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July 7, 2023

Commissioner Daniel Werfel
Internal Revenue Service
CC:PA: LPD:PR (Notice 2023-06)
Room 5203
P.O. Box 7604
Ben Franklin Station
Washington, DC 20044

RE: Comments on Sustainable Aviation Fuel 40B and 45Z Lifecycle Emissions Calculations in Response to Notices 2023-06 and 2023-58.

Dear Commissioner Werfel:

Thank you for the opportunity to comment on the Internal Revenue Service's (IRS) interpretation of several important provisions of the Inflation Reduction Act (IRA) that will drive reductions in greenhouse gas (GHG) emissions and grow American jobs. Growth Energy is the nation's largest association of biofuel producers, representing 92 U.S. plants that each year produce more than 9 billion gallons of low-carbon, renewable fuel; 115 businesses associated with the production process; and tens of thousands of biofuel supporters around the country. Our members are committed to developing a robust sustainable aviation fuel (SAF) market in the United States, consistent with national climate goals and commitments. A number of our members have already made substantial investments in SAF production, and the IRA's Section 40B and 45Z tax credits have the potential to greatly accelerate this trend.

Scaling up SAF production will be critical to the decarbonization and future economic competitiveness of the U.S. aviation sector. The SAF Grand Challenge pledges to reach 3 billion gallons of SAF production per year by 2030 and 35 billion gallons per year by 2050.[1] To meet these goals, it will be necessary to harness the U.S. ethanol industry, which at 17.4 billion gallons per year accounts for over 80% of

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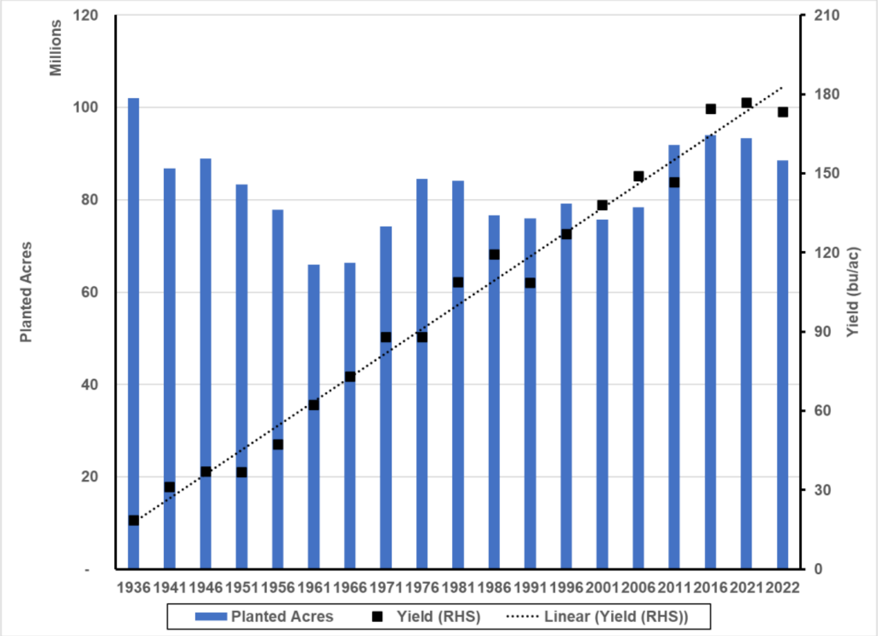
[1] *Sustainable Aviation Fuel Grand Challenge*, U.S. DOE, https://www.energy.gov/eere/bioenergy/sustainable-aviation-fuel-grand-challenge.

biofuels production capacity in the U.S.[2] Ethanol is one of the few readily-available feedstocks for SAF production that can be utilized in the aviation sector if the proper economic conditions are in place and if lifecycle analysis of greenhouse gas emissions associated with ethanol-to-jet (ETJ) SAF is conducted properly.

The U.S. has the largest and most developed biofuels industry in the world.[3] Over the past 20 years, U.S. fuel ethanol production has grown from 2.1 billion gallons/year to 15.4 billion gallons/year.[4] During this time, there has been no observable increase in corn acres planted or related adverse impacts to food prices. Instead, increases in corn demand have consistently been met by increased yield as agricultural practices have become more efficient over time:[5]

Figure 1. U.S. Corn Acres and Yield (1936-2021)



Source: *USDA, Stillwater analysis*

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[2] *2022 Fuel Ethanol Production Capacity*, U.S. Energy Information Administration, https://www.eia.gov/petroleum/ethanolcapacity.

