

Meeting the Global Warming Solutions Act

Chase Whiting, Conservation Law Foundation

Conservation Law Foundation

Founded in 1966, CLF is a nonprofit, member-supported organization working to create solutions that preserve our natural resources, protect public health, and promote thriving communities for the benefit of all people living in New England.

We use the law, science, and the market to create solutions.

We've been working to address the root causes of climate change for decades and have played a part in milestones across New England to curb its harmful causes.



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Climate change is detrimental to Vermont

In August, the Intergovernmental Panel on Climate Change concluded that global warming of 1.5°C and 2°C (the highest levels permitted by the Paris Climate Agreement) will soon occur

- Shorter and shorter maple sugaring seasons
- Shorter winters squeeze Vermont's ski and snowboard industry
- Warmer waters see more cyanobacteria blooms in Lake Champlain
- More frequent and severe floods risk life, health, and property
- More tick born illnesses
- More droughts
- Increased risk of wildfires
- Worsened air and water quality

A Clean Heat Standard Should help meet the Global Warming Solutions Act

Achieving the GWSA

Sec. 3. 10 V.S.A. § 578 is amended to read:

§ 578. GREENHOUSE GAS REDUCTION GOALS REQUIREMENTS

(a) ~~General goal of greenhouse~~ Greenhouse gas reduction requirements. ~~It is the goal of the State to~~ Vermont shall reduce emissions of greenhouse gases from within the geographical boundaries of the State and those emissions outside the boundaries of the State that are caused by the use of energy in Vermont ~~in order to make an appropriate contribution to achieving the regional goals of reducing emissions of greenhouse gases from the 1990 baseline, as measured and inventoried pursuant to section 582 of this title, by:~~

(1) ~~25~~ not less than 26 percent from 2005 greenhouse gas emissions by January 1, ~~2012~~ 2025 pursuant to the State's membership in the United States Climate Alliance and commitment to implement policies to achieve the objectives of the 2016 Paris Agreement;

(2) ~~50~~ not less than 40 percent from 1990 greenhouse gas emissions by January 1, ~~2028~~ 2030 pursuant to the State's 2016 Comprehensive Energy Plan; and

(3) ~~if practicable using reasonable efforts,~~ 75 not less than 80 percent from 1990 greenhouse gas emissions by January 1, 2050 pursuant to the State's 2016 Comprehensive Energy Plan.

→ “Vermont *shall* reduce emissions of greenhouse gases from *within the geographic boundaries of the State* and those *emissions outside the boundaries of the State that are caused by the use of energy in Vermont*”

