



**Presentation to the Vermont House
Energy & Environment Committee
on the “Affordable Heat Act” (S.5)**

April 4, 2023

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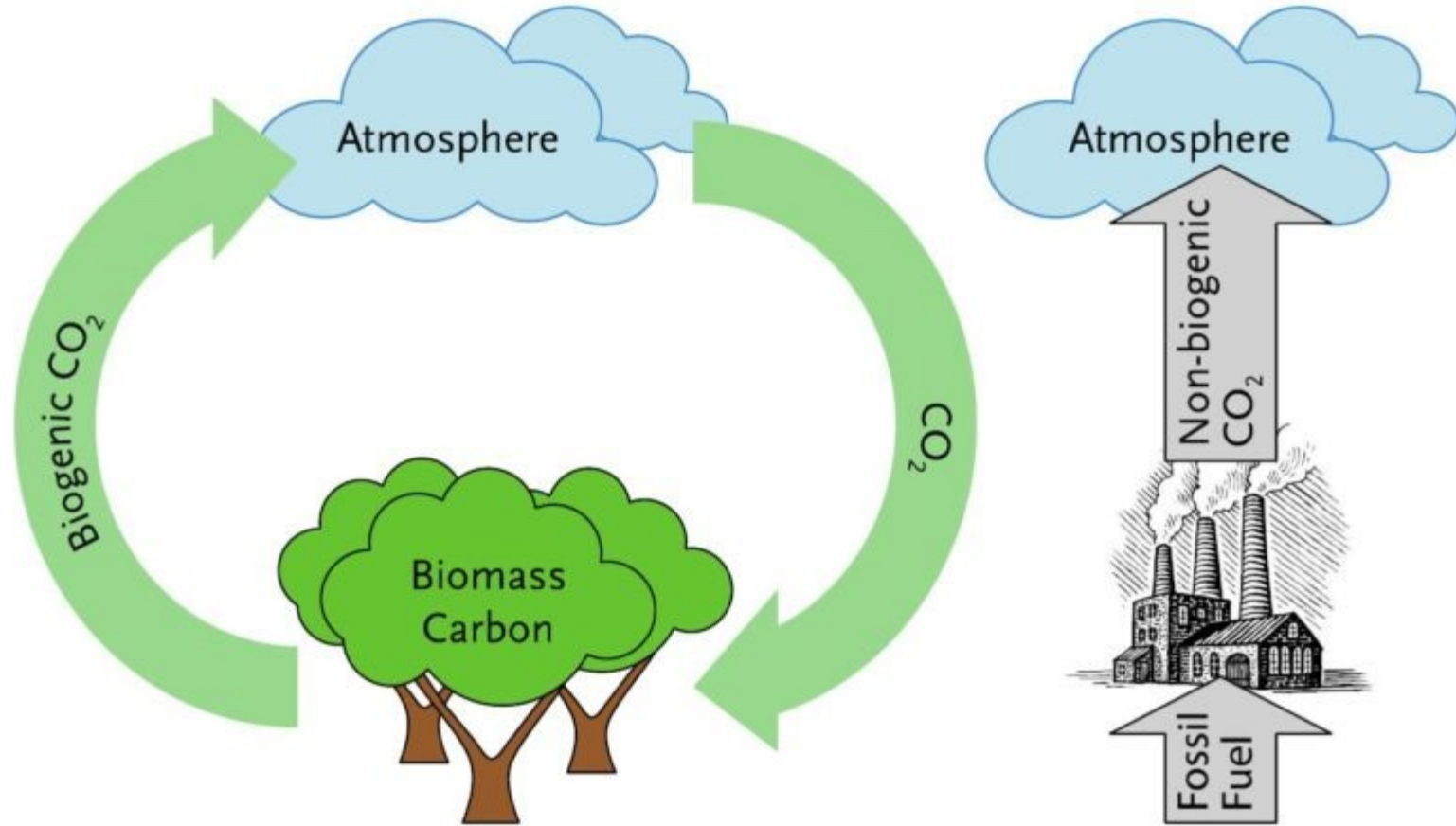