[3] *See, e.g. International Biofuels Production,* U.S. Energy Information Administration, https://www.eia.gov/international/rankings/world?pa=28&u=2&f=A&v=none&y=01%2F01%2F2021&ev=false.

[4] *Oxygenate Production,* U.S. Energy Information Administration, https://www.eia.gov/dnav/pet/pet_pnp_oxy_dc_nus_mbbl_a.htm; *U.S. Production, Consumption, and Trade of Ethanol*, U.S. DOE Alternative Fuels Data Center, https://afdc.energy.gov/data/10323.

[5] For detailed analysis showing the lack of any empirical link between ethanol production and land use change, s*ee, e.g.* Growth Energy Comments on EPA's Renewable Fuel Standard (RFS) Program: Standards for 2023–2025 and Other Changes, Exhibits 2-3, EPA-HQ-OAR-2021-0427-0796, (Feb 10, 2023); Growth Energy Comments on EPA's Workshop on Biofuel Greenhouse Gas Modeling, EPA-HQ-OAR-2021-0324-0580 (Apr. 1, 2022); Growth Energy Comments on EPA's Proposed Renewable Fuel Standard Program: RFS Annual Rules, Exhibits 1-3, EPA-HQ-OAR2021-0324-0521, (Feb. 4, 2022).

Some economic models continue to impose a significant emissions penalty to crop-based biofuels based on predictions of indirect land use change (iLUC) despite the lack of empirical evidence these changes are occurring. For example, a recent International Energy Agency report concludes that "[c]ontrary to modelled relationships, statistics showed **no link** between expansion of U.S. biofuel production between 2005 and 2015 and corn production, corn export, or deforestation in Brazil."[6] After years of projecting land use change associated with corn ethanol that has yet to be observed, the assumptions shared across these economic models are in need of fundamental reconsideration.

Indeed, it is problematic for implementation of the IRA that iLUC assessments are constantly changing and evolving, and depending on the model assumptions used, generating widely-divergent results. For example, EPA initially estimated in 2009 iLUC associated with ethanol that was more than **double** the value it ultimately incorporated into its final rule establishing the 2010 Renewable Fuel Standard. Over a decade on, there is substantial evidence EPA's 2010 estimate is a significant overstatement given improvements in data inputs and modeling approaches in recent years. Indeed, the International Civil Aviation Organization (ICAO) that oversees the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) methodology is currently considering new scientific work on critical inputs to its iLUC estimates that could substantially lower the default lifecycle estimate for ETJ. As such, Treasury must incorporate the best available science into its lifecycle GHG assessments particularly where there have been significant refinements in iLUC estimates over time.[7]

To that end, the U.S.' extensive experience in biofuels production has led U.S. researchers to develop the best tools available for measuring biofuel lifecycle emissions, including the Greenhouse Gases, Regulated Emissions, and Energy Use in Technologies (GREET) model developed by the Department of Energy's Argonne National Laboratory.[8] Earlier this year, EPA highlighted that "the GREET model is well established, designed to adapt to evolving knowledge, and capable of including technological advances."[9] Even GREET is conservative, incorporating an iLUC estimate that is significantly higher than empirical evidence suggests would be realistic for domestically-produced ETJ over the next 5 to 10 years. Still, GREET's overestimate

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[6] *Towards an improved assessment of indirect land-use change,* International Energy Agency Bioenergy Technology Collaboration Program, (Oct. 2022) https://www.ieabioenergy.com/wp-content/uploads/2023/06/IEA-Bioenergy-iLUC-report_Final.pdf.

[7] Growth Energy anticipates submitting a technical paper to Treasury explaining evolution of iLUC estimates over time and what the best available science suggests is a sound approach to this issue.

[8] *See, e.g. Upstream Energy Analysis*, Argonne National Laboratory (Sep. 27, 2022) https://www.anl.gov/esia/upstream-energy-analysis.

[9] *New Source Performance Standards for Greenhouse Gas Emissions From New, Modified, and Reconstructed Fossil Fuel-Fired Electric Generating Units; Emission Guidelines for Greenhouse Gas Emissions From Existing Fossil Fuel-Fired Electric Generating Units; and Repeal of the Affordable Clean Energy Rule*, 88 Fed. Reg. 33,240, 33,328 (May 23, 2023).

is far more reasonable than the flawed, outdated, and substantially overstated iLUC estimates in CORSIA.