→ 26% by 2025

→ 40% by 2030

→ 80% by 2050

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Achieving the GWSA

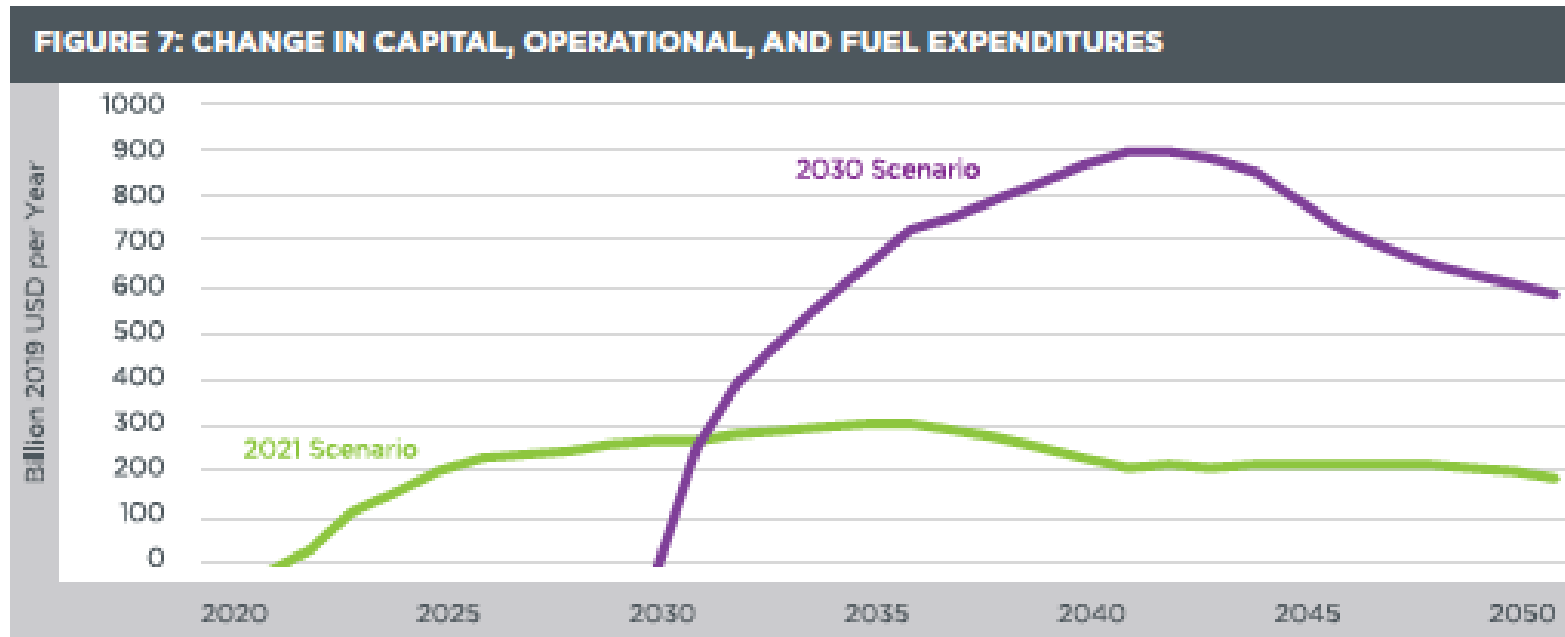
A heating system installed today will likely last for 20 or more years, meaning that it will almost certainly remain in use beyond 2030

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Today's decisions will determine tomorrow's emissions

Today's decisions will also determine tomorrow's costs



Source: *The Energy Policy Simulator*, Energy Innovation

**Vermonters
could get stuck
with expensive
stranded assets**

“If we continue to buy and build polluting power plants, factories, and equipment for the next decade, and then decide we must make the clean energy transition fast to avoid climate damages, we will need to retire much more polluting equipment before the end of its functional life. And that isn’t cheap.”

Source: Hal Harvey, *et al*, *The Costs of Delay*, Energy Innovation Policy & Technology (2021)

Invest in emissions reductions equitably

The Vermont Legislature has found that “a failure to substantially reduce emissions over the next ten years will . . . increase the costs of decarbonization” and “risks significant economic damage to Vermont.”

The “climate crisis disproportionately impacts rural and marginalized, disenfranchised, and disinvested communities” in Vermont, which is why Vermont “must prioritize the allocation of investment of public resources to these communities.”

Source: Vermont Laws, Act No. 153, Sec’s. 2(3), 2(2), 2(5)

Measure twice. Cut once.

A well-designed plan to decarbonize home heating and cooling is critical if Vermont is to do its part in preventing the worst harms of climate change

A poorly designed plan could lock-in high emissions, costs, stranded assets

The details matter

- Clean heat credits must achieve the GWSA

- Accurate greenhouse gas accounting is essential

- Legislative guidance to the Executive Branch, where the CHS will be implemented, can clarify important details

**Clean heat credits should
be awarded for true
greenhouse gas reductions**

Clean heat credits must be in service of the GWSA

- Clean heat credits create economic value
- Where that value arises will incentivize certain heating decisions
- To achieve the GWSA, the value should be based directly on greenhouse gas emissions reductions
- And progressively more credits should be issued for progressively cleaner heating sources

Electric heat is critical to reducing emissions

“All [decarbonization] scenarios share common features — such as relying upon deep decarbonization of the electricity sector, coupled with extensive electrification of the thermal and transportation sectors in order to achieve Vermont’s 2030 and 2050 GHG emissions reduction targets.”