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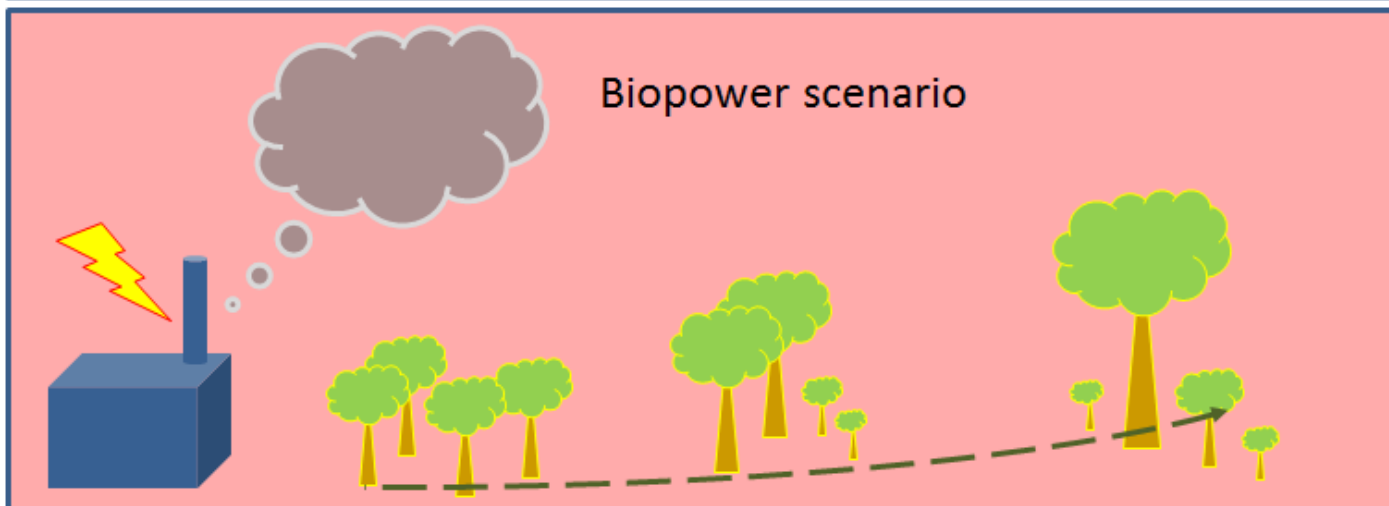
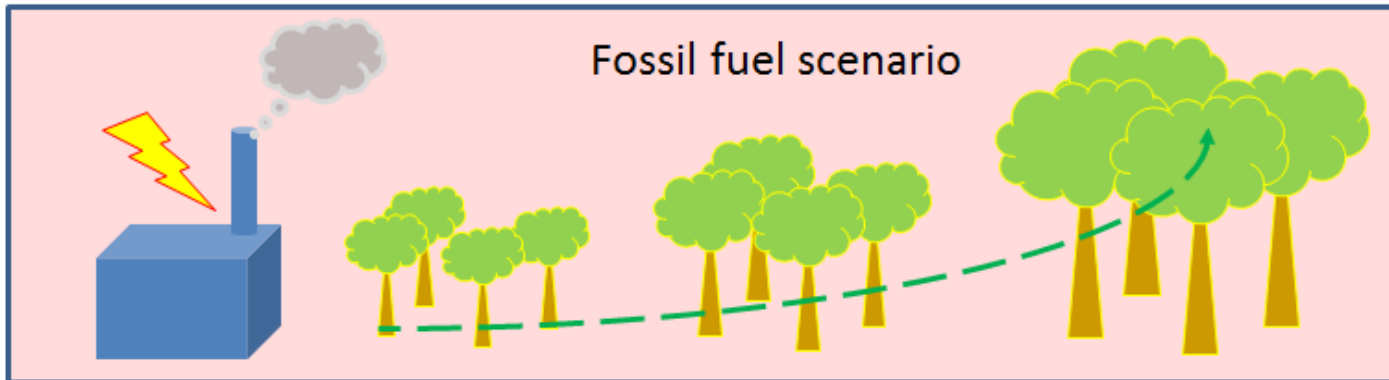
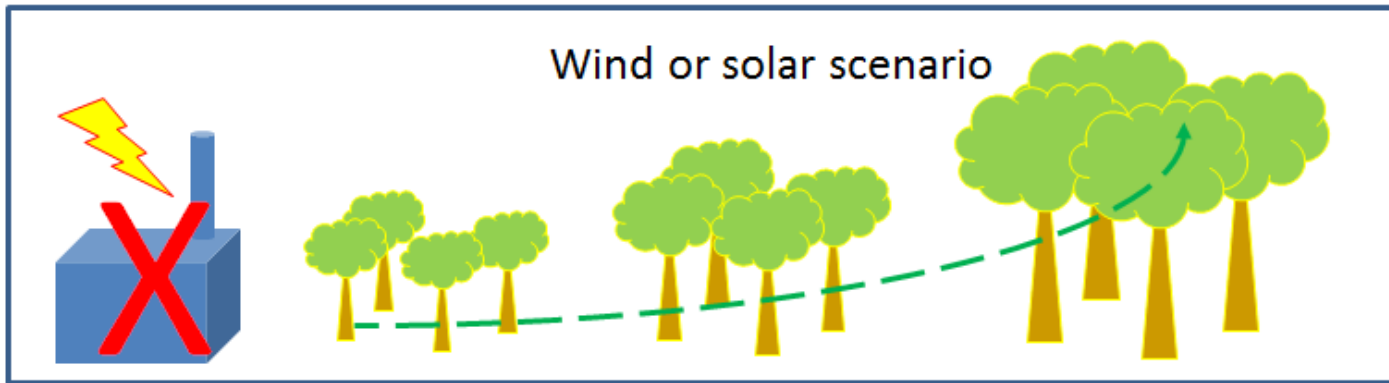
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PFPI Recommendations for S.5

