COMMENT

SEEING THE FOREST FOR THE TREES: REGULATING CARBON DIOXIDE EMISSIONS FROM BIOENERGY PRODUCTION UNDER THE CLEAN AIR ACT

BY

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Greenhouse gas emissions from new and modified major stationary sources are currently regulated under the Prevention of Significant Deterioration (PSD) program of the Clean Air Act. In 2011, EPA issued a final rule exempting stationary sources of biogenic CO_2 emissions from regulation under the Clean Air Act for a period of three years. In this Deferral Rule, EPA asserted that a permanent exemption may be warranted if the agency determines that biogenic emissions have a negligible impact on net atmospheric carbon concentrations. The D.C. Circuit vacated the Deferral Rule in 2013, on the grounds that the administrative law doctrines invoked by the agency failed to legally justify the temporary exemption. However, the court explicitly refrained from deciding whether the Clean Air Act grants EPA authority to permanently exempt sources of biogenic CO_2 emissions from regulation under the PSD program. This Note considers whether the statute provides EPA with sufficient discretion to permanently exempt biogenic emissions from regulation, and concludes that the agency does not have authority to issue a permanent exemption in this context because the Clean Air Act does not permit EPA to consider the net atmospheric impact of a regulated air pollutant when determining whether a source's emissions trigger PSD program requirements. However, EPA may have discretion to consider the net impacts of biogenic emissions when establishing the emissions limitations imposed on a specific source.

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I. INTRODUCTION

Biomass is the black sheep of the renewable energy family. In the context of energy production, "biomass" refers to a broad variety of biologically based feedstocks[1] that provide fuel for bioenergy generation.[2] Bioenergy represents an appealing renewable energy source for a variety of reasons: Biomass is globally

1 Biologically based feedstocks or materials are defined as "non-fossilized and biodegradable organic material originating from modern or contemporarily grown plants, animals, or microorganisms (including products, byproducts, residues, and wastes from agriculture, forestry, and related industries, as well as the non-fossilized and biodegradable organic fractions of industrial and municipal wastes, including gases and liquids recovered from the decomposition of non-fossilized and biodegradable organic material). It does not include materials such as peat, coal, petroleum, natural gas, and products that are ultimately derived from biologic materials but are not renewable on policy-relevant time frames." EPA, ACCOUNTING FRAMEWORK FOR BIOGENIC CO_2 EMISSIONS FROM STATIONARY SOURCES 1 n.3 (2011), *available at* http://www.epa.gov/climatechange/Downloads/ghgemissions/Biogenic-CO2-Accounting-Framework-Report-Sept-2011.pdf [hereinafter ACCOUNTING FRAMEWORK].

2 For the purposes of this note, "bioenergy" is electricity generated through combustion, digestion, fermentation, or decomposition of biomass. *See id.* Emissions resulting from bioenergy production are referred to as "biogenic emissions." *Id.*

abundant and is replenished through cycles of harvest and regrowth.[3] Bioenergy can be generated from a wide variety of feedstocks, eighty areas of the country have access to locally sourced fuel supplies.[4] Moreover, because bioenergy is typically generated through combustion, existing infrastructure currently used to generate fossil fuel-fired electricity may be easily converted for bioenergy generation.[5] In addition, the ability to store excess bioenergy feedstocks allows bioenergy to serve as a source of baseload power.[6] However, bioenergy production has negative implications as well: Biomass production may require large amounts of land and thus may compete with other beneficial land uses, such as food production.[7] In addition, the combustion of biomass generates a significant amount of emissions that contribute to air pollution and climate change.[8] Biomass is therefore a controversial energy source, and it is unclear how existing Clean Air Act (CAA) regulations should apply to biogenic CO_2 emissions.[9]

Concerns over climate change and the environmental impacts associated with fossil fuel emissions influence renewable energy policy in the United States.[10] In 2007, the Supreme Court determined that greenhouse gases (GHGs) meet the definition of "air pollutant" under the CAA, and held that the U.S. Environmental Protection Agency (EPA or the Agency) must regulate GHG emissions under the CAA if the Agency determined that these emissions contribute to climate change.[11] In accordance with this mandate, EPA determined that anthropogenic GHG emissions contribute to air pollution that endangers public health and welfare,[12] and subsequently issued an "Endangerment Finding," a necessary prerequisite to regulating GHG emissions under the CAA.[13] In 2010, EPA finalized rules

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3 *See* SCIENCE ADVISORY BOARD, EPA, SAB REVIEW OF EPA'S ACCOUNTING FRAMEWORK FOR BIOGENIC CO_2 EMISSIONS FROM STATIONARY SOURCES 1 (2012), *available at* http://yosemite.epa.gov/sab/sabproduct.nsf/0/57B7A4F1987D7F7385257A87007977F6/$File /EPA-SAB-12-011-unsigned.pdf [hereinafter SAB REVIEW].

4 *See id.*

5 *See* NAT'L RENEWABLE ENERGY LAB., BIOMASS CO-FIRING: A RENEWABLE ALTERNATIVE FOR UTILITIES (2000), *available at* www.nrel.gov/docs/fy00osti/28009.pdf.

6 *See* R.L. BAIN ET AL., NAT'L RENEWABLE ENERGY LAB., BIOPOWER TECHNICAL ASSESSMENT: STATE OF THE INDUSTRY AND TECHNOLOGY 4-4, 5-4 (2003), *available at* http://www.fs.fed.us/ccrc/topics/urban-forests/docs/Biopower_Assessment.pdf (noting that biomass currently provides baseload power in the United States, and that "[a]ll biomass combustion systems require feedstock storage and handling systems").

7 *See* ACCOUNTING FRAMEWORK, *supra* note 1, at 19–20.

8 EPA, REGULATORY IMPACT ANALYSIS FOR THE PROPOSED STANDARDS OF PERFORMANCE FOR GREENHOUSE GAS EMISSIONS FOR NEW STATIONARY SOURCES: ELECTRIC UTILITY GENERATING UNITS 4–10 (2012), *available at* http://www.epa.gov/ttnecas1/regdata/RIAs/egughgnspspro posalria0326.pdf [hereinafter REGULATORY IMPACT ANALYSIS].

9 Clean Air Act, 42 U.S.C. §§ 7401–7671q (2006). SAB REVIEW, *supra* note 3; ACCOUNTING FRAMEWORK, *supra* note 1, at 1. "Biogenic emissions" are defined as "CO_2 emissions directly resulting from the combustion, decomposition, or processing of biologically based materials." *Id.*

10 *See* Deferral for CO_2 Emissions from Bioenergy and Other Biogenic Sources Under the Prevention of Significant Deterioration (PSD) and Title V Programs, 76 Fed. Reg. 43,492 (July 20, 2011) (to be codified at 40 CFR pts. 51, 52, 70, and 71) [hereinafter Deferral Rule].

11 Massachusetts v. EPA, 549 U.S. 497, 534 (2007).

12 Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66,496 (Dec. 15, 2009) (codified at 40 C.F.R. ch. I) [hereinafter Endangerment Finding].

13 *Id.*

regulating GHG emissions from motor vehicles and stationary sources.[14] The Prevention of Significant Deterioration (PSD) and Title V Greenhouse Gas Tailoring Rule (Tailoring Rule) adjusted the applicability requirements of the CAA's PSD program to make regulation of GHG emissions administratively feasible.[15] The PSD program regulates emissions from new or modified "major emitting" stationary sources in areas that are in attainment of National Ambient Air Quality Standards (NAAQS).[16] The Tailoring Rule applies the program's requirements to new and modified major stationary sources with potential to emit GHGs above a specific regulatory threshold; accordingly, these sources must now obtain PSD permits prior to commencing construction and must apply the "best available control technology" (BACT) to each regulated air pollutant they may emit.[17]

The final Tailoring Rule applies to emissions of six well-mixed GHGs and does not differentiate between CO_2 emissions resulting from fossil fuel combustion or those from combustion of biomass feedstocks.[18] In response, EPA received a number of comments from stakeholders requesting that the Agency exempt biogenic emissions from PSD requirements.[19] The stakeholders argued that the production of biomass resources acts as a carbon sink, and therefore bioenergy production does not increase atmospheric GHG concentrations.[20] One basis for these assertions involved the United States' annual GHG inventory, in which EPA reported that the Land Use and Land Use Change and Forestry (LULUCF) sector—which includes bioenergy production—constitutes a net carbon sink.[21] After reviewing available data regarding the GHG implications of bioenergy production, EPA concluded that "at least some biomass feedstocks . . . have a negligible impact on the net carbon cycle, or possibly even a positive net effect."[22] This created a dilemma for the Agency: If it proceeded to regulate biogenic emissions under the PSD program, it would impose regulatory burdens on bioenergy sources that may have a negligible impact on net atmospheric GHG levels.[23] If, on the other hand, EPA decided to categorically exempt bioenergy facilities from the PSD program, it risked exempting stationary sources that had the potential to emit significant quantities of GHGs.[24] Instead, EPA decided to defer application of the Tailoring Rule to biomass facilities for a period of three years, to provide the Agency time to

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14 Prevention of Significant Deterioration (PSD) and Title V Greenhouse Gas Tailoring Rule, 75 Fed. Reg. 31,514, 31,519 (June 3, 2010) (codified at 40 C.F.R. pts. 51–52, 70–71) [hereinafter Tailoring Rule].

15 *See id.* "Stationary source" is defined in § 111 of the CAA as "any building, structure, facility, or installation which emits or may emit any air pollutant." 42 U.S.C. § 7411(a)(3) (2006).

16 Prevention of Significant Deterioration of Air Quality, 42 U.S.C. §§ 7470–7492 (2006).

17 Tailoring Rule, *supra* note 14, at 31,516–18.

18 *Id.* at 31,518.

19 *Id.* at 31,590.

20 *Id.* at 31,590–91.

21 EPA, PSD AND TITLE V PERMITTING GUIDANCE FOR GREENHOUSE GASES 10 (2011), *available at* http://www.epa.gov/nsr/ghgdocs/ghgpermittingguidance.pdf [hereinafter GHG GUIDANCE].

22 Deferral Rule, *supra* note 10, at 43,499.

23 *Id.*

24 *Id.*

conduct a thorough scientific evaluation on the net GHG impacts of biogenic CO_2 emissions.[25]

The basis for deferring regulation of biogenic CO_2 emissions involved EPA's assumption that biogenic CO_2 emissions are offset by CO_2 sequestration in living biomass.[26] EPA determined that biogenic CO_2 emissions require special consideration because living biomass sequesters atmospheric carbon over relatively short periods of time, and thus may function as a net carbon sink rather than a net carbon source.[27] Underlying policy objectives influenced the final Deferral Rule as well—EPA generally considers biomass a renewable fuel source and "recognize[d] that use of certain types of biomass can be part of the national strategy to reduce dependence on fossil fuels."[28] The Agency noted that a number of states have adopted policies that encourage bioenergy production as a means of reducing GHG emissions and promoting renewable energy production.[29] Taking these considerations into account, EPA concluded that regulation of biogenic CO_2 emissions may not be warranted; however, the Agency first needed to evaluate the best available science before it could justify permanently excluding biogenic CO_2 emissions based on the negligible impact these emissions have on net atmospheric carbon levels.[30]

The final Deferral Rule went into effect in 2011.[31] The Rule operated by excluding biogenic CO_2 from the group of six well-mixed GHGs that in the aggregate constitute an air pollutant subject to regulation under the CAA.[32] In doing so, the Rule temporarily exempted biogenic CO_2-emitting stationary sources from the PSD program's applicability requirements,[33] which are the "set of conditions that determine which sources and modifications are subject to the agency's permitting requirements."[34] The Center for Biological Diversity and several other environmental groups petitioned the U.S. Court of Appeals for the D.C. Circuit to review the Deferral Rule on the grounds that EPA acted arbitrarily and capriciously in issuing the temporary exemption.[35] EPA asserted that the Rule was justified under the "one-step-at-a-time," "administrative necessity," "absurd results," and "de minimis" doctrines.[36] The D.C. Circuit held that these doctrines failed to justify the temporary deferral, and vacated the Rule.[37] However, the court explicitly refrained from deciding whether the CAA allows for a permanent exemption; the opinion "leaves for another day the question whether the agency has authority under the Clean Air Act to permanently exempt biogenic carbon dioxide

25 *Id.* at 43,492.
26 *Id.* at 43,499.
27 EPA, GUIDANCE FOR DETERMINING BEST AVAILABLE CONTROL TECHNOLOGY FOR REDUCING CARBON DIOXIDE EMISSIONS FROM BIOENERGY PRODUCTION 6 (2011), *available at* http://www.epa.gov/nsr/ghgdocs/bioenergyguidance.pdf [hereinafter BIOMASS BACT GUIDANCE].
28 Deferral Rule, *supra* note 10, at 43,492.
29 *Id.*
30 *Id.* at 43,495, 43,497.
31 *Id.* at 43,492, 43,495.
32 *Id.* at 43,497.
33 *Id.*
34 Coal. for Responsible Regulation v. EPA, 684 F.3d 102, 115 (D.C. Cir. 2012).
35 Ctr. for Biological Diversity v. EPA, No. 11-1101, slip op. at 2–3 (D.C. Cir. July 12, 2013).
36 Deferral Rule, *supra* note 10, at 43,496–99.
37 *Center for Biological Diversity*, No. 11-1101, slip op. at 18–19.

sources from the PSD permitting program."[38] Moreover, the court's analysis seems to indicate that the Agency could potentially justify a permanent exemption under the "administrative necessity," "absurd results," and "de minimis" doctrines.[39]

This Note concludes that the CAA does not grant EPA discretion to exempt biogenic CO_2 from regulation under the CAA because the net atmospheric impact of biogenic CO_2 is not a permissible factor to consider in determining whether a source's GHG emissions trigger PSD applicability.[40] EPA may, however, have discretion to consider the net effects of biogenic CO_2 emissions when determining the emissions limitations sources are ultimately subject to.[41] In the preamble to the final Deferral Rule, EPA maintained that the BACT provisions of the CAA are sufficiently flexible to allow a permitting authority to take into account the net GHG impacts of biogenic CO_2 emissions.[42] In a 2010 guidance document, EPA stated: "There are compelling public health and welfare reasons for BACT to require all GHG reductions that are achievable, considering economic impacts and the other listed statutory factors."[43] The PSD program mandates that potential energy, economic, and environmental impacts associated with available pollution control options are taken into account when making BACT determinations.[44] EPA interprets this provision to "enable permitting authorities to consider the potential sequestration of carbon in biogenic resources outside the boundaries of the facility when evaluating BACT for greenhouse gases."[45] In addition, EPA encourages permitting authorities to take relevant renewable energy policies into account when making BACT determinations.[46] Permitting authorities may therefore conclude that use of biomass is itself BACT for a bioenergy facility.[47] The process of conducting an accurate accounting of the net impacts associated with a source's biogenic CO_2 emissions will likely impose additional burdens on permitting authorities. However, incorporating this accounting into the BACT analysis will help ensure that sources with negligible net climate impacts avoid unnecessarily stringent regulatory obligations, while also ensuring that sources with negative net impacts will be subject to adequate emissions controls.

This Note examines the regulatory and policy implications associated with bioenergy production and corresponding biogenic CO_2 emissions within the context of the PSD program of the CAA. Part II provides an overview of the current GHG regulatory regime under the CAA. Part III discusses the climate change implications of bioenergy production and explains the factors, conditions, and feedstocks that may influence net carbon cycle impacts. Part IV analyzes the potential legal implications of a permanent regulatory exemption, concluding that the statute does not grant EPA the discretion to issue a permanent exemption and the "administrative necessity," "absurd results," and "de minimis" doctrines do not

38 *Id.*

39 *See id.* at 13, 16, 18.