We strongly urge IRS to incorporate the GREET model as an option to demonstrate SAF lifecycle emissions for ETJ as it implements the Section 40B and 45Z tax credits. Sections 40B and 45Z explicitly authorize alternatives to the CORSIA methodology for calculating such emissions. In particular, these sections permit the use of either CORSIA "*or* … any similar methodology" that satisfies the Renewable Fuel Standard's definition of "lifecycle greenhouse gas emissions."[10] As explained below, the U.S. government-developed GREET model can and should be used to improve upon the international CORSIA approach. Specifically:

- IRS has ample discretion under the statute to adopt alternative LCA methodologies for SAF, and should do so, consistent with Congress's intent, when the alternative methodologies more accurately calculate lifecycle GHG emissions;
- GREET clearly satisfies all statutory criteria to qualify as an alternative LCA methodology;
- As applied to U.S. ETJ production, CORSIA has fundamental flaws, including a vastly overestimated projection of indirect land use change (iLUC) emissions; and
- GREET improves upon CORSIA's flaws in multiple respects, including by incorporating updated emissions factors and utilizing an amortization period that is well-recognized under U.S. biofuels policy.

I. Consistent with Congressional Intent Behind the IRA, the IRS Should Exercise Its Explicit Statutory Authority to Adopt Alternative Methodologies that More Accurately Determine the Lifecycle Emissions of U.S. SAF Production

Congress enacted the Inflation Reduction Act to stimulate clean energy production, technology, and innovation in the United States, in order to accelerate the energy transition and reduce greenhouse gas (GHG) emissions.[11] Sections 40B and 45Z, in particular, incentivize production of clean fuels with the greatest potential for emissions reductions by scaling the value of the tax credit to a fuels' carbon intensity, measured by the percentage reduction in lifecycle GHG emissions achieved compared

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[10] 26 U.S.C. § 40B(e)(2).

[11] *See,* e.g. *Inflation Reduction Act Guidebook*, U.S. White House, (Jan. 2023), https://www.whitehouse.gov/cleanenergy/inflation-reduction-act-guidebook/#:~:text=To%20provide%20loans%20to%20support,from%20the%20Bipartisan%20Infrastructure%20Law.

with petroleum-based fuels.[12] Thus, for these incentives to function properly, it is essential that a clean fuels' lifecycle GHG emissions be calculated accurately and in accordance with the best available science.[13]

The Section 40B and 45Z tax credit provisions both provide two alternative pathways for calculating a fuel's lifecycle emissions. First, a producer could use "the most recent Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) which has been adopted by the International Civil Aviation Organization (ICAO)." 26 U.S.C. § 40B(e)(1); *id.* § 45Z(b)(1)(B)(iii)(I). Alternatively, producers may use "any similar methodology" which "satisfies the criteria under section 211(o)(1)(H) of the Clean Air Act." 26 U.S.C. § 40B(e)(2); *Id.* § 45Z(b)(1)(B)(iii)(II).

This optionality is crucial for achieving Congress's core objectives. First, while CORSIA may be acceptable as a default approach for sustainable aviation fuels, due to its broad coverage of fuel types capable of being utilized as sustainable aviation fuel, CORSIA is fundamentally flawed when applied to certain fuels—including ETJ, as discussed further below. Additionally, as an internationally-negotiated compromise standard, CORSIA incorporates European or global assumptions that may be distorted or entirely inapplicable in the particular circumstances of the U.S. market. Congress avoids these and other potential problems by requiring IRS to consider alternative LCA methodologies that meet certain minimum standards.[14] Indeed, it would be contrary to congressional intent for IRS to ignore well-accepted, U.S.-based alternative methodologies that avoid CORSIA's flaws and demonstrably produce more accurate calculations in certain contexts.

Separately, Sections 40B(f) and 45Z(f)(1) address registration and third-party certification requirements. These procedural guardrails are largely independent of the choice of lifecycle analysis (LCA) methodology in 40B(e) and 45Z(b)(1)(B). To the extent an operator is able to comply with the CORSIA-based certification requirements of 40B(f)/45Z(f), including those relating to supply chain traceability and information transmission, it can do so regardless of which LCA methodology was used to derive the information being disclosed, so long as the choice of methodology is explicit. Moreover, where an alternative, higher-accuracy LCA methodology is utilized, certification requirements can be tailored to account for any differences from CORSIA.[15,16] Such third-party verification procedures have long been used in the federal RFS program and

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[12] 26 U.S.C. § 40B(b); *id.* § 45Z.

