

23-2220-RULE
23-2221-INV

2/2/2024

Technical Advisory Group Members,

Per federal policy, the GREET model published by the Argonne National Lab treats wood combustion as “carbon-neutral,” and does not count CO₂ emissions from the combustion of wood. The question, “is burning woody biomass carbon neutral?” is both an environmental question and a policy question. At the national level, moderate republican senator Susan Collins annually requires a statement that burning woody biomass is carbon-neutral be inserted into any budget package in exchange for her vote.

2016: <https://www.collins.senate.gov/newsroom/senators-collins-klobuchar-king-biomass-amendment-passes-senate>

2020: <https://www.latimes.com/opinion/story/2020-12-28/wood-burning-power-plants-clean-energy>

2022: <https://www.eenews.net/articles/carbon-neutral-scores-another-victory-in-omnibus/>

2023: <https://www.collins.senate.gov/newsroom/bill-to-fund-key-interior-and-environmental-programs-in-maine-clears-appropriations-committee>

You find this language on page 922 of the 2023 Senate Appropriations Budget Amendment:
(<https://www.appropriations.senate.gov/imo/media/doc/JRQ121922.PDF>)

Policies Relating to Biomass Energy

SEC. 432. To support the key role that forests in the United States can play in addressing the energy needs of the United States, the Secretary of Energy, the Secretary of Agriculture, and the Administrator of the Environmental Protection Agency shall, consistent with their missions, jointly—

- (1) ensure that Federal policy relating to forest bioenergy—
 - (A) is consistent across all Federal departments and agencies; and
 - (B) recognizes the full benefits of the use of forest biomass for energy, conservation, and responsible forest management; and
- (2) establish clear and simple policies for the use of forest biomass as an energy solution, including policies that—
 - (A) **reflect the carbon neutrality of forest bioenergy and recognize biomass as a renewable energy source**, provided the use of forest biomass for energy production does not cause conversion of forests to non-forest use;
 - (B) encourage private investment through out the forest biomass supply chain, including in—
 - (i) working forests;
 - (ii) harvesting operations;
 - (iii) forest improvement operations;
 - (iv) forest bioenergy production;
 - (v) wood products manufacturing; or
 - (vi) paper manufacturing;
 - (C) encourage forest management to improve forest health; and
 - (D) recognize State initiatives to produce and use forest biomass.

In 2018, climate crisis denier and Trump EPA director Scott Pruitt declared burning woody biomass carbon-neutral:

[Sierra Club on Pruitt on Biomass](#)

[NRDC on Pruitt on Biomass](#)

[Cliamte News on Pruitt on Biomass](#)

[Scientific American on Pruitt and Congress on Biomass](#)

As these articles make clear, while the politicians are declaring the burning of wood carbon neutral, the climate scientists are advising that burning wood adds CO₂ to the atmosphere. This conflict between the policy and the science led the EPA to issue its Biomass Policy Statement in 2018, found here: [EPA Biomass Policy Statement](#). The policy statement recognizes that executive orders and congressional directives have forced it to claim that burning wood is carbon-neutral despite the science:

To proactively address congressional directives and stakeholder concerns specific to the use of forest biomass for energy, EPA's policy in forthcoming regulatory actions will be to treat biogenic CO₂ emissions resulting from the combustion of biomass from managed forests at stationary sources for energy production as carbon neutral....

This statement of agency policy is not a scientific determination and does not revise or amend any scientific determinations that EPA has previously made....

Beginning in 2010, in response to stakeholder comments, EPA sought to advance the technical understanding for assessing the net biogenic CO₂ emissions associated with the use of biomass at stationary sources. In 2011, as part of this process to advance our technical understanding, EPA submitted for peer review with the EPA Science Advisory Board (SAB) a draft technical report presenting considerations for evaluating the biogenic CO₂ emissions associated with biomass use for energy at stationary sources (2011 Draft Framework). The SAB peer review of the 2011 Draft Framework found that it is not scientifically valid to assume that all biogenic feedstocks are carbon neutral, but rather that the net biogenic carbon profile related to the use of biomass feedstocks depends upon factors related to feedstock characteristics, production and consumption, and alternative uses....

