STATE OF MINNESOTA
PUBLIC UTILITIES COMMISSION

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In the Matter of an Investigation into Implementing Changes to the Renewable Energy Standard and the Newly Created Carbon-Free Standard under Minn. Stat. § 216B.1691	**Docket No. E-999/CI-23-151**

PETITION OF THE CLEAN ENERGY ORGANIZATIONS FOR CLARIFICATION AND RECONSIDERATION

November 27, 2024

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INTRODUCTION

Minnesota Center for Environmental Advocacy ("MCEA") and Sierra Club (collectively, "Clean Energy Organizations" or "CEOs") respectfully petition the Commission for clarification and reconsideration of certain portions of its November 7, 2024, order ("Order")[1] related to the definition of "carbon-free" and to the partial compliance provisions of Minnesota's Carbon-Free Standard ("CFS"). We particularly seek clarification and reconsideration of the Commission's treatment of electricity generation fueled by biomass and municipal solid waste ("solid waste"), two carbon-intensive forms of generation.

SUMMARY OF ARGUMENT

The CEOs believed the Commission reached a final decision on the issues we raise in this petition at the September 26, 2024, hearing. However, the Commission's Order from that hearing can be read as postponing a final decision on these issues until the record is developed further in a new docket.[2] We therefore request that the Commission clarify whether the following three issues have already been decided by the Commission

[1] Minn. Pub. Utils. Comm'n, *In the Matter of an Investigation into Implementing Changes to the Renewable Energy Standard and the Newly Created Carbon-Free Standard under Minn. Stat. § 216B.1691,* Order Initiating New Docket and Clarifying "Environmental Justice Area," Docket No. E-999/CI-23-151 (Nov. 7., 2024) [hereinafter "Order"].

[2] *In the Matter of a Commission Investigation into a Fuel Life-Cycle Analysis Framework for Utility Compliance with Minnesota's Carbon-Free Standard,* Docket No. E-999/CI-24-352.

in its Order, or whether they will be decided after further record development in the new docket. Specifically, the CEOs ask the Commission to clarify:

1. Has the Commission decided that a generating facility burning biomass or solid waste could be considered carbon-free, either fully or partially, based on how its emissions compare to the greenhouse gas emissions of alternative waste management methods?
2. Has the Commission decided that a generating facility burning biomass or solid waste could be considered carbon-free, either fully or partially, based on the "carbon neutrality" of biomass fuels or the biomass component of solid waste?
3. Has the Commission decided that, in calculating partial compliance for a fossil fuel facility with carbon capture and sequestration ("CCS"), it will exclude indirect carbon dioxide emissions and focus solely on direct emissions?

If the Commission has already decided these questions, and decided in the affirmative, we request that the Commission reconsider. However, even if decisions on these questions will be made after record development in the newly-launched docket, the CEOs still request the Commission reconsider and resolve these issues now as described below to avoid unnecessary delay and administrative burden.

Specifically, the Commission should reconsider the first two issues because the plain language of the CFS statute simply does not allow the Commission to disregard the carbon dioxide emissions of a biomass- or a solid waste-burning facility based on how the facility's emissions compare to alternative waste management methods, or based on a finding that biomass is carbon neutral. Both interpretations violate the plain language of the law and the expressed legislative intent; undermine state climate and waste goals; and harm human health, especially in environmental justice areas. And each will create tremendous new administrative complexity and an ongoing regulatory uncertainty that will likely continue for decades.

We also ask the Commission to reconsider the third issue, the exclusion of indirect emissions from the calculation of partial compliance credit for plants with CCS. These emissions can be substantial, and ignoring them will result in overestimating the share of generation from such a plant that can be considered carbon-free. Ignoring indirect emissions is also incompatible with legislative intent and is inconsistent with the Order's treatment of hydrogen co-firing plants, which includes consideration of both direct and indirect carbon dioxide emissions.

LEGAL STANDARD

The CEOs file this petition pursuant to Minn. Stat. § 216B.27 and the Commission's rule at Minn. R. part 7829.3000. The statute authorizes the Commission to reverse, change, modify or suspend its Order if it "is in any respect unlawful or unreasonable." The Commission generally reviews petitions to determine whether the petition "(i) raises new issues, (ii) points to new and relevant evidence, (iii) exposes errors or ambiguities in the underlying order, or (iv) otherwise persuades the Commission that it should rethink its decision."[3]

PETITION FOR CLARIFICATION

In June and July of this year, multiple parties submitted initial and reply comments responding to the Commission's request for comments regarding new and amended terms added in 2023 to Minn. Stat. § 216B.1691 (the "Carbon-Free Standard" or "CFS"

[3] Minn. Pub. Utils. Comm'n, *In the Matter of Xcel's Petition for Approval of Electric Vehicle Pilot Programs,* Order Denying Reconsideration, Denying Stay, and Approving Compliance Filings, Docket No. E-002/M-18-643 (Oct. 7, 2019).

law). The Commission in particular sought comment on how to define "carbon-free" and how to consider the "partial compliance" provision of the CFS law. On September 26, 2024, the Commission held a hearing on these issues and adopted a series of Decision Options that appeared to be final decisions on three threshold issues specified below. The September 26, 2024, Decision Options became the basis for the Commission's November 7, 2024, Order. However, the language of the Order can be read to postpone a final decision on the three threshold issues until the record is further developed in a newly-launched docket (CI-24-352). The CEOs seek clarification regarding whether the issues identified below have already been decided or are still pending.

I. The Order is unclear on whether the Commission has definitively decided three issues that affect application of the CFS law or whether these issues will be decided after further record development in Docket CI-24-352

The Commission's Order does not explicitly state what the Commission decided as to three threshold issues that were discussed extensively by the parties' comments and in the Decision Options in this docket. The CEOs seek clarification as to the Commission's decision on the following issues that affect whether a generating technology is treated as fully or partially carbon-free under the CFS statute.

The first issue is whether the Commission has decided to permit the use of comparative waste-management analysis when determining whether a technology is fully or partially carbon-free (hereafter "comparative waste-management analysis"). If permitted, the comparative waste-management analysis would allow the Commission to disregard the carbon dioxide emissions from waste-burning generators on the grounds that other means of managing the waste in question—such as landfilling or leaving wood

waste in forests—would also have GHG emissions. The Commission's Order requests comments in the forthcoming docket on calculating "partial compliance by generators burning waste materials based on a fuel cumulative life-cycle basis considering the greenhouse gas benefits relative to *alternative waste management methods*."[4] However, the Order is not clear regarding whether the Commission has already decided that this comparative waste-management analysis must be used, or whether such a decision will be made after further record development in docket CI-24-352.

The second issue is whether the Commission has decided to permit the use of a carbon neutrality analysis when determining whether a technology is fully or partially carbon-free (hereafter "carbon neutrality analysis"). A carbon neutrality analysis would allow the Commission to disregard some or all of the carbon emissions derived from burning materials like trees based on the assumption that biomass fuels are carbon neutral, or on other grounds that treat carbon dioxide from biomass differently than carbon dioxide from fossil fuels. At different points in this docket, the terms "life-cycle analysis," "fuel life-cycle analysis," and "fuel cumulative lifecycle basis"[5] seemed to contemplate using a carbon neutrality analysis, and these terms are used in the Order. The Order's reference to defining "sustainable and waste biomass" also implies the use of the carbon neutrality analysis, as could the recommendations of the Partnership on Waste and Energy.[6] However, the Order is not explicitly clear whether the Commission

[4] Order, p. 7 (emphasis added). Based on the staff briefing papers and other aspects of the record, we believe the terms "life-cycle analysis" and "fuel life cycle analysis" used in the Order on page 6 were also intended to include a comparative waste-management analysis.
[5] Order, p. 6-7.
[6] Order, p. 6.

has already decided that this carbon-neutrality analysis *must* be used, or whether such a decision will be made after further record development in docket CI-24-352.

The third issue is whether the Commission has decided to exclude indirect emissions when determining the amount of partial credit to be given for generation from plants with CCS (hereafter "CCS indirect emissions exclusion"). Adding CCS to a plant reduces its direct emissions (that is, those occurring at the power plant itself), but it can substantially increase indirect emissions (those occurring elsewhere but attributable to the CCS). The Order says comments will be invited on calculating "partial compliance for fossil fuel generation with carbon capture and sequestration/storage (CCS) by estimating the total *direct* carbon dioxide emissions per megawatt-house (MWh) reduced by the CCS…."[7] However, the Order is not explicitly clear whether the Commission has definitively decided that indirect emissions should not be included in the CCS analysis, or whether such a decision will be made after further record development in docket CI-24-352.

Thus, the CEOs seek the Commission's clarification on whether it has already decided the three issues listed above, or whether it intends for there to be further record development in docket CI-24-352 regarding whether the analyses and exclusion are legal and reasonable. Additionally, with regard to the Order's bulleted list of topics for discussion in the forthcoming docket,[8] the CEOs ask the Commission to clarify whether the docket is intended to focus only on *how* to undertake the listed methodologies or also

[7] *Id* (emphasis added).
[8] Order, p. 6-7.

on *whether* those methodologies should be used and are consistent with the requirements of the CFS law. The CEOs believe this clarification will help all parties by ensuring there is a common understanding of the scope of issues in the forthcoming docket. It will allow all parties to engage on the substantive issues rather than wasting time debating what issues are "on the table."

PETITION FOR RECONSIDERATION

If the Commission has definitively decided that the comparative waste-management analysis, the carbon neutrality analysis, and/or the CCS indirect emissions exclusion should be used when determining a technology's full or partial carbon-free status, we urge the Commission to reconsider these decisions for the reasons set forth below.[9] However, even if the Commission clarifies that it has not yet decided these three issues, the CEOs still urge the Commission to reconsider its Order and to decide that comparative waste-management analysis, carbon neutrality analysis, and exclusion of indirect emissions from CCS should not be allowed.

The record in the current docket demonstrates that using either the comparative waste-management analysis or the carbon neutrality analysis to determine a technology's CFS eligibility is illegal under the CFS law. The CEOs do not believe there is merit in using the forthcoming docket to debate the highly complex details and subjective choices required to implement these two analyses when the CFS law does not permit their use.

[9] The CEOs also attach to this petition and incorporate by reference the initial and reply comments we filed in this phase of the docket, dated June 28, 2024 and July 24, 2024.

We believe pursuing these issues further would be a waste of time and resources for all concerned, including for the Commission. Therefore, the Commission should decide now that these two analyses will not be used when determining whether a generating technology's output counts as fully or partially carbon-free.

As for the CCS indirect emissions exclusion, even if the Commission has not yet decided to exclude indirect emissions, we would ask it to reconsider the language of the Order and to specify now that it *will* consider a CCS plant's indirect emissions when determining partial compliance, or at least invite comment on the question. If the Commission wants the new docket to further develop the record on this issue,[10] commenters should be invited to comment on the type and scope of indirect carbon dioxide emissions that should be considered and the sources of information regarding those emissions. If indirect emissions were to remain excluded from the Order's language, leaving commenters to believe only direct emissions are to be considered, the Commission could be deprived of helpful information regarding how to determine a CCS plant's indirect emissions.

