

The background features abstract, overlapping green geometric shapes in various shades, including light lime green, medium green, and dark forest green, creating a modern, layered effect.

U.S. Bioenergy Policy *Timeline and Context*

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2 DATE

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5 EPA-SAB-19-xxx

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7 The Honorable Andrew Wheeler
8 Acting Administrator
9 U.S. Environmental Protection Agency
10 1200 Pennsylvania Avenue, NW
11 Washington, D.C. 20460

12
13 Subject: SAB review of *Framework for Assessing Biogenic CO₂ Emissions from Stationary*
14 *Sources* (2014)

15
16 Dear Acting Administrator Wheeler:

17 ...

8 The 2014 Framework does not, however, provide the policy context, specific BAF calculations for that
9 context, or the implementation details the SAB previously requested. In fact, the lack of information in
10 both Frameworks on how the EPA may use potential BAFs made it difficult to fully evaluate these
11 frameworks. The BAF is inherently a *construct* designed to evaluate the importance of the stack
12 emissions of CO₂ at a given time relative to their climate impacts at some point in the future when some
13 of the emitted CO₂ will have been sequestered by regrowth of the biogenic feedstocks. As such, that
14 construct depends upon the future point of interest, which is explicitly a policy decision. Policies
15 designed to affect change in emissions or impacts in the short term will need to be evaluated over the
16 short term, and thus, the relevant time-period for the BAF computation will be that same short term.
17 Feedstocks will have different BAF values depending on the policy-driven relevant time-period.

Ok, let's give some context

Timeline & Context

- ▶ **April 2, 2007** - *Massachusetts v. EPA*
 - ▶ The Supreme Court found that GHGs are air pollutants covered by the CAA.

- ▶ **June 26, 2009** - H.R. 2454 passed in the House.
 - ▶ Waxman Markey included a definition of ‘renewable biomass’ for the purpose of cap-and-trade.
 - ▶ Actively managed ag or pastureland that was non-forested as of 2009
 - ▶ Actively managed forests established before 2009
 - ▶ New managed forests on land that was non-forested before 2009
 - ▶ Thinnings or invasive species removals from public lands
 - ▶ Waste
 - ▶ Mill residues and by-products

Timeline & Context

- ▶ **December 7, 2009** - EPA issued the Endangerment Finding:
 - ▶ Six, key, well-mixed GHGs - CO₂, CH₄, N₂O, HFCs, PFCs and SF₆ - threaten public health and welfare of current and future generations.
 - ▶ Emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to greenhouse gas pollution with threatens public health and welfare. (Cause & Contribute Finding)
- ▶ **April 1, 2010** - Light-duty vehicle rule controlling GHG emissions finalized.
- ▶ **May 13, 2010** - The EPA issued the Tailoring Rule.
 - ▶ NSR triggered for GHG emissions > 100,000 tons instead of 100 tons

Timeline & Context

- ▶ **July 2010** - The Liberman-Warner Cap-and-Trade bill died in the Senate.
- ▶ **July 1, 2011** - The EPA finalized the Deferral Rule.
 - ▶ Deferred for three years the application of the PSD and title V permitting requirements to CO₂ emissions from bioenergy and other biogenic stationary sources while the Agency conducted a detailed examination of the science associated with these biogenic CO₂ emissions.
- ▶ **September 2011** - The EPA released for Science Advisory Board (SAB) review the *Draft Accounting Framework for Biogenic CO₂ Emissions from Stationary Sources*.

Timeline & Context

- ▶ **March 1, 2012** - Senator Bingaman introduced S. 2146 “Clean Energy Standard Act of 2012”
 - ▶ Defined ‘qualified renewable biomass’ as renewable biomass produced and harvested through land management practices that maintain or restore the composition, structure, and processes of ecosystems, including the diversity of plant and animal communities, water quality, and the productive capacity of soil and the ecological systems.
 - ▶ Called for an NAS study to “evaluate models and methodologies for quantifying net changes in greenhouse gas emissions associated with generating electric energy from each significant source of qualified renewable biomass, including evaluation of additional sequestration or emissions associated with changes in land use by the production of the biomass.” The study would then inform regulations for determining the carbon intensity of electric energy generated from qualified renewable biomass.