- 1) Add health-based standards
- 2) Prioritize weatherization, heat pumps, solar hot water, geothermal
- 3) Remove or limit eligibility for wood-burning and biofuels
- 4) Clarify that GHG lifecycle analysis will count biogenic emissions

THEORY: "Closed Loop" Carbon Cycle





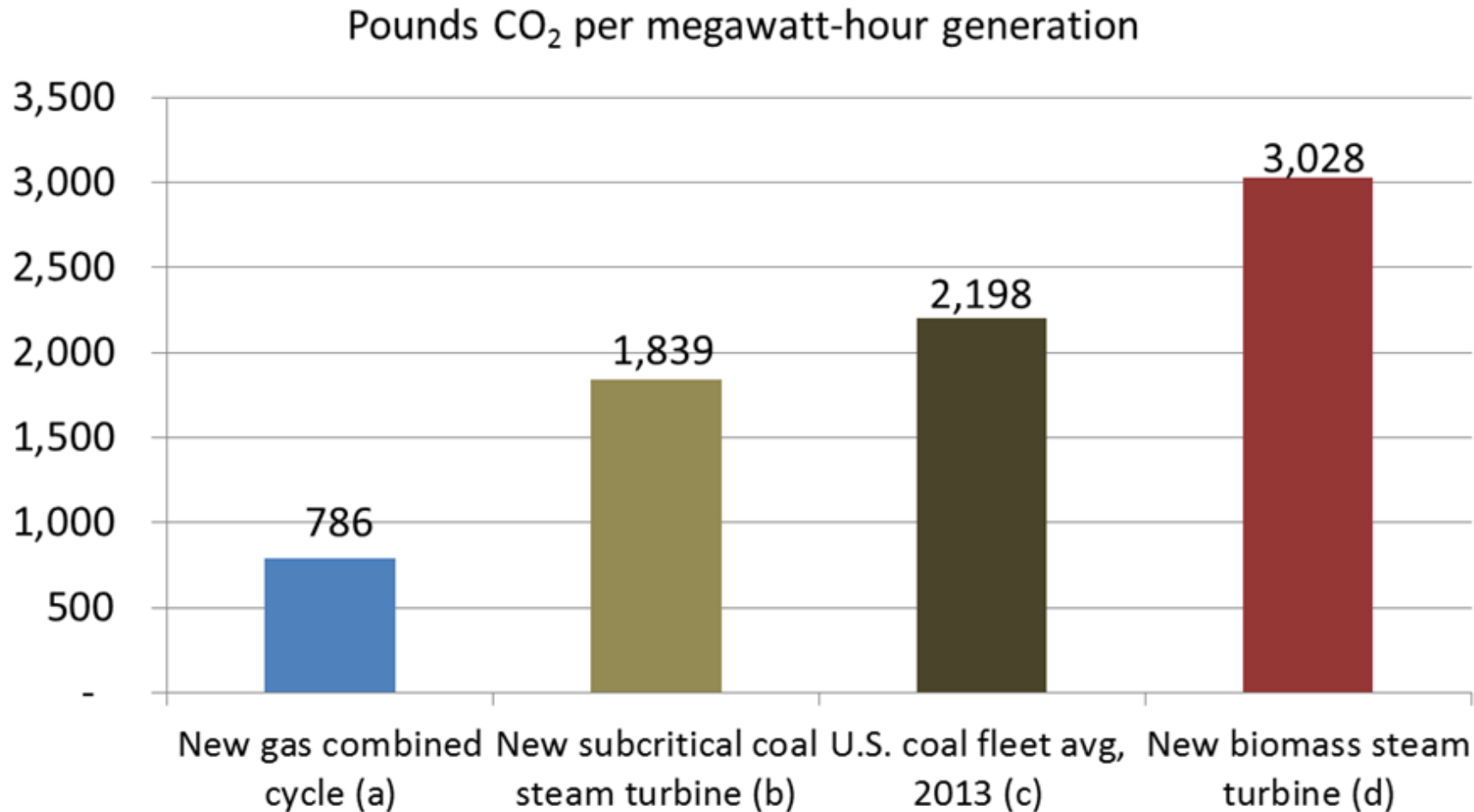
Time →

REALITY:

Wood burning power plants emit more CO₂ per unit energy and also degrade the forest carbon sink.

The result is higher atmospheric CO₂ concentrations.

Wood-burning power plants emit more CO₂ per MWh than coal or gas-fired plants



GHG lifecycle analysis commissioned by MA shows offsetting bioenergy CO₂ takes decades

Wood for electricity and heat: Time to parity with fossil fuels

TABLE 7 Years for Biomass Energy Emissions to Reach Equal Flux with Fossil Fuel Energy Emissions

Harvest scenario	Fossil fuel technology			
	Oil (#6), thermal	Coal, electric	Gas, thermal	Gas, electric
Mixed wood	15–30	45–75	60–90	>90
Logging residues only	<5	10	10	30

Optimistic because assumes forests are allowed to regrow fully

Walker, T., et al (2013). "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): 130-158.**

The myth of biomass “carbon neutrality”

IPCC: does “*not automatically consider or assume biomass used for energy as 'carbon neutral,' even in cases where the biomass is thought to be produced sustainably*”