Below, the CEOs detail the specific reasons why the Commission should reconsider its Order and expressly reject the comparative waste-management analysis (section I), the carbon neutrality analysis (section II), and the CCS indirect emissions exclusion (section III).

[10] As we explain in section IV below, the CEOs believe it would be sufficient for the Commission to establish now the general principle that it will look at direct and indirect emissions associated with CCS and leave the more detailed discussion of the carbon accounting methodology for such projects until later, when CCS projects are actually proposed.

I. The Commission should reconsider its decision and not allow the use of a comparative waste-management analysis

Using a comparative waste-management analysis to determine whether a technology is carbon-free under the CFS law would allow the two most carbon-intensive forms of generation on the grid today—solid waste and biomass plants—to be considered partially or even fully carbon-free. ***Both solid waste and biomass plants emit more CO_2/MWh than coal plants.***[11] The legislature certainly did not intend, through its landmark 100% carbon-free standard, to incentivize *greater* reliance on the most carbon-intensive generation technologies currently used.

The plain language of the CFS law does not allow the considerable carbon dioxide emissions from plants burning solid waste or waste biomass to be disregarded based on how those emissions compare to emissions from other forms of managing the waste in question. Instead, the statute defines "carbon-free" based entirely on the generating technology's *own* carbon emissions. Moreover, the legislative history clearly shows that the legislators fully intended and understood that waste-burning facilities would not qualify under the CFS, regardless of how those emissions compare to alternate waste management methods. And the legislative history also shows that the partial compliance provisions were not intended as a back-door means of allowing high-carbon generation to partially qualify as carbon-free. Moreover, using a comparative waste-management analysis is incompatible with state climate and waste goals; fails to comply with the statutory instruction to maximize air pollution reductions, especially in environmental

[11] See section II.B.1 for additional discussion of these emission rates.

justice areas; and introduces immense administrative complexity and ongoing uncertainty into the Commission's implementation of the CFS.

A. The Commission lacks statutory authority to permit a comparative waste-management analysis to be used to determine whether a technology is carbon-free

1. The law defines "carbon-free" solely based on a generating technology's own carbon dioxide emissions

The CFS statute defines "carbon-free" as "a technology that generates electricity without emitting carbon dioxide."[12] Notably, the law is clear that the relevant emissions are only those from "a technology that generates electricity." Thus, the standard for whether a generating technology is carbon-free is whether it generates "without emitting carbon dioxide." This means the technology's carbon dioxide emissions should be compared to zero, not to the emissions of any other technology or an alternative form of waste disposal.

Using the comparative waste-management approach of "considering greenhouse gas benefits relative to alternative waste management methods," as stated in the Commission's Order, requires abandoning the "without emitting carbon dioxide" standard established by the statute, and replacing the statutory standard in this way is not permitted by law. When the meaning of a statute is apparent from its language, no further statutory construction is permitted.[13] And even if there were reason to believe the legislature had intended to authorize a comparative waste-management analysis, neither

[12] Minn. Stat. § 216B.1691, subd. 1(b).
[13] *State, Dept. of Public Safety v. Van Bus Delivery Co.*, 400 N.W.2d 759, 761 (Minn. App. 1987), *quoting McCaleb v. Jackson,* 239 N.W.2d 187, 188 n. 2 (Minn. 1976).

the Commission nor a court could read such authority into the law. As the Minnesota Supreme Court has held regarding another statute, "[i]f the literal language of this statute yields an unintended result, it is up to the legislature to correct it. This court 'will not supply that which the legislature purposefully omits or inadvertently overlooks.'"[14]

2. The partial compliance provision only applies to facilities using technologies that can generate electricity without emitting carbon dioxide, which excludes solid waste and biomass plants

Biomass and solid waste plants also cannot qualify as partially carbon-free under the statute. Under the CFS statute, the Commission is required to allow for "partial compliance" with the CFS for "electricity generated from facilities that utilize carbon-free technologies for electricity generation, but only for the percentage that is carbon-free."[15] The reference to "*carbon-free* technologies" and to the "percentage that is *carbon-free*" in this provision refers back to the statutory definition of carbon-free, which means "a technology that generates electricity *without emitting carbon dioxide*."[16] Thus, partial compliance credit under this provision may only be granted for generation from technologies that can generate electricity "without emitting carbon dioxide."

The partial compliance provision introduces ambiguity into the CFS law. A generating facility that uses *only* carbon-free technology would get full compliance credit, not partial, thereby rendering the partial compliance provision without meaning. On the other hand, a facility that uses some carbon-emitting technology and therefore emits

[14] *Haghighi v. Russian-American Broadcasting Co.,* 577 N.W.2d 927, 930 (Minn. 1998), citing *Green Giant Co. v. Comm'r of Revenue,* 534 N.W. 2d 710, 712 (Minn. 1995).
[15] Minn. Stat. § 216B.1691, subd. 2d(b)(2)(i).
[16] Minn. Stat. § 216B.1691, subd. 1(b).

some carbon would not meet the definition of carbon-free. This statutory ambiguity must be resolved consistent with legislative intent, according to the rules of statutory construction at Minn. Stat. § 645.16.[17] The courts are clear that "[l]egislative history, including records of legislative hearings and changes in statutory language, may be used to resolve ambiguity in statutory language."[18]

As we show in the following section, the legislature explicitly intended this partial compliance provision to apply to green hydrogen and CCS. Both are emerging technologies that are widely discussed as ways to reduce carbon emissions from a carbon-emitting plant by an ascertainable percentage,[19] and both are expected to be partially used before they are fully employed at a power plant. A plant cofiring green hydrogen can reasonably be said to combine a percentage of generation fueled by natural gas (not carbon-free) with a percentage of generation fueled by hydrogen (carbon-free). Similarly, a plant using partial CCS can reasonably be said to combine a share of generation that lacks capture (not carbon-free) with a share of generation that employs capture (carbon-free).

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[17] Minn. Stat. § 645.16 states that "[t]he object of all interpretation and construction of laws is to ascertain and effectuate the intention of the legislature. Every law shall be construed, if possible, to give effect to all its provisions. When the words of a law in their application to an existing situation are clear and free from all ambiguity, the letter of the law shall not be disregarded under the pretext of pursuing the spirit. When the words of a law are not explicit, the intention of the legislature may be ascertained by considering, among other matters" a list of factors including "the contemporaneous legislative history."

[18] *Thorson v. Billy Graham Evangelistic Ass'n,* 687 N.W.2d 652, 656 (Minn. App. 2004) (interpreting a statute consistent with statements made by the bill's House and Senate sponsors during legislative debates), *citing* Minn. Stat. § 645.16(7) and *Baker v. Ploetz*, 616 N.W.2d 263, 269 (Minn. 2000).

[19] The CEOs have concerns about many aspects of CCS technology and believe that green hydrogen may be of much greater use outside the power sector. Our arguments in this petition should not be viewed as necessarily endorsing use of these technologies to reduce power plant emissions.

By contrast, solid waste and biomass plants always emit carbon. They do not "partially" employ any distinct emerging technology that can be said to generate electricity without emitting carbon dioxide or that could move us toward the statutory goal of generating electricity "without carbon dioxide emissions." Therefore, no share of their generation can reasonably be deemed carbon-free.

3. The legislative history shows that facilities burning solid waste and biomass were not considered carbon-free, either fully or partially

The legislative history shows that the legislature very clearly intended that generation from solid waste and biomass plants would not qualify as carbon-free under the CFS. The history further shows that the partial compliance provision was intended to allow credit for emerging technologies that could potentially move Minnesota toward a fully carbon-free grid, not to incentivize burning solid waste and biomass, which would have the opposite effect.

a. Legislators intended and understood that generation from solid waste and waste biomass plants would <u>not</u> count toward compliance with the CFS, regardless of how they compared to other waste disposal methods

The plain language of the statute unambiguously excludes from the definition of carbon-free the electricity generation from carbon-emitting sources like solid waste and waste biomass plants, so the Commission does not need to consult the legislative history on this point. However, the legislative history can resolve any doubt about whether excluding solid waste and waste biomass was intentional. Solid waste and waste biomass plants were both discussed in the CFS law's legislative history, and both the bill's

proponents and its opponents understood that ***generation fueled by burning solid waste or biomass would not count toward compliance (either fully or partially) with the CFS.***

In effect, the comparative waste-management argument was raised and dismissed at the legislature. Witnesses at the House committee hearing argued that the law as written would lead to less solid waste incineration and more landfilling, which would increase landfill methane emissions, causing more climate damage than incineration of the same waste.[20] One witness suggested the law should be "revised to prevent public utility policy from interfering with solid waste management policy."[21] The bill's chief House author, Majority Leader Jamie Long, was not persuaded. He rejected as "factually inaccurate" the witnesses' argument that the bill would necessarily increase landfilling. He noted that both landfilling and incineration were at the bottom of the Minnesota's waste management hierarchy, and that methods like more recycling, composting and waste diversion were cleaner alternatives to more methane-producing landfilling. The bill was not amended, and there was no suggestion that the Commission could legitimately stretch the definition of carbon-free so far as to somehow define solid waste incineration as "carbon-free" on the grounds of it allegedly having lower emissions than landfilling.

Similarly, Representative Marion O'Neill opposed the bill during the House floor debate on the same grounds raised and rejected in the House committee hearing. She

[20] Comments by Jeff Lundy, Hennepin Co. Commissioner, and Chris McConn, Minnesota Resource Recovery Association, House Climate and Energy Finance and Policy Committee, Jan. 18, 2023, at minutes 1:08:15 - 1:10:26 and 1:12:56 – 1:15:03, *available at* https://www.house.mn.gov/hjvid/93/896125.
[21] *Id.*, comments by Chris McConn, at 1:13:05 – 1:13:52.

echoed the comparative waste-management concern raised in committee (that the CFS would disincentivize solid waste incineration, and thus increase landfilling and GHG emissions), and once again it was rejected. Indeed, she claimed that the CFS bill would close all the solid waste-burning plants in Minnesota.[22] The CEOs disagree that the CFS is likely to have such impact on the existing solid waste-incinerators. However, this is further evidence that legislators clearly understood that solid waste-fueled generation would not count as carbon-free generation under the CFS. The legislature did not apply – and did not expect or authorize the Commission to apply – any sort of comparative waste management analysis that would result in some or all of a waste-burning plant's generation being deemed carbon-free.

