories, they also combined their results to a single environmental damage score, which they tested for sensitivity to develop one useful "weighted environmental impact" metric.

The study found that gasoline has a better environmental impact score than E85 in terms of eutrophication, water use, and land occupation, with a slight advantage for smog formation and acidification effects as well. E85 scored better in terms of fossil fuel energy consumption and global warming impact,[23] and had a slightly smaller ecological toxicity. For the two fuels, no clear difference was found for ozone layer depletion, cancer and noncancer human health, and respiratory effects. From a geographic standpoint, E85 from different states had variable eutrophication, water use, land occupation, and global warming impacts, since regional agricultural practices (*e.g.,* dependence on irrigation), climate, and topography were quite different. Consequently, there is substantial uncertainty around the study's findings with respect to corn ethanol's impact on nationwide water use and eutrophication. In any case, E85 requires much more water than gasoline, given that irrigation is sometimes used and that water is needed for the ethanol conversion process. Yang et al. conclude that, overall, according to their weighted average, E85 has between a 6% to 108% (23% average) greater total environmental impact than gasoline, and that this range becomes 16%-188% (33% average) when indirect land use change data (associated with uncertainty) is incorporated.

C. Proposal Would Limit New Demand for Biodiesel and, Indirectly, for Palm Oil

Finally, by going forward with its proposed adjustments to the volume requirements, EPA would reduce the likelihood of a dramatic expansion in biodiesel consumption in 2014. According to Irwin and Good of the University of Illinois, if EPA's final rule "includes only a write down of the advanced mandate" per CAA §211(o)(7)(D)(i), a biodiesel-led compliance scenario would result in a 600 million-gallon jump in annual biodiesel use.

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[23] Yang *et al.* analyze E85's climate impact using highly conservative and somewhat questionable assumptions about indirect land use change emissions (ILUC). Yang et al. note that a 2010 study by Richard Plevin et al. "estimated that iLUC GHG emissions ranged from 10 to 340 g CO2 equiv MJ^{-1}, with a 95% confidence interval from 21 to 142 CO2 equiv MJ^{-1}." Yang *et al*. choose the extreme low end of that interval (21g CO2e MJ^{-1}) for their own analysis, but Plevin et al. provides no basis for such a decision. Moreover, Plevin and his co-authors pointed out that "[w]hile we chose to define the 'plausible' range as the central 95% interval, it is important to recognize that the further right tails of these distributions represent nonzero risk of very high ILUC emissions if fossil fuel is displaced by biofuels, and the left tail offers no such corresponding prospect of very large emissions reductions." Richard Plevin, *et al*. 2010. *Greenhouse Gas Emissions from Biofuels' Indirect Land Use Change Are Uncertain but May Be Much Greater than Previously Estimated*. Environ. Sci. Technol. 44 (8015); DOI: 10.1021/es101946t. (http://rael.berkeley.edu/http%3A/%252Fpubs.acs.org/doi/abs/10.1021/es101946t)

Feedstock consumption would "skyrocket" at a time when demand for soybeans—the most commonly used biodiesel feedstock in the US—is substantially outpacing supply.[24] Increased demand for soy biodiesel would indirectly increase the overall demand for vegetable oil, which in turn would broaden the market for palm oil. An increase in the production of Southeast Asian palm oil is likely to have a range of negative environmental and social consequences. The Clean Air Task Force and other organizations have explained this concern in previous comments:

> Because palm oil is the fastest growing and least expensive vegetable oil, future expansion of the biodiesel mandate will tend to expand demand for palm oil, regardless of whether the biodiesel is directly produced from soybean oil, rapeseed oil or chicken fat. EPA should conduct further work to assess the level of substitutability and fungibility in the global vegetable oil market, and if this supports a conclusion that the existing analyses have underestimated the effect of demand for other biodiesels on palm oil markets, the analysis of biodiesel from soy, canola etc. should be updated with a more complete inclusion of palm oil land use effects.[25]

Ninety percent of palm oil production operations occur in countries with land critical to global biodiversity, including the peat forests of Indonesia and Malaysia. According to a literature review conducted by a handful of organizations (including CATF) for comments submitted to EPA in 2012, at least one-third of new palm oil plantations in Indonesia and Malaysia are expected to be located on peat soils. Conversion of peat soils poses significant climate change-related threats and damages the environment in a host of other ways, as CATF wrote in a report on the unintended consequences of policies that promote biofuel use[26]:

> Undisturbed peat soils, which are formed by the accumulation of partially decomposed organic material, provide a variety of important environmental services. They reduce the incidence and severity of droughts by trapping moisture during rainy seasons and slowly releasing it during dry months. They filter water, prevent erosion, and provide valuable habitat for rare species.[27] In

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[24] Darrel Good, *A Slower Pace of Soybean Consumption Is Needed*, FARMDOC DAILY (January 27, 2014) (http://farmdocdaily.illinois.edu/2014/01/slower-pace-of-soybean-consumption-needed.html).

[25] Union of Concerned Scientists, *et al*. *Joint Science and Environmental Stakeholder Comments on Docket No. EPA–HQ–OAR–2011–0542: EPA's analyses of palm oil used as a feedstock under the Renewable Fuel Standard (RFS) program* 5 (April 27, 2012) ("Joint Palm Comments 2012") (http://www.ucsusa.org/assets/documents/global_warming/EPA-palm-oil-comments-final.pdf).

[26] CATF, *Leaping Before They Looked: Lessons from Europe's Experience with the 2003 Biofuels Directive* 16-17 (2007) (http://www.catf.us/resources/publications/files/Leaping_Before_They_Looked.pdf).

[27] *See* Joint RFS Palm Oil Comments at 22 ("Peat swamp forests are also a distinct ecosystem containing endemic and important species. Peat swamps contain species adapted to living in a water-logged ecosystem, with high acidic and anaerobic soils. In Sumatra, peat swamp forests are also habitat to the critically endangered Sumatran tigers. In both Sumatra and Borneo, they provide habitat to orang utans (*Pongo pygmaeus*). In Sarawak, species occuring in the peat swamp include Storm's Stork (*Ciconia*

addition, the peatlands of Southeast Asia store some 42 billion metric tons of soil carbon.[28]

When peatlands dry out, however, the underlying organic matter fully decomposes and the stored carbon escapes to the atmosphere. Moreover, because the embedded carbon acts as ready-made fuel, dried peatlands are exceptionally susceptible to fires, which in turn accelerate the carbon discharge.

Southeast Asian peatlands are currently releasing their carbon stocks at an astonishing rate, thanks in large part to the increased demand for biofuels. Peatlands are not suitable for most kinds of agriculture, but through a process of draining, clearing, and burning, they can be converted into productive palm oil plantations. In 2006, Wetlands International and the Dutch consulting firm Delft Hydraulics reported that almost 12 million hectares of Indonesian peatland have been drained, cleared, and often burned – much of it to make room for oil palms.[29] In the process, approximately 2000 million metric tons of CO2 are released annually, making peatlands destruction a leading source of global warming emissions.[30] After accounting for these emissions – which equal 8% of global CO2 emissions from fossil fuel use – researchers determined that Indonesia's CO2 emissions were the third highest in the world, behind only the United States and China.[31] The problem is even worse in years when burning gets out of control. Fires that engulfed Indonesian forests and peatlands in 1997 released between 3000-9000 MT CO2 – the equivalent of 15-40% of the CO2 emissions from fossil fuel use that year.[32]

To the extent that CO2 releases from palm oil production are attributable to an RFS-driven increase in total demand for vegetable oil, the releases constitute "lifecycle greenhouse gas emissions" as defined by CAA §211(o)(1)(H) and must be accounted for within the context of the RFS's GHG reduction requirements.[33] Consequently, EPA cannot rely on the lifecycle

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stormi), the red-banded langur (*Presbytis melalophos cruciger*) and the proboscis monkey (*Nasalis larvatus*). Peat swamp forests are also home to ramin (*Gonystulus bancanus*), a timber species, which is currently listed under CITES Appendix III, for the purpose of managing the trade in that species to prevent extinction. The peat swamp forests are also important in stabilizing water levels and buffering inland areas against saline intrusion into agricultural and water catchment areas, especially when peat forests occur in coastal areas."

[28] Wetlands International and Delft Hydraulics, *Assessment of CO2 emissions from drained peatlands in SE Asia* 6 (December 7, 2006) ("Wetlands Intl-Delft") (http://www.wetlands.org/LinkClick.aspx?fileticket=NYQUDJl5zt8%3D&tabid=56).