EPA Science Advisory Board: “*Not all biogenic emissions are carbon neutral nor net additional to the atmosphere, and assuming so is inconsistent with the underlying science*”

IPCC: “*The neutrality perception is linked to a misunderstanding of the guidelines for GHG inventories*”

McNeil CO₂ emissions estimates with and without counting the emissions from burning wood

2022 VEIC lifecycle assessment of McNeil GHG Emissions

Total CO ₂ e emissions (only counting fossil fuel input)	16,393 metric tons
Not counted: CO₂ emissions from burning wood	341,402 metric tons*

Average GHG emissions (metric tons CO ₂ e per MWh)	
McNeil (only counting fossil inputs)	.07
ISO-New England fuel mix	.43
McNeil (counting <u>all</u> emissions)	1.44 metric tons CO₂e per MWh

* PFPI estimates based on burning 338,581 metric tons wood chips per year, 26% plant efficiency, 45% average moisture content, per [2022 VEIC Assessment of lifecycle GHG emissions from Joseph C. McNeil Generation Station, April 29, 2022](#)

May 12, 1998



Not carbon neutral: Trees take a long time to regrow

25-ACRE CLEARCUT, MAINE

~ 950 dry tons biomass

Enough fuel to power a 50-MW biomass plant for about 21 hours

October 31, 2007



**NEARLY 10 YEARS –
REGROWTH NEGLIGIBLE**

Biomass power plants are extremely inefficient



McNeil Generating Station operates at about 26% efficiency – meaning that nearly $\frac{3}{4}$ of the energy content of the wood fuel is wasted.