The legislative history similarly shows that generation fueled by waste biomass was not intended or expected to count toward compliance with the CFS, even when an alternative method of disposing of the waste biomass would also emit carbon dioxide. On the Senate floor, Senator Robert Farnsworth from Hibbing described how a Hibbing municipal generator burns wood chips from a pallet factory, and if not burned, those wood chips "would just be put in a field, and they would be left to rot. And as the foresters that I met with yesterday explained, that would emit CO2."[23] However, he did not suggest that the Commission could in the future deem the Hibbing plant fully or partially carbon-free on the grounds that this other method of disposing of the wood

[22] Comments by Rep. Marion O'Neill, House Floor Session, Jan. 26, 2023, at minutes 5:49:40 – 5:53:40, *available at* https://www.house.mn.gov/hjvid/93/896169.

[23] Comments by Sen. Robert Farnsworth, Senate Floor Session, Part 2, Feb. 02, 2023, at minutes 1:02:28 – 1:03-11, *available at* https://mnsenate.granicus.com/player/clip/10105?view_id=1&redirect=true&h=d4d3df43d64903eb6913c3f78d9e5ea3.

chips would also have carbon emissions. On the contrary. He knew the language of the bill meant the Hibbing plant would not be considered carbon-free, so he supported an amendment to let municipalities opt out of the CFS. When that amendment failed, he voted against the bill.

In short, the legislative history clearly shows using a comparative waste analysis was never intended by the legislature. Legislators understood the law as requiring generators that burn solid waste and biomass to be treated as the carbon-emitting technologies that they are, meaning none of their generation would count toward CFS compliance. The legislators discussed that other methods of managing the same waste could or would also have emissions, but these comparisons to other waste disposal methods were identified as irrelevant to the carbon-free status of the waste-burning plants under the CFS law.

b. The partial compliance provision was intended to incentivize emerging carbon-free technologies, not carbon-intensive technologies like burning solid waste and biomass

Because the partial compliance provision of the CFS law is ambiguous, the legislative history must inform how that section is to be interpreted, and that history similarly shows that biomass and solid waste generation were not intended to be considered even partially carbon-free. The legislative history shows the chief authors of the CFS explicitly discussed only two technologies to which the partial compliance section would apply: (1) cofiring with green hydrogen and (2) generation with partial CCS. The chief House author described his amendments to his bill by stating in the House

committee hearing that "we for example have a provision in here … that allows for partial credit, so that for example if you were having green hydrogen at a particular facility that you were burning, under the old bill you would have had to have 100% replacement for that. Under the new bill you can credit the carbon-free power, which is incentivizing carbon-free electricity."[24] This approach makes sense given that at present, use of hydrogen will generally involve blending it at some percentage with natural gas at natural gas plants. But at some point, 100% hydrogen-fired power plants may become viable. In this context, it is understandable that the legislature would include language to incentivize the emergence of green hydrogen by giving credit for partially carbon-free generation, with specific reference to a "percentage" of a facility's emissions that could be deemed carbon-free.

Similarly, the chief Senate author, Senator Nick Frentz, discussed the importance of the partial compliance provision with respect to CCS. In a Senate committee hearing, he stated, "carbon capture is addressed significantly in the bill, especially in the partial credit. And I agree with you 100% that we're trying to reduce carbon going into the air. That's what we're doing here because global warming is a threat to our planet. And I'm glad to be an author of a bill in which carbon capture is counted, to the extent it captures the carbon, toward the 100% goal ... If we say our goal is to reduce carbon and there are technologies that exist now and that maybe we're going to invent and improve on in the future, we better be asking ourselves, if we're not interested in those, why is it we say

[24] Comments by chief author and House Majority Leader Jamie Long, House Climate and Energy Finance and Policy Committee, Jan. 18, 2023, at minutes 1:43:51 – 1:44:15, *available at* https://www.house.mn.gov/hjvid/93/896125.

that reduction in carbon is our focus."[25] Like hydrogen cofiring, CCS is a widely-discussed but still emerging technology. There are currently no CCS plants that capture 100% of a plant's carbon dioxide emissions, but there are some that capture a percentage of those emissions and more are proposed. Like hydrogen, CCS is therefore a technology that – if it has a viable future – is expected to first reduce emissions from carbon-emitting plants by a certain percentage, rather than emerging as a 100% carbon-free source of generation. The partial compliance provision aligns the CFS with this potential step-wise carbon reduction rather than denying all compliance credit under the CFS until 100% carbon-free generation is achieved.

In contrast with these explicit references, there is no indication that legislators intended the partial compliance provision to apply to burning solid waste or biomass. Instead, as noted above, both solid waste and biomass generation were understood by legislators to fall outside the CFS. This makes sense given that, unlike hydrogen co-firing and CCS, relying more on solid waste and biomass would only *increase* the grid's emissions per MWh rather than moving the grid toward the 100% carbon-free goal. Moreover, unlike with hydrogen cofiring and CCS, where some percentage of the generation can be attributed to a distinct but only partially-used carbon-free technology, there is no reasonable way to attribute some percentage of the generation of a solid waste

[25] Comments by chief author Sen. Nick Frentz, Senate Energy, Utilities, Environment and Climate Committee, Jan. 25, 2023, at minutes 3:26:47 - 3:27:35, *available at* https://mnsenate.granicus.com/player/clip/9925?view_id=5&redirect=true&h=adda2f7454d75a9cc88a29e0cc91d836.

or biomass plant as being from a generating technology "without carbon dioxide emissions."

4. If the legislature intended for comparative waste analysis to be used, it would have included language to this effect as it did with beneficial electrification

If the legislature intended for a comparative waste analysis to be used, it would have provided for this in the law as it did with the analysis allowed for beneficial electrification, which explicitly allows for a comparison of emissions. Specifically, under the provisions of subdivision 2b, the Commission must consider the "additional electric load from beneficial electrification and the greenhouse gas emissions savings associated with those loads as compared to serving the load with nonelectric energy sources."[26] Under this provision the Commission might, for example, give extra time to a utility to comply with the CFS if the emissions increase in the power sector is outweighed by resulting emission reductions in the transportation sector (by enabling more electric vehicles) or in the buildings sector (by enabling more heat pumps). However, unlike with beneficial electrification, there is no statutory authorization for the Commission to consider comparative GHG benefits related to different waste management options. Surely, if the legislature had intended the Commission to engage in the considerable complexities of weighing various forms of waste management, a subject entirely new to the Commission, it would have stated as much in the law, as it did regarding beneficial electrification.

[26] Minn. Stat. § 216B.1691, subd. 2b(a)(10).

B. Using the comparative waste-management analysis undermines state climate and waste management goals

In addition to being contrary to the CFS law, using a comparative waste-management analysis could undermine Minnesota's climate progress and the state's waste management goals. Disallowing the analysis will not greatly increase the likelihood of any existing plants burning solid waste or biomass closing, but allowing the analysis could significantly increase the grid's carbon dioxide emissions by incentivizing new, high-emitting biomass facilities.

1. The comparative waste-management analysis assumes a lack of progress in waste management, which is incompatible with achieving net zero by 2050

The reason for the comparative waste-management analysis, as articulated by its supporters,[27] is that if waste is not burned to generate electricity the waste would follow another waste management path (like landfilling), and that path would have its own, possibly even higher, greenhouse gas emissions. Therefore, supporters of the analysis argue some (or all) of the carbon dioxide emissions from waste-burning facilities should be disregarded when considering whether they qualify under the CFS.

However, the logic behind the comparative waste-management analysis depends on the assumption that our current waste management practices will continue, unchanged. But Minnesota's statutory goal of reducing GHG emissions by half by 2030 and achieving net zero GHG emissions by 2050[28] means no GHG-emitting activity will

[27] *See, e.g.*, Staff Briefing Papers for Sep. 26, 2024 meeting, p. 23.
[28] Minn. Stat. § 216H.02, subd. 1.

be exempt from scrutiny and emission reduction efforts. All waste management methods that emit GHGs will have to be re-examined for ways to reduce their emissions, including the management of both solid waste and waste woody biomass.

Indeed, the management of solid waste is already being driven in lower-carbon directions by state and local policies. The state is seeking to reduce both landfilling and incineration and to move toward the statutorily preferred methods of waste reduction and reuse, waste recycling, and composting.[29] For example, state law establishes the goal that metro counties will recycle or compost 75 percent of total solid waste by the end of 2030, and non-metro counties will recycle or compost 35 percent of total solid waste by that date.[30] On October 29 of this year, Hennepin County's Board of Commissioners formally adopted its most recent solid waste plan, the foundation of which is a "Zero Waste Plan" developed "to meet the county's goal of diverting 90% or more of waste from landfills or incinerators," and giving highest priority to actions that accelerate the closure and repurposing of the Hennepin Energy Recovery Center ("HERC").[31]

Federal efforts are also underway to reduce landfill methane emissions. The Environmental Protection Agency ("EPA") announced it will propose updated regulations under the Clean Air Act to reduce methane emissions from new and existing

[29] Minn. Stat. § 115A.02 (b).
[30] Minn. Stat. § 115A.551, subd. 2a.
[31] Hennepin County 2024-2029 Solid Waste Management Plan, p. 4, and Hennepin County Zero Waste Plan, both *available at* https://www.hennepin.us/en/your-government/projects-initiatives/solid-waste-planning.

landfills,[32] and it is formally gathering data on diverting organic waste, increasing landfill gas collection rates, improving daily landfill cover practices, and other measures.[33] Moreover, the EPA has a voluntary program in place working with industry stakeholders and waste officials to reduce landfill methane emissions nationwide.[34] Given these ongoing state and federal policy efforts, the Commission cannot reasonably assume that solid waste not burned will necessarily have higher GHG emissions through landfilling.

Similarly, the Commission cannot reasonably assume that there are no lower-emitting options for disposing of waste woody biomass than burning it in biomass plants. In fact, landfilling wood can sequester a great deal of the carbon it contains because landfilled wood decays extremely slowly in an anaerobic environment, generating far less methane than fast-decaying biomass like food waste. One study found that no more than 3 percent of the carbon in landfilled wood is ever emitted as landfill gas, with the remainder staying sequestered in the landfill indefinitely.[35] And other options for sequestering the carbon in waste wood are gaining traction. For example, Minneapolis is investing in a process to convert wood from diseased or damaged trees into "biochar," a charcoal-like substance that when added to soils both enriches the soil and sequesters

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[32] White House Fact Sheet: Biden-Harris Administration Announces New Actions to Detect and Reduce Climate Super Pollutants (July 23, 2024), *available at:* https://www.whitehouse.gov/briefing-room/statements-releases/2024/07/23/fact-sheet-biden-harris-administration-announces-new-actions-to-detect-and-reduce-climate-super-pollutants/.

[33] EPA website, "Non-regulatory Public Docket: Municipal Solid Waste Landfills," *at:* https://www.epa.gov/stationary-sources-air-pollution/non-regulatory-public-docket-municipal-solid-waste-landfills.