[29] Wetlands Intl-Delft, summary.

[30] Wetlands Intl-Delft, 29.

[31] Wetlands Intl-Delft, 29.

[32] Wetlands Intl-Delft, 22.

[33] As EPA knows, volume is a key parameter in lifecycle emissions modeling of biofuels. If an underlying assumption about the production/consumption levels for a particular fuel turn out to be incorrect—for

analyses it performed in 2010 to allow soy-based biodiesel and other biofuels to generate RINs if those fuels are being produced and/or imported in volumes that differ substantially from what the Agency modeled. EPA has a duty to ensure that the biofuels used to comply with the RFS meet the lifecycle GHG reduction requirements established in EISA. Specifically, the Agency must ensure that biomass-based diesels and other non-cellulosic "advanced biofuels" used to comply with the RFS have lifecycle GHG emissions "that are at least 50 percent less than baseline lifecycle greenhouse gas emissions." CAA §211(o)(1)(B).

EPA should avoid compliance scenarios that directly or indirectly cause the production and use of palm biodiesel to increase. Fortunately, the current proposal meets that test.[34]

IV. EPA IS REQUIRED TO CONSIDER CAA §211(o)(2)(B)(ii) CRITERIA FOR 2016 AND BEYOND

In its proposal, EPA outlines a three-step process

> to ensure that the proposed volumes are reasonably achievable given limitations in the volume of ethanol that can be practically consumed in motor vehicles considering constraints on the supply of higher ethanol blends to the vehicles that can use them and other limits on ethanol blend levels approved for use in motor vehicles and the volume of non-ethanol renewable fuels that we expect would be reasonably achievable.[35]

As mentioned above, CATF supports the objectives behind this effort, particularly EPA's determination that reductions to the implied corn ethanol mandate—and not just to the advanced biofuels requirement—must "play a role in addressing the ethanol blendwall."[36] EPA needs to develop a regulatory path forward that preserves headroom in the biofuel market for environmentally-beneficial advanced biofuels, and the three-step volume setting process described in its proposal charts such a path for 2014 and 2015.

After 2015, however, EPA must make adjustments to the annual volume requirements in accordance with the process and criteria that Congress detailed at CAA §§211(o)(7)(F) and

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example, if biodiesel use exceeds projected levels—"there is a real risk that [indirect land use change] could undermine the environmental viability of biofuels," write Perrihan Al-Riffai and others. "Non-linear effects, in terms of biofuels volumes and behavioural parameters, pose a risk." Perrihan Al-Riffai, *et al*. *Global Trade and Enviromental Impact Study of the EU Biofuels Mandate* 71 (2010) (study carried out for the Directorate General for Trade of the European Commission) (http://trade.ec.europa.eu/doclib/docs/2010/march/tradoc_145954.pdf).

[34] Irwin and Good (December 4, 2013) (Under EPA's proposed approach, "[b]iodiesel production, and therefore feedstock consumption, is stable in 2014 and 2015.")

[35] 78 Fed. Reg. at 71754/1.

[36] *Id*. at 71754/2.

211(o)(2)(B)(ii). The benefits of that approach are described at length in CATF's comments on EPA's 2013 volume proposal,[37] and are summarized below.

We are raising this issue again in these comments because statements in EPA's 2014 volume proposal could be read to suggest that the Agency is not planning to follow the approach laid out at CAA §§211(o)(7)(F) and 211(o)(2)(B)(ii). Specifically, EPA writes, "We anticipate that the [three-step] framework described in this section would apply not only to 2014, but to subsequent years as well."[38] Elsewhere, EPA states more clearly that its "objective in this rulemaking is to develop a general approach for determining appropriate volume requirements that can be applied not only in 2014, but also for 2015 and beyond."[39] Because EPA appears to plan on using its new approach in 2016 and in subsequent years, we are concerned that EPA's proposed approach may be inconsistent with both EPA's legal obligations under CAA §211(o)(2)(B)(ii) as well as the pressing need to recalibrate the RFS volume requirements in order to improve the program's environmental performance.