[13] *See Physicians for Social Resp'y v. Wheeler*, 956 F.3d 634 (D.C. Cir. 2020) (agencies must consider best available science when enacting environmental policy).

[14] 26 U.S.C. § 40B(e)(2); *Id.* § 45Z(b)(1)(B)(iii)(II).

[15] 26 U.S.C. § 40B(f)(2)(A)(ii); *Id.* § 45Z(f)(1)(A)(i)(II)(aa)(BB).

[16] Certain parties have asserted that the certification requirements in § 40B(f) mandate the use of the CORSIA LCA methodology in § 40B(e). This assertion is entirely unfounded, both substantively and as a matter of statutory interpretation. Were § 40B(f) intended to mandate use of the CORSIA LCA methodology it would strip § 40B(e)(2) of all meaning and effect. Canons of statutory interpretation require that IRS avoid reducing other sections of the statute to mere surplusage.

numerous state clean fuels standards, which could readily be adapted for these purposes.

Notably, flexibility provided in § 40B(e)/§ 45Z(b)(1)(B)(iii) and § 40B(f)/§ 45Z(f) is not seen in other parts of the statute. For non-aviation fuel under Section 45Z, only GREET "or a successor model (as determined by the Secretary)" may be applied to determine lifecycle emissions.[17] Limiting the alternative model pathway in the non-aviation fuels context to one that has been "determined by the Secretary" to be a "successor" to the existing model is much narrower than the authority to accept "any similar methodology" in the sustainable aviation fuel context. Congress thus provided a heightened level of flexibility for SAF producers to rely on a more suitable, widely-accepted methodology to calculate lifecycle emissions – and it would defy congressional intent for IRS to ignore these alternative methodologies where they produce more accurate results than CORSIA. This heightened flexibility in the context of sustainable aviation fuel makes sense: not only is the international CORSIA standard a bad fit for certain markets and fuel types, but U.S. tax and climate policy should not be subservient to consensus-based international organizations, which are made up of foreign regulatory agencies far less experienced and sophisticated in biofuels LCA modeling compared with U.S. agencies such as the Department of Energy's Argonne Laboratory.

In short, when implementing the Section 40B and 45Z SAF tax credits, IRS must ensure LCA methodologies used for calculation of credits reflect the best available science so as to incentivize increased production of low carbon-intensity SAF in order to further Congress's core objective of accelerating the reduction of GHG emissions from the U.S. transportation system. Implementing the statute in this manner is critical to the decarbonization and continued economic competitiveness of the U.S. aviation sector.

II. CORSIA's Calculation of U.S. Ethanol-to-Jet SAF Lifecycle Emissions Is Fundamentally Flawed and Demonstrably Less Accurate Than the U.S.-Developed GREET Model

A. GREET is a "Similar Methodology" to the CORSIA-Approved Methodology

As Growth Energy has described in previous letters, the GREET model and methodologies that rely on it are similar to the methodology approved by CORSIA to calculate lifecycle GHG emissions, with multiple shared inputs, similar design, and similar scope. GREET-based methodologies (including GREET's reliance on the Argonne-developed input Carbon Calculator for Land Use Change from Biofuels Production (CCLUB)) plainly satisfy the criteria for lifecycle analyses under Clean Air Act (CAA) § 211(o) and were chosen by Congress to serve as the default lifecycle emissions methodology under other IRA provisions. Congress has also endorsed

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[17] 26 U.S.C. § 45Z(b)(B)(ii).

GREET as an appropriate mechanism to determine the emissions intensity of ethanol in light duty vehicles. ICAO itself endorses the use of GREET for determining lifecycle greenhouse gas emissions; it has developed an ICAO-specific version of GREET it uses for calculation of the carbon intensity of various fuels *except* for emissions associated with indirect land use change (iLUC) of crop-based biofuels. For example, ICAO uses a modified version of GREET to calculate "core"/direct ETJ emissions (which includes emissions from feedstock production, feedstock transport, fuel production, and fuel transport)[18] as well as "lower carbon aviation fuels" that are produced from petroleum using lower carbon processes such as carbon capture and sequestration (CCS), clean hydrogen, or renewable electricity.[19] In contrast, ICAO seemingly arbitrarily incorporated in CORSIA a method for calculating indirect land use change (iLUC) of crop-based fuels that departs from GREET's approach and is disadvantageous to U.S. ETJ.