40 *See* discussion *infra* Part IV.C.

41 *See* discussion *infra* Part V.

42 Deferral Rule, *supra* note 10, at 43,495.

43 GHG GUIDANCE, *supra* note 21, at 40.

44 42 U.S.C. § 7479(3) (2006).

45 CLEAN AIR ACT BIOMASS BACT GUIDANCE, *supra* note 27, at 21.

46 *Id.* at 25.

47 *Id.* at 5.

legally justify permanently exempting biogenic CO_2 emissions from regulation under the PSD program. Part V examines the potential for permitting agencies to designate biomass as BACT for CO_2 emissions from bioenergy facilities, and briefly explains the accounting process that permitting authorities must conduct to determine the net impacts these emissions will have on atmospheric GHG concentrations. This Note concludes that EPA cannot categorically exempt biogenic CO_2 emissions from regulation under the PSD program; however, the Agency can minimize the regulatory burdens imposed on bioenergy facilities on a case-by-case basis by determining that specific types of feedstocks are BACT for biogenic CO_2 emissions.

II. Regulating Greenhouse Gas Emissions Under the Clean Air Act

GHG officially became subject to regulation under the CAA on January 2, 2011,[48] but the initial impetus for regulation arose in 2007 with the Supreme Court decision *Massachusetts v. EPA*.[49] Prior to 2007, EPA did not consider CO_2 to be an "air pollutant" under the CAA,[50] which the statute defines as "any air pollution agent or combination of such agents, including any physical, chemical . . . substance or matter which is emitted into or otherwise enters the ambient air."[51] The Supreme Court, however, found this definition to encompass all airborne compounds, and held that EPA may regulate GHGs as air pollutants under the CAA.[52] Under section 202(a)(1) of the CAA, EPA is required to promulgate standards for new motor vehicles emissions that "cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare."[53] The Court held that this provision requires EPA to regulate GHG emissions unless the Agency determines that GHG emissions do not contribute to climate change, and directed EPA to make an endangerment finding for GHGs.[54]

In accordance with the Court's directive, EPA issued an Endangerment Finding in 2009, which concluded that "greenhouse gases in the atmosphere may reasonably be anticipated both to endanger public health and to endanger public welfare."[55] The Agency supported this finding with extensive scientific evidence on the effects of rising atmospheric GHG concentrations on global temperatures.[56] EPA concluded that elevated atmospheric GHG concentrations are the "root cause" of climate change, and that motor vehicle emissions of six well-mixed GHGs[57] are

48 Reconsideration of Interpretation of Regulations that Determine Pollutants Covered by Clean Air Act Permitting Programs, 75 Fed. Reg. 17,004, 17,019 (Apr. 2, 2010) (codified at 40 C.F.R. pts. 50, 51, 70, and 71) [hereinafter Timing Rule]

49 549 U.S. 497 (2007).

50 *Id.* at 528.

51 Clean Air Act, 42 U.S.C. § 7602(g) (2006).

52 *Massachusetts*, 549 U.S. at 529.

53 42 U.S.C. § 7521(a)(1) (2006).

54 *Massachusetts*, 549 U.S. at 533–34.

55 Endangerment Finding, *supra* note 12, at 66,497.

56 *Id.* at 66,510–512, 66,518.

57 The Administrator defines GHGs as a single air pollutant, "the aggregate group of the same six long-lived and directly-emitted greenhouse gases: Carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride." *Id.* at 66,536–37. EPA measures these

endangering public health and welfare by causing or contributing to climate change.[58] This conclusion triggered the Agency's mandate to establish motor vehicle emissions standards under section 202(a)(1),[59] and EPA subsequently promulgated the Tailpipe Rule, establishing GHG emissions standards for cars and light trucks.[60]

Following promulgation of the Tailpipe Rule, the six well-mixed GHGs officially became a regulated air pollutant under the CAA. Under EPA regulations, once a pollutant is subject to regulation under any CAA provision, it automatically becomes regulated under the PSD and Title V programs.[61] Stationary sources with the potential to emit GHGs above the relevant emissions thresholds must therefore obtain permits under these programs.[62] Title V requires stationary sources with the potential to emit 100 tons per year (tpy) of any air pollutant to obtain a state-issued operating permit.[63] Under the PSD program, stationary sources must obtain a PSD permit prior to commencing construction if the source has the potential to emit 250 tpy of any air pollutant, or 100 tpy of any pollutant if the source category is listed under section 169(1).[64] In addition, sources must apply the "best available control technology" (BACT) for every pollutant they may emit.[65]

Stationary sources typically emit GHGs in quantities that far exceed the statutory emissions thresholds of 100 and 250 tpy, and immediately subjecting these sources to the PSD requirements would impose substantial burdens on sources and permitting authorities alike.[66] In an effort to reduce these burdens, EPA decided to phase in GHG emissions regulations for stationary sources.[67] First, EPA issued the so called Timing Rule, which established the date upon which GHGs officially become "subject to regulation."[68] The EPA determined that GHGs would become subject to regulation on January 2, 2011, the date the Tailpipe Rule would enter into effect, and therefore GHG emissions would be subject to PSD and Title V regulation on that date as well.[69] Next, EPA issued the Tailoring Rule, which established the GHG emissions thresholds that would trigger PSD and Title V applicability.[70] The underlying impetus for the Tailoring Rule involved the

six aggregate gases according to their CO_2 equivalent (CO_2e), which is based on each gases' "warming effect relative to carbon dioxide . . . over a specified timeframe." *Id.* at 66,519.

58 *Id.* at 66,499, 66,518.

59 Clean Air Act, 42 U.S.C. § 7521(a)(1) (2006).

60 Light–Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards, 75 Fed. Reg. 25,324 (May 7, 2010) (codified at 40 C.F.R. pts. 85, 86, 600, and 49 C.F.R. pts. 531, 533, 536, 537, and 538) [hereinafter Tailpipe Rule].

61 PSD requirements apply to a "major emitting facility," 42 U.S.C. § 7475(a) (2006), which is defined as a source that emits 100 or 250 tons of "any air pollutant." *Id.* § 7479(1). EPA has interpreted "any air pollutant" to mean any "regulated NSR pollutant," which is further defined as any pollutant "subject to regulation" under any CAA provision. 40 C.F.R. §§ 52.21(b)(50)(iv), § 52.21(b)(2) (2012). Title V also applies to major sources that emit "any air pollutant," 42 U.S.C. 7661(a).

62 42 U.S.C. §§ 7475, 7479(1), 7602(j) (2006).

63 *Id.* §§ 7602(j), 7661a(a).

64 *Id.* §§ 7475, 7479(1).

65 *Id.* § 7475 (a)(4).

66 Tailoring Rule, *supra* note 14, at 31,536.

67 *Id.*

68 Timing Rule, *supra* note 48, at 17,019.

69 *Id.*

70 Tailoring Rule, *supra* note 14, at 31,516–17.

discrepancy between the statutorily prescribed "major source" thresholds and the practical reality of stationary source GHG emissions.[71] In the final rule, EPA explained that the major source thresholds of 100 and 250 tpy were far too low for GHGs, which sources typically emit in much higher volumes than other air pollutants.[72] The EPA estimated that approximately six million sources have the potential to emit more than 100 tpy of GHGs.[73] Because maintaining the current thresholds would impose incredible costs on permitting authorities and regulated stationary sources, EPA moved to reduce this permitting burden by increasing the threshold for GHG emissions.[74] Under the Tailoring Rule, new stationary sources with the potential to emit 100,000 tpy of any GHG, calculated according to the gases' CO_2 equivalent (CO_2e), and with the potential to emit 100 or 250 tpy of any regulated air pollutant on a mass basis, are subject to PSD.[75] Existing sources that undergo a modification increasing net GHG emissions by 75,000 tpy CO_2e also trigger PSD.[76]

EPA received several requests to exempt biogenic emissions and biomass combustion activities from PSD requirements, but it declined to create such an exemption through the Tailoring Rule.[77] In the Rule, EPA had justified its departure from the statutorily prescribed emissions thresholds under the "absurd results," "administrative necessity," and "one-step-at-a-time" doctrines,[78] and did not believe these doctrines provided sufficient legal justification for exempting biogenic CO_2 emissions from PSD at the time it promulgated the Tailoring Rule.[79] However, EPA noted that this decision did not preclude it from creating such an exclusion at a later date,[80] and on January 12, 2011, EPA Administrator Lisa Jackson announced the Agency's intention to defer application of PSD to biogenic CO_2 emissions for a period of three years.[81]

On July 20, 2011, EPA issued a final rule deferring biogenic CO_2 emissions from regulation under the PSD and Title V programs.[82] This Deferral Rule exempted biogenic CO_2 emissions from PSD and Title V applicability determinations for a three-year period.[83] EPA reported that it had gathered additional information regarding biomass and biogenic emissions following finalization of the Tailoring Rule, and had subsequently determined that the complexity and uncertainty associated with accounting for the net impacts of biogenic emissions warranted further consideration.[84] EPA established the three-year deferral period to provide itself sufficient time to conduct a detailed scientific

71 *Id.*
72 *Id.* at 31,534–36.
73 *Id.* at 31,536.
74 *Id.* at 31,516.
75 *Id.* at 31,523.
76 *Id.* at 31,541.
77 *Id.* at 31,590–91.
78 *Id.* at 31,516.
79 *Id.* at 31,591.
80 *Id.*
81 Letter from Lisa Jackson, Adm'r, EPA, to Sen. Jeff Merkley, U.S. Senate (Jan. 12, 2011), *available at* http://www.epa.gov/NSR/ghgdocs/MerkleyBiomass.pdf.
82 Deferral Rule, *supra* note 10.
83 *Id.* at 43,490.
84 *Id.* at 43,496.

examination and develop a clearer understanding of the net atmospheric impact of biogenic CO_2 emissions.[85] EPA disclosed that it would explore whether a permanent exemption would be appropriate, but also emphasized that it would not pursue a permanent exemption if it concluded that biogenic CO_2 emissions have a significant net impact on the global carbon cycle.[86]

The underlying premise of the final Deferral Rule reflects the presumption that carbon sequestration in living bioenergy feedstocks may entirely or substantially offset a source's biogenic CO_2 emissions.[87] Bioenergy has unique implications in the context of climate change due to the potential for biomass to act as both a source and a sink of GHG emissions.[88] Part III of this Note provides an overview of the potential impacts bioenergy production may have on atmospheric GHG concentrations, and discusses the factors and conditions that may influence the net GHG effects of bioenergy. Parts IV and V examine the legal and policy implications of a permanent exemption for biogenic CO_2 emissions from regulation under the CAA.

III. CLIMATE CHANGE IMPLICATIONS OF BIOENERGY PRODUCTION

Bioenergy production presents unique implications in the context of climate change due to the fact that biomass can function as both a source and a sink in the global carbon cycle.[89] Biomass acts as a carbon "sink" when it removes CO_2 from the ambient air and sequesters it in growing plant material.[90] Biomass subsequently becomes a carbon source when plant material breaks down and releases previously sequestered carbon.[91] Biomass' unique role in the global carbon cycle has a significant impact on atmospheric CO_2 concentrations, and therefore on climate change.[92] From a renewable energy standpoint, it is theoretically possible to generate energy from biomass in a carbon-neutral manner, where living feedstocks sequester an equal amount of carbon as the previous harvest emitted during combustion.[93] However, a number of factors can disrupt this carbon balance and cause a carbon-neutral energy source to become a net source of GHG emissions.[94] The type of feedstock significantly influences the net carbon impact of bioenergy as well.[95] Bioenergy policies must consider these implications and account for any variables that may increase biogenic CO_2 emissions. The following sections examine biomass's role in the carbon cycle and discuss the various factors that

85 *Id.* at 43,497–98.

86 *Id.* at 43,498.

87 *Id.* at 43,499.

88 SAB REVIEW, *supra* note 3, at 1.

89 *Id.*

90 *Id.*

91 *Id.*

92 EPA 430-R-12-001, INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS: 1990–2010, at ES-13 (2012), *available at* http://www.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2012-ES.pdf [hereinafter 2012 GHG INVENTORY].

93 ACCOUNTING FRAMEWORK, *supra* note 1, at 6, 18.

94 *See*, *e.g.*, *id.* at 6.

95 *See*, *e.g.*, SAB REVIEW, *supra* note 3, at 7.

influence the carbon intensity and related climate impacts associated with bioenergy generation.

A. The Role of Biomass in the Carbon Cycle

The carbon cycle refers to the flow of carbon molecules as they continuously circulate among terrestrial, oceanic, and atmospheric carbon reservoirs throughout the Earth.[96] Atmospheric carbon predominantly exists as CO_2, though it is also a component of methane and carbon monoxide, which occur in lower concentrations.[97] On land, carbon resides in five terrestrial carbon pools: surface biomass, subsurface biomass, dead wood, plant litter, and soil carbon.[98] Plants take up aerial carbon through photosynthesis, and may sequester carbon in living or dead plant matter for a finite period of time.[99] This process allows plants to act as carbon sinks, because they remove CO_2 from the atmosphere.[100] When plant matter is destroyed through combustion or decomposition,[101] sequestered carbon returns to the atmosphere, at which point the biomass becomes a source of biogenic CO_2 emissions.[102]

Due to its role in the carbon cycle—including the ability to serve as a carbon sink—biomass has a significant impact on atmospheric carbon concentrations.[103] According to the 2012 National GHG Inventory, emissions and removals from land use, land use change, and forestry (LULUCF) activities sequestered a net 1,074.7 billion metric tons CO_2 equivalent (Tg CO_2 Eq.) in 2010, which represents 18.8% of the total U.S. CO_2 emissions that year.[104] Land use activities can have a positive or negative impact on carbon concentrations in any of the five terrestrial carbon pools, and land use changes can have a significant net impact on atmospheric GHG concentrations, particularly if the rate of removal or destruction exceeds new growth rates.[105] Trees and other biomass feedstocks may sequester carbon at a faster rate during earlier stages of growth,[106] which suggests that land managers could intentionally manage LULUCF activities to maximize sequestration potential.[107]

As a potential energy source, biomass differs from fossil fuels in a number of significant ways. First, biomass constitutes a renewable resource: careful management involving sequential harvesting and planting rotations can allow for

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96 ACCOUNTING FRAMEWORK, *supra* note 1, at 4.

97 *Id.*

98 *Id.* at 5.

99 *Id.* at 4.

100 The UNFCCC defines "sink" as "any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere." United Nations Framework Convention on Climate Change art. I, para. 8, 1994, S. Treaty Doc. No. 102-38, 1771 U.N.T.S. 107 [hereinafter UNFCCC].

101 ACCOUNTING FRAMEWORK, *supra* note 1, at 4.

102 UNFCCC, *supra* note 100, art. I, para. 9.

103 *See* ACCOUNTING FRAMEWORK, *supra* note 1, at 5 (discussing the multiple ways in which biomass affects carbon cycles, suggesting that biomass has a significant impact upon carbon cycles).

104 2012 GHG Inventory, *supra* note 92, at ES-13.