Per CAA §211(o)(7)(F), excerpted below, the adjustments that EPA has made (and will have to make) to the annual volume requirements in 2011-2015 are triggering a requirement that the Agency promulgate revised volume standards for 2016 and beyond:

> For any of the tables in paragraph (2)(B), if the Administrator waives—
>
> (i) at least 20 percent of the applicable volume requirement set forth in any such table for 2 consecutive years; or
> (ii) at least 50 percent of such volume requirement for a single year,
>
> the Administrator shall promulgate a rule (within 1 year after issuing such waiver) that modifies the applicable volumes set forth in the table concerned for all years following the final year to which the waiver applies, except that no such modification in applicable volumes shall be made for any year before 2016. In promulgating such a rule, the Administrator shall comply with the processes, criteria, and standards set forth in paragraph (2)(B)(ii).

CAA §211(o)(7)(F).

Section 211(o)(2)(B)(ii) directs EPA (in coordination with USDOE and USDA) to make multi-year modifications to volume requirements "based on a review of the implementation of the program during calendar years specified in the tables and an analysis" of the following criteria, which are referred to in these comments as the 2016+ Adjustment Criteria:

[37] CATF Comments on RFS 2013 Volume Proposal at 26-29.
[38] 78 Fed. Reg. at 71754/3.
[39] 78 Fed. Reg. at 71738/2.

(I) the impact of the production and use of renewable fuels on the environment, including on air quality, climate change, conversion of wetlands, ecosystems, wildlife habitat, water quality, and water supply;
(II) the impact of renewable fuels on the energy security of the United States;
(III) the expected annual rate of future commercial production of renewable fuels, including advanced biofuels in each category (cellulosic biofuel and biomass-based diesel);
(IV) the impact of renewable fuels on the infrastructure of the United States, including deliverability of materials, goods, and products other than renewable fuel, and the sufficiency of infrastructure to deliver and use renewable fuel;
(V) the impact of the use of renewable fuels on the cost to consumers of transportation fuel and on the cost to transport goods; and
(VI) the impact of the use of renewable fuels on other factors, including job creation, the price and supply of agricultural commodities, rural economic development, and food prices.

CAA §211(o)(2)(B)(ii).[40]

The criteria set forth at CAA §211(o)(2)(B)(ii) create a sensible and comprehensive framework for adjusting volume requirements. EPA should begin utilizing the criteria as soon as possible, but it must begin using them for its 2016 volume proposal at the latest. As described in CATF's comments on EPA's 2013 volume proposal, using the criteria will produce adjustment decisions that are better and more fully reasoned.[41] Two of the criteria—(I) and (IV)—are particularly relevant to the key challenges that EPA faces in this rulemaking: addressing the E10 blend wall and improving the environmental performance of the RFS as a program.

The first criterion in CAA §211(o)(2)(B)(ii) details the environmental impacts that EPA must consider when analyzing the increased production of biofuels, including the impacts "on air quality, climate change, conversion of wetlands, ecosystems, wildlife habitat, water quality, and water supply." Many of these impacts were examined in EPA's 2011 Triennial Review, but an updated environmental analysis—one that accounts for the revised projections on the types and amounts of biofuels that may be used to comply with the RFS—would be necessary, especially with respect to climate impacts.

The fourth criterion addresses the blend wall by focusing on "the impact of renewable fuels on the infrastructure of the United States, including deliverability of materials, goods, and products other than renewable fuel, and the sufficiency of infrastructure to deliver and use renewable fuel." As EPA acknowledges, a key aspect of the blend wall challenge is that the

[40] CAA §211(o)(2)(B)(ii) also governs the process by which EPA sets the annual volumes requirements for biomass-based diesel after 2012 and for all renewable fuels after 2022.
[41] CATF Comments on RFS 2013 Volume Proposal at 28-29.

"infrastructure to deliver and use" higher blends like E15 is insufficient in most parts of the United States, and will likely remain so for some time.[42]

As EPA thinks about the volume adjustments it will need to make this year and in "subsequent years," we want to remind the Agency of its obligation to base the adjustments for 2016 and beyond on an assessment of the criteria set forth in CAA §211(o)(2)(B)(ii) as well as the practical benefits of using those criteria to guide volume adjustments in earlier years. We look forward to exploring with EPA how the Agency might fit its proposed approach into the analytic framework required by CAA §211(o)(7)(F) and described at CAA §211(o)(2)(B)(ii).

