

# Concerns Related to “Renewable Natural Gas” Assumptions in the DPU 20-80 Future of Gas Consultant Analysis



## Spoken Testimony to the Massachusetts Senate Committee on Global Warming and Climate Change: Future of Gas Oversight

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Thank you Chair Creem and the Committee. Also, thank you to the AGO for starting this important process. My name is Ben Butterworth and I am the Senior Manager of Energy & Climate Analysis for Acadia Center. Seven of the eight scenarios analyzed by E3 rely on biomethane (often referred to as renewable natural gas or RNG). RNG, largely imported from outside the northeast, is presented as a key tool for decarbonizing heating in buildings. For example, by 2050 in the “Hybrid Electrification” scenario, RNG appears to account for over 80% of the total energy flowing through the pipes to homes and businesses.

The E3 analysis makes several troubling assumptions related to RNG:

- #1 Assuming that all forms of RNG are completely emissions-neutral
- #2 Overestimating the supply of RNG that will be available to the Commonwealth

The assumption that RNG is emissions-neutral hinges on not accounting for many of the lifecycle emissions from RNG. One of the key limitations of Massachusetts’ Greenhouse Gas Inventory, is that lifecycle emissions from RNG do not impact reported statewide totals. This is a gross simplification of a complex issue, particularly when considering that methane leaks along the entire RNG supply chain are a massive concern. E3’s analysis “doubles down” on this flawed approach, simply assuming that RNG is emissions-neutral in all instances.

When analyzing the GHG impacts of RNG, it’s important to consider the two general categories of RNG:

#1: RNG derived from “intentionally produced” methane and

#2: RNG derived from “waste methane”

An example of “intentionally produced methane” is converting agricultural residues to methane through a process known as gasification, and an example of “waste methane” is methane released by a landfill as organic material decays. E3 relies on both types of RNG across multiple scenarios. As Dr. Emily Grubert, a professor of Environmental Engineering at Georgia Tech, points out in her research, we know that RNG systems leak methane, just like natural gas systems and potentially even more. When we *intentionally produce* methane, **any** methane leaks along the RNG supply chain results in a net increase in GHG emissions.

For RNG produced using “**waste methane**”, any claims of this form of RNG being emissions-neutral, are based on a flawed comparison against the worst possible alternative – that is allowing methane released from sites like landfills to go directly into the atmosphere. However, if the ultimate goal is to minimize GHG emissions from

sites like landfills, the best option is to capture the biogas and combust it in a combined heat and power facility that produces both electricity and useful heat.

If combined heat and power at a particular site is not a viable option, even just burning the methane (a process known as flaring) is better from a GHG perspective than RNG production because it avoids downstream methane leaks along the RNG supply chain, as research by Dr. Grubert highlights. For RNG produced from waste methane to actually be beneficial from a GHG perspective, leak rates along the supply chain would need to be about 1%, but we know they're much higher than that – typically ranging from 2.8% to 4.8% but observed to be as high as 15.8%.

The E3 report openly acknowledges that treating RNG as emissions-neutral is problematic: “*The Consultants recognize that treating renewable fuels as having net-zero emissions is a simplification of the complex carbon flux associated with these fuels,*” going on to state that, “*...treating renewable fuels as having net-zero carbon emissions may overestimate their decarbonization potential... Such an overestimation increases the risk of not meeting the Commonwealth’s decarbonization goals...*”