[34] EPA website, "Landfill Methane Outreach Program (LMOP), *at:* https://www.epa.gov/lmop#:~:text=LMOP%20is%20a%20voluntary%20program,or%20join%20the%20LMOP%20listserv.

[35] J.A. Micales and K.E. Skog, "The decomposition of forest products in landfills," *International Biodeterioration and Biodegradation,* vol. 39, issues 2-3, p-145-158 (1997), *available at:* https://www.sciencedirect.com/science/article/abs/pii/S0964830597833896?via%3Dihub.

carbon.[36] Waste wood can also be buried in special enclosures known as "wood vaults" designed to semi-permanently sequester the carbon.[37] Composting can help sequester carbon in soils.[38] And an analysis by the Partnership for Policy Integrity ("PFPI") found that leaving logging residuals (like treetops, limbs, and slash) to decay in the forest rather than burning them slows the release of their CO_2 by decades.[39]

Finally, allowing the burning of waste to be considered fully or partially carbon-free would reduce the pressure to move away from burning waste and toward waste reduction or lower-carbon waste management. For example, a paper mill or a sawmill would have no incentive to identify innovative technological approaches to reduce its wood waste, or waste management options that would sequester the carbon in that waste, if its wood waste could simply be sold for electricity generation.

Thus, the comparative waste management analysis does not recognize ongoing progress in waste management methods, making its comparisons fundamentally flawed. Moreover, allowing the analysis would shelter some of the most carbon-intensive forms of generation from the reach of the CFS, and reduce incentives for identifying better waste

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[36] Susan Du, "Minneapolis is on the leading edge of biochar, a carbon sequestering material full of promise and still under research," *Star Tribune* (July 14, 2024), *available at:* https://m.startribune.com/minneapolis-is-on-the-leading-edge-of-biochar-a-carbon-sequestering-material-full-of-promise-and-still-under-research/600380658/.

[37] Ning Zeng and Henry Hausman, "Wood Vault: remove atmospheric CO2 with trees, store wood for carbon sequestration for now and as biomass, bioenergy and carbon reserve for the future," *Carbon Balance and Management,* 17(2) (2022), *available at:* https://cbmjournal.biomedcentral.com/articles/10.1186/s13021-022-00202-0.

[38] Martha Walden, "Composting Mill Waste Wins Blue Ribbon for the Climate," *Northcoast Environmental Center* (Dec. 7, 2020), *available at*: https://www.yournec.org/composting-mill-waste-wins-blue-ribbon-for-the-climate/.

[39] *See* reply comments by PFPI, *et al.* (July 14, 2024), p. 8, *citing* Mary S. Booth, "Not carbon neutral: Assessing the net emissions impact of residues burned for bioenergy," *Environmental Research Letters* (Feb. 21, 2018), *available at:* https://iopscience.iop.org/article/10.1088/1748-9326/aaac88.

management methods. In short, allowing the comparative waste management analysis could hinder achievement of both Minnesota's climate and waste management goals.

2. Rejecting the comparative waste-management analysis will not likely close existing solid waste and biomass facilities

The Commission need not be concerned that excluding generation from plants burning biomass and solid waste from the definition of carbon-free would lead to the imminent closure of the existing facilities causing a cascade of waste-management related harms. The CFS law contains ample flexibility for utilities currently generating or purchasing energy from such facilities to continue to do so if these forms of carbon-emitting generation are important to their energy portfolios. For example, they could purchase Renewable Energy Credits ("RECs") to cover the generation. This is a better policy than allowing biomass and waste burning facilities to qualify as carbon-free resources, because purchasing RECs would at least incentivize truly carbon-free generation elsewhere, helping reduce the grid's total climate impact.[40] Moreover, biomass and solid waste generation facilities currently represent only about 2 percent of Minnesota electricity generation.[41] Utilities have until 2040 before they must achieve 100 percent carbon-free generation, and that requirement is based not on 100 percent of generation or procurement but on 100 percent of Minnesota sales, leaving a certain amount of room for continued use of carbon-emitting generation.

[40] Under Minn. Stat. § 216B.1691, subd. 4, a REC must "meet the requirements" of subdivision 2g (that is, be carbon-free) in order to be used to satisfy the CFS.

[41] Minn. Dept. of Commerce, Energy Policy and Conservation Quadrennial Report (2024), p. 104, Figure 5-1. This figure shows that 2 percent of generation comes from biomass, which the CEOs understand to include municipal solid waste given its inclusion under the category of biomass at Minn. Stat. § 216B.1691, subd. 1(c)(5).

As for the owners of the solid waste and biomass plants, even if Minnesota utilities were to decide not to buy power generated from those facilities, the plant owners could still sell that power to other buyers not subject to the CFS. Hennepin County has already agreed to sell the generation from HERC, which no longer qualifies for compliance with the state Renewable Energy Standard, into the wholesale electricity market via a power marketing firm.[42] And of course, the CFS does not mandate the closure of any solid waste or biomass plants. The plants may be forced to close for other economic or environmental reasons, but if the value of such plants for managing waste is as high as some commenters claim, these plants will not need the extra incentive they would get from having their generation deemed carbon-free under the CFS. There is, therefore, no reason to be concerned that reading the CFS law as written will cause a sudden increase in environmentally harmful landfilling or other dramatic consequences in other sectors.

3. Adopting the comparative waste-management analysis could incentivize the growth of new facilities with high carbon emissions

There is reason to be concerned that using a comparative waste management analysis to deem as carbon-free the generation from solid waste or woody biomass would hurt Minnesota's GHG reduction efforts. While it is unlikely that Minnesota will build new solid waste-burning plants for a variety of reasons, there is a high likelihood that new woody biomass plants may be built. Minnesota Power has already indicated it plans

[42] Board of Hennepin County Commissioners, Resolution 24-0161, approved Apr. 30, 2024, *available at:* https://hennepinmn.legistar.com/LegislationDetail.aspx?ID=6637094&GUID=A2934A5A-2809-41B6-AE9D-9A81FB56ABDC.

to propose a woody biomass facility in its next IRP, and Minnesota's forest products industry is aggressively seeking new markets.

Relying more on woody biomass will inevitably increase the grid's carbon emissions per MWh. As we discuss further below, biomass plants emit carbon dioxide at a rate even higher than the coal plants Minnesota is working to retire, and it can take many decades for forests to recover that excess carbon, if they do at all. Europe encouraged the conversion of coal plants to wood-burning plants years ago, and the negative results have sparked a widespread outcry in the scientific community. Hundreds of scientists have publicly disputed the alleged climate benefits of Europe's promotion of woody biomass for electricity in a series of statements to the European Commission, including statements in 2018, 2021, 2022, and 2023.[43] (In 2022, the European Parliament voted to limit the types of woody biomass that can be used to meet renewable energy targets, though controversy remains over whether this step went far enough.[44]) In one of these statements, directed to President Biden as well as other world leaders, over 500 scientists urged leaders "not to undermine both climate goals and the world's biodiversity by shifting from burning fossil fuels to burning trees to generate energy."[45]

[43] Edward Robinson, "The scientific case against burning forest biomass for energy," *Land and Climate Review* (March 28, 2023), *available at:* https://www.landclimate.org/the-problem-of-bioenergy-in-the-eu/.
[44] Frederic Simon, "Forest activists hail EU move to cap biomass fuels, industry worried," *Euractiv* (Sep. 16, 2022), *available at:* https://www.euractiv.com/section/biomass/news/forest-activists-hail-eu-move-to-cap-biomass-fuels-industry-worried/.
[45] Woodwell Climate Research Center, "Letter Regarding Use of Forests for Bioenergy" (Feb. 11, 2021), *available at* https://www.woodwellclimate.org/letter-regarding-use-of-forests-for-bioenergy/.

Burning wood for energy has been intensely controversial in the U.S. as well,[46] in part because U.S. forests are now being used to supply these wood-pellet burning plants overseas. For example, the Drax coal plant in the U.K. was converted to burn wood, and is now largely supplied from pellet mills located in the U.S. and Canada. While Drax claims it is only burning waste wood, recent reporting revealed extensive photographic evidence of whole trees in North Carolina and Virginia entering the pellet mills that serve Drax, and of forests in British Columbia "shorn clean of their spruce, birch, and pine trees" by a Drax subsidiary logging to fuel the plant.[47] Media investigations, including one by the *New York Times*, have similarly found evidence that European companies claiming to sell logging residuals were in fact harvesting ancient trees clear cut from protected forests to grind into wood pellets.[48]

There will be a clear negative effect if the Commission allows burning of trees or waste woody biomass to be deemed carbon-free under the CFS. Doing so would incentivize the construction of new facilities that undermine Minnesota's climate goals, including both the CFS goals and our net-zero by 2050 goal. Such a decision also risks depleting our forests at a time when their carbon-absorbing value is higher than ever.

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[46] William H. Schlesinger *et al.*, "Pruitt is Wrong on Burning Forests for Energy," *New York Times* (May 3, 2018), *available at:* https://www.nytimes.com/2018/05/03/opinion/pruitt-forests-burning-energy.html.
[47] Sarah Miller, "The Millions of Tons of Carbon Emissions That Don't Officially Exist: How a Blind Spot in the Kyoto Protocol Helped Create the Biomass Industry," *New Yorker,* Dec. 8, 2021, *available at:* https://www.newyorker.com/news/annals-of-a-warming-planet/the-millions-of-tons-of-carbon-emissions-that-dont-officially-exist.
[48] Sarah Hurtes and Weiyi Cai, "Europe is Sacrificing Its Ancient Forests for Energy," *New York Times* (Sep. 7, 2022), *available at* https://www.nytimes.com/interactive/2022/09/07/world/europe/eu-logging-wood-pellets.html.

C. Adopting the comparative waste-management analysis violates the statutory instruction to interpret the CFS law in a way that maximizes the reduction in air pollution, especially in environmental justice areas

The Commission should also reject the use of the comparative waste-management analysis because the CFS law requires the Commission to interpret the law in a way that maximizes a reduction in air pollution, particularly in environmental justice areas. Specifically, Minn. Stat. § 216B.1691, subd. 9, states:

> The Commission shall take all reasonable actions within the commission's statutory authority to ensure this section is implemented in a manner that maximizes net benefits to all Minnesota citizens. Reasonable actions the commission must take and benefits that must be maximized include but are not limited to: . . . (5) ensuring that statewide air emissions are reduced, particularly in environmental justice areas….

Both solid waste plants and biomass plants emit pollutants with potentially severe health impacts, and those impacts have fallen disproportionately on environmental justice communities.