Source: 2022 Vermont Comprehensive Energy Plan

The Clean Heat Standard Should Effectively Value Electric Heat Sources

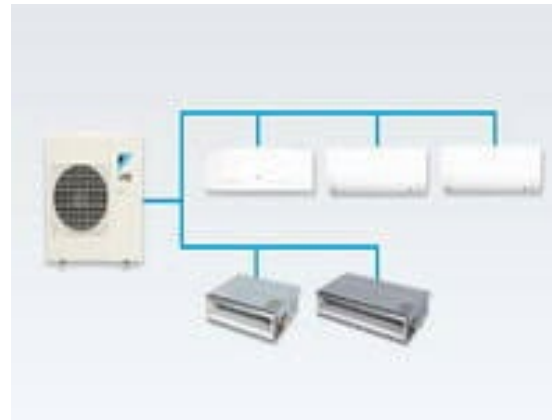
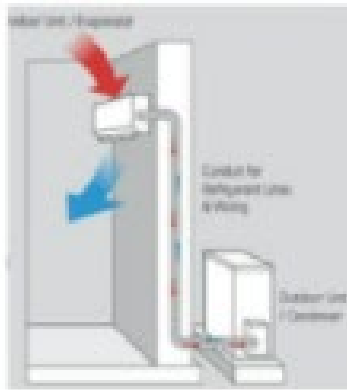
- Clean grid electricity used as ‘fuel’ for heat
- Heat pumps
- Rooftop solar coupled with heat pumps

Modern heat pumps work

Modern cold climate heat pumps can operate efficiently in sub-zero temperatures

Heat pumps can heat single rooms or entire buildings

- **Single-head heat pumps:** One indoor unit
- **Multi-head heat pumps:** 2-3 indoor units placed in different rooms
- **Ducted heat pumps:** Provide heat throughout a building using ducts



Heat pumps can provide both heating and cooling

The Takeaways

Clean electric heat is an essential part of the equation

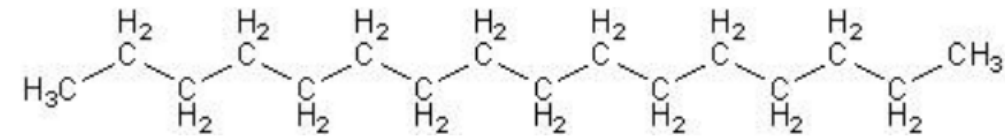
Clean electricity, weatherization, alternative fuels, and heat pumps must all be assessed based on accurate greenhouse gas emissions reductions

Accurate Greenhouse Gas Accounting

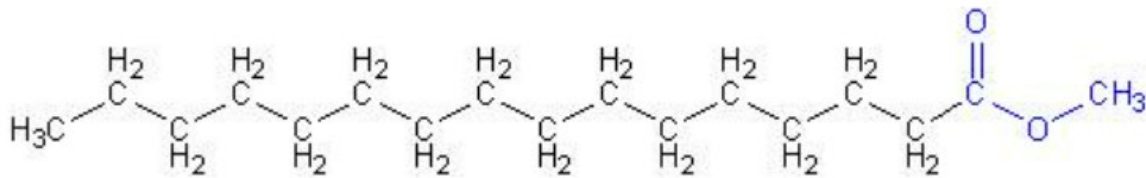
Measure twice. Cut once.

Biofuels are a lot like fossil fuels

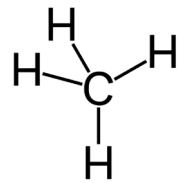
Hydrocarbons: Made from hydrogen and carbon