In this letter, we focus on one particular factor where there is a substantial, quantifiable distinction between GREET/CCLUB and CORSIA: iLUC. As explained further below, the differences in iLUC values between GREET/CCLUB and CORSIA primarily result from the selection of two inputs: emissions factors and amortization periods. The assumptions and inputs used in GREET/CCLUB, however, are more accurate for U.S. crop-based biofuels than the international CORSIA approach, which is outdated and incorporates policy decisions unique to the European context.

B. The CORSIA Methodology Substantially Overestimates iLUC Values for U.S. ETJ

The CORSIA methodology for calculating lifecycle emissions from aviation fuels reflects a compromise approach that is not the best or most scientifically-supported approach available for all nations or fuel types. Biofuels markets and industries across ICAO member nations are heterogeneous, with the existing U.S. production of crop-based biofuels an extreme outlier in size (~40% of global biofuel production[20]) and development (over 230 billion gallons of ethanol produced spanning the past two decades[21]). Despite considerable improvements over years of research, LCA modeling inevitably includes some degree of technical uncertainty and policy-driven choices and assumptions. CORSIA's approach to several of these modeling choices, especially those related to iLUC, is simply a bad fit for the uniquely-situated U.S. ethanol industry. This mismatch between the international assumptions within CORSIA and the specific

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[18] *CORSIA Supporting Document: CORSIA Eligible Fuels—Life Cycle Assessment Methodology*, ICAO, (June 2022) at 57.

[19] *CORSIA Methodology for Calculating Actual Life Cycle Emissions Values*, ICAO, (June 2022) at 23, 31.

[20] *See, e.g. International Biofuels Production*, U.S. Energy Information Administration, https://www.eia.gov/international/rankings/world?pa=28&u=2&f=A&v=none&y=01%2F01%2F2021&ev=false

[21] *U.S. Production, Consumption, and Trade of Ethanol*, U.S. DOE Alternative Fuels Data Center, https://afdc.energy.gov/data/10323

circumstances of U.S. markets is precisely what the IRA's flexible approach to alternative methodologies is designed to address.

As an initial matter, CORSIA uses two entirely separate and distinct LCA models (GTAP-BIO and GLOBIOM) that include different inputs and assumptions. It makes numerous tweaks to each of those models and then simplistically averages together the results to arrive at default values for various types of SAF. As CORSIA acknowledges, "GTAP-BIO (AEZ-EF) and GLOBIOM have different structures, and use data sets, parameters and emission factors from different sources."[22] This awkward "composite" approach reflects the consensus-driven nature of the ICAO body, where dozens of stakeholders offer disparate technical perspectives and the resulting compromise approach may not be scientifically defensible for all SAF in all jurisdictions. As part of this consensus approach, ICAO sought to avoid exclusive reliance on U.S.-developed models that are more applicable to the domestic context in favor of models developed by European researchers (like GLOBIOM).

In addition, the CORSIA methodology's default iLUC estimate is untethered from reality and fails to take into account the substantial potential diversion of U.S. ethanol production from current uses to the SAF market. CORSIA acknowledges that in jurisdictions where increased demand is met through yield increases or unused existing cropland, it is erroneous to apply CORSIA's default iLUC calculation.[23] Indeed, the methodology assumes, without support, that there will be a substantial amount of land conversion in the United States associated with ETJ production. To the contrary, however, increased demand for ethanol has historically been met in the United States with increased yield from *existing* acreage. It is well-documented that the billions of gallons of increased ethanol production (associated with the United States' transition from E0 to E10 as the predominant gasoline) did *not* result in the land conversion early modeling predicted. On this basis alone, it would be reasonable for Treasury to omit application of CORSIA's default iLUC calculation altogether; at a minimum, Treasury must allow use of an available, widely-accepted methodology that more accurately addresses this critical factor in the U.S. context.

Further, the CORSIA methodology fails to acknowledge that any increase in ETJ production in coming decades will coincide with declining production of internal combustion engine (ICE) vehicles, meaning there is significant opportunity to divert ethanol produced to fuel those vehicles to the SAF market. While liquid fuels will remain the predominant fuel source for light duty vehicles over at least the next decade, electric vehicles are nonetheless projected to displace an increasingly significant portion

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[22] CORSIA 2022 Supporting Document at 99.

[23] CORSIA 2022 Methodology for Calculating Actual Life Cycle Emissions Values at 11-12.

of ICE vehicles — resulting in a projected decrease ethanol consumption, measuring in the billions of gallons.[24]

Moreover, each year since 2015, the U.S. has exported over a billion of gallons of ethanol to meet market demands.[25] If ethanol becomes more valuable in the domestic market as ETJ, the U.S. can produce billions of gallons of ETJ without needing to produce a single additional gallon of ethanol by diverting from current export flows. Diversion of ethanol from one use to the other, of course, entails <u>no</u> land conversion. However, the assumptions built into CORSIA's iLUC estimates completely fail to take this substitution effect into account. As a result, CORSIA substantially overestimates the amount of additional ethanol production (and relatedly, additional corn production) that would meet SAF demand, resulting in an artificially inflated iLUC estimate.