For example, HERC has historically been Hennepin County's largest emitter of nitrogen oxides, and the second largest emitter of sulfur dioxide and particulate matter ($PM_{2.5}$)[49] -- pollutants known to contribute to cardiovascular and respiratory disease and premature death. HERC has been estimated to contribute to 1 to 2.2 premature deaths and $11-24 million in health impacts annually.[50] HERC also emits dioxins, which are carcinogenic, and HERC is the county's third largest emitter of lead, which can cause developmental problems in children, among other things.[51] Solid waste incinerators in

[49] PSE Healthy Energy, "Hennepin Energy Recovery Center: Fact Sheet" (Nov. 2022), *available at:* https://www.sierraclub.org/sites/default/files/2023-08/PSE%20HERC%20Fact%20Sheet.pdf.
[50] *Id.*
[51] *Id.*

general are major emitters of all these pollutants, as well as other air pollutants of growing concern, such as per- and polyfluoroalkyl substances (so-called "forever chemicals," or "PFAS") and polycyclic aromatic hydrocarbons (PAHs).[52]

Air pollutants emitted from biomass-burning plants are also problematic and can have an even greater impact on human health than coal plants. The Hibbard plant in Duluth, for example, has historically burned waste biomass from a paper mill along with some coal. A 2022 analysis modeling Hibbard's health impacts for the single year of 2021 indicates it may have contributed to 6.4 premature deaths and $70 million in total health impacts.[53] These estimated health impacts are even higher than the Boswell coal plant's estimated health impacts, even though Boswell generates more than 200 times more electricity.[54] This could be because biomass facilities nationwide have been subject to relatively lax environmental regulation. A 2014 analysis of 88 air permits for biomass power plants showed they were allowed to emit far higher levels of certain health-harming pollutants per MWh than coal plants, including nitrogen oxides, volatile organic compounds, particulate matter, and carbon monoxide.[55]

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[52] Neil Tangri, "Waste incinerators undermine clean energy goals," *PLOS Climate* 2(6) (2023), *available at* https://journals.plos.org/climate/article?id=10.1371/journal.pclm.0000100; Cui Li, et al., "Identification of emerging organic pollutants from solid waste incinerations by FT-ICR-MS and GC/Q-TOF-MS and their potential toxicities," *J. Haz. Mat. Vol. 48, 128220* (2022), *available at* https://www.sciencedirect.com/science/article/abs/pii/S0304389422000085?via%3Dihub.

[53] PSE Healthy Energy, "Incorporating Health and Equity Metrics into the Minnesota Power 2021 Integrated Resource Plan," (April 2022) p. 28, *available at:* https://fresh-energy.org/publication/incorporating-health-and-equity-metrics-into-the-minnesota-power-2021-integrated-resource-plan. This report was submitted with Clean Energy Organizations' Initial Comments, *In the Matter of Minnesota Power's Application for Approval of its 2021-2035 Integrated Resource Plan,* Docket No. E015/RP-21-33 (April 28, 2022).

[54] *Id.*, p. 17, 19.

[55] Mary S. Booth, *Trees, Trash, and Toxics: How Biomass Energy Has Become the New Coal,* Partnership for Policy Integrity (April 2, 2014), at 5, 18, *available at* https://www.pfpi.net/wp-content/uploads/2014/04/PFPI-Biomass-is-the-New-Coal-April-2-2014.pdf.

These health harms are currently falling disproportionately upon environmental justice and BIPOC communities. Minnesota has seven solid waste incinerators, six of which are located in or near an environmental justice community.[56] And the analysis of Hibbard mentioned above found that its large health impacts fall disproportionately on Native people. Thus, the statute's explicit mandate to the Commission to interpret the CFS in a way that maximizes the reduction in air pollution emissions, especially in environmental justice areas, is another reason to reject use of the comparative waste-management analysis. Considering biomass or waste incineration to be carbon-free under a comparative waste-management analysis would incentivize added reliance on these polluting facilities rather than maximizing the reduction of air pollutant emissions.

D. Allowing the comparative waste-management analysis would create an administrative burden and require the use of complex analyses for future CFS compliance questions related to waste

The CEOs further ask the Commission to reconsider allowing the comparative waste-management analysis because it would create added complexity for all future CFS determinations related to waste-burning plants. In conducting a life-cycle analysis, it is common to consider direct emissions (generally called "Scope 1" emissions), indirect emissions associated with purchased power (called "Scope 2" emissions),[57] and sometimes other upstream and downstream indirect emissions (called "Scope 3"

[56] Tishman Environment and Design Center, *the Cost of Burning Trash: Human and Ecological Impacts of Incineration in Minnesota* (2020), *available at* https://static1.squarespace.com/static/5d14dab43967cc000179f3d2/t/5fc686311972c46e3c8167d1/1606846003793/The+Cost+of+Burning+Trash-+All+5+states.pdf.
[57] EPA Center for Corporate Climate Leadership, "Scope 1 and Scope 2 Inventory Guidance," web page, *available at:* https://www.epa.gov/climateleadership/scope-1-and-scope-2-inventory-guidance.

emissions).[58] A comparative waste-management analysis does not fall within Scope 1, 2, or 3 analyses. Moreover, the CEOs are not aware of *any* existing life-cycle analysis protocols that utilize a comparative waste-management analysis. To our knowledge, the concept that some or all waste-management emissions can be disregarded on the grounds that other waste-management methods would also emit GHGs is unique to this docket. There are no accepted protocols for such an analysis, and the Commission would have to create them.

Creating parameters and guidelines for how to conduct a comparative waste-management analysis will require making a number of assumptions and choices. Moreover, the assumptions used will have to be different depending on the type of facility, type of solid waste stream, and type of biomass. This means that a general analysis will not work, and instead an individual analysis will have to be performed for each proposed biomass or waste incineration facility, using assumptions relevant to that specific proposal. Additionally, because these analyses require so many predictions, any Commission determination that a certain solid waste or biomass plant's generation is fully or partially carbon-free would have to be revisited periodically to account for changes in waste streams, waste management policies and practices, and waste management technologies, which could dramatically alter the calculus over time. The result would be an ongoing administrative burden likely lasting to 2040 and beyond.

[58] Scope 3 emissions include a wide range of GHGs associated with the full value chain of a product, facility or corporation and are often larger than Scope 1 and 2 emissions. Greenhouse Gas Protocol, "Corporate Value Chain (Scope 3) Standard," web page, *available at:* https://ghgprotocol.org/corporate-value-chain-scope-3-standard. Scope 3 emissions are typically counted only in voluntary carbon accounting settings.

Moreover, the ongoing legal uncertainty would make it challenging to comply with the CFS law. By contrast, determining now that solid waste and biomass generation cannot be considered either fully or partially carbon-free under the law would provide regulatory certainty for everyone, including utilities, and steer utilities' investments toward resources that are "without carbon dioxide emissions."

To illustrate the administrative complexity, the CEOs note the following list of issues that would need to be addressed in order to conduct a reasonably accurate life-cycle analysis of a biomass or solid waste-burning facility that considers "greenhouse gas benefits relative to alternative waste management methods":[59]

> 1. **Estimating the carbon emissions from burning many different types of waste**. Each waste stream will have a different carbon content and a different rate of carbon emissions. With respect to solid waste, for example, the carbon emissions when burned will vary depending on the percentage of food waste, yard waste, paper, cardboard, wood, and plastic. These percentages will depend in turn on rates of recycling, composting and waste reduction, which varies by community. As for waste woody biomass, there are many different types of waste produced by pulp, paper, and wood products mills and other sources.[60] The Commission would need to determine the likely future emissions for each biomass plant based on its particular waste biomass source, which may be a mix of different wastes. It would also need to consider how to ensure that the biomass in question is actually the waste product of another economic activity, rather than trees harvested for energy.
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> 2. **Estimating the non-carbon air emissions from burning the waste stream, especially in environmental justice areas.** As discussed previously, the CFS requires the Commission to interpret the law in a way

[59] PUC Order, p. 7.

[60] *See* letter submitted by the American Forest and Paper Association in this docket (Sep. 19, 2024), requesting that the Commission to include under the CFS, among other things: spent pulping liquors, pulping by-products, bark, woody manufacturing residuals, paper recycling residuals, wastewater and process water treatment plant residuals, harvest residuals, downed wood from extreme weather, nonhazardous landscape or right-of-way trimmings, plants removed for control of invasive or noxious species, and used wood products.

that maximizes net benefits to all Minnesotans, including ensuring that statewide air emissions are reduced, particularly in environmental justice areas.[61] This will require estimating the quantity of the non-GHG air pollutants emitted from a waste-burning facility. These emissions will vary greatly depending on the content of the solid waste or the waste woody biomass burned. The latter category could include toxic chemicals introduced during the industrial process or toxic substances used to treat the wood, such as creosote used to treat railroad ties.[62]

3. **Estimating comparative landfill emissions.** In the comparative waste-management analysis urged by some commenters in this docket, burning solid waste and waste biomass is compared to landfilling, meaning the Commission would have to estimate the emissions of the most likely landfill that would receive the waste if not burned. Estimating methane and carbon-dioxide emissions from landfills is notoriously difficult because the gases are not emitted through a stack where they can be measured but rather leak out from various locations over time. Those emissions therefore have to be estimated based upon, among other things, the percentage and type of organics in the waste stream, the landfill's design, and whether it has effective methane collection systems. The Commission would also need to estimate the timing of the methane leakage, which is spread over several decades.[63]

4. **Estimating comparative emissions from recycling, composting, waste reduction, and other measures.** As the chief House author of the CFS stated during the debate over the bill, it is factually wrong to assume that solid waste that is not incinerated will automatically be landfilled. Landfilling and incineration are both low on Minnesota's statutory waste management hierarchy,[64] and both the state and counties are actively working to reduce the use of landfilling and incineration by using lower-GHG methods like composting, recycling, and waste reduction. And waste woody biomass could have lower (or slower) carbon emissions if landfilled, composted, turned into biochar, buried in a wood vault, or left on the ground to decay. The Commission would need to estimate the relative quantity and timing of GHG emissions for each of these pathways compared to burning the waste in a biomass plant.

5**. Predicting the alternative pathways the waste would be likely to follow if not burned and in what percentage**. Additionally, if the waste in question is not burned, it would not necessarily all follow a single path.

[61] Minn. Stat. § 216B.1691, subd. 9(a)(5).
[62] The CEOs understand that the Hibbard plant burns chemically-treated railroad ties.
[63] Initial comments by MPCA, p. 4 (June 28, 2024).
[64] Minn. Stat. § 115A.02(b).

Some percentage of it could be landfilled, some composted, some recycled, some waste avoided entirely, some converted to biochar, etc. The amount and timing of GHG emissions would vary for each option. The Commission would need to predict what percentage of the unburned waste would likely follow each outcome.

