

July 21, 2023

Sent via email to: DEEP.EnergyBureau@ct.gov

Connecticut Department of Energy and Environmental Protection
Bureau of Energy & Technology Policy
10 Franklin Square
New Britain, CT 06051

Re: Inaccuracies in the 1990-2021 Connecticut Greenhouse Gas Inventory

Dear Bureau of Energy and Technology Policy,

The undersigned environmental and clean energy advocacy organizations, Conservation Law Foundation, Sierra Club, Connecticut League of Conservation Voters, Vote Solar, Acadia Center, Connecticut Roundtable on Climate and Jobs, Connecticut Citizen Action Group, People's Action for Clean Energy (PACE), Electric Vehicle Club of Connecticut, and the Ashford Clean Energy Task Force, have serious concerns about the accuracy of the 1990-2021 Connecticut Greenhouse Gas Emissions Inventory (GHG Inventory). Several problematic assumptions and methodological decisions in the inventory suggest that Connecticut is not fully accounting for its greenhouse gas (GHG) emissions. This is particularly alarming given the GHG Inventory's conclusion that Connecticut is not on track to achieve the 2030 and 2050 GHG reduction targets required under the Global Warming Solutions Act (GWSA).

We urge the Department of Energy and Environmental Protection (DEEP) to address these concerns in an updated version of the GHG Inventory as soon as possible.

1. DEEP's consumption-based methodology fails to account for GHG emissions from electricity generated in Connecticut for export.

First, we are concerned that DEEP's consumption-based methodology for electric sector emissions undercounts the state's overall emissions and ignores the environmental justice implications of fossil fuel generation in our state. DEEP's consumption-based methodology only accounts for emissions from electricity *consumed* in the state and fails to include emissions from electricity *generated* in the state, which generation-based accounting would otherwise capture.

As DEEP noted in the most recent Integrated Resources Plan, "Connecticut is a net exporter of power generation, consuming only 73 percent of the electricity generated in the state."¹ Using consumption-based methodology for the electric sector does not account for all GHG emissions from the state's power plants because emissions from exported electricity are not included in the calculation. The GHG Inventory states: "Emissions associated with electricity generated in-state but not consumed in-state **should** be included in the GHG inventories of the

¹ CT DEEP, *Integrated Resources Plan*, p. 118 (Oct. 2021), <https://portal.ct.gov/-/media/DEEP/energy/IRP/2020-IRP/2020-Connecticut-Integrated-Resources-Plan-10-7-2021.pdf>.

state where the electricity was purchased.”² The Inventory does not, however, verify that these emissions are **actually** included in other states’ GHG inventories.

Consumption-based accounting of electric sector emissions fails to reflect the true impact of electricity generation in Connecticut. In fact, it appears that use of the consumption-based methodology is the only reason that Connecticut “achieved” its statutorily mandated emissions reduction target of 10% below 1990 levels by 2020.³ This approach also overlooks the localized impacts of electric generation in Connecticut communities, which bear the brunt of pollution and resulting health impacts.

DEEP must accurately account for emissions from electric generation in the GHG Inventory. A consumption-based methodology for the electric sector should not be used unless DEEP verifies that all emissions from exported electricity are accurately accounted for by other states. Any emissions that are not fully accounted for by consuming states must be included in the Connecticut inventory. In addition, DEEP should acknowledge the localized impacts and environmental justice implications of electric generation in Connecticut.

2. Emissions from fuel cells and biogenic energy, including biomass and biofuel, must be accurately reported in the GHG inventory rather than treated as carbon neutral.

a. Emissions from fuel cells must be included in the GHG Inventory.