Model Efficiency Standards for Biomass Plants

Massachusetts RPS (2012)

A Generation Unit achieving **60% or higher overall efficiency** in a quarter will receive one RPS Class I Renewable Energy Attribute for each MWh of RPS Class I Renewable Energy Generation.

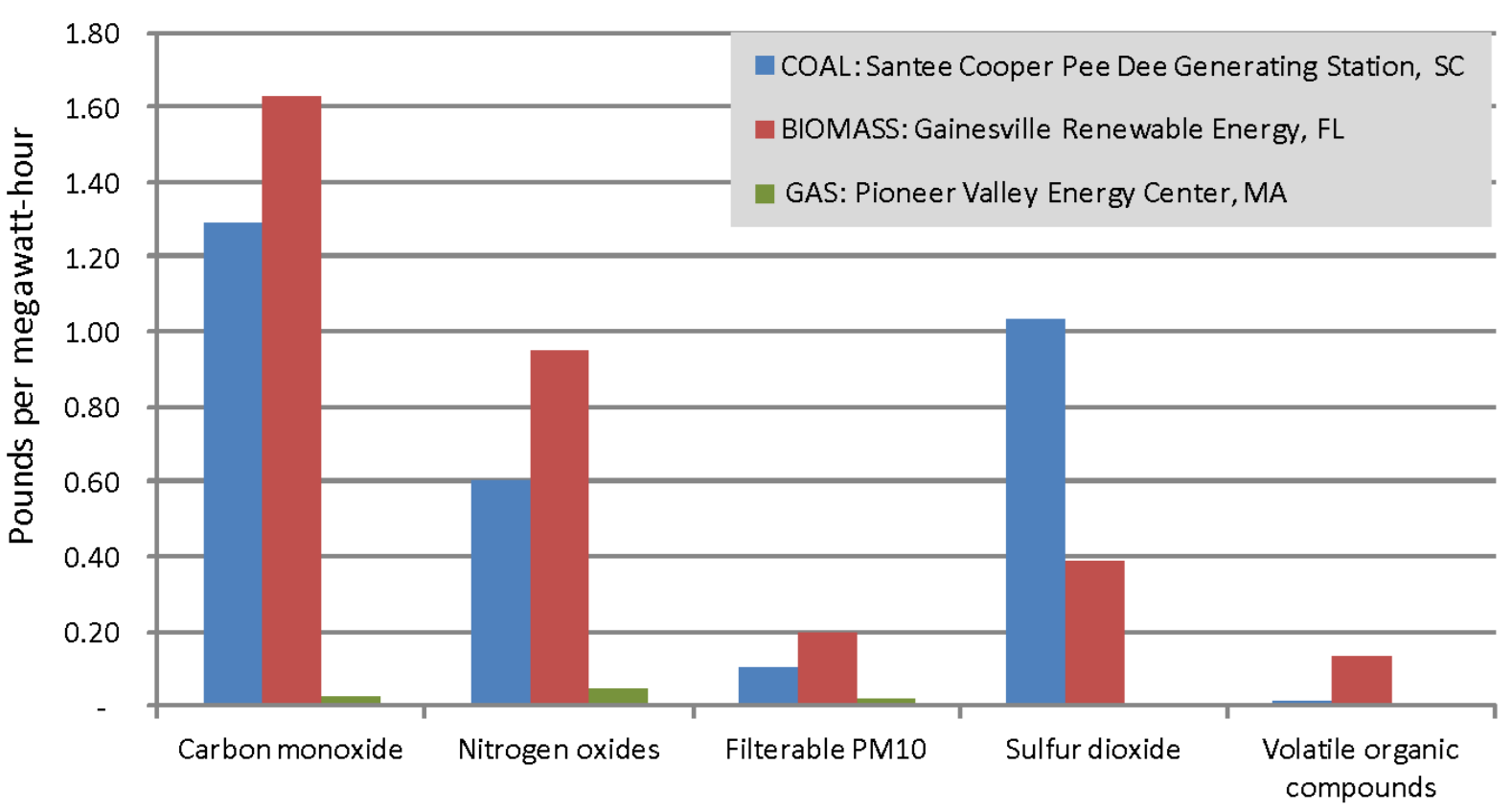
Washington, DC RPS (2015)

Qualifying biomass used at a generation unit that achieves a total system efficiency of **at least 65%** on an annual basis

Federal CLEAN Future Act (2021)

Qualifying wood waste used in a combined heat and power system that operates with an energy efficiency percentage of **greater than 60%** on a year-round basis.