6. **Predicting how changing policies, practices, and technologies will affect emissions from each waste-burning facility *and* each waste-management alternative.** Using a comparative waste-management analysis will also require accounting for the way emissions associated with waste-burning facilities and the alternative waste management methods will change in the decades ahead. Waste management practices are in a state of flux, driven by the climate crisis, waste management goals, and changing policies and technologies. As discussed previously, the federal government is pushing practices to reduced methane from landfills, and state and local policies are promoting greater composting and recycling. At least eight states have already passed laws banning single-use plastic bags,[65] a policy that reduces fossil carbon from the solid waste stream. Given that waste reduction is at the top of Minnesota's waste management hierarchy, it is not unreasonable to expect such a ban here someday. And innovative methods for sequestering the carbon in waste wood are being developed. No valid comparison of the relative emissions of burning solid waste or woody biomass can ignore these potentially major changes. Additionally, the pace of change will likely accelerate due to efforts to reach net zero GHG emissions by 2050.

7. **Weighing immediate carbon emissions from waste burning against the delayed emissions from other forms of waste management.** Finally, many of the waste-management comparisons will involve comparing the harm caused by an immediate pulse of carbon dioxide released by burning solid waste or biomass to the harm caused by a slower stream of emissions taking years to unfold. Methane can take decades to leak from landfills. Waste wood left on the ground to decay can emit carbon dioxide slowly over many years. The Commission will need to consider the vexing question of how these delayed emissions compare to the immediate emissions from burning the waste. This analysis will have to be made in recognition of the state and federal goal of reaching net-zero GHG emissions by 2050, and be updated to reflect the latest science regarding the urgency of reducing GHG emissions.

[65] National Conference of State Legislatures, "State Plastic Bag Legislation," web page (last updated Feb. 8, 2021), *available at:* https://www.ncsl.org/environment-and-natural-resources/state-plastic-bag-legislation.

Clearly then, conducting a reasonably accurate comparison of the carbon emissions of a waste-burning facility with the emissions of the many evolving alternative paths the waste could follow would be a resource-intensive process. And given changing policies and technologies, no utility could be confident that the generation deemed carbon-free in one year would still be considered carbon-free the next, creating ongoing regulatory uncertainty for all parties. In contrast, confirming now that comparative waste management analysis is not permitted aligns with current best practices in life-cycle analysis, avoids the need to answer all of these complex questions and to continue revisiting those answers, and provides regulatory certainty that will make forthcoming CFS implementation easier.

II. The Commission should reconsider its decision and not allow use of a carbon neutrality analysis

A. The Commission lacks statutory authority to permit a carbon neutrality analysis to be used to determine whether a technology is carbon-free

If the Commission has decided a carbon neutrality analysis can be used to determine whether a generating facility is fully or partially carbon-free, it should reconsider this decision. Although the Order does not explicitly mention a carbon neutrality analysis, based on the briefing papers, the comments of other parties, and the discussion at the September 26 hearing, the CEOs understand that the terms "life-cycle analysis," "fuel life-cycle analysis," and "fuel cumulative lifecycle basis" were intended to allow the Commission to consider a carbon neutrality analysis for biomass.[66] However,

[66] *See, e.g.,* Staff Briefing Papers for Sep. 26, 2024 meeting, p. 19-20, 35-39. The terms "sustainable" and "waste biomass" also imply use of a carbon neutrality analysis, as do the recommendations of PWE. Order, p. 6.

the CFS law defines "carbon-free" as meaning "without carbon dioxide emissions." Thus under the law, "carbon-free" does not equal carbon neutral, and the law makes no distinction between carbon dioxide emitted by burning fossil fuels and carbon dioxide emitted by burning biomass.

An emission is simply something which is emitted. The dictionary defines "emit" as "to throw or give off or out; to send out."[67] Minnesota Statutes § 116.06, subdivision 9, which governs air pollution, defines "emission" as "a release or discharge into the outdoor atmosphere of any air contaminant or combination thereof." The statutory definition of carbon-free is not cyclical when it comes to carbon dioxide. It focuses solely on carbon dioxide coming out of a generating technology. It does not require or authorize the Commission to consider when that carbon dioxide was absorbed from the atmosphere, how long it had been sequestered in the fuel, nor how it fits within the global carbon cycle. Carbon dioxide absorption is the opposite of carbon dioxide emission, and the law defines carbon-free solely in terms of emissions.

The legislative history described previously in Section I clearly establishes that both solid waste plants and biomass plants were understood to fall outside the definition of carbon-free, just like the carbon-emitting plants burning fossil fuels. The Commission therefore does not have statutory authority to disregard carbon dioxide emissions simply because they are derived from trees. To the extent a contemplated fuel lifecycle analysis would do this, it would be illegal and the Commission should reconsider it.

[67] Merriam-Webster Dictionary, online, *available at:* https://www.merriam-webster.com/dictionary/emit.

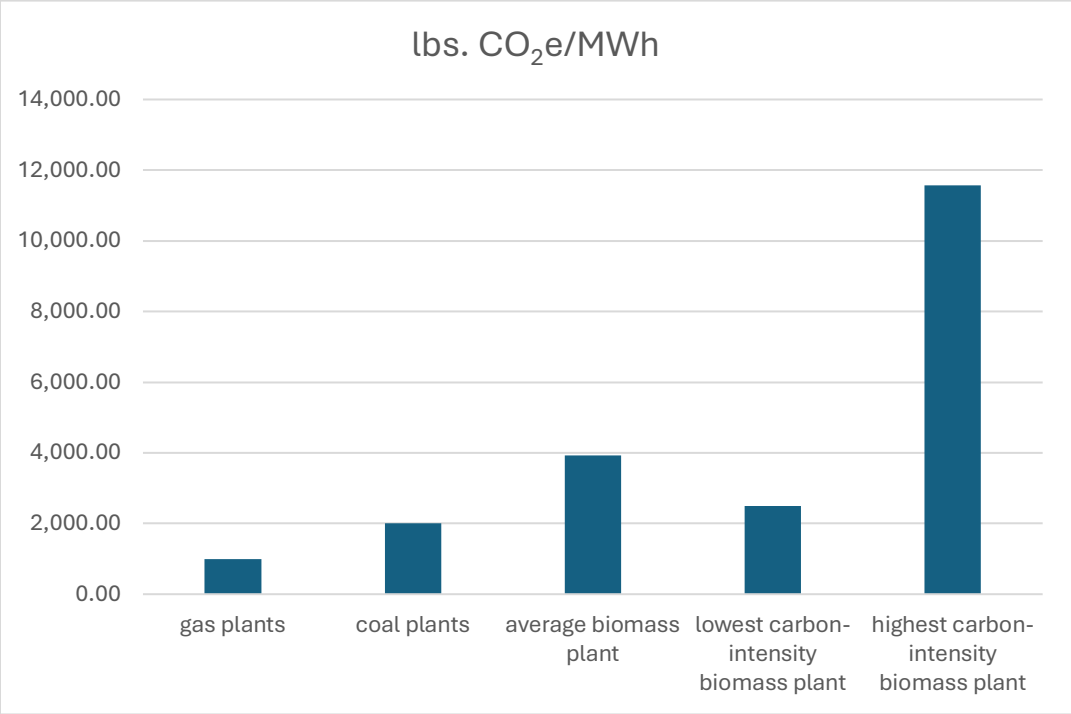
B. Using a carbon neutrality analysis ignores the reality that neither woody biomass nor solid waste plants are carbon neutral

1. Woody biomass plants emit more carbon dioxide per MWh than coal or natural gas

Plants that burn woody biomass not only emit carbon dioxide, they emit a strikingly high amount of it per unit of electricity generated. Whereas natural gas plants emit about 1,000 lbs CO_2e/MWh and coal plants emit about 2,000 lbs CO_2e/MWh, an analysis of 21 biomass-burning facilities in California found that on average they emitted 3,928 lbs CO_2e/MWh, or roughly double the emission rate of coal plants and four times the rate of gas plants.[68] As shown in Figure 1, there was a wide range of emission rates among the 21 plants, but even the least carbon-intensive plant emitted 2,498 lbs CO_2e/MWh, a rate significantly higher than coal and far higher than gas. Meanwhile, the most carbon-intensive biomass plant emitted 11,564 lbs CO_2e/MWh, a rate nearly six times higher than coal and nearly twelve times higher than gas.

[68] Center for Biological Diversity, "Biomass Energy is Polluting: A False Climate Solution that Worsens the Climate Crisis," (June 2020 update), *available at*: https://www.biologicaldiversity.org/programs/climate_law_institute/pdfs/Biomass-Energy-Is-Polluting-2.pdf.

Figure 1: Relative Carbon Intensity of Coal, Gas, and Biomass Plants[69]



2. It takes many decades for forests to reabsorb the carbon dioxide emitted by biomass plants

Proponents of using a carbon neutral analysis in this docket argued that the Commission can ignore carbon dioxide emitted by burning trees because trees grow back, and in so doing re-absorb carbon dioxide from the atmosphere, rendering tree-burning carbon-neutral. However, even if the law called for "carbon neutral" technologies rather than "carbon-free" ones, studies show it takes many decades to approach carbon neutrality even under optimal conditions, and biomass plants cannot be considered carbon neutral in the meantime. On the contrary, they *increase* total carbon dioxide emissions from the grid, immediately and for decades to come. Such plants are therefore

[69] *Id*. Figures reflect biomass plant emission for 2017.

incompatible with Minnesota's statutory goal of net zero GHG emissions by 2050 and its broader efforts to combat the climate crisis.[70]

Considerable research has been done comparing the climate impact of burning wood for electricity versus burning fossil fuels. One major study of Massachusetts forests found that it would take 45-75 years of forest re-growth to make burning trees for electricity no worse for the climate than a coal plant, and it would take 90 years of forest re-growth to make the same facility no worse for the climate than a natural gas plant.[71] This study led Massachusetts to eliminate electricity-only biomass plants from the state's renewable energy portfolio standard.[72] Another analysis found that even when making assumptions that favor biomass, burning wood for electricity rather than coal would still *worsen* global warming "over the critical period through 2100."[73] A third analysis found that "replacing fossil fuels with wood will likely result in 2-3x more carbon in the atmosphere in 2050 per gigajoule of final energy."[74]

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[70] Minn. Stat. § 216H.02, subd. 1. There is also significant potential for the 2050 date to be brought forward. This subdivision requires the MPCA to review the goals annually based on the latest climate science. Global temperature measurements for 2023 and 2024, the hottest years on record, show that the Earth has already exceeded, at least temporarily, its globally-agreed goal of keeping warming below 1.5 degrees C. Andrea Thompson, "Earth Will Exceed 1.5 Degrees Celsius of Warming This Year," *Scientific American* (Nov. 6, 2024), *available at:* https://www.scientificamerican.com/article/2024-will-be-the-first-year-to-exceed-the-1-5-degree-celsius-warming/.

[71] Thomas Walker, et al., "Carbon Accounting for Woody Biomass from Massachusetts (USA) Managed Forests: A Framework for Determining the Temporal Impacts of Wood Biomass Energy on Atmospheric Greenhouse Gas Levels," *Journal of Sustainable Forestry,* 32:1-2, 130, at 150 (Table 7) (2013), *available at* https://www.tandfonline.com/doi/abs/10.1080/10549811.2011.652019.