V. IF EPA FAILS TO REDUCE TOTAL RENEWABLE VOLUME REQUIREMENT BELOW THE STATUTORY TARGET, IT MUST AT A MINIMUM REDUCE THE ADVANCE BIOFUEL REQUIREMENT BY THE SAME AMOUNT THAT IT REDUCES THE CELLULOSIC REQUIREMENT

For the reasons outlined in Parts II and III of these comments, CATF strongly supports EPA's effort to reduce the implied corn ethanol mandate below the statutory target of 14.4 billion gallons. First, by restricting the amount of corn ethanol that can be used to comply with the RFS in 2014, EPA preserves headroom in the market for other biofuels that provide better environmental performance. And second, irrespective of the effect the Agency's proposal would have on the marketability of advanced biofuels, a rule that constrains corn ethanol consumption will in itself benefit the environment and economically vulnerable communities.

One of the many advantages of EPA's proposed volume targets for 2014 is that they largely address the primary concern that CATF raised in the comments we submitted to EPA on its 2013 volume proposal. Specifically, by significantly reducing the statutory mandate for advanced biofuels (in conjunction with the required reduction to the mandate for cellulosic biofuels) and by scaling back the implied mandate for corn ethanol mandate, EPA's proposal responsibly addresses the "cellulosic void"—*i.e.*, the rapidly growing discrepancy between the annual cellulosic volume targets specified at CAA §211(o)(2)(B)(III) and the volumes of cellulosic biofuel that are projected to become available over the next decade.

In our comments on EPA's 2013 volume proposal, CATF urged the Agency to address the void by reducing the volume requirements for advanced biofuels and total renewable fuel by the same amount that it planned to reduce the annual volume requirement for cellulosic biofuel. We argued that EPA must not allow additional volumes of non-cellulosic advanced biofuels or conventional biofuels to make up for the shortfall of cellulosic biofuels in 2013

[42] *See, e.g.*, 78 Fed. Reg, at 71755/1 ("With regard to the ethanol blendwall, a decrease in total gasoline consumption since EISA was enacted in 2007, coupled with limitations in the number and geographic distribution of retail stations that offer higher ethanol blends such as E85 and the number of FFVs that have access to E85, as well as other market factors, combine to place significant restrictions on the volume of ethanol that can be supplied to and consumed in the transportation sector.")

or in any subsequent year. We pointed out that there would not be adequate supplies of the mostly commonly used advanced biofuels, specifically sugarcane ethanol and soybean biodiesel, to fill the cellulosic void going forward, and, more importantly, that allowing such fuels to fill the void would exacerbate climate change by indirectly causing the production of corn ethanol and palm oil to expand significantly.[43]

If EPA backs away from the approach it has proposed here, in which it relies on Sections 211(o)(7)(D)(i) and 211(o)(7)(A), and proceeds instead under the authority of CAA §211(o)(7)(i) only, the concerns we raised in 2013 about using increased volumes of advanced biofuels to backfill the cellulosic void become relevant again. Any substantial reliance on sugarcane ethanol and soy-based biodiesel to make up for the shortfall in cellulosic biofuel production would indirectly cause an increase in the global demand for corn ethanol and palm oil. As CATF has explained in these and other comments submitted to EPA, increases in the production of both corn ethanol and palm oil would contribute to an array of environmental problems, including climate change.

Consequently, if EPA proceeds under the authority of CAA §211(o)(7)(i) only, we would respectfully urge the Agency to reduce the overarching 2014 volume requirements for advanced biofuels and total renewable fuels by the full extent allowable (*i.e.*, by the same amount that it will reduce the 2014 volume requirement for cellulosic biofuels (roughly 1.73 billion gallons, according to the proposal)).

VI. CONCLUSION

For the reasons provide above, CATF respectfully urges EPA to finalize its proposal to reduce the 2014 volume requirements for cellulosic biofuels, advanced biofuels, and total renewable fuels, and to keep the requirement for biomass-based diesel at the level mandated for 2013. The reductions proposed by EPA are not only an appropriate response to the practical constraints caused by the E10 blend wall, they are also appropriate in light of the negative environmental impacts associated with conventional biofuels, especially corn ethanol.

Respectfully submitted,

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[43] CATF Comments on RFS 2013 Volume Proposal at 4-17.