Diesel

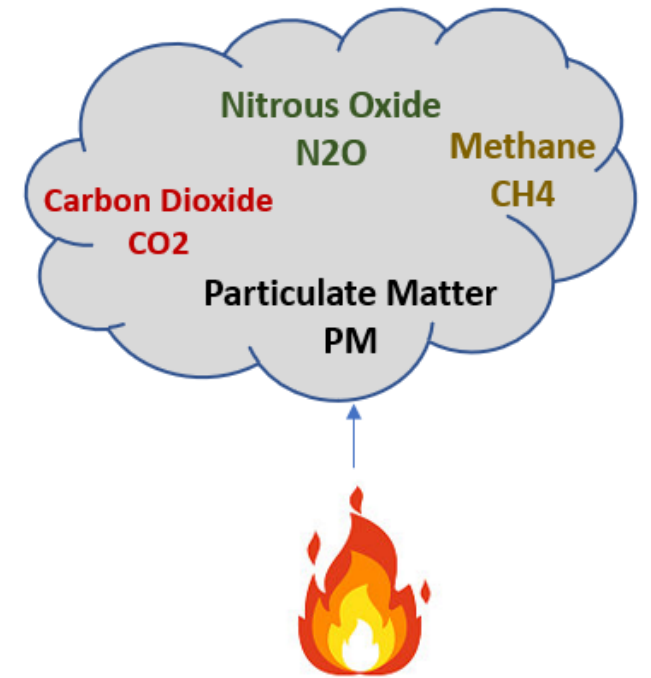


Biodiesel

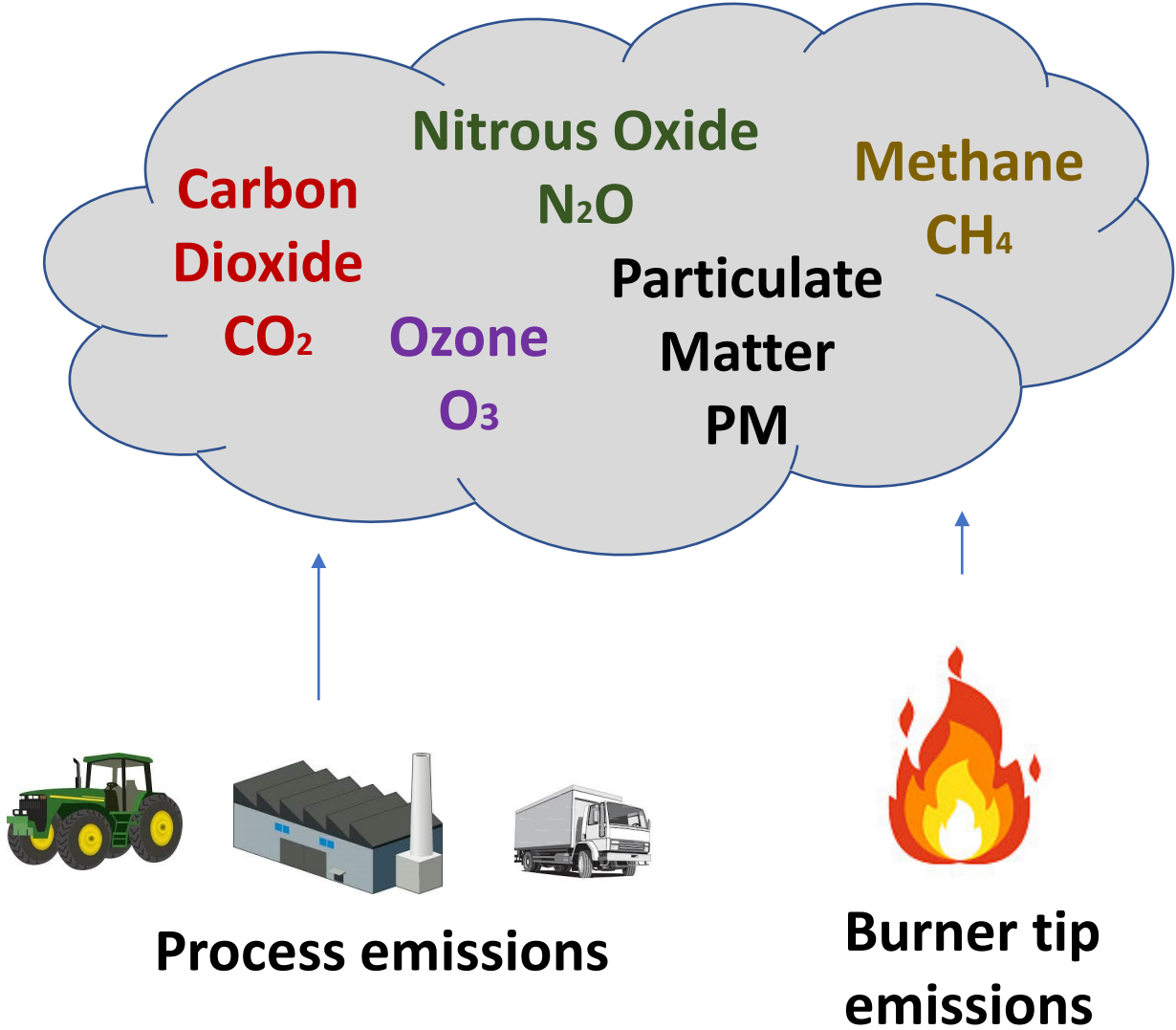


**Natural Gas &
Renewable Natural Gas**

**They Cause Similar Emissions
When Combusted**



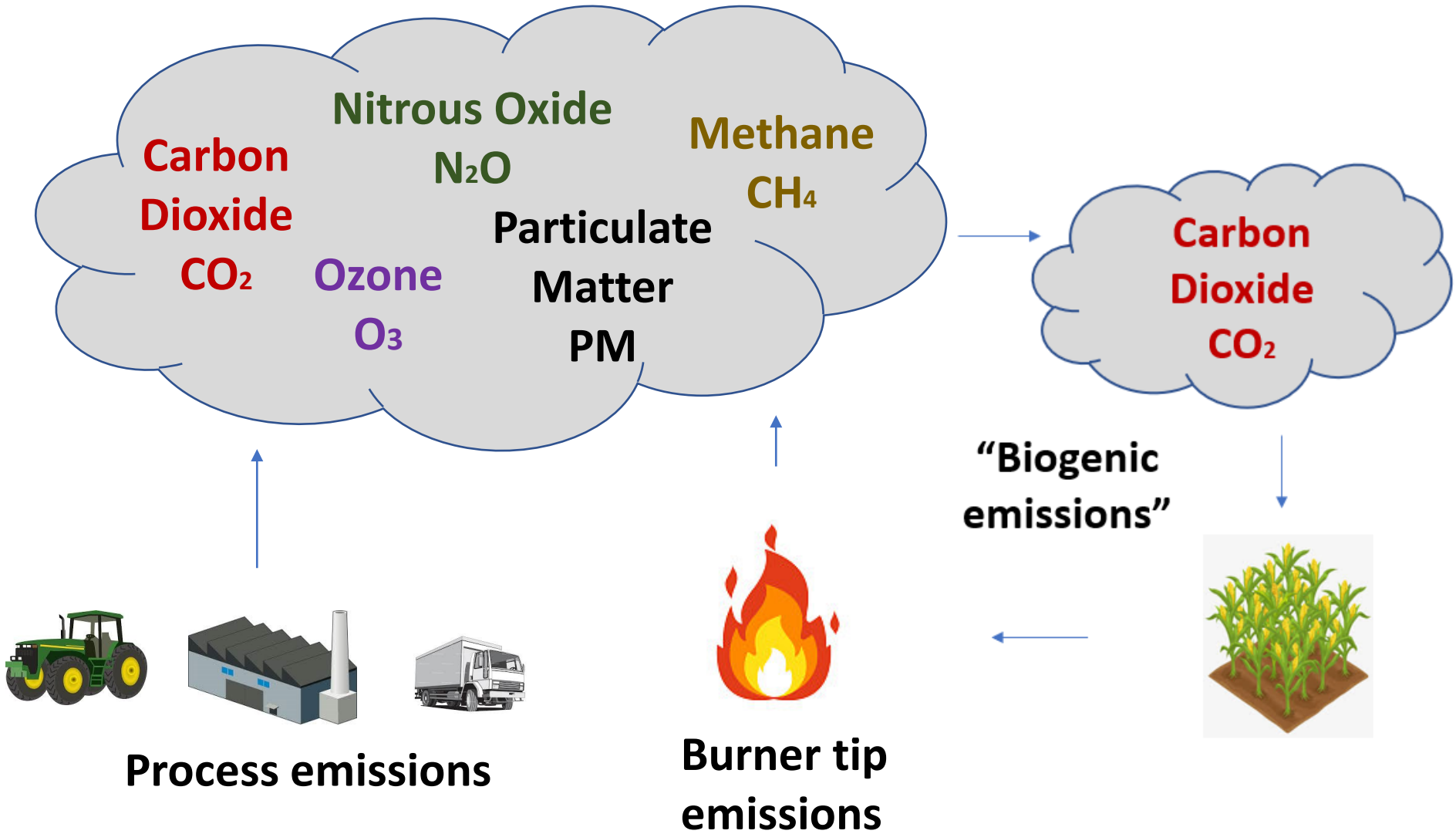
Lifecycle Greenhouse Gas Emissions



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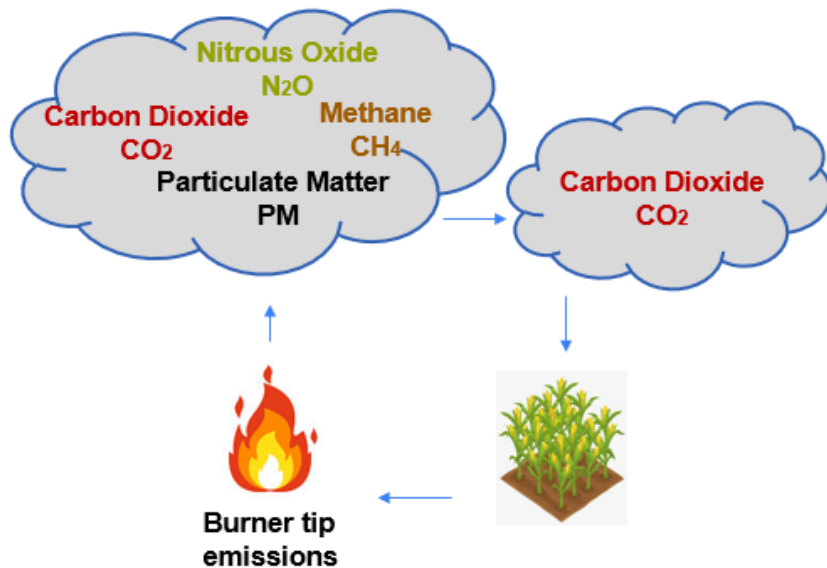
10 V.S.A. § 578(a)

Lifecycle Greenhouse Gas Emissions