Emissions from fuel cells must be included in Connecticut’s GHG Inventory in order to accurately assess the state’s level of emissions. The GHG Inventory does not attribute *any* CO₂ emissions to fuel cells, although the report states that fuel cells generated 598,111 MWh of electricity in 2019.⁴ The assumption that fuel cells are carbon-neutral is false.⁵

Most fuel cells use hydrogen as a fuel source.⁶ The vast majority of hydrogen is currently produced from fossil fuels and is a source of CO₂ emissions.⁷ Bloom fuel cells, for example, are estimated to generate an average of 773 to 884 pounds of CO₂ per megawatt-hour.⁸ There are 52 MW of behind-the-meter Bloom fuel cell projects operating in Connecticut, plus another 19 MW of grid-tied projects.⁹ Overall, Connecticut has “approximately 130 fuel cell projects . . . totaling

² CT DEEP, 1990-2021 Connecticut Greenhouse Gas Inventory, p. 17, https://portal.ct.gov/-/media/DEEP/climatechange/1990-2021-GHG-Inventory/DEEP_GHG_Report_90-21_Final.pdf (emphasis added) [hereinafter GHG Inventory].

³ See *id.* at p. 8 (Figure 1).

⁴ See *id.* (Table 2: Electricity generation and GHG emissions from Connecticut’s 2019 RPS profile).

⁵ The Connecticut Renewable Portfolio Standard (RPS) characterizes fuel cells as Class I renewable resources. Conn. Gen. Stat. § 16-1(a)(20). Despite this characterization, fuel cells are not carbon neutral.

⁶ U.S. DOE, *Types of Fuel Cells*, <https://www.energy.gov/eere/fuelcells/types-fuel-cells>.

⁷ Connecticut Hydrogen Task Force Study, p. 13-15 (Jan. 2023), <https://www.ctgreenbank.com/wp-content/uploads/2023/01/Connecticut-Hydrogen-Task-Force-Study-FINAL-20230114.pdf>.

⁸ Eric Wesoff, Greentech Media, *Bloom’s Fuel Cells: Just How Green Is a Bloom Box?* (Sept. 4, 2013), <https://www.greentechmedia.com/articles/read/blooms-fuel-cells-just-how-green-is-a-bloom-box>.

⁹ Connecticut Hydrogen Task Force Study, p. 7 (Jan. 2023), <https://www.ctgreenbank.com/wp-content/uploads/2023/01/Connecticut-Hydrogen-Task-Force-Study-FINAL-20230114.pdf>.

nearly 180 MW of fuel cell deployment.”¹⁰ Pretending that these fuel cells produce zero CO₂ emissions in the GHG Inventory is unjustified and inaccurate.

Omitting emissions from fuel cells in the GHG Inventory is especially concerning as the state continues supporting deployment of this technology. For example, in 2021, the Connecticut state legislature authorized the electric distribution companies to solicit up to 30 MW of new fuel cell electricity generation projects.¹¹ Emissions from all fuel cell projects in Connecticut should be properly accounted for and included in the state’s GHG Inventory.

b. Emissions from the combustion of biofuels must be included in the GHG Inventory.

DEEP must include the emissions from burning biofuels in the GHG Inventory *unless* the best available information indicates that the emissions from growing, refining, and transporting the biofuels have already been properly counted by the jurisdiction where they were grown. DEEP currently uses an international accounting norm under which GHGs from the combustion of biofuels are considered carbon-neutral in the jurisdiction where they are burned (unless that is also the jurisdiction where the biofuel feedstocks were grown). As we explain below, this fiction results in undercounting emissions in jurisdictions like Connecticut where biofuels are burned, but not grown, because the emissions associated with growing, refining, and transporting the fuels are rarely accounted for in the growing jurisdiction.

As Professor Tim Searchinger described during his presentation at DEEP’s Technical Session #6 for the 2022 Comprehensive Energy Strategy, this accounting practice is problematic. It is only accurate from a global perspective, and only if GHG emissions are properly accounted for where the biofuel feedstock is grown. Under this practice, emissions are counted once where a feedstock is grown and harvested, but not again when the feedstock is burned as a biofuel. This avoids double counting emissions *at the global level*. However, this accounting practice is deeply flawed when used at the level of individual jurisdictions like Connecticut.