Biomass Health Impacts



→ Biomass power plant emissions per MWh exceed those from coal and gas for key air pollutants

Vermont Environmental Disparity Index shows area around McNeil Generating Station are more vulnerable to higher environmental risks

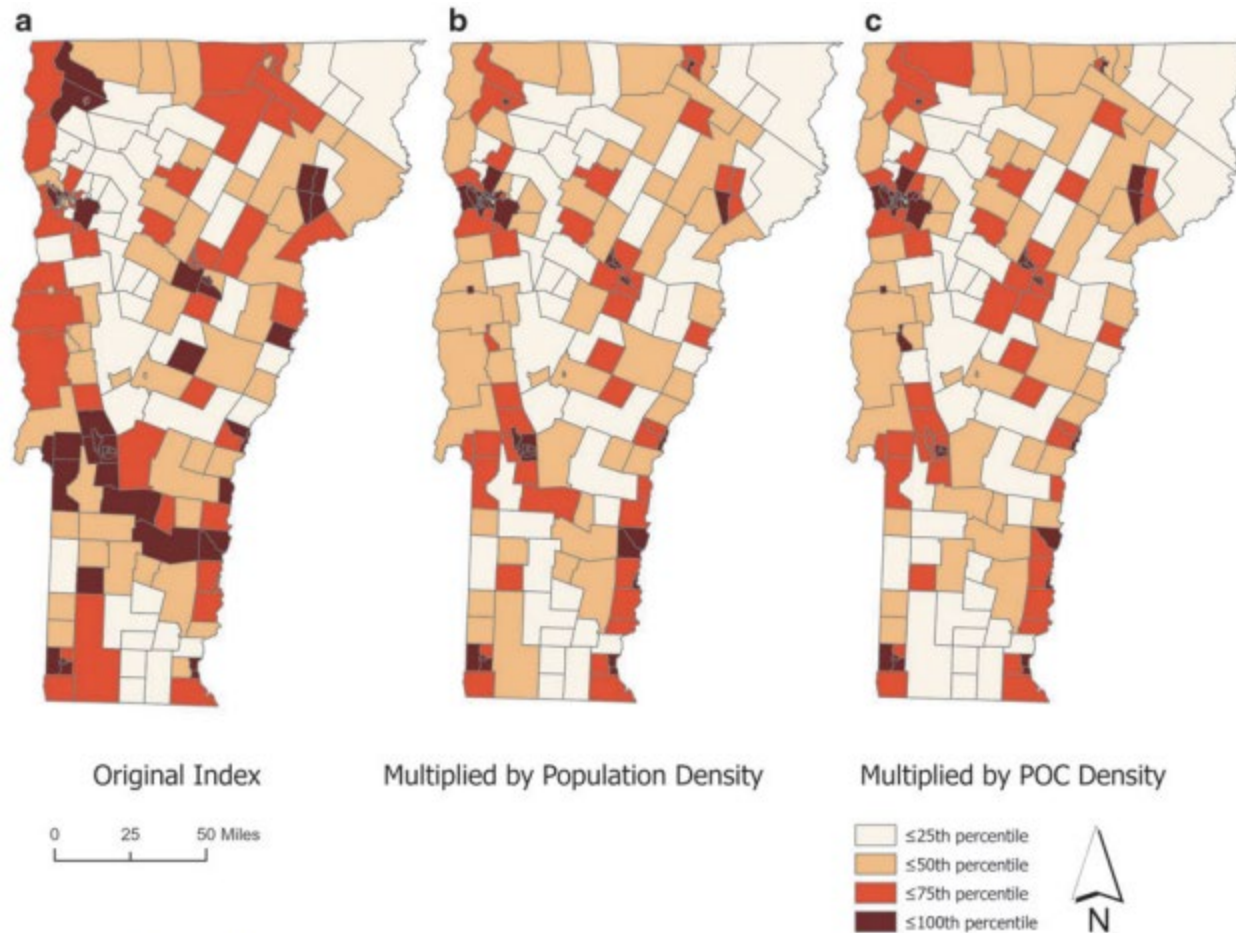
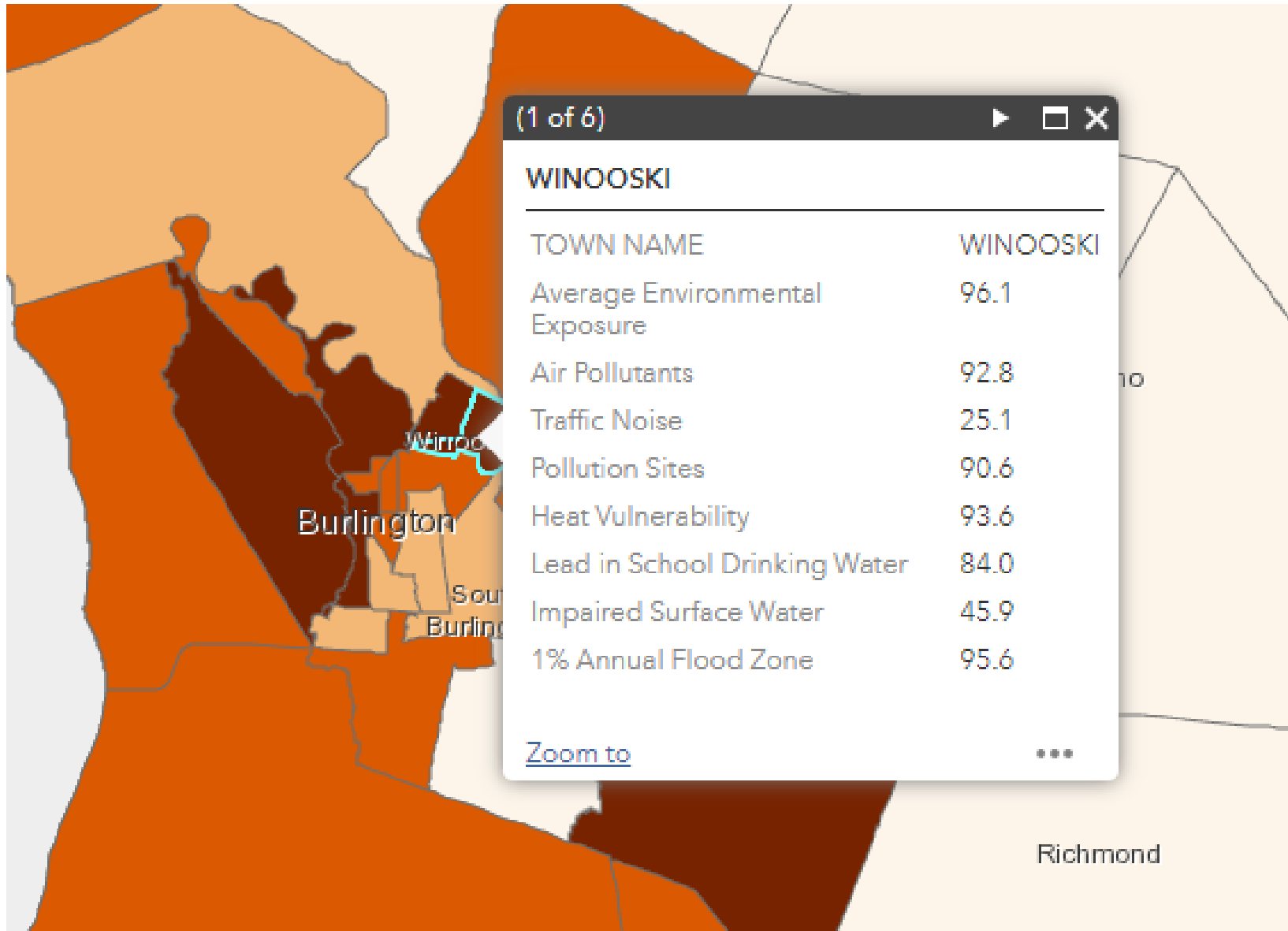


FIG. 6. VTEDI (a); weighted by population density (b); and density of people of color (c).