Assumptions about biogenic emissions could have policy consequences for a CHS

Consider assumptions carefully



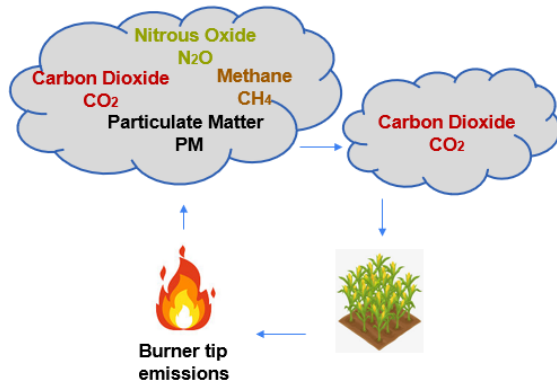
In Vermont, carbon dioxide emissions from “biogenic” sources are not counted. This means that CO₂ emissions from biomass, wood pellet stoves, and landfill gas (RNG) used to heat buildings is not counted.

“Carbon dioxide emitted from the combustion or decomposition of biogenic materials . . . are assumed to be either sequestered by the regrowth of the biogenic material that produced them, or captured in the flux from the land use change.”

Source: Vermont Greenhouse Gas Emissions Inventory and Forecast (1990-2017)

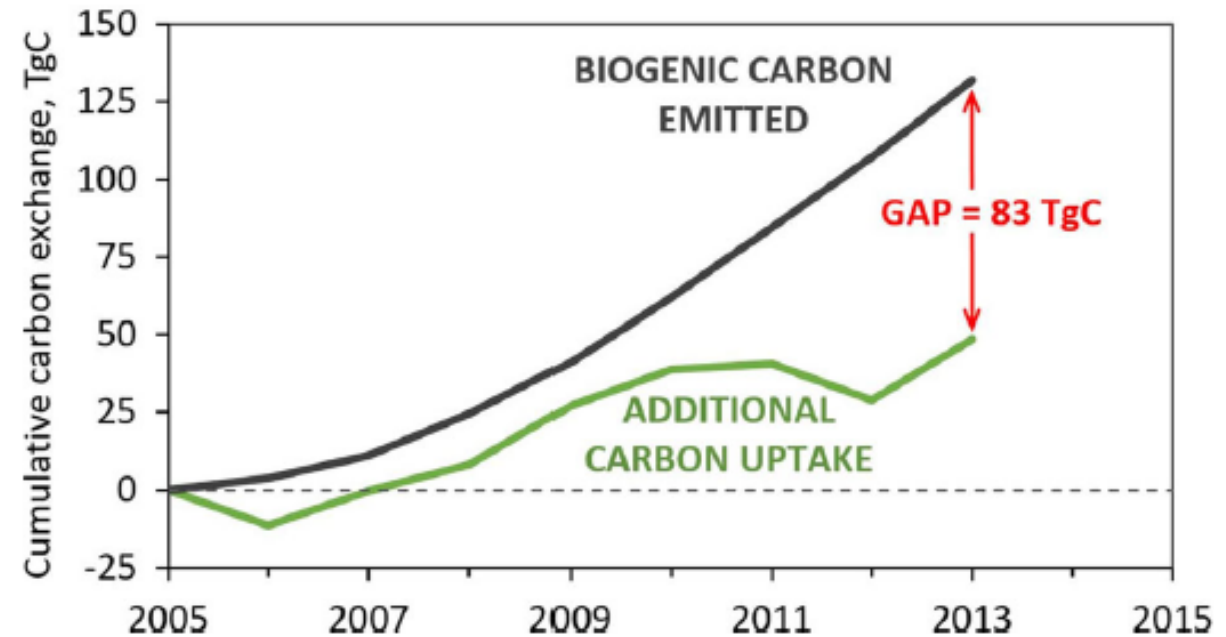
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Fig. 4 Cumulative carbon emitted by U.S. biofuel use compared to cumulative additional carbon uptake on cropland