Timeline & Context

- ▶ **September 2012** - The SAB completed its peer review of the original draft framework and found:
 - ▶ Carbon neutrality for biomass could not be assumed *a priori*,
 - ▶ Future anticipated baseline approach appropriate,
 - ▶ Historic regional approach is not (additionality is important),
 - ▶ IPCC inventory approach not adequate,
 - ▶ Consider generating default factors by feedstock and region.
- ▶ **July 12, 2013** - The D.C. Circuit issued an opinion that vacated the Deferral Rule (*CBD v EPA*).
- ▶ **June 18, 2014** - Clean Power Plan proposed rule released

Timeline & Context

- ▶ **June 23, 2014** - *UARG v. EPA*.
 - ▶ The Supreme Court struck down the Tailoring Rule, but ruled that the EPA could regulate large sources of greenhouse emissions as long as they were already being regulated for emitting conventional pollutants.

- ▶ **November 2014** - U.S. announced INDC target to reduce net GHG emissions to 26-28% below 2005 levels in 2025, recognizing that these actions would have been part of the longer range effort to transition to low-carbon economies, mindful of the global temperature goal of 2°C

Timeline & Context

- ▶ **November 2014** - The EPA released a revised draft of the *Framework for Assessing Biogenic CO₂ Emissions from Stationary Sources* for targeted SAB review of specific charge questions
 - ▶ The new framework includes an anticipated baseline approach.
 - ▶ The results of applying approach are highly dependent on assumptions, particularly time frame and the size of the shock, so EPA developed targeted charge questions for a second SAB review:
 - ▶ What criteria should be used for choosing the time frame for analysis, and should the time frame vary by policy?
 - ▶ What criteria should be used for choosing the scale of biomass demand for the analysis?
- ▶ **November 2014** - Along with revised Framework, EPA also released the 'McCabe Memo.'
 - ▶ In the context of CPP SIPs, the Agency expected to recognize the biogenic CO₂ emissions and climate policy benefits of waste-derived and certain forest-derived feedstocks, and also expected that states' reliance on sustainably-derived agricultural- and forest-derived feedstocks were potentially approvable.

Timeline & Context

- ▶ **August 3, 2015** - Final Clean Power Plan released
- ▶ **August 27, 2015** - SAB Biogenic Carbon Emissions Panel released 1st draft response for panel discussion
- ▶ **December 2015** - Paris Agreement
 - ▶ included Article 2 goal to hold the increase in the global average temperature well below 2C above pre-industrial levels

Timeline & Context

- ▶ **February 2016** - SAB Biogenic Carbon Emissions Panel released 2nd draft response, submitted to Chartered SAB for quality review
 - ▶ “The 2014 Framework lacks concreteness and is written in a way that is too flexible, with too many possibilities. Rather than offering a lengthy menu of calculation options, the EPA needs to make some decisions and offer justification for those choices. For proper scientific evaluation, the Framework needs to be applied in a specific policy context with specific BAF calculations and clearly defined boundaries for EPA’s regulatory authority.”
 - ▶ Change from flux-based to stock-based equations
 - ▶ “We conclude that the appropriate time scale for calculating a BAF is the time period over which all terrestrial effects occur; thus a cumulative BAF is scientifically appropriate.”
 - ▶ Alternative cumulative BAF to take into account changes in terrestrial carbon stocks over time - (BAF Sigma T)
 - ▶ “EPA should identify and evaluate its criteria for choosing a model and examine the sensitivity of BAF estimates to these features.”

Timeline & Context

- ▶ **March 31, 2016** - Chartered SAB rejected Panel's 2nd draft response sending it back to the Panel for revision
 - ▶ “Members expressed concern regarding the proposal to specify a timeframe for the emission horizon. They found that there is variation in the BAF at points along the 100-year timeline and the draft report should not be prescriptive relative to time...The relevant emission timeframes are dependent on the timeframe required for specific policies”