Recognizing these myriad shortcomings of CORSIA's methodology highlights the importance of the flexibility afforded by Congress to adjust and improve upon CORSIA's estimates—within the constraints of "similarity" and the Renewable Fuels Standard's definition of lifecycle greenhouse gas emissions.[26] We focus here on two factors in particular, choice of emissions factors and amortization period, that have a substantial impact on iLUC estimates that CORSIA's methodology approaches very differently from the GREET/CCLUB methodology. On both of these factors, the GREET/CCLUB approach is scientifically supported, consistent with U.S. policy whereas CORSIA is not, and well within the statutory contours of Section 40B(e)(2).

C. The Emissions Factors Used in CCLUB Are Consistent with the IPCC and the Best Available Science

iLUC estimates are the result of multiplying the acres of land that a model projects will be converted from various existing land uses to crop production (in order to meet a perceived increase in biofuel demand) by the additional GHG emissions that are attributable to that land conversion. The second input in this equation, estimating the GHG emissions attributable to each acre of land conversion, is referred to as the "emissions factor." Emissions factors vary based on the type of land converted. For example, converting forestland to cropland has greater GHG emissions than converting pastureland to cropland. Emissions factors are built on a multitude of assumptions relating to carbon stocks of particular land types, including both above ground carbon (i.e., in trees or vegetation) and below ground carbon (including soil organic carbon).

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[24] *See, e.g. The U.S. National Blueprint for Transportation Decarbonization: A Joint Strategy to Transform Transportation*, U.S. DOE, DOT, EPA, & HUD, (Jan. 2023) at 52, https://www.energy.gov/sites/default/files/2023-01/the-us-national-blueprint-for-transportation-decarbonization.pdf.

[25] *U.S. Exports of Fuel Ethanol*, U.S. Energy Information Administration, (May 31, 2023) https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=m_epooxe_eex_nus-z00_mbbl&f=a.

[26] 26 U.S.C. § 40B(e)(2).

The choice of emissions factor that a model applies can have a significant impact on iLUC estimates.[27]

CORSIA's composite approach applies two different models with two different sets of emissions factors (e.g., the AEZ-EF emissions factor in GTAP along with GLOBIOM's embedded emissions factors). GREET's CCLUB instead utilizes CENTURY and Winrock emissions factors. The CCLUB emissions factors are more scientifically defensible than CORSIA's for multiple reasons. For example, CCLUB was developed by the Department of Energy over a decade ago and is updated regularly to improve its estimates as the best available science develops.[28] In contrast, AEZ-EF was created for a particular modeling exercise completed by California in 2014 and has not been updated since, notwithstanding significant refinements in understandings regarding critical inputs like soil organic carbon (SOC) estimates.[29] By its authors' own admission, AEZ-EF "relies heavily on IPCC greenhouse gas inventory methods and default values" from **2006**.[30] The Section 40B and 45Z tax credits, which together last through 2027, should incorporate the most up-to-date modeling techniques and not rely on emissions factors estimates incorporating data from nearly two decades ago.

CCLUB incorporates U.S. SOC estimates rather than relying on outdated international defaults, again demonstrating that GREET/CCLUB is a better fit for U.S. ETJ production than the international CORSIA standard.[31] Further, CCLUB's treatment of cropland pasture, one type of land that could potentially be converted for cropland, is informed by empirical data from USDA, and so is more evidence-based than AEZ-EF, which simply assumes that converting cropland pasture to cropland releases 50% of the emissions associated with converting pasture to cropland. In addition, CCLUB accounts for a broad range of soil, climate, and management conditions, which "is consistent with the technique of the Intergovernmental Panel on Climate Change of continuously updating carbon stock change factors based on such factors as management activities and various yield scenarios."[32]

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[27] Taheripour, et al., *Biofuels induced land use change emissions: The role of implemented emissions factors in assessing terrestrial carbon fluxes* (2022) at Table 2; *see also* Draft Regulatory Impact Analysis: RFS Standards for 2023-2025 and Other Changes, EPA-420-D-22-003, (Nov. 2022) at 162 (noting that "at the most basic level, we can clearly say that the land use change emissions factors are an influential part of biofuel GHG modeling.").