105 ACCOUNTING FRAMEWORK, *supra* note 1, at 5.

106 *Id.*

107 *See id.* at 10.

sustainable extraction and regrowth.[108] Second, living biogenic feedstocks sequester carbon during growth and then emit it during combustion.[109] Because the quantity of carbon sequestered equals the quantity of carbon emitted, biogenic feedstocks can potentially be produced and combusted in a carbon-neutral manner.[110] In addition, when feedstocks are replanted after harvest, new growth may partially or entirely offset emissions from the previous harvest.[111] In contrast, fossil fuel emissions will always contribute additional CO_2 into the atmosphere because fossil fuel reservoirs contain carbon that was removed from the atmosphere over the course of millions of years.[112] EPA considers these fundamental differences between biogenic and fossil fuels in terms of a "policy-relevant time scale," which is "the timeframe of concern required for stabilization of atmospheric GHG concentrations to avoid 'dangerous anthropogenic interference with the climate system'".[113] According to EPA, fossil fuel combustion circulates carbon over geological timescales, and thus will increase atmospheric carbon concentrations over the policy-relevant time scale.[114] Biogenic emissions, on the other hand, may increase atmospheric carbon concentrations over the policy-relevant time scale, but subsequent sequestration may partially or completely offset emissions during this period.[115]

While biomass comprises a unique energy source due to its ability to offset previous emissions, biomass-fired electricity generates CO_2 emissions at a rate comparable to coal-fired power.[116] Biogenic CO_2 emissions are physically identical to CO_2 emissions from fossil fuel combustion and contribute equally to climate change.[117] Moreover, while bioenergy production is carbon neutral under certain circumstances, some bioenergy feedstocks may be carbon intensive, especially when lifecycle emissions are taken into account.[118] A number of conditions can shift the balance between emissions and sequestration: If land managers fail to replant feedstocks after harvest, or production practices generate additional nonbiogenic emissions or waste substantial quantities of combustible feedstock, energy generation will likely result in a net increase in emissions.[119] The capacity for bioenergy to lead to net additions or reductions in atmospheric CO_2 concentrations depends on: 1) management-related factors and conditions, such as land use changes, and 2) feedstock-specific characteristics, such as regeneration times.

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108 SAB REVIEW, *supra* note 3, at 1.

109 *Id.*

110 ACCOUNTING FRAMEWORK, *supra* note 1, at 6, 18.

111 *Id.* at 1.

112 *Id.* at 6.

113 *Id.* at 1 n.4. EPA notes that the parties to the UNFCCC agreed to use 100 years as the time scale for determining global warming potential, so this presumably is a policy-relevant time scale. *Id.* at 1 n.4.

114 *Id.* at 1, 6.

115 *Id.* at 1.

116 EPA modeling estimates CO_2 emissions from coal average from 205–217 lbs/MMbtu, while CO_2 emissions from biomass average 195 lbs/MMbtu. REGULATORY IMPACT ANALYSIS, *supra* note 8, at 4–10.

117 ACCOUNTING FRAMEWORK, *supra* note 1, at 7.

118 *See* SAB REVIEW, *supra* note 3, at 3.

119 ACCOUNTING FRAMEWORK, *supra* note 1, at 6.

B. Management-Related Factors and Considerations

Management practices significantly influence the net emissions from a specific feedstock. In general, feedstocks that regenerate quickly, and therefore allow for short rotation periods, sequester carbon at a faster rate than feedstocks that regenerate slowly.[120] Cultivated energy crops that either directly or indirectly result in conversions of forest land into agricultural land will have higher net emissions than feedstocks that do not induce land use changes.[121] If energy intensive management practices generate emissions during feedstock production or processing, these lifecycle emissions must be taken into account.[122] Similarly, if a feedstock significantly displaces additional emissions that would occur under a business as usual scenario, these emissions should be taken into account as well.[123] These factors and considerations are explored in more detail below.

Bioenergy production will only result in a reduction in atmospheric GHG concentrations if biomass feedstocks sequester more carbon during growth than bioenergy emits during power generation. The length of time required for a feedstock to regrow to preharvest levels can significantly influence the climate impacts of bioenergy production.[124] For agricultural energy crops with short (typically annual) rotation periods, the net GHG impact may be minimal or even neutral because each new crop will sequester an equivalent amount of carbon to that which was emitted by the preceding year's crop.[125] Generating bioenergy from forest mass may have a much more negative impact on GHG levels, because decades may pass before a new forest stand reaches its pre-harvest capacity to sequester carbon.[126] In other words, combusting one fifty-year old tree to produce bioenergy instantly releases fifty years of sequestered carbon, and another fifty years will pass before a new tree will offset those emissions. Therefore, generating bioenergy from feedstocks with long rotation times may not be justified from a policy standpoint, where the ultimate goal may be to reduce atmospheric GHG concentrations within a fifty- or 100-year time frame.[127]

Land management is a very important component of bioenergy production. Bioenergy feedstock production can cause land use changes that result in significant additional emissions.[128] Direct land use changes occur when land being used for another purpose is converted for feedstock production.[129] If feedstock production displaces other commercial land uses—such as food production—leakage may occur.[130] Leakage comprises "the indirect impact that a targeted activity in a certain place at a certain time has on carbon storage at another place or

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120 *Id.* at 18.
121 *Id.* at 19–20.
122 *See* SAB REVIEW, *supra* note 3, at 16.
123 *See*, *e.g.*, ACCOUNTING FRAMEWORK, *supra* note 1, at 37.
124 *See* SAB REVIEW, *supra* note 3, at 2.
125 ACCOUNTING FRAMEWORK, *supra* note 1, at 18.
126 Tara W. Hudiburg et al., *Regional Carbon Dioxide Implications of Forest Energy Production*, 1 NATURE CLIMATE CHANGE 419, 419 (2011).
127 SAB REVIEW, *supra* note 3, at 2.
128 ACCOUNTING FRAMEWORK, *supra* note 1, at 18.
129 *Id.* at 19.
130 *Id.* at 20.

time."[131] Leakage is closely related to the concept of "carbon debt," which refers to the situation where managers clear land containing substantial stocks of sequestered carbon to produce bioenergy feedstocks.[132] EPA defines carbon debt as "the net GHG implications of conversion of lands with substantial carbon stocks to intensive production of an annual feedstock."[133] The feedstock production may be carbon neutral meaning subsequent growth sequesters an equal amount of carbon to that emitted from the previous harvest—but the future crop production does not sufficiently offset the carbon released from the initial land use change.[134] To avoid excess indirect GHG emissions resulting from land use changes, biomass production must identify and account for any leakage or carbon debts that may occur.

Bioenergy production can also have a net climate impact as a result of indirect lifecycle emissions. The CAA defines "lifecycle greenhouse gas emissions" as

> the aggregate quantity of greenhouse gas emissions (including direct emissions and significant indirect emissions such as significant emissions from land use changes) . . . related to the full fuel lifecycle, including all stages of fuel and feedstock production and distribution, from feedstock generation or extraction through the distribution and delivery and use of the finished fuel to the ultimate consumer.[135]

In the context of bioenergy feedstocks, lifecycle emissions may include fossil fuel emissions generated during harvest, transport, or processing of feedstocks;[136] carbon emissions from soil disturbances caused by harvest practices;[137] and fertilizer applications.[138] Because lifecycle emissions include carbon in addition to the amount sequestered in the feedstock itself, any feedstock with excess lifecycle emissions cannot be carbon neutral.[139]

While land use changes and lifecycle emissions may lead to additional GHG emissions for certain feedstocks, other types of feedstocks may prevent or displace emissions that would occur under a business-as-usual scenario. For example, waste material will eventually emit carbon as it decays.[140] Organic waste will emit the same amount of carbon regardless of whether it decays naturally or is combusted to generate electricity, so neither of these outcomes have a significant climate benefit from an emissions standpoint. However, because the waste material was initially removed from the land for economic purposes unrelated to bioenergy production, the emissions associated with the harvest and transport of the biomass should not

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131 *Id.* at 71.

132 *Id.* at 21.

133 *Id.* at 21, n.28.

134 *Id.* at 22.

135 Clean Air Act, 42 U.S.C. § 7545(o)(1)(H) (2006).

136 CARRIE LEE ET AL., STOCKHOLM ENVTL. INST., GREENHOUSE GAS AND AIR POLLUTANT EMISSIONS OF ALTERNATIVES FOR WOODY BIOMASS RESIDUES at 7 (2011), *available at* http://data.orcaa.org/files/7913/0927/5799/SEI_WoodyBiomassEmissions_final_v2.pdf [hereinafter SEI REPORT].

137 ACCOUNTING FRAMEWORK, *supra* note 1, at 19.

138 SAB REVIEW, *supra* note 3, at 16.

139 *See* Colin R. Hagan, *Closing the Gap Using the Clean Air Act to Control Lifecycle Greenhouse Gas Emissions From Energy Facilities*, 30 UCLA J. ENVTL. L. & POL'Y 247, 257 (2012).

140 ACCOUNTING FRAMEWORK, *supra* note 1, at 18–19.

be viewed as additional.[141] Moreover, bioenergy generation may prevent additional emissions if waste material displaces fossil fuel as an energy source. It is important to consider what the fate of a specific feedstock would be under a business-as-usual scenario in order to determine the full climate implications of bioenergy production.

C. Biomass Feedstocks Have Varying Carbon Impacts

Bioenergy is generated from a variety of feedstocks that can be broadly categorized as agricultural energy crops, forest mass (including live trees), agricultural and forestry residues and processing byproducts (including mill waste), and municipal and industrial waste.[142] The type of feedstock greatly influences the net GHG impact of bioenergy production; different feedstocks have varying energy densities, and the length of time required for a stock to regrow to preharvest levels can have significant climate implications.[143] From a climate change perspective, agricultural and forestry residues, clean municipal wastes, and certain energy crops have been identified as "beneficial" or carbon neutral bioenergy feedstocks.[144] Production of bioenergy from living forest mass, on the other hand, is projected to result in an increase in GHG emissions over time.[145]

Energy crops are an attractive bioenergy feedstock because of their short rotation times and their capacity to grow on marginal agricultural land.[146] Switchgrass, for example, is resistant to flooding and drought, grows well in nutrient-poor soil, and does not require extensive fertilizer use.[147] However, energy crop production may result in negative land use changes if existing forest or grassland is converted into cropland.[148] Similarly, leakage may occur if energy crops displace other beneficial agricultural crops, or if energy crops compete with other crops for arable land.[149] In general, energy crops will have negative climate implications if crop production leads to the destruction of other carbon-rich ecosystems.[150] In addition, energy crops may require processing and storage to provide consistent energy generation.[151]

Forest mass is a highly controversial bioenergy source. As discussed above, trees typically regenerate over the course of decades, rather than months or years, and therefore may not offset biogenic emissions within a policy-relevant time

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141 *See, e.g.*, *id.* at 37.

142 *See*, *e.g.*, SAB REVIEW, *supra* note 3, at 7; Union of Concerned Scientists, *How Biomass Energy Works*, http://www.ucsusa.org/clean_energy/our-energy-choices/renewable-energy/how-biomass-energy-works.html (last visited Nov. 23, 2013).

143 *See* Hudiburg et al., *supra* note 126.

144 Union of Concerned Scientists, *supra* note 142; ACCOUNTING FRAMEWORK, *supra* note 1, at 39.

145 Hudiburg et al., *supra* note 126; MANOMET CENTER FOR CONSERVATION SCIENCES, BIOMASS SUSTAINABILITY AND CARBON POLICY STUDY 6–7 (2010), *available at* http://www.mass.gov/eea/docs/doer/renewables/biomass/manomet-biomass-report-full-hirez.pdf [hereinafter MANOMET STUDY].

146 Union of Concerned Scientists, *supra* note 142.

147 *Id.*

148 ACCOUNTING FRAMEWORK, *supra* note 1, at 33–34.

149 *Id.* at 35.

150 Union of Concerned Scientists, *supra* note 142.

151 ACCOUNTING FRAMEWORK, *supra* note 1, at 34.

frame.[152] In a recent study on the CO_2 implications of forest bioenergy production, researchers at Oregon State University concluded that harvesting forest mass for bioenergy production would result in a 2–14% increase in CO_2 emissions over current forest management practices in the Pacific Northwest.[153] A study conducted by the Manomet Center for Conservation Sciences made comparable findings, and determined that bioenergy produced from forest biomass would begin to offset emissions from displaced coal after twenty years, but would not offset emissions from displaced natural gas for at least ninety years.[154]

However, other stakeholders argue that generating electricity from forest mass is justified for reasons beyond emissions reductions. The executive director of the Forest Research Institute reportedly argued that forests in eastern Oregon contain such large amounts of biomass that they must be actively managed to prevent "catastrophic wildfire."[155] The Union of Concerned Scientists notes that bioenergy can create demand for unmarketable forest mass, and that income from the sale of this biomass could help offset forest management costs.[156]

Leakage represents a significant concern when live trees are harvested for energy production. Bioenergy produced from commercial-sized timber may result in leakage issues if the demand for timber leads to an increase in harvesting in other areas.[157] Nonmarketable forest biomass should not have the same leakage impacts;[158] however, harvesting small diameter trees for bioenergy production may not be cost effective, and landowners may simultaneously harvest larger, commercially valuable timber to increase profit margins.[159]

Alternatively, bioenergy generated from forestry residues may have a lesser climate impact than energy generated from living timber. Forest residue is primarily a byproduct of timber production,[160] and therefore landowners can use existing infrastructure to collect and transport residues to bioenergy generation facilities.[161] As a waste product, forest residue will decompose naturally within ten to fifteen years, at which point the carbon it contains will enter the terrestrial carbon cycle.[162] From a sustainability standpoint, removing excess forest residues can negatively impact soil chemistry and reduce soil carbon stores.[163] However,

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152 *See* discussion *supra* Part III.A.

153 Hudiburg et al., *supra* note 126, at 419.

154 MANOMET STUDY, *supra* note 145, at 7.

155 Eric Mortenson, *Using Oregon's Forests for Bioenergy Production Has a Down Side: Increased Carbon Emissions*, OREGONIAN, Oct. 23, 2011, http://www.oregonlive.com/environment/index.ssf/2011/10/using_oregons_forests_for_bioe.html (last visited Nov. 23, 2013).

156 Union of Concerned Scientists, *supra* note 142.

157 ACCOUNTING FRAMEWORK, *supra* note 1, at 31.

158 *Id.* at 30.

159 *Id.* at 32.

160 Every ton of timber harvested in the Pacific Northwest generates on average one-third of a ton of forest residue. SEI REPORT, *supra* note 136, at 18.

161 BIOMASS BACT GUIDANCE, *supra* note 27, at 28.

162 *Id.* at 29.

163 OREGON DEP'T OF FORESTRY, REPORT: ENVTL. EFFECTS OF FOREST BIOMASS REMOVAL 5, 41, 55 (2008), *available at* http://www.oregon.gov/odf/pubs/docs/odf_biomass_removal_effects_report.pdf [hereinafter ODF REPORT]; ACCOUNTING FRAMEWORK, *supra* note 1, at 19.

leaving large amounts of residue on the forest floor can increase wildfire risk,[164] and forest managers may burn forest residue (referred to as "slash") to reduce forest fire risks.[165] Slash burning produces large amounts of smoke and emits particulate matter, nitrogen oxide, and carbon monoxide in addition to CO_2.[166] Burning forest residue to generate bioenergy produces CO_2, but particulate matter, nitrogen oxide, and carbon monoxide emissions are greatly reduced by pollution control technologies.[167] A recent study by the Stockholm Environmental Institute compared lifecycle emissions resulting from various fates of woody biomass residues.[168] The researchers found that when forest residues replaced fossil fuels in an industrial boiler, the net GHG emissions were 20% lower than emissions from onsite combustion or decomposition of forest residues.[169] In addition, pre-processing emissions, including emissions from gathering, chipping, and transporting forest residues, were found to make up less than 4% of the total lifecycle emissions.[170] However, unprocessed forest biomass contains a significant amount of water by weight, and thus is not very energy dense; therefore, transporting forest residues to generation facilities more than fifty miles from the feedstock source is not very cost effective.[171] Nevertheless, it appears that generating bioenergy from forest residues may have a positive climate impact in comparison to the business-as-usual scenario, as long as sufficient quantities of forest residue are left to decompose naturally onsite.