- ▶ **November 4, 2016** - Election

Timeline & Context

- ▶ **May 2017** - The FY 2017 Consolidated Appropriations Act instructed EPA to establish policies for the use of forest biomass for energy production.
 - ▶ Sec. 428. To support the key role that forests in the U.S. can play in addressing the energy needs of the United States, the Secretary of Energy, the Secretary of Agriculture, and the Administrator of the Environmental Protection Agency shall consistent with their missions jointly:
 1. Ensure that Federal policy relating to forest bioenergy -
 - (A) Is consistent across all Federal departments and agencies; and
 - (B) Recognize the full benefits of the use of forest biomass for energy, conservation, and responsible forest management; and
 2. Establish clear and simple policies for the use of forest biomass as an energy solution including policies that -
 - (A) Reflect the carbon-neutrality of forest bioenergy and recognize biomass as a renewable energy source, provided the use of forest biomass for energy production does not cause conversion of forests to non-forest use.
 - (B) Encourage private investment throughout the forest biomass supply chain including in- (i) Working forests; (ii) Harvesting operations; (iii) Forest improvement operations; (iv) Forest bioenergy production; (v) Wood products manufacturing; or (vi) Paper manufacturing;
 - (C) Encourage forest management to improve forest health; and
 - (D) Recognize State initiatives to produce and use forest biomass.

Timeline & Context

- ▶ *June 1, 2017* - U.S. announced plan to withdraw from the Paris Agreement.

Timeline & Context

- ▶ **June 2, 2017** - SAB Biogenic Carbon Emissions Panel released 3rd draft response, submitted to Chartered SAB for quality review.
 - ▶ “We have concluded that the scientifically appropriate time horizon for calculating a BAF is one over which the carbon stock changes due to increased demand for all biogenic feedstocks by stationary facilities stabilizes. This is the time horizon that is long enough to account for nearly all (e.g., >95%) of the positive and negative changes in terrestrial carbon stocks between the increased biomass feedstock demand scenario (with increased demand for all types of bioenergy) and a reference scenario (without increased demand for bioenergy). The use of a shorter time horizon than this would truncate effects on carbon stocks and could lead to feedstock-specific BAFs that either under- or over-estimate net carbon stock effects.”
 - ▶ “It is important to clearly differentiate policy from scientific considerations in selecting the time horizon for calculating BAFs. BAF calculations are fundamentally a carbon accounting activity of expected future changes in carbon stocks due to increases in demand for bioenergy. BAFs and their evaluation should therefore be carbon science-based and derived to assess the implications of policy decisions on carbon stocks. Policy concerns about climate change should be addressed through the selection of appropriate policies and policy targets for greenhouse gas reduction. The stringency of greenhouse gas reduction policy targets should not affect the methods and time-scale used to calculate BAFs.”
 - ▶ “The SAB remains concerned that the reference point approach has important limitations and should not be the preferred approach.”

Timeline & Context

- ▶ **August 30, 2017** - Chartered SAB rejected the Panel's 3rd draft response.
 - ▶ Panel is dissolved.
 - ▶ Draft goes to a subcommittee of the Chartered SAB for revision.

Timeline & Context

▶ **April 23, 2018** - EPA issued a biogenic CO₂ policy statement

- ▶ “To proactively address congressional directives and stakeholder concerns specific to the use of forest biomass for energy, EPA’s policy in forthcoming regulatory actions will be to treat biogenic CO₂ emissions resulting from the combustion of biomass from managed forests at stationary sources for energy production as carbon neutral.”
- ▶ “The Agency’s approach is a pragmatic one, promoting the environmental and economic benefits of the use of forest biomass for energy at stationary sources, while balancing uncertainty and administrative simplicity when making programmatic decisions.”
- ▶ “The SAB peer review of the 2011 Draft Framework found that it is not scientifically valid to assume that all biogenic feedstocks are carbon neutral, but rather that the net biogenic carbon profile related to the use of biomass feedstocks depends upon factors related to feedstock characteristics, production and consumption, and alternative uses. The SAB also asserted that use of some biomass feedstocks may have minimal net biogenic CO₂ emissions and others may require more analysis. Furthermore, the SAB also acknowledged that in addition to scientific elements, EPA may need to consider the tradeoffs and benefits of different accounting approaches and other practical implementation issues to inform policy choices when assessing biogenic CO₂ emissions from stationary sources. The SAB further acknowledged that accounting for biogenic CO₂ emissions associated with stationary sources involves both scientific and policy considerations, including the policy context in which the accounting is applied.”
- ▶ “while a valuable exercise, the lengthy and intensive process of assessment and discussion, including among the SAB, has not to date resulted in a workable, applied approach for consistently assessing the net atmospheric contribution of biogenic CO₂ emissions at stationary sources. In addition, broader considerations also motivate EPA to establish this policy, including the substantial environmental and economic benefits associated with the use of forest biomass, the benefits of providing clarity to stakeholders, and direction from Congress and relevant Executive Orders.”