[72] Reply comments of PFPI, *et al.* (July 24, 2024), p. 7.

[73] John D. Sterman, et al., "Does replacing coal with wood lower CO_2 emissions?" *Environ. Res. Lett.* 13 (2018) 015007, at 8, *available at* https://iopscience.iop.org/article/10.1088/1748-9326/aaa512/pdf.

[74] Timothy D. Searchinger, et al., "Europe's Renewable Energy Directive Poised to Harm Global Forests," *Nature Communications,* 9, 3741, at 2 (2018), *available at:* https://www.nature.com/articles/s41467-018-06175-4.

Moreover, limiting use of a carbon neutrality analysis to just *waste* woody biomass does not significantly change the analysis. Burning waste woody biomass still inevitably emits carbon dioxide and at a very high rate per MWh, so it falls outside the definition of carbon-free. And as discussed above, burning waste woody biomass accelerates carbon emissions compared to allowing it to decompose, and certainly compared to other methods of waste management that could sequester the carbon in the waste woody biomass rather than releasing it.

3. Solid waste plants emit more carbon dioxide per MWh than coal or natural gas, and much of this carbon dioxide comes from fossil sources

Burning solid waste is also extremely carbon intensive. A recent study of the nation's municipal solid waste incinerators found that they emitted 1.7 times the greenhouse gases emitted by coal plants, almost all of which is carbon dioxide.[75]

Much of the carbon dioxide emitted from solid waste incinerators derives not from biomass in the waste stream but from plastics and synthetics, which contain carbon derived from fossil fuels. Indeed, the EPA reports that *more than half* of the carbon dioxide emitted by solid waste incineration in 2021 is attributable to plastics.[76] If landfilled, those plastics would not contribute significantly to methane emissions because plastics do not

[75] Neil Tangri, "Waste incinerators undermine clean energy goals," *PLOS Climate* 2(6) (2023), *available at* https://journals.plos.org/climate/article?id=10.1371/journal.pclm.0000100.
[76] U.S. Environmental Protection Agency, "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2021," p. 7-3, *available at*: https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2021.

biodegrade in measurable quantities under anaerobic conditions;[77] when burned, those plastics release their carbon immediately. Even if the CFS required carbon neutral generation rather than carbon-free generation, the substantial share of fossil carbon in the emissions of solid waste plants undermines any claim such plants would have to carbon neutrality.

4. It is unreasonable for the Commission to offset emissions from burning woody biomass or solid waste against future forest growth when the utilities are not doing anything to ensure that growth

Using a carbon neutrality analysis is also problematic because the forest re-growth conditions needed to offset the emissions from solid waste or biomass are not being implemented and are not required. Any assumption that carbon dioxide emissions from burning trees can be disregarded as carbon neutral effectively grants a type of carbon offsets to utilities generating or procuring electricity from wood-burning plants. However, unlike in the actual carbon offsets market, the utility does not actually have to purchase the offsets. The utility does not have to plant and protect for decades the extra new trees that must be grown above and beyond current conditions to absorb the carbon dioxide emitted by the biomass-fueled generation, nor pay anyone else to do so. Indeed,

[77] U.S. Environmental Protection Agency, "Landfill Carbon Storage in EPA's Waste Reduction Model," web page, *available at:* https://www.epa.gov/sites/default/files/2016-03/documents/landfill-carbon-storage-in-warm10-28-10.pdf.

the future additional forest growth required to offset the biomass emissions may even be claimed by someone else who actually purchased carbon offsets for that growth.

Even finding that the forests providing the trees are "sustainable" would not solve this issue. The Commission's Order discusses inviting comments on the "[d]efinitions of the sources of and requirements for a fuel to qualify as sustainable and waste biomass."[78] However, whether the wood is from a "sustainable" forest is irrelevant. Even if a particular forest resource could be considered to be sustainable for climate purposes (presumably meaning it has a rate of carbon dioxide absorption at or higher than the rate of carbon dioxide lost through burning or decay) that sustainability does not mean the utility generating or buying the biomass-fueled generation is entitled to receive that carbon credit (or that some other party has not already received the credit).

Minnesota's forests are currently considered a carbon sink by the MPCA, meaning that they absorb more carbon than they emit.[79] This net carbon absorption by our forests, if we are lucky and it continues through 2050 and beyond, means that not all anthropogenic GHG emissions in the state will have to be fully eliminated by 2050 for Minnesota to meet its statutory goal of net-zero by that year.[80] Which sectors of the economy should be allowed to keep emitting GHGs and be deemed offset by Minnesota's forests is a vitally important policy decision that will no doubt be hotly debated, and is

[78] Order, p. 6.
[79] MPCA, "Climate Change Trends and Data," web page, *online at:* https://www.pca.state.mn.us/air-water-land-climate/climate-change-trends-and-data.
[80] Minnesota law defines net-zero as "(1) statewide greenhouse gas emissions equal to zero; or (2) when annual anthropogenic emissions of greenhouse gases to the atmosphere are balanced by removals over a specific period." Minn. Stat. § 216H.02, subd. 1(d).

not within the Commission's statutory authority to decide. Minnesota policy-makers may well decide that the carbon sink provided by the state's forest growth should offset continued emissions from sources that are harder to decarbonize than the power sector, like certain hard-to-decarbonize industries, agriculture, or buildings. Indeed, if the legislature intended future forest growth to offset carbon dioxide emissions from the power sector, it would surely have indicated as much in the CFS, a law governing the pace and terms of the power sector's long-term decarbonization. Instead, it provided other forms of flexibility for the power sector, like allowing carbon-emitting generation to be offset through the purchase carbon-free RECs.[81]

Additionally, it is important to recognize that while Minnesota forests have been a carbon sink in recent decades, this could quickly change. The accelerating pace of the climate crisis means our forests face a future of more severe droughts, insect infestations, and fires. Indeed, a study published just last month shows that on a global level the carbon sink that has long been provided by the world's forests was dramatically diminished in 2023, reflecting factors like a drought in the Amazon and widespread forest fires in Canada.[82] The vulnerability of the world's forests to the deteriorating global climate is another reason the Commission should reject the use of a carbon neutrality

[81] Minn. Stat. § 216B.1691, subd. 4.

[82] Piyu Ke, *et al.*, "Low latency carbon budget analysis reveals a large decline of the land carbon sink in 2023, *National Science Review,* Oct. 22, 2024, *available at* https://academic.oup.com/nsr/advance-article/doi/10.1093/nsr/nwae367/7831648; *see also* Patrick Greenfield, "Trees and land absorbed almost no CO2 last year. Is nature's carbon sink failing?" *Guardian,* Oct. 14, 2024, *available at* https://www.theguardian.com/environment/2024/oct/14/nature-carbon-sink-collapse-global-heating-models-emissions-targets-evidence-aoe.

analysis. Given current conditions, counting on our forests to absorb today's or tomorrow's carbon dioxide emissions is not a safe bet.

C. Adopting a carbon neutrality analysis violates the statutory requirement to interpret the CFS law in a way that maximizes the reduction in air pollution, especially in environmental justice areas

As discussed previously, the Commission is required under the CFS to take all reasonable actions to implement the CFS law in a way that maximizes net benefits to Minnesotans, including the benefit of reducing air emissions, particularly in environmental justice areas.[83] Interpreting the CFS to allow for a carbon neutrality analysis in determining whether a resource is carbon-free fails to meet this requirement. Using a carbon neutrality analysis promotes the use of biomass plants by treating them as partially or fully carbon-free under the CFS, thereby making them a more attractive resource for utilities. However, biomass plants tend to have air emission permits that allow much higher rates of pollution than fossil fuel power plants. The recent analysis of the Hibbard biomass plant shows that such plants can have startlingly high health impacts, and the Hibbard plant's health impacts fall disproportionately on Native populations. Therefore, the requirement to maximize the reduction in air emissions, particularly in environmental justice areas, is yet another reason to reject the use of a carbon neutrality analysis.

[83] Minn. Stat. § 216B.1691, subd. 9(5).

D. Allowing a carbon neutrality analysis would also create an administrative burden and require the use of complex analyses for future CFS compliance questions related to biomass

Allowing the use of a carbon neutrality analysis, like allowing the use of the comparative waste-management analysis, will add immense administrative complexity. It would similarly force the Commission to make a multitude of complex assumptions and subjective choices, but in this instance with regard to issues like long-term forest growth rates and forest management practices, which are outside the Commission's traditional areas of expertise.

Conducting a carbon neutrality analysis would likely require determining the following:

1. **Estimating the carbon content and emissions for each form of biomass under consideration.** There are many different types of biomass, and they will have different carbon and moisture contents. Biomass facilities have wildly different rates of GHG emissions, with the study discussed above showing some biomass plants with emission rates four and a half times higher than other biomass plants. The Commission will not be able to use a single estimate for all biomass plants. It will need to determine the carbon emissions of each waste stream and each plant.

2. **Estimating the non-carbon air emissions from the waste stream, especially in environmental justice areas.** As discussed above, the emissions of health-harming air pollutants from burning biomass can be strikingly high. These would have to be estimated for each biomass facility and type of biomass fuel for the Commission to determine the impact of the biomass plant on air pollution, particularly in environmental justice areas.

3. **Determining whether the biomass is truly waste or includes trees harvested for the purpose of energy production.** The Order refers to defining "the sources of and requirements for a fuel to qualify as … waste biomass." Determining whether a source is waste biomass can be difficult, especially if the biomass is being sold to the generating facility (rather than given to it), in which case it is a product rather than waste, and the waste

generator has an economic incentive to create more of it. The Commission would also need to determine how to differentiate waste wood from non-waste wood, since as discussed above, experience in other jurisdictions has shown that some woody biomass that suppliers claimed to be from waste wood is actually derived from trees harvested for energy.

4. **Predicting whether and to what extent forest regrowth will be enhanced to compensate for the woody biomass being burned**. Studies determining how many decades it takes for biomass-fueled generation to be no worse for the climate than fossil fuel-based generation focus on the rate at which a forest will re-sequester enough carbon to compensate for the carbon emitted by the biomass facility. Therefore, the Commission would need to make a similar determination of the rate of regrowth required for Minnesota forests to offset emissions from biomass plants. This, in turn, will require making assumptions about, among other things, the impact of climate change on Minnesota forests and their ongoing availability to sequester carbon.

5. **Considering the CO_2 emissions from the production and use of the woody biomass**. In any carbon neutrality analysis the Commission would also need to factor in the CO_2 emissions associated with the logging, processing, and transporting of any trees harvested for energy. Even if waste biomass is used, the Commission would need to decide the share of the CO_2 associated with producing, storing, the transporting the waste biomass that should be attributed to the biomass plant.