In addition to forest residue, a wide variety of agricultural residues and processing byproducts are also potential bioenergy feedstocks. Wood byproducts from timber milling and paper making offer another promising source of bioenergy; EPA believes that the climate impacts of bioenergy generated from mill residue are negligible because these waste residues are otherwise left to decompose naturally.[172] Crop residues can be collected from fields after harvest without creating any negative land use changes.[173] Byproducts from agricultural processing can be combusted rather than discarded as waste. A gasification facility in Arkansas, for example, substitutes natural gas with biogas produced from waste rice hulls, and a sugar cane processing facility in Florida generates enough electricity from waste sugar cane stalks to power the facility and 60,000 homes.[174]

From a policy standpoint, responsibly managed bioenergy production represents a promising renewable energy source with the potential to replace fossil fuels as a source of baseload and peakload power.[175] Energy generation from the

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164 ODF REPORT, *supra* note 163, at 5.

165 Mortenson, *supra* note 155, at 2.

166 ODF REPORT, *supra* note 163, at 6.

167 *Id.* CO emissions may be reduced by more than 93%, and $PM_{2.5}$ emissions may be reduced by more than 85%. SEI REPORT, *supra* note 136, at 38.

168 SEI REPORT, *supra* note 136, at 38.

169 *Id.* at 12.

170 *Id.* at 16.

171 Union of Concerned Scientists, *supra* note 142.

172 BIOMASS BACT GUIDANCE, *supra* note 27, at 23.

173 ACCOUNTING FRAMEWORK, *supra* note 1, at 34.

174 Union of Concerned Scientists, *supra* note 142.

175 *See* BAIN ET AL. *supra* note 6, at 4-4 (noting that a number of bioenergy facilities entered into power purchase agreements with California's electric utility companies in the late 1980s; these facilities provide both baseload and peakload generating capacity, especially during the hot summer months).

combustion of fossil fuels is the driving force behind climate change: In 2010, fossil fuel combustion generated 85% of the energy consumed in the United States and contributed 87% of the national GHG emissions during that year.[176] EPA "recognizes that use of certain types of biomass can be part of the national strategy to reduce dependence on fossil fuels,"[177] and the Agency thus believes that sources generating bioenergy from feedstocks with negligible carbon cycle impacts should not be subjected to "unnecessary regulation."[178] These policy objectives played a significant role in the promulgation of the final Deferral Rule.[179] However, EPA's desire to achieve a specific policy goal does not grant it authority to ignore or discount statutory mandates.[180] The following Part assesses this issue and discusses the legal and policy implications of exempting biogenic emissions from the applicability requirements of the PSD program.

IV. EXEMPTING BIOGENIC CO_2 EMISSIONS FROM REGULATION

EPA's Deferral Rule temporarily exempted biogenic CO_2 emissions from the applicability requirements of the PSD program by excluding these emissions from the "air pollutant" that is "subject to regulation" in the PSD and Title V implementing regulations.[181] The Rule was only set to be effective for a period of three years and would have expired on July 20, 2014.[182] However, EPA reserved the authority to permanently exempt some or all biogenic CO_2 emissions from regulation if it concludes that bioenergy emissions do not significantly contribute to atmospheric GHG concentrations.[183] The D.C. Circuit vacated the temporary Deferral Rule on July 12, 2013, but the court did not decide whether a permanent exemption would be permissible under the CAA.[184] In *Center for Biological Diversity v. EPA*, EPA attempted to justify the temporary exemption under the "administrative necessity," "absurd results," and "de minimis" doctrines.[185] While the D.C. Circuit determined that these doctrines failed to justify the temporary exemption, the court did not determine whether these doctrines could adequately support a permanent exemption.[186] However, these legal doctrines only help justify an agency's interpretation of an ambiguous statutory provision; if the statutory requirements are clear, the agency must comply with text. This Note concludes that the PSD applicability requirements are unambiguous and do not grant EPA discretion to categorically exempt major sources of air pollutants on the basis of fuel type. Moreover, even if the text of the PSD provision can be construed to grant

176 2012 GHG INVENTORY, *supra* note 92, at ES-12.

177 Deferral Rule, *supra* note 10, at 43,492.

178 *Id.*

179 *Id.*

180 *See*, *e.g.*, Ala. Power Co. v. Costle, 636 F.2d 323, 360–61 (D.C. Cir. 1979).

181 Deferral Rule, *supra* note 10, at 43,507–08 (amending the definition of "subject to regulation" under 40 C.F.R. §§ 51.166(b)(48), 52.21(b)(49), 70.2(2), and 71.2(2)).

182 *Id.* at 43,490.

183 *Id.* at 43,498.

184 Ctr. for Biological Diversity v. EPA, No. 11-1101, slip op. at 18–19 (D.C. Cir. July 12, 2013).

185 Deferral Rule, *supra* note 10, at 43,496–99; Brief for Respondents at pt. III, *Ctr. for Biological Diversity*, No. 11-1101 (D.C. Cir. July 12, 2013).

186 *Ctr. for Biological Diversity*, No. 11-1101, slip op. at 13, 16, 18–19.

the Agency discretion to construe the scope of the PSD applicability requirements, the administrative necessity, absurd results, and de minimis doctrines do not provide sufficient legal justification for a permanent regulatory exemption of biogenic CO_2 emissions. This Part discusses the statutory and regulatory frameworks encompassing the PSD applicability requirements and considers whether EPA's interpretations of the statutory provisions are permissible. Section A provides an overview of the relevant statutory and regulatory requirements within the context of the Deferral Rule. Section B considers whether Congress granted EPA discretion to consider lifecycle emissions and offsite sequestration in PSD applicability determinations. Finally, Section C examines whether the administrative necessity, absurd results, or de minimis doctrines sufficiently justify a permanent regulatory exemption for biogenic CO_2 emissions.

A. The Deferral Rule

EPA's Deferral Rule exempted biogenic CO_2 emissions from the PSD applicability requirements by differentiating biogenic CO_2 from the "air pollutant" CO_2 that is "subject to regulation" under the CAA. The exemption stems from the EPA's interpretation of the term "major emitting facility."[187] The PSD program of the CAA prohibits the construction of a "major emitting facility" unless the facility complies with specified requirements.[188] A "major emitting facility" is a stationary source with the potential to emit either 100 tpy or 250 tpy or more of "any air pollutant."[189] EPA's PSD implementing regulations have a slightly narrower scope: the regulations apply to "major stationary sources" with the potential to emit "any regulated NSR pollutant" in quantities that exceed the statutory thresholds of 100 or 250 tpy.[190] "Regulated NSR pollutants" include any pollutant "subject to regulation" under the CAA.[191]

The term "subject to regulation" has been subjected to a lengthy process of agency interpretation.[192] In 2008, EPA Administrator Stephen Johnson interpreted the phrase "subject to regulation" to refer to pollutants that are subject to actual emissions controls under the CAA or implementing regulations.[193] Pollutants that are only subject to monitoring or reporting requirements are not "subject to regulation."[194] EPA further refined this interpretation in the Timing Rule, which clarified that newly regulated pollutants—notably GHGs—become "subject to regulation" at the time regulatory emissions controls for the pollutant "take

187 Clean Air Act, 42 U.S.C. §§ 7475(a), 7479(1) (2006).

188 *Id.* § 7475(a).

189 *Id.* § 7479(1).

190 40 C.F.R. §§ 52.21(a)(2), 52.21(b)(1) (2012). The regulations under § 52.21 apply to federal implementation of the PSD program; regulations for state implementation of the PSD program are located at 40 C.F.R. § 51.166 (2012). Both Parts limit applicability to emissions of "regulated NSR pollutants." *See* 40 C.F.R. §§ 52.21(b)(1), 51.166(b)(1) (2012). For the sake of simplicity, this Note references the federal implementing regulations unless otherwise noted.

191 40 C.F.R. § 52.21(b)(50) (2012).

192 *See*, *e.g.*, Tailoring Rule, *supra* note 14, at 31,521–22.

193 Timing Rule, *supra* note 48, at 17,005.

194 *Id.*

effect."[195] At this time, the pollutant becomes a "regulated NSR pollutant," and thus subject to the requirements of the PSD program.[196] The Tailoring Rule codified EPA's interpretation by adding a definition of "subject to regulation" to the PSD implementing regulations.[197] The Rule added one exception to this definition: The statutory emissions thresholds would not apply to GHG emissions.[198] This exception codified GHG-specific emissions thresholds[199] and specified that a source's GHG emissions would be represented in tons per year of CO_2 equivalent emissions (CO_2e).[200]

The Tailoring Rule established that GHG emissions are subject to regulation under the PSD program, and therefore solidified the requirement that GHG emissions be considered when determining whether a stationary source triggers the PSD requirements.[201] As discussed above, the Tailoring Rule did not exempt biogenic emissions from PSD applicability determinations,[202] though EPA noted in the preamble to the final rule that it would consider the implications of biogenic CO_2 emissions on the net carbon cycle.[203] One year later, EPA issued the Final Rule deferring biogenic CO_2 emissions from PSD requirements.[204] The Deferral Rule amended the definition of "subject to regulation" by temporarily excluding biogenic CO_2 emissions from a source's total mass of GHG emissions in tons per year.[205]

EPA rationalized the Tailoring Rule under several administrative law doctrines: the "absurd results," "administrative necessity," and "one-step-at-a-time" doctrines.[206] These doctrines collectively allow the Agency to implement the PSD program "in a manner that is administratively feasible."[207] EPA relied on these same doctrines when promulgating the Deferral Rule, which it asserted was a continuation of the Tailoring Rule,[208] and "constitute a refinement of the approach EPA has taken to regulate GHG emissions from stationary sources through a phase-in approach, based on an evolving understanding of the complexities, uncertainties,

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195 *Id.*

196 *Id.*

197 "Subject to regulation means, for any air pollutant, the pollutant is subject to either a provision in the Clean Air Act, or a nationally-applicable regulation codified by the Administrator in subchapter C of this chapter, that requires actual control of the quantity of emissions of that pollutant, and that such a control requirement has taken effect and is operative to control, limit or restrict the quantity of emissions of that pollutant released from the regulated activity." Tailoring Rule, *supra* note 14, at 31,606–08; 40 C.F.R. § 52.21(b)(49) (2012).

198 Tailoring Rule, *supra* note 14, at 31,606–08.

199 Beginning January 2, 2011, sources that qualify as major stationary sources due to their potential to emit non-GHG regulated NSR pollutants and also have a potential to emit 75,000 tpy CO_2e are subject to regulation. *Id.* Beginning July 1, 2011, any source with a potential to emit 100,000 tpy CO_2e are subject to regulation. *Id.*

200 *Id.* CO_2e is calculated by multiplying the mass of GHG emissions in tpy by the specific gas's global warming potential (GWP), as codified in Table A-1 of Subpart A of 40 C.F.R. Part 98. *Id.*

201 Deferral Rule, *supra* note 10, at 43,493.

202 *Id.* at 43,492.

203 Tailoring Rule, *supra* note 14, at 31,590–91.

204 Deferral Rule, *supra* note 10.

205 *Id.* at 43,507–08.

206 *Id.* at 43,496–99.

207 Brief for Respondents *supra* note 185, at 7.

208 *Id.*

and nuances associated with biogenic emissions."[209] The Agency argued that the Deferral Rule was necessary to avoid overwhelming administrative burdens associated with regulating biogenic GHG emissions, and avoid the absurd result of regulating emissions that have a trivial impact on atmospheric GHG concentrations.[210] EPA is currently conducting a comprehensive assessment of the science associated with lifecycle emissions from biogenic sources to determine whether a permanent exemption is warranted for some or all types of bioenergy feedstocks.[211] If it determines that these emissions have a negligible impact on the net carbon cycle, the Agency may undertake an additional rulemaking to permanently exempt these emissions from regulation.[212]

In August of 2011, a group of environmental organizations filed a lawsuit in the D.C. Circuit, requesting that the court overturn the Deferral Rule on the grounds that the three-year exemption was "arbitrary, capricious, an abuse of discretion, and otherwise not in accordance with the law."[213] The petitioners asserted that the PSD requirements of the CAA are unambiguous—PSD applicability determinations are entirely dependent on the quantity of air pollutants emitted from a stationary source, and it is unreasonable for EPA to allow offsite CO_2 sequestration to offset biogenic source emissions.[214] EPA responded that the CAA allows EPA to exercise scientific and technical expertise in administering the statute's requirements, and the scientific uncertainty surrounding the impacts of biogenic emissions warranted deferring regulation of these sources.[215] The Agency asserted that the Deferral Rule was justified under the administrative necessity, absurd results, and one-step-at-a-time doctrines,[216] and maintained that the administrative necessity, absurd results, and de minimis doctrines may support a permanent exemption as well.[217] The D.C. Circuit heard oral arguments on April 8, 2013, and vacated the Rule in *Center for Biological Diversity v. EPA* on July 12, 2013.[218] However, while the decision vacated the temporary deferral, it left the door open for a permanent exemption of biogenic CO_2 emissions at some point in the future.[219]

EPA asserts that biogenic CO_2 emissions should be permanently exempted from regulation under the PSD program if these emissions have a negligible impact on net atmospheric GHG concentrations.[220] This assertion is premised on the inference that CO_2 emissions from biomass combustion are fundamentally different from CO_2 emissions from fossil fuel combustion, because future CO_2 sequestration

209 Deferral Rule, *supra* note 10, at 43,496.
210 *Id.* at 43,498.
211 *Id.*
212 *Id.*
213 Press Release, Ctr. for Biological Diversity, Lawsuit Challenges Clean Air Act Exemption for Biomass Burners (Aug. 15, 2011); Brief for Petitioners at 20, *Ctr. for Biological Diversity*, No. 11-1101 (D.C. Cir. July 12, 2013) (quoting 42 U.S.C. § 7607(d)(9)(A), (C) (2006)).
214 Brief for Petitioners, *supra* note 213, at 40.
215 Brief for Respondents, *supra* note 185, at 24–25.
216 *Id.* at 33.
217 *Id.* at 34–35.
218 *Ctr. for Biological Diversity*, No. 11-1101, slip op. at 18–19 (D.C. Cir. July 12, 2013).
219 *Id.* at 19.
220 Deferral Rule, *supra* note 10, at 43,498.

in living biomass may offset the CO_2 emitted from current biomass combustion.[221] However, all CO_2 emissions—whether they result from combustion of fossil fuels or biomass—are physically and chemically identical, and contribute equally to climate change.[222] Moreover, EPA's presumption that biogenic CO_2 can be excluded from the body of air pollutants subject to regulation under the CAA assumes that offsite sequestration can be taken into account when determining whether a source's emissions trigger PSD applicability. The following sections consider whether the statutory provisions can be construed to allow for lifecycle emissions and offsite sequestration to be considered in PSD applicability determinations, and if so, whether the administrative necessity, absurd results, and de minimis doctrines justify permanently exempting major sources of biogenic CO_2 emissions from the PSD requirements.