The SAB further acknowledged that accounting for biogenic CO₂ emissions associated with stationary sources involves both scientific and policy considerations, including the policy context in which the accounting is applied....

The Argonne National Lab follows federal policy, and thus does not count the emissions from wood-combustion. The GREET model follows this policy, counting only upstream CO₂ emissions from logging activity. I don't believe the ePUC site allows for .xls documents so I've attached a .pdf export of the bioelectric tab from the 2023 GREET .xls spreadsheet. Note that CO₂ is not among the tracked greenhouse gases.

Here in Vermont, the Scott administration falls squarely in the Scott Pruitt camp. It continues to be the policy of the Vermont Agency of Natural Resources (ANR) to consider burning wood carbon-neutral, despite clear evidence to the contrary. In ANR's [Vermont Greenhouse Gas Emissions Inventory and Forecast Methodologies](#) ANR makes the following erroneous statement:

Carbon dioxide from electricity generated through biomass combustion is not included because the CO₂ is of biogenic origin, but CH₄ and N₂O emissions are included in the totals. States in the region differ on this accounting practice, however, it is consistent with IPCC inventory guidelines for the treatment of biogenic CO₂.

Again, ANR's statement about IPCC guidelines is incorrect; IPCC guidelines do not claim that biomass combustion should not be included in inventories. ANR Secretary Julie Moore admitted this in an email to me dated May 16, 2023, stating, "You are correct that the IPCC guidelines do not state that biogenic CO₂ shouldn't be included greenhouse gas inventories." Sec. Moore then goes on to incorrectly claim that IPCC guidelines state "that the CO₂ released [from wood-combustion] will eventually be re-sequestered through the regrowth of the biogenic material." IPCC guidelines make no such claim.

In Act 170 of 2012, "An act relating to the Vermont energy act of 2012," the Vermont legislature mandated that ANR draft rules for greenhouse gas accounting by September 1, 2013. Ten years later, Secretary Moore acknowledged that ANR has still not drafted these rules. By fiat only is ANR making the decision not to count emissions from wood, and is doing so without proper rule making or oversight. Further, ANR has directed consultants it hires to exclude the emissions from wood-burning. The recent 2023 Vermont Energy Report published by the Department of Public Service (DPS) demonstrates this. Writing about the *Cadmus/Energy Futures Group Pathways Analysis*, the DPS report advises that ANR guided EFG to consider wood-burning carbon neutral:

"For example, advanced wood heat is identified as being the most cost-effective measure through 2030, with reductions in vehicle miles traveled (VMT) being the most expensive. It must be noted that, like any modeling, the analysis here is directly related to the inputs. For example, emissions from biomass were, consistent with Agency of Natural Resources guidance,¹¹ assumed to be zero...." (11, [2023 Vermont Energy Report, DPS](#))

In order to actually reduce greenhouse gas emissions, the TAG must provide for accurate emission factors for all fuel types, including and especially wood. The emission factors from the EPA website is a good place to start, though the EPA only provides factors on a 100-year global warming potential (GWP) basis. Using emission factors with a 20-year GWP would be even better.

District Energy Systems (DES) that use geothermal heating and cooling systems can play an important role in reducing thermal related greenhouse gases. However, not all DES are created equal. Vermont Gas (VGS) and Burlington Electric (BED) are proposing a DES that relies on the highly inefficient McNeil wood-burning generator to supply heat the University Medical Center (UVMC). They've modeled their system using GREET. I've attached two slides from a BED and VGS presentation of their DES proposal to the Burlington City Council. They claim that the proposed District Energy System will reduce CO₂ emissions by about 13,000 tons annually. They claim this because VGS and BED also claim that burning wood is carbon-neutral. Climate scientists have thoroughly debunked this belief. Even so, at Vermont's current rate of deforestation, even by the accounting methods used by VGS and BED, **Vermont forests will be net carbon emitters in only 25 years** if the Vermont legislature does not take action. Using the MMBTU amounts on the first slide and the carbon emissions factors found in the EPA website: <https://www.epa.gov/climateleadership/ghg-emission-factors-hub>, we find that the proposed VGS-BED district energy system will actually *increase* CO₂ emissions by 6,778 tons annually.