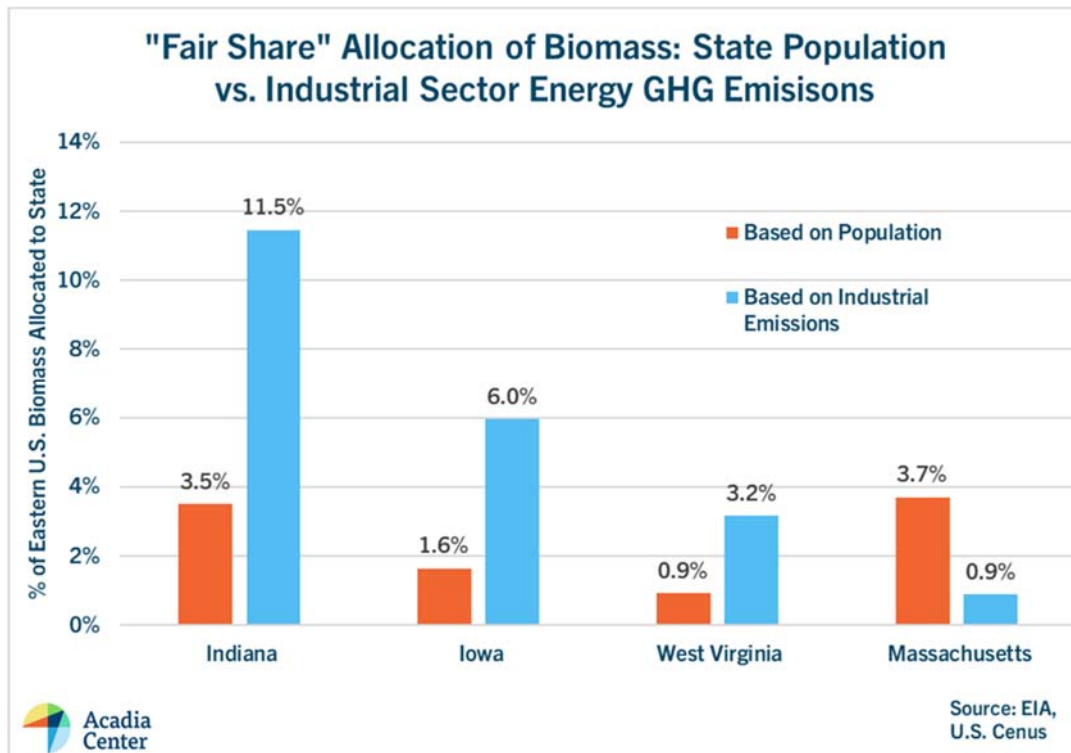
Despite this acknowledgement in the report, the consultants ignored multiple requests from stakeholders to consider net GHG emissions from RNG.

Some forms of *truly sustainable* biofuels can play a role in achieving net zero emissions – however, relying on the nation’s **limited supply** of sustainable biomass feedstocks to produce RNG for the gas system, does not come without a *massive* opportunity cost. Biomass resources should not be allocated to sectors, like residential & commercial heating, which are relatively easy to electrify. Instead, these resources should be used to decarbonize the sectors that are hardest-to-electrify like industry, chemical production, aviation and shipping.

As a nation, we won’t have enough biomass to decarbonize buildings, never mind decarbonizing buildings and the hardest-to-electrify sectors. This is one of the reasons that none of the five decarbonization pathways modeled in the Princeton Net-Zero America (NZA) Project found it cost effective to use biomass to produce biofuels for use in buildings, and instead prioritized these fuels for hard-to-electrify sectors.

E3’s model attempts to account for these opportunity costs by modeling competition for biomass feedstocks across heating, industrial, and transportation sectors *within* Massachusetts. However, E3’s approach allocates a “fair share” of biomass resources to each state strictly based on that state’s population. For example, since Massachusetts makes up 3.7% of the Eastern U.S. population, E3’s model assumes that Massachusetts can responsibly use 3.7% of all Eastern U.S. biomass.

This population-weighted approach fails to account for the critical point that states with a disproportionate concentration of hard-to-electrify sectors, like heavy industry, will need more biomass to achieve carbon neutrality. A simplified example of this dynamic is shown in the figure here.



The **orange** shows an allocation of biomass energy resources based on state population, as E3 has done. The **blue** shows an allocation of biomass based on current industrial sector emissions in each state. The industrial sector will need something to combust.

Indiana's population is lower than that of Massachusetts, yet industrial energy demand in Indiana is nearly **13 times** higher than industrial energy demand in the Commonwealth. Allocating biomass to states based on industrial sector energy consumption would result in bioenergy resources for Massachusetts being greatly constrained.

In Massachusetts, notice how this tweak to biomass allocation reduces the amount of biomass, and thus RNG, available to Massachusetts **by over 75%**. If E3 allocated biomass resources based on industrial emissions in each state, the scenarios that rely heavily on RNG would simply fall apart. The population-based allocation E3 assumed is very convenient if you're trying to make the case that RNG will be plentiful in Massachusetts, but not-so-convenient for industry-heavy states like Indiana that get shortchanged by this approach.

Acadia Center brought up this major issue several times in the early stages of E3's analysis, but the response from E3 then was similar to the explanation in the report now: "*Other ways to allocate biomass availability to Massachusetts were also considered, and were found to result in similar percentages.*" However, 0.9% and 3.7% are not similar percentages. It appears that none of these "other ways" considered by E3 were based on the near-universal consensus among experts that alternative fuels should be prioritized for the hardest-to-electrify sectors.

Thank you very much for your time today and I am happy to answer any questions.



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