[28] *See, e.g.* Kwon, et al. *Carbon Calculator for Land Use and Land Management Change from Biofuels Production (CCLUB) Users' Manual and Technical Documentation*, Argonne National Laboratory (Oct. 2021).

[29] Plevin, et. al, *Agro-ecological Zone Emission Factor Model v52*, (Jan. 2014).

[30] Plevin, et. al, *Agro-ecological Zone Emission Factor Model* (Sep. 2011).

[31] *Cf.* Kwon, et al. (2021) at 8 (describing CCLUB approach to modeling soil organic carbon changes in the U.S.; Plevin, et. al. (2014) at Table 20 (citing IPCC defaults).

[32] Taheripour et al. *Response to "how robust are reductions in modeled estimates from GTAP-BIO of the indirect land use change induced by conventional biofuels?"* 310 Journal of Cleaner Production 127,431 (2021).

D. Consistent with Long-Standing U.S. Biofuels Policy, ETJ Lifecycle Emissions Modeling Should Apply an Amortization Period of 30 Years in iLUC Calculations

The amortization period is the length of time over which emissions impacts are evaluated. Lifecycle emissions models generally project an initial iLUC-driven increase in emissions in the first year that additional biofuel demand is introduced into a market, followed by many years of emissions reductions as biofuels displace higher-emitting fossil fuels.[33] As a result, longer amortization periods that consider longer-term emissions impacts generally result in lower LCA estimates for biofuels. U.S.-developed LCA models consistently apply a 30-year amortization period for biofuels, based in part, on the expected lifespan of U.S. biofuels production facilities. Europe instead applies a 20-year amortization period. The 25-year period utilized by CORSIA is simply "a compromise between the European use of 20 years and the U.S. value of 30 years."[34] CORSIA does not provide any scientific rationale to support its choices of 25-year period, acknowledging that the amortization period is "usually a decision made by policy-makers," given that it "play[s] an important role in affecting ILUC emission intensity."[35] A recent National Academy of Sciences (NAS) report agrees, noting that the "choice of the amortization periods in ILUC modeling may be a political decision and subject to the time period for policy goals" and that "[t]here is no single correct choice for amortization period."[36] As a result, NAS cautions that there is "significant parameter uncertainty" with respect to this input.[37] Indeed, a recent analysis found that, holding other inputs constant, adjusting the amortization period from 25 to 30 years reduces the resulting iLUC estimate by nearly 17%.[38]

In the U.S., federal and state agencies consistently apply a 30-year amortization period when evaluating the lifecycle emissions of biofuels, including in the U.S. Renewable Fuel Standard, the California Low Carbon Fuels Standard, and the Oregon and Washington Clean Fuel Programs. In fact, EPA recently confirmed its long-standing practice of using a 30-year amortization period, reasoning that "using 30 years as a reasonable time horizon for analysis is that biofuel production facilities last multiple

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[33] As Growth Energy has repeatedly demonstrated to EPA, this initial demand "shock" is not observed in the real world, and is one of several flaws in LCA modeling that results in a systematic overestimation of iLUC emissions across economic models. *See, e.g.* Growth Energy Comments on EPA's Renewable Fuel Standard (RFS) Program: Standards for 2023–2025 and Other Changes, EPA-HQ-OAR-2021-0427-0796, (Feb 10, 2023); Growth Energy Comments on EPA's Workshop on Biofuel Greenhouse Gas Modeling, EPA-HQ-OAR-2021-0324-0580 (Apr. 1, 2022); Growth Energy Comments on EPA's Proposed Renewable Fuel Standard Program: RFS Annual Rules, EPA-HQ-OAR2021-0324-0521, (Feb. 4, 2022).

[34] CORSIA 2022 Supporting Document at 105.

[35] *Id.*

[36] *Current Methods for Life Cycle Analyses of Low-Carbon Transportation Fuels in the United States,* National Academies of Sciences, Engineering, and Medicine, at 64 (Oct. 2022).

[37] *Id.*

[38] Taheripour et al. (2022) at Table 2.

decades after they are constructed."[39] Further, under the IRA, fuels utilizing GREET to calculate lifecycle emissions under the Section 45Z tax credit will apply a 30-year amortization period.[40]

The IRS should not force SAF producers to apply an amortization period for purposes of Section 40B that deviates from the amortization period utilized across the board in Section 45Z and by U.S. state and federal agencies. The IRA tax credits were carefully designed to provide the greatest incentivizes to fuels with the highest potential for greenhouse gas reductions. Inconsistencies across how those reductions are calculated, such as use of disparate amortization periods in the Section 40B and Section 45Z credits, will distort the balance struck by these incentives.