This accounting practice enables jurisdictions that burn, but do not grow, biofuels to disclaim any responsibility for the emissions that occur at the point of combustion. The burning jurisdiction can claim that the biofuels have net-zero emissions, but this is only accurate (1) from a global perspective, and (2) *if the growing jurisdiction properly accounts for emissions* from growing the feedstock, plus the upstream emissions that result from producing, refining, and transporting the biofuel. If a jurisdiction where a biofuel feedstock is grown does not factor in the opportunity cost of land used for biofuel crops, for example, then total emissions are *not* accounted for, and the burning jurisdiction cannot accurately claim that the biofuels have net-zero emissions.

In most instances, growing jurisdictions do not properly account for the emissions associated with growing the biofuel, or the other upstream emissions from producing and transporting the biofuel, and the burning jurisdiction has zero incentive to determine whether these emissions are being counted. They can simply point to the international norm and claim

¹⁰ *Id.*

¹¹ Conn. Gen. Stat. § 16-244y.

that burning biofuels results in no net emissions. Through this faulty accounting, jurisdictions like Connecticut that burn biofuels, but do not grow the feedstock for them, can appear to greatly reduce their carbon footprint while making no substantial emissions reductions.¹²

DEEP is aware that biofuels are not carbon-neutral, as the agency hosted a CES Technical Session that addressed this topic. Indeed, DEEP specifically asked about the issue in its request for comments following Technical Session #6.¹³ It is disappointing that DEEP continues to treat biofuels as carbon-neutral despite compelling evidence that biofuels are a source of emissions. Connecticut must stop pretending that biofuels are carbon-neutral and include emissions from biofuels in the state GHG Inventory.

3. Millstone environmental attributes should be appropriately calculated so as to not artificially inflate reported GHG emissions.

In 2019, Connecticut's electric distribution companies (EDCs) entered into long-term contracts with Dominion Energy to purchase 9 million MWh of zero-carbon, nuclear energy from the Millstone Power Station (Millstone).¹⁴ Pursuant to these contracts or purchase power agreements (PPAs), the EDCs must purchase approximately **50%** of Millstone's energy output each year, from 2019 to 2029, yet they "receive the zero-carbon environmental attributes associated with **100%** of the facility's output."¹⁵ Millstone currently supplies New England's electric grid and will continue to do so beyond the expiration of the current PPAs. In 2021, DEEP proposed its new consumption-based methodology for calculating electric-sector GHG emissions, noting that Connecticut could claim credit for all of Millstone's environmental attributes.¹⁶

DEEP has yet to release the supporting data for the GHG Inventory, but it appears that the agency may have used 100% of Millstone's environmental attributes to offset the state's total electric sector GHG emissions. From a consumption-based accounting perspective, taking credit for 100% of Millstone's environmental attributes when the state only uses approximately half of the facility's energy output each year not only renders DEEP's calculations incorrect but also ingenuine. Moreover, it is unclear from the GHG Inventory whether DEEP has considered how

¹² Further, this accounting failure likely induces a greater reliance on biofuels at the expense of truly zero-emissions resources, effectively increasing localized air pollution impacts due to the increased combustion of these fuels.

¹³ CT DEEP, Notice of Request for Written Comments (Oct. 19, 2022), <https://portal.ct.gov/-/media/DEEP/energy/CES/Notice-of-technical-meetings-5--6CESFINAL.pdf> (Question 10(f)).

¹⁴ Mary Fitzpatrick, Office of Legislative Research, *Millstone Power Procurement* (September 1, 2020), <https://www.cga.ct.gov/2020/rpt/pdf/2020-R-0203.pdf>, p. 3; see also Governor Ned Lamont, State of Connecticut, *Press Release: Governor Lamont Applauds PURA Approval of Millstone Contract Between Dominion, Eversource, and United Illuminating* (September 18, 2019), <https://portal.ct.gov/Office-of-the-Governor/News/Press-Releases/2019/09-2019/Governor-Lamont-Apprals-PURA-Approval-of-Millstone-Contract>; Dominion Energy, *Signed Agreement Ensures Millstone Power Station will Continue to Provide More than 90 Percent of Connecticut's Carbon-free Electricity for Next 10 years* (March 15, 2019), <https://news.dominionenergy.com/2019-03-15-Dominion-Energy-Millstone-Nuclear-Statement>.