“Carbon Neutrality Gap”

**Between 2005 and 2013, only 37% of biofuel emissions were removed from the atmosphere
→ Net increases in atmospheric CO₂**



Source: John DeCicco, *et al*, *Carbon balance effects of U.S. biofuel production and use*, 138 *Climate Change* 667-680 (2016).

Consider undesired consequences

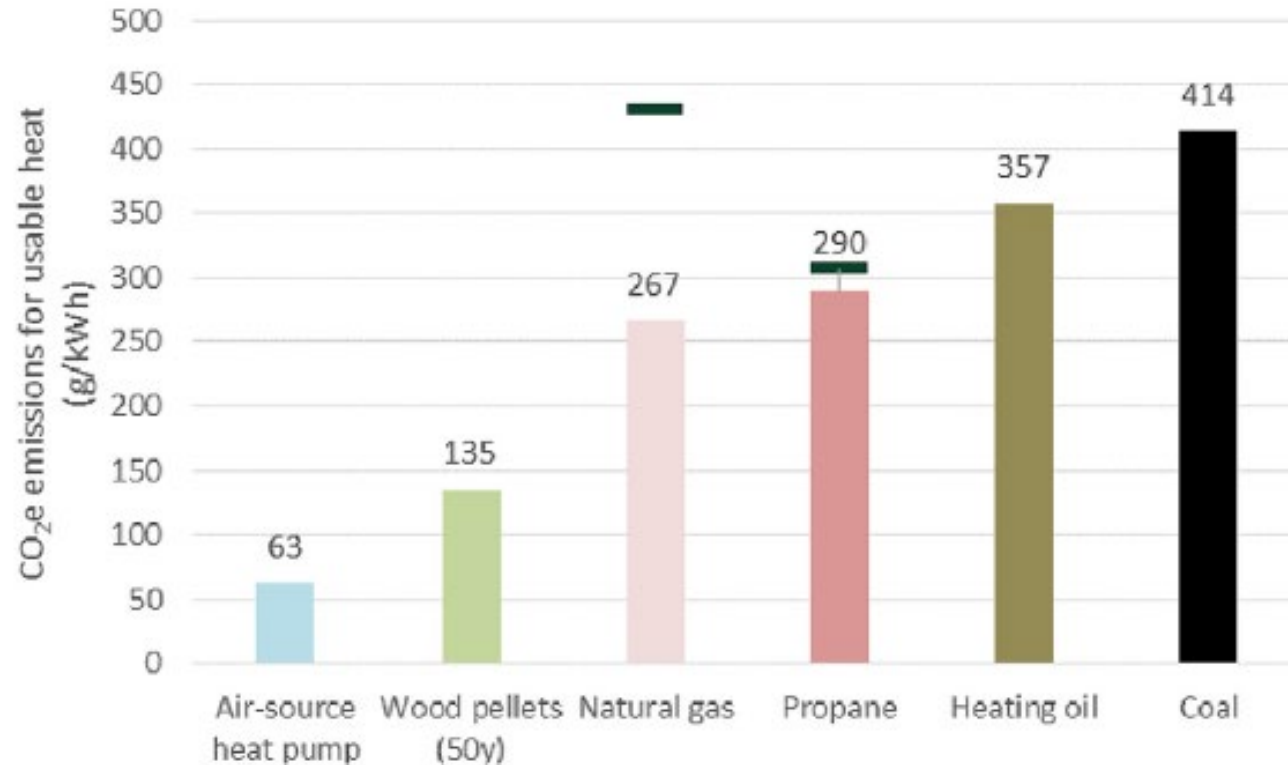
Many biofuels are derived from food crops such as corn, soy, and sugarcane