6. **Determining when and whether utilities can claim credit for future forest growth.** As discussed above, it would be wrong and inconsistent with carbon accounting principles to simply grant utilities the right to claim credit for the carbon sequestered by future forest growth when the utilities did not take any action to promote or ensure that growth. This is especially true when other sectors of the economy may similarly be counting on that forest regrowth to offset their emissions. At a minimum, the Commission would need to decide how to verify the forest regrowth required to eventually achieve carbon neutrality and how to ensure the carbon credit for forest regrowth is not already claimed by other offset holders or sectors of the economy.

7. **Weighing certain and immediate carbon emissions against speculative and delayed carbon absorption.** Any carbon neutrality analysis will require weighing CO_2 emitted today by a biomass plant against CO_2 absorbed by forests in the decades ahead. Weighing today's actual carbon emissions against tomorrow's (much more speculative) carbon absorption requires decisions about whether to apply a form of "discount rate" to future assumed sequestration, what that rate should be,

and whether future assumed sequestration occurring after a particular year should count at all, given the urgent need to reduce carbon emissions now and achieve net zero emission by 2050.

8. **Determining forest "sustainability" for carbon sequestration purposes.** Finally, the Commission's Order seeks comment on the requirements for a fuel to qualify as "sustainable" biomass.[84] However, as the reply comments of the Partnership for Policy Integrity (PFPI) explain, the sustainable forest designation is not a proxy for carbon neutrality, and forestry certification programs were not designed to ensure carbon neutrality.[85] Thus, determining if biomass has come from a sustainable forest will not simplify the carbon neutrality analysis.

In sum, actually implementing a carbon neutrality analysis would be an ongoing administrative challenge, requiring the Commission to make a series of assumptions, predictions, and choices regarding issues beyond the Commission's traditional areas of expertise. Therefore, allowing a carbon neutrality analysis will add complexity and an ongoing administrative burden into implementation of the CFS. A better approach, and the one that is consistent with the language and purpose of the CFS statute, is to reject use a carbon-neutrality analysis, since carbon-neutral does not equal carbon-free.

III. The Commission should reconsider its decision to exclude indirect emissions when calculating partial compliance for CCS

In its Order, the Commission seeks comment on calculating "partial compliance for fossil fuel generation with carbon capture and sequestration/storage (CCS) by estimating the total direct carbon dioxide emissions per megawatt-hour (MWh) reduced by the CCS, and applying that percentage to the output of the generation resource employing CCS to determine its carbon-free generation."[86] This language is based upon

[84] Order, p. 6.
[85] Reply comments of PFPI, et al. (July 24, 2024), p. 15-16.
[86] Order, p. 6.

a decision option that originally stated that partial compliance for plants with CCS should be based on both *direct and indirect* emissions. At the September 26 hearing, the Commission adopted a modified version of the decision option that deleted the reference to indirect emissions, restricting the calculation just direct emissions.

The CEOs urge the Commission to reconsider the exclusion of indirect emissions from the calculation of partial compliance credit granted to plants with CCS. These indirect emissions can be substantial relative to the direct emissions reduced by the CCS, and no basis has been provided for excluding them. Moreover, excluding the indirect emissions of CCS plants is inconsistent with the Commission's treatment of hydrogen co-firing plants. The partial compliance provision should be implemented consistently between these two technologies.

A. CCS plants can have substantial indirect carbon emissions that should be considered when determining a facility's percentage of carbon-free emissions

Adding CCS to generating technology creates indirect carbon dioxide emissions both upstream and downstream of the CCS plant. For example, it takes considerable energy just to power the CCS process. The Department of Energy estimates that operating CCS at a coal plant requires steam and electrical power equivalent to about 25 percent of a coal plant's output.[87] In some cases, the extra energy needed to power the CCS process may come from fossil fuel plants offsite, in which case the carbon dioxide emissions

[87] U.S. Department of Energy, *Eliminating the Derate of Carbon Capture Retrofits – Revision 2,* National Energy Technology Laboratory (Mar. 31, 2023), at 6, *available at* https://www.osti.gov/servlets/purl/1968037/.

associated with the CCS would be considered indirect emissions that would not be considered under the current formulation in the Commission's Order.

The potential for offsite sources to power a CCS project is illustrated by Project Tundra, the CCS project proposed by Minnkota to capture emissions from the Milton R. Young coal plant in North Dakota. It has been estimated that the CCS project will consume the energy equivalent of up to 27% of the total output of the Milton R. Young coal plant to meet its steam and electrical needs.[88] Initially, it was stated that the project might involve building a new gas power plant and boiler to provide both the electricity and steam Project Tundra needed,[89] and since Project Tundra is considered a separate facility from the coal plant it serves, the carbon dioxide emitted by this gas plant would be considered indirect emissions. The federal Draft Environmental Assessment for the project indicates a change of plans; the electricity for Project Tundra will now come from "the Minnkota electricity system (*i.e.*, grid) that includes multiple generation sources." [90] However, these too would be indirect emissions. Thus, under the Commission's current Order, the carbon dioxide associated with either of the proposed offsite energy sources (gas plant or electric grid) would be overlooked when the Commission determines the

[88] *See* Comments on the Revised Draft Environmental Assessment for Project Tundra on Behalf of Sierra Club, CURE, and Dakota Resource Council (May 13, 2024), at 6, submitted as Attachment A to the CEOs' reply comments in this docket (July 24, 2024) [hereinafter, "Sierra Club Project Tundra Comments"].
[89] *Id.*, at 11.
[90] U.S. Department of Energy, Revised Draft Environmental Assessment for North Dakota, CarbonSAFE: Project Tundra, DOE/EA-2197D (April 13, 2024), at K-28, *available at:* https://www.energy.gov/nepa/articles/doeea-2197-revised-draft-environmental-assessment-april-2024; *see also,* Sierra Club Project Tundra Comments, at 11.

percentage of the coal plant's generation that can be considered carbon-free. This would result in significantly overestimating the project's reduction of carbon dioxide emissions.

Another major source of indirect emissions associated with CCS plants are the downstream emissions if the captured carbon dioxide is used for Enhanced Oil Recovery ("EOR"). Using captured carbon for EOR (as opposed to sequestering it permanently) will result in at least some of that carbon being re-released into the air, resulting in emissions. If EOR is used, these indirect downstream emissions could exceed the direct emission reductions at the CCS plant and should not be ignored. The legislative history supports considering the indirect downstream emissions of CCS projects. On the floor of the House, an amendment to the CFS bill was introduced to make the promotion of carbon capture and storage a state policy. The CFS bill's chief author, Majority Leader Jamie Long, objected that "the amendment does not distinguish between carbon that is permanently sequestered and carbon that is used for enhanced oil recovery, which would actually increase carbon emissions."[91] Given the bill author's recognition that CCS could actually increase carbon emissions when EOR is used, it follows that the author intended the Commission to take into account the potential use of EOR, which requires considering downstream indirect emissions.

B. CCS plants should be treated consistently with hydrogen co-firing plants

The CEOs support the calculation the Commission specifies in its Order for hydrogen co-firing plants, which looks at both direct and indirect emissions. Looking at

[91] Comments by Majority Leader Jamie Long, House Floor Session, Jan. 26, 2023, at minutes 2:40:29 -2:40:39, *available at*: https://www.house.mn.gov/hjvid/93/896169.

the indirect emissions associated with hydrogen production is consistent with the statement the chief author made in the House committee hearing quoted above, referring to applying the partial compliance provisions to "*green* hydrogen." The only way to know if hydrogen is green is to look upstream at the indirect carbon dioxide emissions associated with the hydrogen's production.

The Commission should similarly consider the indirect emissions associated with CCS. Doing so would demonstrate a fair and consistent application of the partial compliance provision across competing technologies. It would also result in a more accurate estimate of the total carbon dioxide reductions attributable to CCS and a more accurate measure of what percentage of the plant's generation could reasonably be considered carbon-free.

IV. Requested Remedies

Based on the above arguments, the CEOs respectfully request that the Commission reconsider its Order and issue the following findings:

> 1. When determining whether generating technologies that burn waste biomass or solid waste are fully or partially carbon-free under the CFS statute, the Commission will base its determination on the generating technology's own carbon-dioxide emissions. The Commission will not consider how those emissions would compare to the emissions from alternative methods for managing the waste the facilities burn.
>
> 2. When determining whether generating technologies are fully or partially carbon-free under the CFS statute, the Commission will treat carbon dioxide that derives from biomass sources the same as carbon dioxide that derives from fossil fuel sources. The statutory definition of carbon-free does not differentiate between these two sources of carbon dioxide, nor does the CFS statute authorize the Commission to analyze whether a fuel might be considered "carbon neutral."

> 3. The Commission will determine partial compliance for carbon-emitting plants with carbon capture and storage by estimating how much *total* carbon dioxide emissions (including both direct and indirect emissions) per MWh are reduced by the CCS, and applying that percentage to the output of the generation resource employing CCS to determine its carbon-free generation.

Consistent with these findings, we request that the Commission narrow the scope of the newly-launched docket CI-24-352. We believe this docket should continue to develop the record on the definition and calculation of market purchases, as already identified in the Commission's current Order.[92] It should also continue to seek comment on development of an accounting methodology to consider energy withdrawn from short-, medium-, and long-duration storage.

The new docket could also develop the record regarding the scope of indirect emissions that should be considered when determining the partial compliance credit granted for CCS or hydrogen co-firing (or other potential technologies that can partially reduce direct carbon dioxide emissions), though the CEOs are not convinced record development on this issue is needed at this time. Both CCS and hydrogen-co-firing are new technologies never before considered by the Commission, and a docket focused on the indirect emissions of these technologies would necessarily be working in the abstract, without the specific project details necessary to truly assess which indirect emissions are significant and ascertainable enough to include. The CEOs believe it would be sufficient to establish now the general principle that significant and ascertainable indirect emissions related to both hydrogen co-firing and CCS *will* be considered in future partial-credit

[92] Order, p. 7.

determinations, with the precise scope of indirect emissions determined if and when such a project is proposed and when the sources of indirect emissions can be better identified.

However, if the Commission wishes to have this new docket develop the record around the types of indirect emissions CCS and hydrogen co-firing technologies create, we request that the Commission either avoid using the term "life-cycle analysis" altogether (because the scope of life-cycle analyses varies so widely, depending on context) or else clearly specify that as used by the Commission, life-cycle analysis will not be used to *exclude* any of a technology's direct carbon dioxide emissions (such as through comparative waste-management or carbon neutrality analyses). Rather, the term is being used to mean an analysis that allows the Commission to accurately estimate both the direct and indirect carbon-dioxide emissions of a facility seeking to establish that some percentage of its generation is carbon-free under the partial compliance provision.

CONCLUSION

For the foregoing reasons, the CEOs respectfully request that the Commission clarify and reconsider its November 7, 2024 Order in this docket.

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