Wood: 93.80kg CO₂ per mmBtu 93.8 X 190,000 MMBTU = 17,822,000 kg CO₂

Natural Gas: $53.06 \text{ kg CO}_2 \text{ per mmBtu} \times 220,000 \text{ MMBTU} = 11,673,200 \text{ kg CO}_2$

Net **increase** by switching to wood is **6,148,800 kg CO₂** per year
or **6,778 tons of CO₂ annually**.

It is no wonder why the VGS representative at the 2/2/2024 TAG meeting promoted the use of GREET: if you count the actual emissions, the DES is more polluting. GREET should not be used to model wood-combustion systems. If the TAG chooses to use the GREET model, TAG must also ensure that clear and significant, well documented and published changes are made to the emission factors for wood and other bio-fuels used in the GREET model.

Sincerely,

Pike Porter
Burlington, VT
pikeporter@gmail.com

This document uses active hyperlinks. If a link is broken, please contact me and I'll supply the correct link.

Bio-Electricity Generation

Hon

1) Scenario Control and Key Input Parameters

Forest resource extraction

Residues collection energy use	2
Source of wood chips	1
Source of wood pellets	1
Properties of pulplogs (for transportation calculation)	2

Assumptions on emissions

Emission factors for bio-power plant	1
GWP for black carbon (BC)	1

Allocation method (lumber mill operation)

	wood chips
Sawing process	3
Planning process	3

2) Key Input Parameters for Electricity Generation Mixes, Combustion Technology**2.1) Regional Combustion Technology Shares and Power Plant Energy Conversion Efficiency**

Fuel	
Combustion Technology	
Region	U.S.
Efficiency	21.7%
Technology Share	100.0%
Emissions (g/kWh)	
VOC	0.032
CO	1.182
NOx	0.679
PM10	0.073
PM2.5	0.069
SOx	0.122
BC	0.010
OC	0.022
CH4	0.113
N2O	0.060

2.2) Urban Emission Share for Stationary Applications

1.30%

2.3) Electric Transmission and Distribution Loss

Region	U.S.
T&D Loss factor	4.9%

2.4) Electricity mix and T&D Loss for each state if NERC level data option is selected



Notice of Non-compliance 2011, No. 170 (Adj. Sess.), § 14., 10 VSA 582(g)

Moore, Julie <Julie.Moore@vermont.gov>

Tue, May 16, 2023 at 10:40 AM

To: Pike Porter <pikeporter@gmail.com>

Cc: ANR - Info <ANR.Info@vermont.gov>, "Hughes, Kelly" <Kelly.Hughes@vermont.gov>, "Beling, John" <John.Beling@vermont.gov>, "Schmeltzer, John" <John.Schmeltzer@vermont.gov>, "McKelvie, John" <John.McKelvie@vermont.gov>, "Tierney, June" <June.Tierney@vermont.gov>, pbaruth <pbaruth@leg.state.vt.us>, jkrowinski <jkrowinski@leg.state.vt.us>, "jim@dumontlawvt.com" <jim@dumontlawvt.com>, "McNamara, Ed" <Ed.McNamara@vermont.gov>

Dear Mr. Porter:

Thank you for your email dated May 3, 2023, regarding the most recent Greenhouse Gas Inventory and the supplemental Methodology; below I respond to your concerns about the methodology point by point.

1. Regarding the methodology for the treatment of the biogenic CO₂ emissions from the McNeil and Ryegate facilities and the suggested inconsistencies with the IPCC inventory guidelines:

You are correct that the IPCC guidelines do not state that biogenic CO₂ shouldn't be included greenhouse gas inventories. The methodology document is not explicit enough, in that what it should say is "Even though the emissions from these two facilities occur within the state, they are not included in the inventory totals for two reasons. The first is because the combustion of wood for electricity generation produces CO₂ that is considered biogenic, and no biogenic CO₂ is included in the energy related sectors of the GHG inventory totals per IPCC inventory guidelines because it is assumed that the carbon will be captured in the fluxes in the land-use, land use change and forestry sector, and that the CO₂ released will eventually be re-sequestered through the regrowth of the biogenic material."