Arable land is finite

Increasing the demand for biofuels could

- **Displace food resources with biofuels**
- **Squeeze limited water resources**
- **Incentivize deforestation and the conversion of wild grasslands (where carbon is stored long-term) into biofuel feedstock fields**

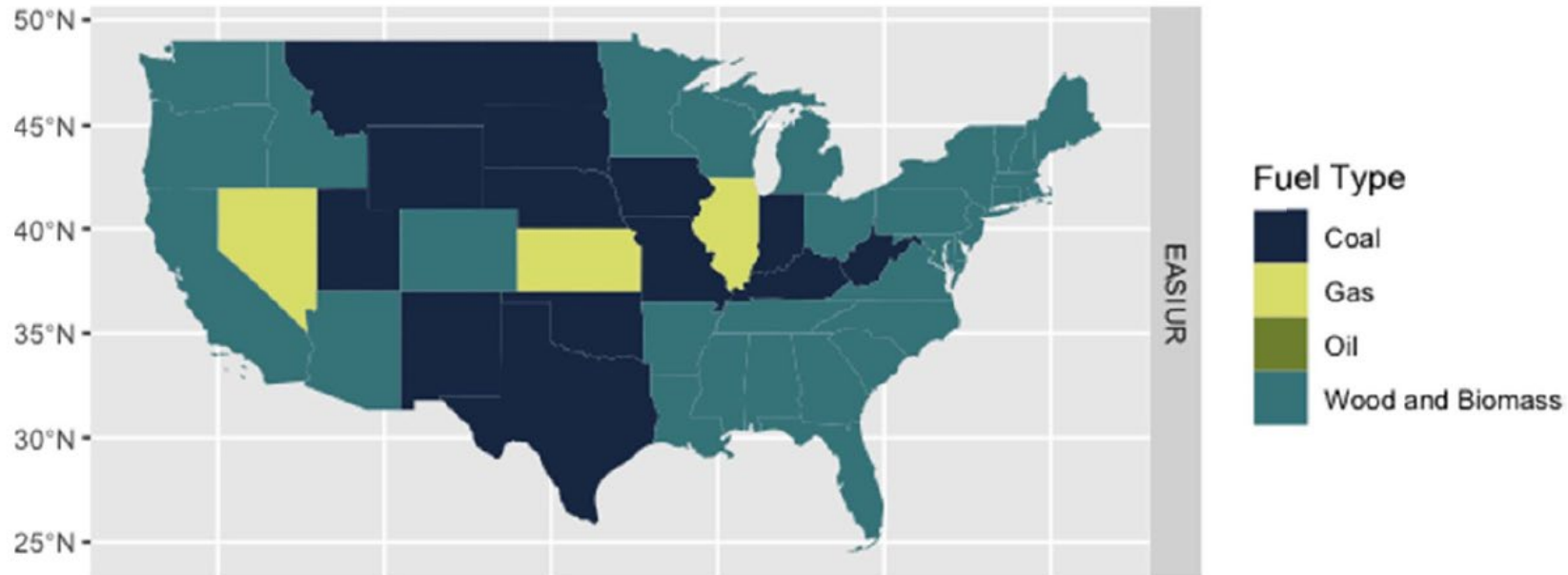
Consider what fuels are made out of



In this analysis, GHG benefits may be possible when wood pellets are made from 50% wood “residue” and 50% wood pulp; but those GHG emissions benefits disappear when wood pellets are made from increasing amounts of pulp.

Source: Thomas Buchholz, *et al*, *Greenhouse gas emissions of local wood pellet heat from northeastern US forests*, Energy (2017).

Consider social costs such as human health



“Nationwide, in 2017, health impacts of biomass and wood combustion are higher than combustion of coal and gas individually.”

The combusted fuel with the highest public health burden from PM_{2.5} in 2017, by state

Source: Jonathan Buonocore, *et al*, *A decade of the U.S. energy mix transitioning away from coal: historical reconstruction of the reductions in the public health burden of energy*, *Environ. Res. Letters* (2021)