B. Can EPA Consider Offsite Sequestration in PSD Applicability Determinations?

Congress delegated authority to EPA to administer the PSD program of the CAA and to promulgate regulations necessary to implement the statutory requirements.[223] The Supreme Court has long recognized agency authority to engage in administrative rulemaking to fill any gaps in the statute the agency is tasked with administering.[224] However, an agency does not have authority to issue its own construction of a clear and unambiguous statutory mandate, because both agencies and courts "must give effect to the unambiguously expressed intent of Congress."[225] When courts review an agency's interpretation of the statute it administers, they apply the familiar *Chevron* two-step analysis: First, a court determines "whether Congress has directly spoken to the precise question at issue. If the intent of Congress is clear, that is the end of the matter."[226] If, however, "the statute is silent or ambiguous," the court will move on to step two and determine "whether the agency's answer is based on a permissible construction of the statute."[227] The CAA's PSD provisions do not explicitly vest EPA with discretionary authority to make pollutant-specific applicability determinations;[228] therefore, EPA may only issue a permanent exemption for biogenic emissions if the statute's applicability requirements are ambiguous.[229]

PSD's preconstruction permitting requirements apply to any "major emitting facility" that commences construction or modification in an area that is designated

221 *See id.* at 43,499.

222 ACCOUNTING FRAMEWORK, *supra* note 1, at 7.

223 Clean Air Act, 42 U.S.C. § 7601(a)(1) (2006); *see also id.* § 7471 (granting EPA authority to issue regulations establishing emissions limitations); *id.* § 7479(3) (granting EPA authority to make pollutant-specific BACT determinations).

224 "The power of an administrative agency to administer a congressionally created . . . program necessarily requires the formulation of policy and the making of rules to fill any gap left, implicitly or explicitly, by Congress." *Chevron*, 467 U.S. 837, 843 (1984) (quoting Morton v. Ruiz, 415 U.S. 199, 231 (1974)).

225 *Id.* at 842–43.

226 *Id.* at 842.

227 *Id.* at 843.

228 *See* 42 U.S.C. §7475(a) (2006).

229 *Chevron*, 467 U.S. at 843.

as in attainment or unclassifiable under section 107 of the CAA.[230] "Major stationary source" means any stationary source listed under section 169 that emits or has the potential to emit "one hundred tons per year or more of any air pollutant," or "any other source with the potential to emit two hundred and fifty tons per year or more of any air pollutant."[231] For EPA to categorically exempt sources of biogenic CO_2 emissions from these applicability requirements, any or all of the statutory terms, including "major stationary source," "potential to emit," or "any air pollutant," must be ambiguous.[232] EPA asserts that it has "considerable discretion" to interpret how biogenic emissions affect PSD applicability because "Congress left a gap in the CAA that requires EPA to assess how to consider and measure increases in emissions covered by PSD."[233] However, while measuring emissions increases may provide EPA with discretion to determine whether a source has undergone a modification triggering PSD applicability, this discretion does not automatically extend to PSD applicability determinations in general.[234] The following sections consider whether the PSD applicability requirements are ambiguous, and thus grant EPA discretion to categorically exempt biogenic sources from PSD on the basis of lifecycle emissions and offsite sequestration. This Part concludes that the statutory text is unambiguous, and therefore EPA cannot interpret the terms "any air pollutant," "major emitting facility," and "potential to emit" to support a categorical exemption of biogenic CO_2 emissions.

1. "Any Air Pollutant"

To support a permanent categorical exemption of biogenic CO_2 emissions, the statutory term "any air pollutant" must support varying interpretation, depending on the source of a particular pollutant. The CAA imposes PSD preconstruction permitting requirements on any stationary source that emits or has the potential to emit "*any air pollutant*" in quantities exceeding the statutory thresholds.[235] EPA regulations interpret "any air pollutant" to mean any air pollutant "subject to regulation" under the CAA.[236] Carbon dioxide is one of the six well-mixed gases that comprise the air pollutant GHG,[237] which is an air pollutant subject to regulation under the CAA.[238] EPA further reduced the scope of its interpretation of "any air pollutant" in the Deferral Rule: "Prior to July 21, 2014, the mass of the greenhouse gas carbon dioxide shall not include carbon dioxide emissions resulting from the combustion or decomposition of non-fossilized and biodegradable organic

230 42 U.S.C. §§ 7471, 7475(a), 7479(1)(C) (2006).

231 *Id.* § 7479(1).

232 *See Chevron*, 467 U.S. at 842–43.

233 Brief for Respondents, *supra* note 185, at 52.

234 *See* New York v. EPA, 413 F.3d 3, 27 (D.C. Cir. 2005) (stating that when Congress enacted the modification provisions of the NSR program, it "did not specify how to calculate 'increases' in emissions, leaving EPA to fill in the gap while balancing the economic and environmental goals of the statute").

235 *Id.* § 7479(1) (emphasis added).

236 40 C.F.R. § 52.21(b)(50).

237 Tailoring Rule, *supra* note 14, at 31,518–19.

238 *Id.* at 31,528.

material originating from plants, animals, or micro-organisms."[239] However, the CAA's reference to "any air pollutant" is unambiguous, and thus EPA does not have discretion to exclude biogenic CO_2 from the GHG CO_2 subject to regulation under the statute.

The D.C. Circuit recently examined the phrase "any air pollutant" in the definition of "major emitting facility" and concluded that the statute is unambiguous: "The phrase 'any air pollutant' includes *all* regulated air pollutants, including greenhouse gases."[240] Thus, because *Chevron* requires an agency to "give effect to the unambiguously expressed intent of Congress,"[241] PSD requirements must apply to GHG emissions from "major emitting facilities."[242] In the preamble to the Proposed Deferral Rule, EPA acknowledged that biogenic CO_2 is a constituent of the regulated air pollutant GHG, and therefore "the terms of the CAA suggest that the PSD and Title V requirements should apply to CO_2 emissions from bioenergy or other biogenic sources."[243] However, the Agency asserted that it had implied authority to exclude biogenic CO_2 from the definition of "subject to regulation" under the de minimis doctrine.[244]

EPA's interpretation of "any air pollutant" in the Deferral Rule was a stark departure from its previous interpretation of "regulated NSR pollutant." In the preamble to the Tailoring Rule, EPA clarified that the regulatory term "regulated NSR pollutant" merely identifies pollutants subject to PSD as the same pollutants that are subject to other regulation under other provisions of the CAA:

> The term is a simple cross-reference. It carries no implication that EPA, in identifying the pollutant to which PSD or title V apply, may redefine the pollutant that is regulated elsewhere in the Act. Whatever the pollutant is that is regulated elsewhere, it is that pollutant to which PSD and title V apply.[245]

Therefore, because the air pollutant GHG—as defined as the aggregate group of the six well-mixed GHGs—is subject to control under the Tailpipe Rule, this is the air pollutant that triggers PSD and Title V applicability.[246] The Agency emphasized that it "do[es] not have discretion to interpret the GHG 'air pollutant' differently for the purposes of PSD or title V."[247]

In its challenge to the Deferral Rule, the Center for Biological Diversity maintained that EPA lacks authority to exempt biogenic CO_2 emissions from PSD requirements.[248] In response, EPA asserted: "The Deferral Rule does not address whether CO_2 emissions from biomass are, as a general matter, constituents of a

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239 Deferral Rule, *supra* note 10, at 43,507.

240 Coal. for Responsible Regulation v. EPA, 684 F.3d 102, 134 (D.C. Cir. 2012).

241 *Chevron*, 467 U.S. 837, 843 (1984).

242 *Coal. for Responsible Regulation*, 684 F.3d 102, 134 (D.C. Cir. 2012).

243 Deferral for CO_2 Emissions from Bioenergy and Other Biogenic Sources Under the PSD and Title V Programs: Proposed Rule, 76 Fed. Reg. 15,249, 15,260 (Mar. 21, 2011) [hereinafter Proposed Deferral Rule].

244 *Id.*

245 *Id.*

246 *Id.*

247 *Id.*

248 Brief for Petitioners, *supra* note 213, at 19.

regulated pollutant. Instead, the Rule seeks scientific data to shed light on the question of whether and to what extent CO_2 emitted from biomass should be counted in examining emissions (or increases thereof) under PSD and Title V."[249] According to the Agency, the Deferral Rule was a permissible exercise of authority because Congress granted EPA discretion to calculate emissions within the PSD and Title V programs.[250] However, this explanation fails to justify the Agency's departure from an unambiguous statutory mandate: "Any air pollutant" means *any* air pollutant, including biogenic CO_2. While the statute does delegate authority to EPA to issue regulations establishing emissions limitations,[251] the statute does not grant the Agency authority to exclude CO_2 from biogenic sources from the mass of CO_2 that is subject to regulation under the CAA.[252]

The majority decision in *Center for Biological Diversity v. EPA* did not consider whether EPA has authority to exclude biogenic CO_2 from the GHG CO_2 subject to regulation under the CAA.[253] Though the court noted that "the question before us is whether EPA may exempt certain biogenic carbon dioxide *sources*—not just the air pollutant itself—from the PSD program,"[254] the majority did not analyze whether the Deferral Rule violated the plain language of the CAA.[255] The court instead explored whether the Rule was justified under the administrative doctrines invoked by EPA.[256] The concurrence, however, asserted that "[these] doctrines do not trump the fact that EPA simply lacks statutory authority to distinguish biogenic carbon dioxide from other forms of carbon dioxide for purposes of the PSD and Title V permitting programs."[257] Thus, while the court recognized the inconsistency between the statutory language and the Agency's exemption, it determined that the Agency's failure to justify the Deferral Rule under any of its proffered administrative law doctrines was sufficient to invalidate the Rule.[258]

2. *"Major Emitting Facility"*

To support a permanent exemption, the definition of "major emitting facility" must allow for consideration of offsite CO_2 sequestration. A "major emitting facility" under the PSD provisions of the CAA is a "stationary source[] of air pollutants."[259] The CAA defines "stationary source" as "any building, structure, facility, or installation which emits or may emit any air pollutant subject to regulation under the Act."[260] EPA regulations define "building, structure, facility,

249 Brief for Respondents, *supra* note 185, at 47.
250 *Id.*
251 Clean Air Act 42 U.S.C. § 7471 (2006).
252 *See id.* § 7479(1).
253 *Ctr. for Biological Diversity*, No. 11-1101 slip op. (D.C. Cir. July 12, 2013).
254 *Id.* at 11.
255 *Id.* at 12.
256 *Id.*
257 *Id.* at 2 (Kavanaugh, J., concurring).
258 *See*, *e.g.*, *id.* at 14 ("[W]e need not decide . . . whether the Clean Air Act unambiguously requires the regulation of all carbon dioxide from whatever source because . . . EPA's invocation of the one-step-at-a-time doctrine was arbitrary and capricious.").
259 42 U.S.C. § 7479(1) (2006).
260 *Id.* § 7411(a)(3).

or installation" as "all of the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person."[261] EPA interprets this plantwide definition to authorize a source's aggregate emissions to be "bubbled" when determining PSD applicability.[262] Under this interpretation, a stationary source's emissions are calculated as if the source were encased in a giant bubble; any emission reductions resulting from a modification in one area of the source can be subtracted from any emissions increases resulting from a modification in another area of the facility.[263] If the total emissions minus the total reductions are below the major source thresholds, the source is not subject to PSD.[264]

The regulatory definition of "building, structure, facility, or installation" appears broad enough to allow lifecycle emissions and sequestration to be taken into account under certain circumstances. EPA could potentially allow CO_2 sequestration in living biomass to offset a source's emissions if the living biomass and the emissions source are 1) "under common control of the same person;" 2) "located on one or more contiguous or adjacent properties;" and 3) "in a single major industrial grouping."[265] Permitting authorities ultimately determine whether emissions aggregation is appropriate on a case-by-case basis, and "no single determination can serve as an adequate justification for how to treat any other source determination for pollutant-emitting activities with different fact-specific circumstances."[266] Bioenergy facilities that grow bioenergy crops onsite or generate combustible waste materials may satisfy these aggregation requirements, but sources unable to produce their own bioenergy feedstocks cannot incorporate offsite sequestration into their aggregate emission calculations. Thus, while the definition of "major emitting facility" may allow limited consideration of lifecycle emissions, EPA cannot reasonably justify a permanent exemption of biogenic CO_2 emissions on the basis of general emissions aggregation.

3. "Potential to Emit"

If EPA issues a permanent categorical exemption for biogenic CO_2 emissions, the Agency must be authorized to exempt stationary source emissions that exceed the regulatory thresholds from PSD applicability. To constitute a "major emitting facility" under the PSD program, a stationary source must emit or have the potential to emit "PTE" air pollutants.[267] EPA's regulations define "PTE" as "the maximum capacity of a stationary source to emit a pollutant under its physical and operational design."[268] The regulatory definition further states that "[a]ny physical or operational limitation on the capacity of the source to emit a pollutant . . . shall

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261 40 C.F.R. § 52.21(b)(6) (2012).

262 *See Chevron*, 467 U.S. 837, 840 (1984).

263 *Id.*

264 *See id.*

265 40 C.F.R. § 52.21(b)(6) (2012).

266 Gina McCarthy, Assistant Adm'r, EPA, Withdrawal of Source Determinations for Oil and Gas Industries (2009), *available at* http://www.epa.gov/region07/air/nsr/nsrmemos/oilgaswithdrawal.pdf.

267 Clean Air Act, 42 U.S.C. §7479(1) (2006).

268 40 C.F.R. § 52.21(b)(4) (2012).

be treated as part of its design if the limitation or the effect it would have on emissions is federally enforceable."[269] A stationary source can therefore accept an enforceable physical or operational limitation to prevent its PTE from exceeding the "major" source threshold; these sources are called "synthetic minor sources."[270] EPA asserts that its authority to approve synthetic minor source permits grants it discretion to exempt sources with the PTE pollutants in excess of the applicable thresholds from PSD regulation.[271] However, while EPA may have discretion to exempt specific sources from PSD on a case-by-case basis, it cannot issue a categorical exemption on the basis of PTE.

Synthetic minor sources typically restrict their PTE through an enforceable permit limitation.[272] EPA guidance clarifies that "any permit limitation can legally restrict potential to emit if it meets two criteria: 1) it is federally enforceable . . . and 2) it is enforceable as a practical matter."[273] A state-issued minor source construction permit can therefore limit a source's PTE if the permit is federally and practicably enforceable.[274] EPA's guidance provides examples of the types of permit limitations that can restrict a source's PTE, including emissions, production, and operational limits.[275] Neither emissions limits—restrictions on the quantity of pollutants emitted—nor production limits—restrictions on manufacturing and production capacity—offer sufficient flexibility to incorporate lifecycle sequestration into PTE calculations.[276] Operational limitations, however, may potentially allow for sequestration to offset PTE. According to EPA, "[o]perational limits are all other restrictions on a manner in which a source is run, including hours of operation, amount of raw material consumed, fuel combusted, or conditions which specify that the source must install and maintain add-on controls that operate at a specified emission rate or efficiency."[277] If CO_2 sequestration in living biomass can qualify as an "add-on control," a permit could theoretically require that a source maintains living biomass and sequesters sufficient quantities of CO_2 to restrict the source's PTE to minor source levels.