E. An Accurate LCA Methodology Must Account for Emissions Reductions in SAF Production Associated with Carbon Capture and Sequestration.

To properly incentivize the adoption of lower-carbon agricultural practices and production processes, any LCA methodology adopted by the IRS must incorporate the wide variety of methods by which a biofuel producer can significantly reduce their fuels' emissions rate. As described in our previous letter,[41] ETJ producers should receive appropriate credit for introducing any of the myriad of techniques available to measurably reduce lifecycle emissions, including use of cover crops, low- or no-till farming practices, manure application, improved fertilizer application, use of low-carbon ammonia, use of renewable electricity, use of biomass for process heat, and deployment of CCS technologies, among others. Commenters' suggestion that the IRS must modify the approach both CORSIA and GREET take to exclude consideration of GHG emissions reductions associated with CCS is not scientifically defensible. The U.S. ethanol industry is a first-mover in implementation of innovative CCS technologies. In coming years, production of low carbon intensity ETJ will incorporate CCS if the IRA's tax incentives, including the enhanced 45Q tax credit, are properly implemented. Significantly, both CORSIA and GREET's approach to evaluating lifecycle GHG emissions assess full feedstock-to-fuel lifecycle emissions and incorporate GHG emissions reductions from CCS. Specifically, CORSIA's LCA methodology highlights that "GHG emissions reductions could be achieved through measures such as **carbon capture and sequestration (CCS)**, renewable and low carbon intensity hydrogen, and

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[39] November 2022 Draft Regulatory Impact Analysis at 167 ("After considering public comments and the input of an expert peer review panel, in the March 2010 RFS2 rule (75 FR 14670), EPA determined that our lifecycle greenhouse gas emissions analysis for renewable fuels would quantify the GHG impacts over a 30-year period. One of the reasons for using 30 years as a reasonable time horizon for analysis is that biofuel production facilities last multiple decades after they are constructed. EPA continues to believe that 30 years is an appropriate timeframe for evaluating the lifecycle GHG emissions of renewable fuels…").

[40] *See, e.g.* 26 U.S.C. § 45Z(b)(1)(B)(ii); *Id.* § 45V.

[41] Growth Energy Comment on Notice 2022-58, IRS-2022-0029-0075, (Dec. 2, 2022).

renewable and low carbon intensity electricity."[42] Similarly, GREET provides inputs to calculate emissions of production processes that incorporate CCS.

Consistent both with Congressional intent and the widely-accepted understanding of the scope of lifecycle GHG emissions, the IRS must recognize GHG emissions reductions from CCS in ETJ LCA estimates.

F. GREET Reasonably Accounts for Methane Emissions Rates

Certain parties have asserted that GREET fails to accurately capture upstream methane emissions associated with natural gas used as process energy in SAF production. This is unfounded. GREET's estimate of upstream methane emissions related to natural gas production is linked to national emissions values published by the EPA.[43] EPA closely monitors methane emissions from the natural gas sector and has recently proposed more stringent methane regulations that, among other things, particularly target intermittent, large emission events.[44] IRS should defer to EPA's considerable expertise on U.S. methane emissions rates as incorporated into the GREET model.

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Growth Energy appreciates the IRS's consideration of this input as it implements the Section 40B credit for Sustainable Aviation Fuel. We look forward to engaging further on this important work and would be happy to meet with your staff to present on these issues in more detail and answer any questions.

Sincerely,

Chris Bliley
Senior Vice President of Regulatory Affairs
Growth Energy

CC:

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[42] *Id.* at 21.

[43] https://www.epa.gov/system/files/documents/2023-04/US-GHG-Inventory-2023-Main-Text.pdf at Table 3-65.

[44] *Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review*, 87 Fed. Reg. 74,702, 74,749 (Dec. 26, 2022).

The Honorable Janet Yellen, Secretary, U.S. Department of the Treasury

The Honorable Tom Vilsack, Secretary, U.S. Department of Agriculture

The Honorable Jennifer Granholm, Secretary, U.S. Department of Energy

The Honorable Pete Buttigieg, Secretary, U.S. Department of Transportation

The Honorable Michael Regan, Administrator, U.S. Environmental Protection Agency

The Honorable Brenda Mallory, Chair, White House Council on Environmental Quality