¹⁵ Mary Fitzpatrick, Office of Legislative Research, *Millstone Power Procurement* (September 1, 2020), <https://www.cga.ct.gov/2020/rpt/pdf/2020-R-0203.pdf>, p. 3 (emphasis added).

¹⁶ See Michael Malmrose, CT Department of Energy & Environmental Protection, *Calculation of Electric Sector Greenhouse Gas Emissions in Connecticut* (October 26, 2021), [ElectricSectorPublicMeetingPresentation-2021-1026-finalc.pdf](#), pp. 26–27; CT Department of Energy & Environmental Protection, *Proposed Methodology for Electric-Sector GHG Accounting* (November 9, 2021), <https://www.youtube.com/watch?v=o3nhE2n9J0Q>.

other states account for their own consumption of Millstone’s energy output, if at all, especially given that energy companies in Massachusetts and Vermont own portions of Millstone Unit No. 3 along with Dominion Energy.¹⁷

Accordingly, to properly calculate the state’s GHG emissions, DEEP must *not* employ a methodology that double-counts or front loads Millstone’s environmental attributes.

4. To genuinely compare GHG emissions from previous inventories, DEEP must apply the same GHG accounting methodology to prior years.

When completing GHG emissions inventories, DEEP sometimes amends its methodologies to take advantage of better data or accounting practices. DEEP does not, however, seem to apply updated methodologies to prior inventories. DEEP’s failure to amend inventories from earlier years by recalculating emissions using its updated methodologies makes it difficult to compare the 2021 GHG Inventory to previous ones.

At the very least, DEEP should recalculate the 1990-2000 and 1990-2001 GHG emissions inventories because the state’s emissions reductions are calculated in relation to 1990 and 2001 levels.¹⁸ Applying the same methodology to calculate the state’s total GHG emissions each year allows for an “apple-to-apples” comparison of our emissions over time and provides a much more accurate picture of the state’s progress, or lack thereof, towards meeting our mandatory climate targets.

5. Methane leaks are underestimated and should be accurately accounted for in the GHG Inventory.

a. Methane leaks are a significant health and safety risk, and are improperly accounted for in the current state GHG Inventory.

Methane is an extremely potent GHG, with a Global Warming Potential 86 times that of carbon dioxide per unit mass in the short term.¹⁹ Methane emissions from leaks in the distribution system and from home appliances are significant and are underestimated by the current inventory methodology. Small changes in modeled natural gas leakage rates can therefore have enormous impacts on the state’s overall emissions Inventory. The modeling in the current inventory’s accounting must be updated to include higher leakage rates, as failing to do so obscures the true costs of our reliance on gas—and, more importantly, our urgent need to address the worst leaks in the short term and get off gas in the medium term.

¹⁷ See Massachusetts Municipal Wholesale Company (MMWEC), *Millstone Unit 3*, <https://www.mmwec.org/our-energy-assets/millstone-nuclear/> (last visited July 3, 2023) (identifying MMWEC and Central Vermont Public Service Corporation as owners of Millstone Unit 3); U.S. Nuclear Regulatory Commission, *Dominion Energy Nuclear Connecticut, Inc., et al., Docket No. 50-423 (Millstone Power Station, Unit No. 3) Renewed Facility Operating License, Renewed License No. NPF-49* (November 28, 2005), <https://www.nrc.gov/docs/ML0527/ML052720310.pdf>, pp. 1 n.1, 2 (identifying Dominion Energy, Green Mountain Power Corporation, and MMWEC as licensees and owners of Millstone Unit No. 3).

¹⁸ C.G.S.A. § 22a-200a.

¹⁹ See Intergovernmental Panel on Climate Change, *Climate Change 2013: The Physical Science Basics* 714 (2013), available at https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_all_final.pdf.