Neither the statutory nor regulatory PSD provisions define "add-on controls." However, the regulations define "innovative control technology" as "any system of air pollution control that has not been adequately demonstrated in practice, but would have a substantial likelihood of achieving greater continuous emissions reduction than any control system in current practice or of achieving at least comparable reductions at lower cost in terms of energy, economics, or nonair quality environmental impacts."[278] Additionally, the statutory definition of BACT provides further insight into the scope of "add-on controls": CAA section 169

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269 *Id.*

270 EPA, LIMITING POTENTIAL TO EMIT IN NEW SOURCE PERMITTING 2 (1989), *available at* http://www2.epa.gov/sites/production/files/documents/newsou-perm-rpt.pdf [hereinafter PTE GUIDANCE].

271 Brief for Respondents, *supra* note 185, at 48.

272 *Id.*

273 *Id.*

274 *Id.*

275 *Id.* at 5.

276 *See id.*

277 *Id.*

278 40 C.F.R. § 52.21(b)(19) (2012).

defines "best available control technology" as an emissions limitation that achieves the greatest reduction in pollutant emissions "through application of production processes and available methods, systems, and techniques."[279] If emissions reductions can reasonably be interpreted to encompass sequestration, then permitting authorities may have authority to impose enforceable sequestration requirements on a source's PTE.

However, temporal and geographic limitations restrict the extent to which sequestration can be incorporated into PTE calculations. At a temporal level, EPA guidance states that PTE limitations must extend over the shortest time period possible in order to be practicably enforceable.[280] Operational limitations should generally be limited to one-month periods, which "prevents the enforcing agency from having to wait for long periods of time to establish a continuing violation before initiating an enforcement action."[281] The Agency recognizes that a one-month limit may not be reasonable in certain situations, and allows rolling monthly limits to be imposed on sources with "substantial and unpredictable annual variation in production, such as emergency boilers,"[282] or for sources that shut down operations on a seasonal basis.[283] However, "[u]nder no circumstances would a production or operational limit expressed on a calendar year annual basis be considered capable of legally restricting potential to emit."[284] In addition to EPA's explicit temporal restriction, the Agency imposes an implicit geographic restriction on operational limitations as well: PTE guidance describes operational limits as "all other restrictions on the manner in which *a source* is run."[285] This statement suggests that offsite sequestration cannot constitute an enforceable limitation on PTE because it would not restrict operations at the source itself. Thus, while onsite sequestration could potentially limit PTE on a source-by-source basis, sequestration in living biomass cannot categorically offset biogenic emissions from stationary sources, and EPA cannot permanently exempt bioenergy sources from PSD applicability on the basis of PTE.

C. Legal Justifications for a Permanent Exemption

EPA's primary argument to support the Deferral Rule concerned the supposition that biogenic CO_2 emissions may have only a negligible impact on net atmospheric GHG concentrations.[286] This argument was premised on the presumption that biogenic CO_2 emissions are offset by carbon sequestration in living biomass occurring offsite from the emissions source.[287] In EPA's view, if a bioenergy facility's emissions can be mostly offset by offsite sequestration, these biogenic emissions should not be counted when making a PSD and Title V

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279 Clean Air Act, 42 U.S.C. § 7479(3) (2006).
280 PTE GUIDANCE, *supra* note 270, at 9.
281 *Id.*
282 *Id.* at 9–10.
283 *Id.* at 10.
284 *Id.* at 9.
285 *Id.* at 5.
286 Deferral Rule, *supra* note 10, at 43,499.
287 *Id.*

applicability determination.[288] In order to exclude biogenic emissions from the statutory applicability thresholds, the Deferral Rule effectively treated biogenic CO_2 as a separate air pollutant from fossil fuel-derived CO_2.[289] However, all CO_2 emissions share the same physical and chemical properties and have the same impact on radiative forcing, which is the primary driver of climate change.[290] Nevertheless, the Agency contends that it has discretion to determine how biogenic emissions should be regulated under the PSD program, and thus its interpretation is entitled to deference.[291] Where Congress has implicitly authorized an agency to construe a statutory provision, an agency's interpretation is entitled to deference and must be upheld as long as it constitutes a reasonable interpretation of the statute.[292] However, EPA is only entitled to deference if the scope of the PSD applicability requirements are silent or ambiguous, and its ability to exercise discretion depends on whether a categorical exemption is justified under an applicable legal doctrine.

In the preamble to the final rule, EPA voiced its intent to permanently exempt biogenic CO_2 emissions from regulation under the PSD and Title V programs if it determines that the net carbon cycle impact of these emissions is negligible.[293] EPA later speculated that a permanent deferral might be justified under the administrative necessity, absurd results, and de minimis doctrines.[294] If EPA issues a permanent exemption for biogenic emissions under the PSD program, the Agency will likely argue that the exemption is necessary to reduce heavy administrative burdens and avoid the absurd result of regulating sources of emissions that have a de minimis impact on net GHG levels.[295] The discussion below examines these legal rationales within the existing judicial framework to consider whether a permanent exclusion for biogenic CO_2 emissions would be permissible under the PSD program.

1. The "Administrative Necessity" Doctrine

EPA's first legal justification for the Deferral Rule's biomass exemption relied on the doctrine of "administrative necessity,"[296] which allows an agency to deviate from statutory requirements that are impossible to administer as long as the agency only deviates as far as necessary to make the statute implementable.[297] EPA argued that regulation of biogenic CO_2 emissions is not currently justified given the complexity and uncertainty involved with accounting for such emissions,[298] which

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288 *Id.*

289 *See* exception to the general definition of "subject to regulation," 40 C.F.R. § 52.21(b)(49)(ii)(a) (2012).

290 ACCOUNTING FRAMEWORK, *supra* note 1, at 7.

291 Brief for Respondents, *supra* note 185, at 26–27, 47–48.

292 *Chevron*, 467 U.S. 837, 843–44 (1984).

293 Deferral Rule, *supra* note 10, at 43,498.

294 Brief for Respondents, *supra* note 185, at 35.

295 *See id.* at 7.

296 *See id.* (explaining how the doctrine of administrative necessity was offered as a legal justification for the Tailoring Rule due to the extreme administrative burdens associated with permitting GHG emissions, and stating that this same burden supported promulgation of the Deferral Rule).

297 Deferral Rule, *supra* note 10, at 43,494.

298 *Id.* at 43,496.

is due in part to "the unique role and impact biogenic sources of CO_2 have in the carbon cycle."[299] In the preamble to the final rule, the Agency stated: "[A]t present attempting to determine the net carbon cycle impact of particular facilities combusting particular types of biomass feedstocks would require extensive analysis and would therefore entail extensive workload requirements by many of the permitting authorities."[300] These extensive workload requirements "would unnecessarily strain the resources of the affected permitting authorities and result in delays in processing permits for other applicants," and this "extensive workload . . . justifies exempting those sources for a period of time."[301] In *Center for Biological Diversity v. EPA*, the D.C. Circuit found that the Deferral Rule was not justified under the administrative necessity doctrine because EPA failed to consider a "middle-ground option" that would require sources of biogenic CO_2 "to obtain permits but only if they fail to make 'any effort to take into account net carbon cycle impacts.'"[302] The court held that the Agency's rejection of this approach was arbitrary and capricious, but did not determine whether such a "middle-ground" approach would be consistent with the statutory requirements.[303] Thus, while the administrative necessity doctrine failed to adequately support the temporary Deferral Rule, the court did not foreclose the doctrine from justifying a permanent exemption.[304] Nevertheless, it is apparent that the Agency would have difficulty justifying a permanent categorical exemption for sources of biogenic CO_2 emissions under the doctrine of administrative necessity.

The doctrine of administrative necessity may justify agency action that is not explicitly authorized by statute, "where the conventional course . . . would, as a practical matter, prevent the agency from carrying out the mission assigned to it by Congress."[305] However, while such exemptions may be permissible in limited instances, they "are not favored."[306] The doctrine merely creates a "narrow range of inherent discretion in an agency to create case-by-case exceptions in order to come within the practical limits of *feasibility*."[307] Agencies may also justify a categorical exemption on the basis of administrative necessity, but "[t]he agency's burden of justification in such a case is especially heavy."[308] When an agency seeks judicial authorization for a categorical exemption from statutory requirements on the basis that it lacks the administrative capacity to implement the relevant statutory provision, a court "will carefully study the governing statute . . . to ascertain whether the statute authorizes approaches that deviate from the legislative mandate in response to concerns about feasibility."[309] Furthermore, administrative agencies

299 *Id.*
300 *Id.*
301 *Id.* at 43,496.
302 *Ctr. for Biological Diversity*, No. 11-1101, slip op. at 16 (D.C. Cir. July 12, 2013) (quoting Deferral Rule, *supra* note 10, at 43,496).
303 *Id.* at 16.
304 *See id.* at 17.
305 *Ala. Power Co.,* 636 F. 2d 323, 358 (DC Cir. 1979).
306 *Id.*
307 Pub. Citizen v. Fed. Trade Comm'n, 869 F.2d 1541, 1556 (D.C. Cir. 1998).
308 *Ala. Power Co*., 636 F. 2d at 359.
309 *Id.* at 359–60.

do not have general authority to create exemptions from statutory requirements "based upon the agency's perceptions of costs and benefits."[310]

The CAA requires all proposed "major emitting facilities"—stationary sources with the potential to emit *any air pollutant*—to obtain a preconstruction PSD permit and apply BACT to "each pollutant subject to regulation" under the statute that the source may emit in quantities that exceed the statutory thresholds.[311] However, under EPA's interpretation in the Deferral Rule, biogenic CO_2 does not constitute an air pollutant subject to regulation under the CAA.[312] The Agency justified this interpretation on the grounds that including biogenic CO_2 in the definition of "regulated NSR pollutant"—EPA's longstanding interpretation of "any air pollutant" in the context of the PSD program—would strain the resources of permitting authorities.[313] However, the statutory text does not seem to authorize EPA to exercise such a substantial degree of administrative discretion when making PSD applicability determinations, and feasibility of regulation is not a factor that should be considered in determining whether a pollutant is "subject to regulation" under the CAA.[314]

In promulgating the Deferral Rule, EPA did not argue that regulating sources of biogenic CO_2 emissions would be impossible or impracticable.[315] Instead, EPA essentially contended that the costs associated with regulating biogenic emissions (extensive workloads and strained resources) outweigh the potential benefits of regulation (stationary source control of biogenic emissions).[316] In EPA's view, the Deferral Rule was necessary to avoid extreme administrative burdens that would result if permitting authorities were required to process permit applications for bioenergy facilities, because each application review would require a case-by-case analysis of the source's net impacts on the carbon cycle.[317] EPA voiced concern that permitting agencies may not be able to sufficiently determine the net atmospheric impacts associated with biogenic CO_2 emissions because, at present, no standard methodology exists to guide these agencies in making such calculations.[318] According to EPA, the "extensive workload requirements" this accounting process would entail "would unnecessarily strain the resources of the affected permitting authorities and result in delays in processing permits for other applicants."[319] Given the possibility that EPA may ultimately conclude that bioenergy feedstocks have a negligible or de minimis impact on the carbon cycle, requiring permitting authorities to account for biogenic emissions may not be a productive use of these agencies' limited resources at the present time.[320]

Because the Agency felt that requiring permits for biogenic CO_2 sources "would frustrate the goals" of the Tailoring Rule by regulating "sources with trivial

310 *Id.* at 357.
311 Clean Air Act 42 U.S.C. § 7475(a) (2006).
312 40 C.F.R. § 52.21(b)(49)(ii)(a) (2012).
313 *See*, *e.g.*, Deferral Rule, *supra* note 10, at 43,496–97.
314 *See* 42 U.S.C. § 7475(a) (2006) (stating "No major emitting facility . . . may be constructed").
315 Deferral Rule, *supra* note 10, at 43,496.
316 *See id.* at 43,496–97.
317 *Id.* at 43,496.
318 *Id.*
319 *Id.*
320 *Id.*

or positive impacts on the net carbon cycle," EPA rejected an alternative option that would require a source to obtain a permit if its emissions had a negative impact on the net carbon cycle.[321] The D.C. Circuit held that EPA acted arbitrarily and capriciously in rejecting this option because the administrative necessity doctrine requires an agency to "adopt the narrowest exemption possible."[322] According to the court, however, it was the Agency's failure to provide an explanation of why it rejected this alternative, rather than the rejection itself, that was arbitrary and capricious.[323] Nevertheless, the court noted that the "middle-ground option would have had the practical effect of reducing [biogenic CO_2] emissions."[324] Moreover, that net carbon cycle impacts of biogenic emissions can be considered during the BACT analysis indicated that "permitting authorities are able to handle the scientific complexity of regulating biogenic carbon dioxide."[325]

Thus, while the D.C. Circuit did not foreclose the possibility of justifying a permanent exemption under the doctrine of administrative necessity, the court's analysis suggests that a categorical permitting exemption for all biogenic CO_2 sources would likely be too broad to justify on the basis of administrative necessity alone. On the one hand, it is not impossible for permitting authorities to regulate biogenic emissions—Massachusetts, for example, currently regulates these emissions under step two of the Tailoring Rule.[326] Moreover, the fact that EPA issued a detailed guidance document to assist permitting authorities with making BACT determinations for biogenic sources indicates that these emissions may be controlled by available technologies.[327] On the other hand, if EPA's primary concern is to avoid regulating "sources with trivial or positive impacts on the net carbon cycle,"[328] rather than deviating from statutory requirements that are impossible to administer, then administrative necessity is not an appropriate justification for such a drastic departure from the statutory mandate.

2. *The Absurd Results and De Minimis Doctrines*

EPA believes it has authority to permanently exempt biogenic CO_2 emissions from PSD applicability determinations if the benefit of regulating these emissions would be trivial or de minimis.[329] According to the Agency, if biogenic emissions have a negligible net impact on GHG levels, then regulating these emissions would impose a substantial regulatory burden in exchange for trivial environmental benefits, and could lead to the absurd result of restricting activities that actually reduce GHG levels.[330] In *Alabama Power Co. v. Costle*, the D.C. Circuit recognized an agency's authority to issue certain categorical exemptions "where the

321 *Id.*
322 *Ctr. for Biological Diversity*, No. 11-1101, slip op. at 17 (D.C. Cir. July 12, 2013).
323 *Id.*
324 *Id.* at 16.
325 *Id.* at 17.
326 *Id.*
327 *Id.*; *see* BIOMASS BACT GUIDANCE, *supra* note 27.
328 Deferral Rule, *supra* note 10, at 43,496.
329 *Id.* at 43,498.
330 *Id.* at 43,498–99.

burdens of regulation yield a gain of trivial or no value."[331] This "de minimis" doctrine is closely linked to the "absurd results" doctrine, which requires agencies and the court to look to the purpose of a statute, rather than the plain meaning of the text, where a literal application of the text would "lead to absurd or futile results."[332] To justify a permanent exemption for biogenic CO_2 emissions under the de minimis and absurd results doctrines, EPA must demonstrate that no significant benefits can be gained from regulating biogenic CO_2 emissions, and regulation would lead to "absurd results" that Congress did not intend to occur.