Wood Heating: A Significant Source of Harmful Emissions

- New information continues to emerge regarding the health impacts of fine particulate matter emissions (PM_{2.5}), the leading cause of air pollution-related illness and death in the U.S. There is no safe level of exposure.
- In addition to fine particulates, wood heating is a significant source of harmful emissions including polycyclic aromatic hydrocarbons (PAH), carbon monoxide (CO), nitrogen oxides (NO_x), black carbon, methane, benzene, acrolein, and formaldehyde. Some of these emissions are also climate-warming pollutants of concern. (See [Residential wood heating: An overview of U.S. impacts and regulations](#), Marin et al., 2022).
- About 13% of Vermont households heat with wood, the highest share of any state. More than one-third of Vermont schoolchildren attend facilities heated by wood products. (Source: [EIA](#))
- **According to testimony by Jared Ulmer, Vermont Department of Health, Vermonters suffer an estimated \$100-240 million in direct health impacts each year from biomass emissions alone.**



“Modern Wood Heating” Is Not Clean

- *“The unavoidable conclusion of this [report](#) is that EPA’s certification program to ensure new wood heaters meet clean air requirements is dysfunctional.”* - NESCAUM Assessment of EPA’s Residential Wood Heater Certification Program (2021)
- *The EPA’s Residential Wood Heater Program Does Not Provide Reasonable Assurance that Heaters Are Properly Tested and Certified Before Reaching Consumers – US Environmental Protection Agency Office of Inspector General [Report](#) (Feb. 28, 2023)*

MA Alternate Energy Portfolio Standard (APS) – Renewable Thermal Technologies

Requirements for eligible biomass, biogas and liquid biofuel technologies:

- Emission performance standards that are protective of public health
- Lifecycle GHG emissions accounting (includes biogenic emissions)
- Only high efficiency best-in-class technologies can qualify

Recommended mark-ups to S.5

- Add “protect public health” to legislative intent, require assessment of criteria emissions, add public health professionals to TAG and EAG
- Prioritize eligible measures (1) through (6)
- Delay inclusion of (8) “advanced wood heating” until new standards are issued by USEPA; consult with NESCAUM
- Remove combustion-based renewable energy from (9) eligible district heating services, or require such facilities to be at least 60% efficient
- Require GHG lifecycle analysis to include emissions from both fossil and biogenic fuels

For More Information:

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Springfield, VT biomass power plant: Rejected on climate grounds

Feb 13, 2014: The Vermont Public Service Board rejected a proposed 35-MW wood-fired electric plant in North Springfield, Vermont, stating that the project would interfere with the State's ability to meet statutory goals for reducing greenhouse gases.

“The evidentiary record supports a finding that the Project would release as much as 448,714 tons of CO₂e per year, and that sequestration of those greenhouse gases would not occur until future years, possibly not for decades, and would not occur at all in the case of forest-regeneration failures.”

Springfield, MA biomass power plant: Rejected on health grounds

April 2, 2021: The Massachusetts Department of Environmental Protection revoked its approval for a proposed 42 MW wood-fired power plant in East Springfield, MA, citing concerns about the health impacts on the surrounding EJ communities.

“MassDEP has determined to exercise this authority due to the amount of time that has elapsed since issuance of the PRE Final Plan Approval, more recent health-related information, and the heightened focus on environmental and health impacts on environmental justice populations from sources of pollution during the intervening years.”

Valedictory

Massachusetts State Senator Michael J. Barrett (D-Lexington), Senate Chair of the Joint Committee on Telecommunications, Utilities and Energy on passage of the 2022 law removing woody biomass from the Massachusetts RPS:

“Funny thing about politics. People think good policy doesn’t count for much, but it does. The communities’ take on biomass was not only just, it was also right, and that has brought it a long way.”