Timeline & Context

- ▶ **August 21, 2018** - EPA released the proposed Affordable Clean Energy Rule that would repeal and replace the Clean Power Plan.

Timeline & Context

- ▶ **August 29, 2018** - Chartered SAB Subcommittee released 4th draft response.
 - ▶ “The BAF is inherently a construct designed to evaluate the importance of the stack emissions of CO₂ at a given time relative to their climate impacts at some point in the future when some of the emitted CO₂ will have been sequestered by regrowth of the biogenic feedstocks. As such, that construct depends upon the future point of interest, which is explicitly a policy decision. Policies designed to affect change in emissions or impacts in the short term will need to be evaluated over the short term, and thus, the relevant time-period for the BAF computation will be that same short term. Feedstocks will have different BAF values depending on the policy-driven relevant time-period.”
 - ▶ “While the SAB agreed with many of the recommendations developed by the Biogenic Carbon Emissions Panel in previous drafts of the report, it disagreed with the extended time frame used for the analysis. There was extended discussion between the SAB and the Biogenic Carbon Emissions Panel over the significance of the time horizon used to calculate BAFs. The Panel recommended that a general principle for determining the time horizon for BAF calculations should be to select a time horizon that fully accounts for the temporal dynamics for all feedstocks to accommodate the Agency’s policy neutral approach. During quality reviews the SAB disagreed with this recommendation noting that for policy initiatives that consider shorter time horizons it may be inappropriate to use a BAF calculated to incorporate nearly all carbon stock effects over time. The SAB favors selecting the time horizon for calculating the BAF to comport with the policy time horizon under consideration.”
 - ▶ • “If there are multiple objectives, there are no overriding scientific principles that can be applied a priori to guide alignment among multiple objectives.”
 - ▶ • “The SAB makes no assertion regarding the appropriate policy use of the BAF and thus supports no specific time horizon selected independent of a policy goal.”
 - ▶ “The reference point approach, if adjusted at regular intervals (e.g., every 5 to 10 years) to account for any additional regional sequestration, would address the SAB’s earlier concerns.”

Timeline & Context

- ▶ ***September 26, 2018*** - Chartered SAB will meet to discuss and vote on 4th Draft Response...

Thank You

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Appendix

The background features abstract, overlapping geometric shapes in various shades of green, ranging from light lime to dark forest green. These shapes are primarily located on the right side of the page, creating a modern, layered effect. The rest of the page is plain white.

EPA Charge to SAB

- ▶ As the previous SAB Panel recommended developing default assessment factors by feedstock category and region that may need to be developed outside of a specific policy context, and as the framework could be also be used in specific policy contexts, the questions below relate to the choice of temporal scale both within and outside of a specific policy context.

EPA Charge to SAB

1. What criteria could be used when considering different temporal scales and the tradeoffs in choosing between them in the context of assessing the net atmospheric contribution of biogenic CO₂ emissions from the production, processing, and use of biogenic material at stationary sources using a future anticipated baseline?
 - a) Should the temporal scale for computing biogenic assessment factors vary by policy (e.g., near-term policies with a 10-15 year policy horizon vs mid-term policies or goals with a 30-50 year policy horizon vs long-term climate goals with a 100+ year time horizon), feedstocks (e.g., long rotation vs annual/short-rotation feedstocks), landscape conditions, and/or other metrics? It is important to acknowledge that if temporal scales vary by policy, feedstock or landscape conditions, or other factors, it may restrict the ability to compare estimates/results across different policies or different feedstock types, or to evaluate the effects across all feedstock groups simultaneously.
 - i. If temporal scales for computing biogenic assessment factors vary by policy, how should emissions that are covered by multiple policies be treated (e.g., emissions may be covered both by a short-term policy, and a long-term national emissions goal)? What goals/criteria might support choices between shorter and longer temporal scales?
 - ii. Similarly, if temporal scales vary by feedstock or landscape conditions, what goals/criteria might support choices between shorter and longer temporal scales for these metrics?
 - iii. Would the criteria for considering different temporal scales and the related tradeoffs differ when generating policy neutral default biogenic assessment factors versus crafting policy specific biogenic assessment factors?