In *Center for Biological Diversity v. EPA*, the Agency argued that the Deferral Rule was justified under both the de minimis and absurd results doctrines, but the D.C. Circuit quickly rejected both of these assertions.[333] The court first rejected the de minimis doctrine because EPA conceded in its brief that the doctrine is used to justify permanent exemptions, rather than temporary exemptions like the Deferral Rule.[334] The court later rejected the absurd results doctrine on the grounds that EPA's reliance on the doctrine was post hoc, because the Agency first invoked the doctrine in its appellate brief and did not present the doctrine as justification in the text of the Deferral Rule itself.[335] Because both of these doctrines were easily rejected, the majority did not discuss whether either of these doctrines could justify a permanent exemption for biogenic emissions. The concurrence, however, rejected the Agency's use of the absurd results doctrine, arguing that there is "nothing absurd" about applying the PSD and Title V requirements to biogenic CO_2 emissions when EPA already applies those requirements to biogenic CO_2 emissions in general.[336] The dissent, on the other hand, asserted that the de minimis doctrine could adequately justify a permanent exemption if EPA establishes that biomass combustion does not increase atmospheric CO_2 concentrations.[337] Unfortunately, neither of these opinions provide significant clarity on whether the court would uphold a permanent exemption under the absurd results or de minimis doctrines.

An agency may create a categorical exemption "to overlook circumstances that in context may fairly be considered de minimis."[338] In *Alabama Power*, the court explained that de minimis exemptions are a useful tool for implementing statutory goals when complying with the literal terms of the text would lead to "absurd or futile results."[339] However, this tool does not give agencies unrestrained authority to deviate from statutory requirements.[340] De minimis exemptions are permissible when "the burdens of regulation yield a gain of trivial or no value."[341] De minimis exemptions are not permissible where regulation would provide a benefit or would further regulatory objectives, "but the agency concludes that the

331 636 F. 2d 323, 360–61 (D.C. Cir. 1979); Deferral Rule, *supra* note 10, at 43,498.
332 *Ala. Power Co*., 636 F. 2d at 360, n. 89.
333 *Ctr. for Biological Diversity*, No. 11-1101, slip op. at 13, 18 (D.C. Cir. July 12, 2013).
334 *Id.* at 13 (quoting Brief for Respondents, *supra* note 185, at 35).
335 *Id.* at 17–18.
336 *Id.* at 4 (Kavanaugh, J., concurring).
337 *Id.* at 9 (Henderson, J., dissenting).
338 *Ala. Power Co*., 636 F.2d 323, 360 (D.C. Cir. 1979).
339 *Id.* at 360, n.89.
340 *Id.* at 360.
341 *Id.* at 360–61.

acknowledged benefits are exceeded by the costs."[342] De minimis exemptions must also survive a *Chevron* analysis, and therefore an exemption cannot be contrary to the express terms of the statute, and the agency's interpretation of the statute must be permissible.[343]

The *Alabama Power* court stated that determinations of whether a de minimis exemption is permissible will depend on the specific facts and circumstances involved, and agencies have the burden of showing that the benefits of regulation would truly be trivial or negligible.[344] In the context of the PSD program of the CAA, the court explained that "the Agency must follow a rational approach to determine what level of emission is a de minimis amount."[345] A "rational approach" includes determining de minimis emissions thresholds for each applicable statutory provision: For example, EPA must determine the quantity of emissions that is de minimis for determining whether PSD applies to the source, and EPA must determine what quantity is de minimis for BACT applicability.[346] In addition, the Agency should assess the regulatory burdens associated with various de minimis thresholds.[347]

De minimis exemptions may be upheld for quantities of emissions that are so low they cannot reasonably be regulated, as long as the statutory text allows an agency to exercise discretion. In *Ober v. Whitman*, the Ninth Circuit upheld an EPA plan exempting de minimis sources of particulate matter from "reasonably available control measures" required to reduce pollutant emissions in areas that are not in attainment with the NAAQS.[348] The court stated that a de minimis exemption must be a permissible agency action, and the agency must therefore describe the standard it used in determining de minimis thresholds and must present sufficient factual information to support its determination.[349] The court emphasized that it would "defer to the agency's judgment only if EPA has provided a full explanation of its de minimis levels and its application of those levels to sources of pollution."[350] EPA was able to show that sources emitting less than one microgram of particulate matter (PM_{10}) per cubic meter were de minimis, because these emissions were so low that no "reasonably available control technology" existed to control emissions from these sources.[351] The court upheld EPA's de minimis exemption because the relevant statutory provision required either the application of reasonably available control measures or a demonstration that attainment is

342 *Id.* at 361.

343 A court will review an agency's interpretation of a statutory provision under the *Chevron* two-step analysis: "First . . . if the intent of Congress is clear, that is the end of the matter; for the court, as well as the agency, must give effect to the unambiguously expressed intent of Congress. . . if the statute is silent or ambiguous with respect to the specific issue, the question for the court is whether the agency's answer is based on a permissible construction of the statute." *Chevron*, 467 U.S. 837, 842–43 (1984).

344 *Ala. Power Co.*, 636 F.2d at 360–61.

345 *Id.* at 405.

346 *Id.*

347 *Id.*

348 243 F.3d 1190, 1195 (9th Cir. 2001).

349 *Id.*

350 *Id.*

351 *Id.*

"impracticable."[352] The court found that the statutory terms "reasonably" and "impracticable" "allow for the exercise of agency judgment."[353]

De minimis exemptions may not be upheld where a statutory provision is so explicit and strict that an agency is left no discretion to issue exemptions from the statutory requirements. In *Sierra Club v. EPA*, [354] the D.C. Circuit held that EPA lacked authority to exempt sources from "extraordinarily rigid" CAA requirements that did not grant EPA the discretionary authority to issue de minimis exemptions. That case concerned section 165(e) of the CAA, which requires PSD permit applicants to conduct preconstruction air quality monitoring.[355] EPA argued that it had the authority to exempt sources from these preconstruction monitoring requirements because there is a "virtual presumption of inherent agency authority" to issue de minimis exemptions under the CAA.[356] The court, however, found the statutory language requiring preconstruction monitoring to be unambiguous, and this rigid statutory requirement rebutted EPA's "virtual presumption" of authority to exempt sources from the statutory mandate.[357]

If EPA determines that a permanent exclusion of biogenic CO_2 emissions is warranted, it will have difficulty justifying this exclusion under the de minimis and absurd results doctrines because it cannot show that regulating biogenic CO_2 emissions would yield trivial or negligible benefits or would lead to absurd or futile results. The purpose of the PSD program is "to protect public health and welfare from any potential or actual adverse effect which . . . may reasonably be anticipate[d] to occur from air pollution."[358] In furtherance with this goal, the PSD provisions require that relevant proposed stationary sources obtain a preconstruction permit "setting forth emissions limitations,"[359] and subject "each pollutant subject to regulation" to the "best available control technology."[360] In the 2009 Endangerment Finding, EPA concluded "Greenhouse gases in the atmosphere may reasonably be anticipated both to endanger public health and to endanger public welfare."[361] Therefore, because GHG emissions contribute to air pollution that may endanger public health and welfare, Congress intended for these emissions to be subject to emissions limitations and to the best pollution control technology available.[362] Exempting sources of biogenic emissions from the PSD permitting requirements conflicts with Congress's intentions and therefore is inconsistent with the goals of the PSD program.[363]

Biogenic CO_2 emissions are physically and chemically identical to CO_2 emitted from fossil fuel combustion,[364] and thus all stationary sources emitting CO_2

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352 *Id.* at 1198; Clean Air Act, 42 U.S.C. § 7513a(a)(1)(B)–(C).
353 Ober v. Whitman, 243 F.3d at 1194–95.
354 Sierra Club v. EPA, NO. 10-1413, slip op. (D.C. Cir. Jan. 22, 2013).
355 *Id.* at 467; Prevention of Significant Deterioration of Air Quality, 42 U.S.C. § 7475(e) (2006).
356 *Sierra Club*, 705 F.3d 458, 468 (D.C. Cir. 2013).
357 *Id.*
358 42 U.S.C. §7470(1) (2006).
359 *Id.* §7475(a)(1).
360 *Id.* § 7475(a)(4).
361 Endangerment Finding, *supra* note 12, at 66,497.
362 *See id.*
363 *See* 42 U.S.C. § 7470 (2006).
364 ACCOUNTING FRAMEWORK, *supra* note 1, at 7.

contribute to air pollution that may endanger public health and welfare. EPA speculates that biogenic emissions may only negligibly contribute to air pollution because they may be offset by CO_2 sequestration in living biomass.[365] However, this argument relies on the premise that CO_2 is removed from the atmosphere *after* it has been emitted by sources—it does not refute the fact that biogenic CO_2 contributes to GHG pollution *at the time of emission*. To justify application of the de minimis doctrine in this context, EPA must demonstrate that biogenic CO_2 emissions in excess of 100,000 tpy (or 75,000 tpy for modified sources) essentially balance out to zero due to corresponding sequestration. However, the fact that biomass is combusted under this scenario is irrelevant because 100,000 tons of biogenic CO_2 has the same climate impacts as 100,000 tpy of fossil fuel-derived CO_2. If biogenic emissions can be offset by sequestration, can fossil fuel emissions be offset as well? Moreover, the purpose of the PSD program is to *prevent* deterioration of air quality; regulating sources emitting more than 100,000 tpy of *any* GHG thus furthers this statutory objective.[366] Emissions of CO_2 from bioenergy sources cannot therefore be considered trivial or negligible when they exceed the regulatory thresholds for PSD applicability because they contribute to air pollution that may endanger public health and welfare.

If EPA permanently exempts biogenic CO_2 emissions, the de minimis threshold will be based on the type of fuel combusted at a source, rather than a source's actual, non de minimis emissions rate. This regulatory paradox assumes that sequestration rates are correlated with emissions rates from the stack, but this assumption is misguided. Allowing biogenic emissions to trigger PSD applicability would reduce total GHG emissions, and thus potential benefits of regulation can hardly be viewed as negligible or trivial. Moreover, reducing biogenic emissions at the source level would supplement CO_2 reductions resulting from sequestration in living biomass, further reducing atmospheric GHG concentrations that endanger public health and welfare. These aggregate emissions reductions can hardly be considered an "absurd result" where the explicit purpose of the statutory provision is to protect public health and welfare from the adverse effects of air pollution.[367]

It seems clear that a permanent exemption for biogenic CO_2 emissions would not be a permissible exercise of agency discretion under the legal rationales presented in support of the Deferral Rule.[368] The administrative necessity doctrine would not support a permanent categorical exemption because regulating biogenic emissions is not impossible or impractical.[369] The de minimis doctrine cannot support a permanent exemption because the Agency cannot demonstrate that imposing regulatory limitations and controls on biogenic CO_2 emissions would yield only trivial benefits, and the statutory text does not grant EPA the discretion to issue de minimis exemptions for air pollutants that are subject to regulation

365 Deferral Rule, *supra* note 10, at 43,499.

366 *See* 42 U.S.C. § 7470 (2006).

367 *See*, *e.g.*, *id.*

368 However, this does not mean that a permanent exemption would be unable to survive judicial review in general. The Tailoring Rule was recently upheld by the D.C. Circuit on the grounds that the Rule's challengers lacked standing. *See* Coal. for Responsible Regulation v. EPA, 684 F.3d 102, 134 (D.C. Cir. 2012).

369 *See* discussion *supra* Part IV.B.1.

under the CAA.[370] Finally, the absurd results doctrine would not support a permanent exemption, because regulation would reduce air pollutant that potentially endangers public health and welfare, in accordance with the express purpose of the PSD program.[371] The PSD provisions of the CAA are clear: Any major stationary source with the potential to emit GHGs in quantities that exceed the regulatory thresholds must comply with the PSD program requirements.[372] EPA does not have administrative discretion to interpret the air pollutant GHG differently under different provisions of the CAA.[373]

However, the conclusion that EPA lacks authority to categorically exclude biogenic CO_2 from the air pollutant GHG does not suggest that the Agency's hypothesis regarding the net impacts of bioenergy production is meritless. It is entirely possible that bioenergy generated from certain types of biomass may have a neutral or negligible net impact on atmospheric GHG concentrations when total lifecycle emissions are taken into account. From a policy perspective, EPA may be justified in treating biomass and fossil fuels differently for regulatory purposes, especially if the ultimate goal is to reduce total GHG emissions. However, excluding certain types of CO_2 emissions from regulation on the basis of origin is not the most effective means of accomplishing these policy objectives. EPA should instead explore other avenues to reduce the burdens associated with bioenergy regulation. For example, while biogenic CO_2 emissions may be subject to the PSD requirements, including the requirement to apply BACT,[374] EPA or the relevant permitting authority may consider both direct and indirect energy, environmental, and economic impacts when making BACT determinations.[375] While policy considerations may not factor into PSD applicability determinations, renewable energy policy objectives may thus be incorporated into BACT determinations for specific facilities. The following Part discusses the potential for a specific type of biomass feedstock to be designated BACT for a bioenergy facility and explains why this outcome is preferable to a permanent regulatory exemption of biogenic CO_2.

V. BIOMASS AS THE BEST AVAILABLE CONTROL TECHNOLOGY FOR BIOGENIC CO_2 EMISSIONS

A number of significant policy goals and objectives guide bioenergy policy in the United States, including the desire to reduce dependency on fossil fuels, increase domestic renewable energy production, and reduce GHG emissions that contribute to climate change.[376] While it is dangerous to allow policy objectives to influence science-based decision making, some provisions of the CAA allow policy goals to be considered during the administrative process. EPA believes BACT determinations are an area where policy, science, and economic considerations can

370 *See* discussion *supra* Part IV.B.3.
371 *See* discussion *supra* Part IV.C.2.
372 *See* discussion *supra* Part IV.B.3.
373 *Id.*
374 Clean Air Act, 42 U.S.C. § 7475(a)(4) (2006).
375 *Id.* § 7479(3); BIOMASS BACT GUIDANCE, *supra* note 27, at 25.
376 Deferral Rule, *supra* note 10, at 43,492.

be factored into the statutory decision-making process.[377] The Agency asserts that biogenic CO_2 emissions warrant special consideration in a BACT analysis "because land-based biomass carbon stocks can be replenished more quickly than fossil fuel carbon stocks, and thus these biogenic carbon stocks can act as a sink on a shorter time scale than fossil carbon."[378] In addition, sequestration in living plant material may offset emissions from bioenergy facilities "on a continuous basis."[379] Accordingly, EPA believes "it is appropriate for permitting authorities to account for both existing federal and state policies and their underlying objectives in evaluating the environmental, energy, and economic benefits of biomass fuel."[380] After taking the energy, economic, and environmental impacts associated with biomass into account, EPA believes that permitting authorities may likely conclude that combusting a specific biomass feedstock is by itself the "best available control technology" for a bioenergy facility.[381] The discussion below provides a brief overview of the Five Step BACT Analysis[382] as it pertains to bioenergy facilities, and considers the policy implications of the determination that certain types of biomass are BACT for bioenergy GHG emissions.

A. The BACT Analysis: A Top-Down Approach

Under the CAA, any stationary source triggering PSD applicability must apply the "best available control technology" for each regulated air pollutant it may emit or generate.[383] BACT is "an emission limitation based on the maximum degree of reduction of each pollutant," which the relevant permitting authority "determines is achievable for such facility."[384] BACT can be applied through "production processes and available methods, systems, and techniques."[385] BACT is determined for each proposed facility on a case-by-case basis, and permitting authorities must take into account projected energy, environmental, and economic impacts associated with various control options.[386] EPA recommends permitting agencies use a five step "top-down" approach to determine BACT: Under Step One, all available control technologies should be identified; at Step Two, technically infeasible options should be eliminated; at Step Three, the remaining control technologies should be ranked in order of effectiveness; at Step Four, the top ranked control options should be evaluated; and at Step Five, BACT is selected.[387] When a proposed electricity generating facility has the capacity to utilize biomass as a fuel source, certain types of bioenergy feedstocks may be

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377 BIOMASS BACT GUIDANCE, *supra* note 27, at 25.