A collection of peer-reviewed studies commissioned by the Environmental Defense Fund found that supply chain emissions were approximately 60% higher than the U.S. EPA inventory estimate, or 5 million metric tons more than estimated by the EPA. A 2019 Sierra Club study of methane leaks conducted on public streets in Hartford estimated 4.3 methane leaks per road mile, up from 3.4 methane leaks per road mile observed in 2016.²⁰ The study also found 3.6 leaks per road mile in Danbury in 2019.²¹ Another recent study measured methane leakage around Boston and estimated total supply chain losses of 3.3 to 4.7% for natural gas consumed in urban areas, which significantly increases the climate impacts of natural gas compared to existing U.S. EPA estimates.²² This study also found six times more methane leaking into the air around Boston than reported in the Massachusetts Inventory, and observed no changes in the level of methane emissions in the Boston area over a period of 8 years despite significant efforts over that time period to slow the rate of methane leaks in the gas system.²³ A similar disconnect exists in Connecticut between the levels of unaccounted for gas in the distribution system and estimated methane main and service leaks captured in the current Connecticut inventory.

b. Methane leaks are a health and safety barrier to home energy efficiency solutions, disproportionately impacting underserved and overburdened communities.

Methane leaks represent both a health and safety barrier to Connecticut households, especially low-to-moderate-income households, as they prevent full weatherization that could otherwise achieve substantial energy savings. A 2020 weatherization study found that between 10–35% of all EnergizeCT Home Energy Solution and Home Energy Solution (HES)-Income Eligible jobs were canceled due to health and safety problems, with carbon monoxide and/or gas leaks being some of the highest health and safety-related cancellation reasons.²⁴ Elevated gas and carbon monoxide levels usually arise due to deferred maintenance, and many lower-income Connecticut residents (especially those living in central urban areas built before 1950) who sign up for the EnergizeCT programs are unable to receive services.²⁵

Additionally, a 2020 weatherization barriers workshop hosted by the Energy Efficiency Board and DEEP acknowledged methane leaks as a common barrier to the weatherization of homes through the EnergizeCT program, precluding necessary upgrades to many buildings throughout the state.²⁶ During a two-year period (2017–2019), 23% of HES-Income Eligible homes were barriered from weatherization—many of which were likely due to gas leaks. As such health and safety barriers are more prevalent in low-income housing, low-and-moderate-

²⁰ Tim Keyes, et al., Connecticut Mobile Methane Leaks Survey and Analysis Results, April 1, 2019.

²¹ *Id.*

²² Maryann R. Sargent, *Majority of US Urban Natural Gas Emissions Unaccounted for in Inventories*, October 25, 2021 <https://www.pnas.org/content/118/44/e2105804118>.

²³ *Id.*

²⁴ Annie Harper, Yale University Office of Sustainability's Yale Community Carbon Fund, *Health and Safety Barriers to Weatherization Study* (Technical Report, January 27, 2022).

²⁵ *Id.*, Annie Harper, Yale University School of Medicine, Program for Recovery and Community Health, Testimony in Support of 2016 HB 5398 (February 29, 2016), available at [2016HB-05398-R000301-Annie Harper-TMY.PDF \(ct.gov\)](https://portal.ct.gov/-/media/DEEP/energy/ConserLoadMgmt/Weatherization-Barriers-Workshop-1-Slides.pdf).

²⁶ Energy Efficiency Board and DEEP, Weatherization Barriers Workshop (November 18, 2020), materials available at <https://portal.ct.gov/-/media/DEEP/energy/ConserLoadMgmt/Weatherization-Barriers-Workshop-1-Slides.pdf>.

income households are disproportionately barred from both accessing and achieving full potential of weatherization programs.²⁷

For the foregoing reasons, the undersigned organizations urge DEEP to address these issues in the GHG Inventory and provide an updated version as soon as possible.

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²⁷ See National Renewable Energy Laboratory, Healthy Housing Opportunities During Weatherization Work (March 2011), available at: <https://www.nrel.gov/docs/fy11osti/49947.pdf>; see also Marcos Luna & Dominic Nicholas, *An Environmental Justice Analysis of Distribution-Level Natural Gas Leaks in Massachusetts, USA*, 162 Energy Policy 112778 (March 2022).