To be clear, the most recent version of the IPCC guidelines state:

carbon dioxide (CO₂) emissions from the combustion of biomass or biomass-based products are captured within the CO₂ emissions in the AFOLU sector through the estimated changes in carbon stocks from biomass harvest, even in cases where the emissions physically take place in other sectors (e.g., energy). This approach to estimate and report all CO₂ emissions from biomass or biomass-based products in the AFOLU sector was introduced in the first IPCC guidelines for national greenhouse gas emissions (IPCC 1995), reflecting close linkages with data on biomass harvesting, and for the pragmatic reason to avoid double counting. ^[1]

This was done in the Vermont GHG Emissions Inventory and Forecast (1990 – 2020) report. The Land-Use, Land Use Change, and Forestry (LULUCF) or what is in the more recent IPCC guidelines called the Agriculture, Forestry, and Other Land Use (AFOLU) sector captures emissions from McNeil and Ryegate facilities, consistent with the most recent IPCC guidelines.

2. Use of outdated IPCC Guidelines:

The 2006 guidelines were cited because they are a more comprehensive reference for readers interested in the Vermont Greenhouse Gas Emissions Inventory and Forecast reports to review. In addition, ANR generally followed the 2019 refinement document, which contains updates to the 2006 guidelines for specific sectors.

Historically, Vermont has not included LULUCF emissions as part of the official Inventory totals because of the significant uncertainty associated with the data sources and the complexity of the methodology involved. Estimating emissions and sinks of CO₂ related to forests and carbon fluxes related to land use change involves an accurate quantification of very complex processes and ecosystems at a statewide level. Work is ongoing to make these estimates possible, and the recent release of the Vermont Greenhouse Gas Emissions Inventory and Forecast (1990 – 2020) report does include a more comprehensive LULUCF sector than previous iterations of the report based on newly available datasets from EPA and advances in some of these estimates.

Notwithstanding improvements in the estimates for the LULUCF sector, we still have concerns that the accuracy of this forest carbon sequestration and land use change data is not high enough resolution spatially or temporally to be able to adjust emissions from the other sectors, where more accurate data exists to support those numbers.

3. 10 VSA 582 does not allow you to arbitrarily decide which emissions will be counted:

The accounting decision related to emissions of biogenic CO₂ in the Vermont Greenhouse Gas Emissions Inventory and Forecast reports is not arbitrary but is rather based on the IPCC Guidelines for National Greenhouse Gas Inventories which were developed with the expertise, knowledge, cooperation of, and review by, hundreds of experts from around the world. The issue of accounting for emissions of biogenic CO₂ is a complex one that has been evolving in recent years as more research is done and new data becomes available to help to better understand carbon fluxes through land use change as well as considerations around time scales. The Agency is using the most up-to-date methodology and working with other jurisdictions to understand how other states are dealing with this issue and to work together to inform best practices for accounting in this space.

I trust I have addressed your questions and comments, but please do not hesitate to reach out if you should have further questions or concerns.

[Quoted text hidden]

[1] 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: https://www.ipcc-nggip.iges.or.jp/public/2019rf/pdf/2_Volume2/19R_V2_2_Ch02_Stationary_Combustion.pdf



Why District Energy in Burlington?

- Improve McNeil's efficiency 10%
- Use local renewable thermal resource instead of fossil gas
- Reduces over 220,000 MMBTU of natural gas usage *every year* by creating 190,000 MMBTU of renewable steam (including 3 steam sources - waste heat, steam extraction, and supplementary electric boiler), plus 34,000 MMBTU of efficiency savings
- Cut commercial sector natural gas use 16% in Burlington, cut Burlington carbon dioxide emissions approximately 13,000 tons annually, taking single-biggest step to move towards Burlington's Net Zero Energy 2030 Roadmap goal