378 *Id.* at 6.

379 *Id.* at 8.

380 GHG GUIDANCE, *supra* note 21, at 10.

381 *See* BIOMASS BACT GUIDANCE, *supra* note 27, at 5.

382 *Id.* at 12–31 (outlining EPA's five-step analysis for top-down selection of appropriate best available control technology).

383 Clean Air Act, 42 U.S.C. § 7475(a)(4) (2006).

384 *Id.* § 7479(3).

385 *Id.*

386 *Id.*

387 GHG GUIDANCE, *supra* note 21, at 17–18.

identified as available control options under a BACT analysis.[388] EPA believes that in most of these cases, permitting agencies may conclude that certain types of biomass are inherently BACT for GHG emissions.[389]

The first step in the BACT analysis requires identification of available control options, which are pollution control technologies or techniques, including add-on pollution controls or processes and practices that are inherently lower emitting, which can practicably be applied to the emissions unit.[390] For facilities that intend to use biomass alone as a fuel source, available control options for GHG emissions may be limited to a specific bioenergy feedstock, energy efficiency improvements, or carbon capture and sequestration.[391] For proposed facilities with the capacity to cofire biomass with another type of fuel, available control options would also include using different fuel ratios and combinations.[392] In most BACT analyses for GHG emissions, application of methods or technologies that increase energy efficiency should be included alongside or in combination with other control options.[393]

Under Step Two of the BACT analysis, permitting agencies can eliminate identified control options that are not technically feasible for the specific proposed source.[394] A control option may be infeasible if physical, chemical, or design limitations "would preclude the successful use of the control option on the emissions unit under review."[395] If a control option has been operated successfully at the same type of source or in similar emissions situations, or can "reasonably be installed and operated on the source type under consideration," it is generally presumed to be technically feasible.[396] In the context of bioenergy facilities, an option that requires using a specific feedstock or a large proportion of biomass in conjunction with another fuel may be eliminated as long as the permitting authority can sufficiently demonstrate technical infeasibility.[397]

Under Step Three, the remaining control options are ranked in order of effectiveness.[398] In determining effectiveness, permitting agencies must consider each control option's control efficiency, expected emissions rate, and projected emissions reduction.[399] Energy, environmental, and economic impacts associated with available control options are not assessed under Step Three;[400] control options requiring specific bioenergy feedstocks may therefore be poorly ranked in terms of effectiveness, because these options may not significantly reduce emissions at the source. However, under Step Four of the analysis, a permitting authority's evaluation of the remaining control options is not limited to the top ranked options;

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388 *Id.* at 10.
389 *Id.*
390 *Id.* at 24–25.
391 BIOMASS BACT GUIDANCE, *supra* note 27, at 15.
392 *Id.*
393 *See* GHG GUIDANCE, *supra* note 21, at 29.
394 *Id.* at 33.
395 *Id.*
396 *Id.* at 33–34.
397 BIOMASS BACT GUIDANCE, *supra* note 27, at 16.
398 GHG GUIDANCE, *supra* note 21, at 37.
399 *Id.*
400 *Id.* at 37 n.92.

authorities can consider the impacts and benefits of any technically feasible available control.[401]

The net climate impacts of biogenic emissions can be considered under Step Four of the BACT analysis. Under Step Four, permitting authorities must consider the direct and indirect energy, economic, and environmental impacts associated with the remaining available control options.[402] The energy impacts evaluation should assess the source's energy demands, including energy that is produced and consumed onsite, as well as energy drawn from the grid.[403] This assessment can also consider the impacts this demand has on fuel scarcity, or availability of locally sourced fuel supplies.[404] When BACT analyses concern bioenergy facilities, EPA asserts in BACT Guidance that the energy impacts analysis should also consider local, state, or federal policies that aim to diversify the types of fuels used in electricity generation.[405] In addition, the Agency contends that it may be appropriate to consider renewable energy policies as well.[406] EPA recognizes that while renewable fuel policies "have not traditionally been part of the BACT energy impacts analysis," they could be considered, "especially if state policies mandate the replacement of fossil fuel with biogenic fuel."[407] By incorporating these considerations into the BACT analysis, states—through their permitting authorities—can encourage bioenergy facilities to use locally available biomass feedstocks as BACT. In some cases, this may further additional policy goals, such as diverting waste from landfills or generating energy from forest residues that would otherwise be burned in the field.[408]

In evaluating the economic impacts associated with a control option, "[t]he emphasis should be on the cost of control relative to the amount of pollutant removed, rather than economic parameters that provide an indication of the general affordability of the control alternative relative to the source."[409] An available control option can be eliminated on economic grounds if the cost of reducing emissions, expressed in dollars per ton of pollutants removed, are "disproportionately high."[410] In addition to direct economic impacts, permitting authorities can also consider indirect economic impacts and benefits.[411] According to EPA guidance, indirect economic benefits may include economic growth and employment opportunities associated with bioenergy production, or increased demand for feedstocks that would otherwise be disposed of.[412] Any local or state policies that promote bioenergy production to foster economic growth may also be considered.[413]

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401 BIOMASS BACT GUIDANCE, *supra* note 27, at 20.
402 GHG GUIDANCE, *supra* note 21, at 38.
403 BIOMASS BACT GUIDANCE, *supra* note 27, at 19.
404 *Id.*
405 *Id.* at 27.
406 *See id.* (acknowledging that renewable energy policies could become part of BACT analysis).
407 *Id.*
408 *See generally id.* at 27–28 (describing such policies and their benefits in several states).
409 *Id.* at 19.
410 GHG GUIDANCE, *supra* note 21, at 38–39.
411 BIOMASS BACT GUIDANCE, *supra* note 27, at 25.
412 *Id.* at 25–27.
413 *See id.* at 25.

Traditionally, EPA interpreted the environmental impact analysis requirement under Step Four to focus on "the indirect or collateral environmental impacts that may result" from an available control option.[414] This traditional analysis did not consider the direct environmental impacts resulting from a source's emissions of a regulated pollutant.[415] In recent BACT Guidance, however, the Agency stated that "a different frame of reference should be considered" for biogenic CO_2 emissions.[416] EPA explained that biogenic emissions may be offset by sequestration that occurs outside the facility, and this potential sequestration should therefore be considered under Step Four of the BACT analysis.[417] Any factor that may affect the net carbon impacts of a source's biogenic emissions should be considered during this analysis.[418] In addition, "it may also be appropriate to consider broad categories of feedstocks in terms of their net impact on atmospheric GHG stocks."[419] In other words, permitting authorities must conduct a complete accounting of the net impact a source's biogenic CO_2 emissions would have on atmospheric and terrestrial GHG concentrations.[420]

Finally, in Step Five of the analysis, the most effective control option identified in Step Four should be selected as BACT, and the permitting authority must establish an emissions limit.[421] Permitting authorities have discretion to consider a range of factors when setting an emissions limit, and may consider "special circumstances at the specific source under review which might affect the range of performance."[422] Permitting authorities must also establish the form of the limits so that they can be practicably enforced.[423] Finally, the permitting authority must review the record to ensure that the final BACT determination is fully justified.[424]

B. Applying BACT to Advance Bioenergy Policy

EPA believes that using biomass residue material as a feedstock will provide sufficient energy, economic, and environmental benefits to justify its selection as BACT for GHG emissions from bioenergy facilities.[425] Where a facility intends to co-fire biomass and a fossil fuel, EPA speculates that BACT may require a higher ratio of biomass to fossil fuel use, along with additional controls to reduce emissions or increase energy efficiency.[426] This is because the benefits associated with a small proportion of biomass feedstocks may not fully outweigh the negative

414 GHG GUIDANCE, *supra* note 21, at 39.
415 *Id.*
416 BIOMASS BACT GUIDANCE, *supra* note 27, at 20.
417 *See id.* at 20–21.
418 *Id.* at 21.
419 *Id.*
420 *Id.*
421 GHG GUIDANCE, *supra* note 21, at 44.
422 *Id.*
423 *Id.* at 45.
424 *Id.*
425 BIOMASS BACT GUIDANCE, *supra* note 27, at 29.
426 *Id.* at 30.

impacts associated with the source's fossil fuel use.[427] This observation is significant, because it indicates that a fossil fuel fired power plant could not attempt to avoid stringent BACT limitations by co-firing coal with a small percentage of biomass. Ultimately, however, permitting authorities must support any determination that biomass is BACT with evidence that the carbon cycle impacts of the feedstock result in lower net emissions than other control options.[428] This raises a couple of questions: First, how can permitting authorities accurately account for the net impacts of biogenic emissions? Next, if this accounting establishes that biomass is significantly less carbon intensive than coal, can permitting authorities require use of biomass as BACT for facilities that intend to use fossil fuels?

To conduct a complete accounting of a source's net impact on atmospheric GHG concentrations, permitting authorities must engage in a case-by-case assessment of the proposed facility and the types of feedstocks used.[429] The source's biogenic CO_2 emissions rate would be offset by the rate of carbon sequestration in new feedstock growth, and the resulting net increase or decrease could be compared to the "business as usual" scenario—the amount of emissions or reductions that would occur if the facility is not constructed.[430] In addition, any projected land use changes would have to be factored into the equation. For example, if increased demand for the bioenergy feedstock required a conversion of forestland into agricultural land, these additional emissions would need to be accounted for.[431] "Where a residue material is utilized, any loss of energy efficiency attributable to the use of this type of biomass feedstock may be offset by the absence of a significant net carbon cycle impact above the business as usual case."[432] While the process of conducting a comprehensive accounting of biogenic emissions is complex and time intensive, it is necessary to ensure that use of a specific feedstock will result in emissions reductions over a business-as-usual scenario.

The preceding analysis involved the comparison between biogenic emissions resulting from bioenergy generation and biogenic emissions resulting under a business-as-usual scenario. However, requiring use of biomass as BACT raises the additional question of whether permitting authorities can compare bioenergy emissions with nonbiogenic emissions resulting under a business-as-usual scenario. In other words, if permitting authorities conclude that biogenic emissions have a considerably lower impact on net atmospheric CO_2 levels than fossil fuel emissions, can permitting authorities require biomass as BACT for coal-fired boilers? This issue involves what EPA refers to as "redefining the source," which occurs when permitting authorities list a control option under Step One of the BACT analysis that requires a source to use a different fuel source than the one the applicant proposed to use in its permit application.[433] In general, permitting

427 *Id.*
428 *See* GHG GUIDANCE, *supra* note 21, at 45; Deferral Rule, *supra* note 10, at 43,500.
429 BIOMASS BACT GUIDANCE, *supra* note 27, at 21.
430 *Id.* at 21–22.
431 *Id.* at 22.
432 *Id.* at 30.
433 *Id.* at 13.

authorities are not required to consider control options that redefine a source.[434] EPA formulated a "redesign" test to determine whether a proposed control option would redefine a source, which asks whether the proposed control would "so substantially alter the purpose or basic design of [the] proposed facility that it should be considered a redefinition of the source?"[435] First, the permitting authority must assess the facility's basic design, including the "end, object, aim, or purpose," as defined by the permit applicant.[436] Next, the permitting authority "should take a 'hard look'" at the facility's design to determine "which design elements may be changed to achieve pollutant emissions reductions without disrupting the applicant's basic business purpose for the proposed facility."[437] Additionally, permitting authorities must consider that in most cases, BACT "should not be applied to regulate the applicant's purpose or objective for the proposed facility."[438]

When the "redesign" test is applied in the context of biomass, it seems clear that permitting authorities are not required to include biomass as an available control option when a proposed facility is designed to use coal. However, while permitting authorities are not required to consider options that redefine a source, this does not mean that they are prohibited from doing so. In EPA's BACT Guidance, the Agency indicated that state permitting authorities have discretion to consider available control options: "The 'redefining the source' issue is ultimately a question of degree that is within the discretion of the permitting authority."[439] State permitting authorities may therefore have discretion to require coal-burning facilities to use biomass as BACT, especially where this determination would further the state's renewable energy policy objectives.[440]

BACT determinations thus give states the discretion to incorporate important policy objectives into the existing regulatory regime, and provide flexibility to ensure that GHG regulations do not unnecessarily burden sources of biogenic emissions that have a negligible impact on the net carbon cycle. However, the process of conducting a net CO_2 accounting is extremely complex, and EPA recognized that "such a case-by-case analysis of the net atmospheric impact of biomass fuels would likely be prohibitively time-consuming and complex for facilities and permitting authorities."[441] In addition, the Agency was concerned that requiring a permitting process of this magnitude might discourage the construction of bioenergy facilities.[442] These concerns ultimately led the Agency to conclude that a regulatory exclusion for biogenic CO_2 emissions was more feasible and appropriate than conducting net carbon cycle analyses on a case-by-case basis.[443] However, incorporating a net carbon accounting into the BACT analysis is the most effective way to further bioenergy policy objectives within the statutory framework

434 *Id.* at 12.

435 In re: Desert Rock Energy Co., PSD Appeal No. 08-03 et al., Slip Op. at 64 (EAB Sept. 24, 2009).

436 *Id.*

437 *Id.*

438 *Id.*

439 BIOMASS BACT GUIDANCE, *supra* note 27, at 13.

440 *See id.* at 29.

441 *Id.* at 23.

442 *Id.* at 24.

443 Deferral Rule, *supra* note 10, at 43,495–96.

of the PSD program.[444] Conducting case-by-case accountings will allow sources with negligible net climate impacts to avoid unnecessarily stringent regulatory obligations, while ensuring that sources with negative net impacts will be subject to adequate emissions controls. This process is the only way to guarantee that biogenic CO_2 emissions from bioenergy generation do not increase atmospheric CO_2 concentrations above a business-as-usual baseline. In addition, case-by-case BACT determinations allow states to further renewable energy and climate policy objectives in a reasonable and effective manner, whereas a permanent categorical exemption would prohibit states from regulating sources with extremely high levels of biogenic emissions, regardless of the resulting environmental impacts that may occur. Incorporating biomass considerations into the BACT analysis thus appears to provide the best balance between the desire to promote beneficial policy objectives and the necessity to prevent harmful GHG emissions.

VI. CONCLUSION

Climate change presents a significant environmental challenge, and it is important that renewable energy policy in the United States takes account of the need to reduce anthropogenic GHG emissions. There are valid policy rationales that support bioenergy generation as one component of a larger emissions reduction strategy. However, bioenergy is not a panacea, and CO_2 emission reductions can only be realized through compliance with stringent management practices and appropriate substitution for fossil fuel use. Exempting biogenic CO_2 emissions from regulatory control under the PSD program of the CAA is not legally justifiable, nor will it help achieve climate change policy objectives. Instead, EPA should encourage permitting authorities to conduct a net biogenic CO_2 accounting for bioenergy generating facilities during the BACT analysis. The process would allow permitting authorities to tailor a bioenergy source's emissions limitation to correspond with the source's net carbon cycle impact. This in turn decreases the regulatory burden imposed on the facility, while ensuring that the source will responsibly manage its bioenergy feedstock resources.

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444 In September 2011, EPA issued an Accounting Framework for calculating biogenic CO_2 emissions from stationary sources. ACCOUNTING FRAMEWORK, *supra* note 1. The EPA Science Advisory Board and its Biogenic Carbon Emissions Panel reviewed the Accounting Framework, and issued its own report in September 2012. SAB REVIEW, *supra* note 3. These documents cumulatively provide a coherent accounting methodology that permitting authorities may use for calculating a stationary source's net biogenic CO_2 emissions.

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