EPA Charge to SAB

- b. Should the consideration of the effects of a policy with a certain end date (policy horizon) only include emissions that occur within that specific temporal scale or should it consider emissions that occur due to changes that were made during the policy horizon but continue on past that end date (emissions horizon)?⁹ The production, processing, and use of biogenic feedstocks at stationary sources can, in some circumstances, have terrestrial emissions effects extending into the future and there are different methods and perspectives about how to assess future emissions trajectories. Assessing for these emissions appropriately in different policy contexts and policy temporal scales may necessitate various decisions that reflect the goals, parameters and temporal scale of the policy. In some cases, the emissions horizon and the policy horizon can differ significantly. In some cases, emissions are considered under/affected by multiple policies (e.g., state, U.S. national, those impacted by policies in other nations) or commitments (e.g., emissions may be covered by multiple EPA regulations with different policy horizons, or an EPA regulation may have a policy horizon that differs from U.S. nationally determined contributions to the UNFCCC process).
- c. Should calculation of the biogenic assessment factor include all future fluxes into one number applied at time of combustion (cumulative - or apply an emission factor only once), or should there be a default biogenic assessment schedule of emissions to be accounted for in the period in which they occur (marginal - apply emission factor each year reflecting current and past biomass usage)?
- d. What considerations could be useful when evaluating the performance of a future anticipated baseline application on a retrospective basis (e.g., looking at the future anticipated baseline emissions estimates versus actual emissions *ex post*), particularly if evaluating potential implications for/revisions of the future anticipated baseline and alternative scenarios going forward?

EPA Charge to SAB

- ▶ EPA seeks guidance on technical considerations concerning how to select model perturbations ('shocks') for future anticipated baseline simulations estimating the net atmospheric contribution of biogenic CO₂ emissions from the production, processing, and use of biogenic material at stationary sources, using the above referenced components of the revised framework report as the starting point for the SAB Panel's discussion. As the SAB Panel recommended developing default assessment factors by feedstock category and region that may need to be developed outside of a specific policy context, and as the framework could be also be used in specific policy contexts, the questions below relate to the choice of model shocks both within and outside of a specific policy context.

EPA Charge to SAB

2. What is/are the appropriate scale(s) of biogenic feedstock demand changes for evaluation of the extent to which the production, processing, and use of biogenic material at stationary sources results in a net atmospheric contribution of biogenic CO₂ emissions using a future anticipated baseline approach? In the absence of a specific policy to model/emulate, are there general recommendations for what a representative scale of demand shock could be?
- a) Should the shock reflect a small incremental increase in use of the feedstock to reflect the marginal impact, or a large increase to reflect the average effect of all users?
 - b) What should the general increment of the shock be? Should it be specified in tons, or as a percentage increase?
 - c) Should the shock be from a business as usual baseline, or from a baseline that includes increased usage of the feedstock (i.e., for a marginal shock, should it be the marginal impact of the first ton, or the marginal impact of something approximating the last ton)?
 - d) Should shocks for different feedstocks be implemented in isolation (separate model runs), in aggregate (e.g., across the board increase in biomass usage endogenously allocated by the model across feedstocks), or something in between (e.g., separately model agriculture-derived and forest-derived feedstocks, but endogenously allocate within each category)?
 - e) For feedstocks that are produced as part of a joint production function, how should the shocks be implemented? (e.g., a general increase in all jointly produced products; or, a change in the relative prices of the jointly produced products leading to increased use of the feedstock, and decreased production of some other jointly produced products, but not necessarily an overall increase in production).
 - f) How should scale of the policy be considered, particularly for default factors? (e.g., can a single set of default factors be applied to policies that lead to substantially different increases in feedstock usage)?
 - g) Would the answers to any of the above questions differ when generating policy neutral default factors, versus generating factors directly tied to a specific policy?
 - h) What considerations could be useful when evaluating the performance of the demand shock choice ex post, particularly if evaluating potential implications for/revisions of the future anticipated baseline and alternative scenarios going forward?