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MARYLAND CHAPTER

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August 14, 2026

Transmitted by email to cleanheat.mde@maryland.gov

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RE: Maryland Sierra Club Comments on Maryland's Zero-Emission Heating Equipment Standard (ZEHES) and Clean Heat Standard (CHS)

Dear Mr. Stewart and the Maryland Department of the Environment,

Thank you for this opportunity to comment on Maryland's Zero-Emission Heating Equipment Standard (ZEHES) and Clean Heat Standard (CHS). The Maryland Sierra Club has also signed onto a comment letter submitted by Evergreen Action on July 31, and our remarks below offer additional comments. Specifically, these comments describe improvements that we request that the Maryland Department of the Environment (MDE) make to the process of granting waivers to contractors in the context of ZEHES. These comments also explain our strong recommendation that CHS not incentivize the adoption of certain alternative fuels, such as biomethane, biogas, biomass, and hydrogen, which are energy intensive, costly, highly polluting, and not technologically mature.

At the outset, we appreciate MDE's efforts, supported by the Regulatory Assistance Project (RAP), to reach out to stakeholders to establish a new CHS to reduce and eventually eliminate the 16% of Maryland's total greenhouse emissions that are produced by the buildings sector. Eliminating these damaging in-home and building emissions is a win-win for industry, Marylanders, and the environment, improving health, housing, and climate resiliency, and reducing expenditures on electricity bills. Specifically, we applaud the level of detail and approach taken, in addition to the webinars held by MDE, to help us all better understand the new Maryland Clean Heat Rules (CHR).[1]

[1] Maryland's Clean Heat Rules are two complementary policies—the Zero-Emissions Heating Equipment Standard (ZEHES) and the Clean Heat Standard (CHS)—designed to reduce air pollution, cut greenhouse gas emissions, and lower energy costs for residents and businesses. *Source:* https://mde.maryland.gov/programs/air/ClimateChange/Clean-Buildings/Pages/Clean-Heat-Rules.aspx

There are two aspects, however, of the proposed Rules that we feel undermine these efforts:

1. Under ZEHES: The automatic waiver for contractors
2. Under the Clean Heat Standard: Credits for the use of green hydrogen and biofuels such as biogas, biomass, and biodiesel.

1. ZEHES: Automatic Waiver for Contractors

As mentioned in MDE's webinars, many contractors prefer installing traditional HVAC systems, boilers, and gas furnaces. Initial training, experience, and multiple decades of strong relationships between manufactures and fuel producers often drive contractors to promote traditional systems and fuels as the better option. While the proposed ZEHES policies call for the installation of emissions-free heat pumps and water heaters to reduce NOx, costs, risks of explosion, etc., the proposed ZEHES permits an automatic waiver of the rule if a contractor provides:

- Cost comparison (of equipment, labor, and incentives)
- A written justification for installing a new emissions-emitting system

After uploading these two documents, contractors will automatically download a waiver and can purchase fossil fuel or biofuel powered heating equipment. This, in short, is an easy way out for contractors, which dramatically undermines the purpose of ZEHES. **As such, we urge MDE to incorporate the following into the waiver process:**

- ***Establish standards for cost comparisons:*** Cost comparisons should include the lifetime expenses of maintaining each type of heating equipment. Contractors should be required to complete a standard form, developed by MDE, in order to facilitate review, discourage misconduct, and ensure compliance.
- ***Establish criteria for issuing a waiver:*** All waivers should be issued based on objective standards, to ensure they are justified. Without objective criteria, the waiver option may be abused.
- ***Establish a review process:*** We strongly recommend that all waivers be approved or denied by an MDE official. Alternatively, MDE could establish a regular audit or inspection of contractors' justification statements, which would encourage contractor compliance and prevent overuse or abuse of the waiver.

<u>Cost Comparison Requirements</u>

Cost comparisons should be based on lifecycle analysis (LCA), not just up-front installation costs. To do so, we recommend that any potential waiver require:

- Comparison of the cost of fossil fuel heating equipment and the cost of electric heat pump heating equipment to include the expenses of fueling and maintaining the equipment over the next 5, 10, and 15 years. Algorithms can be embedded in a

calculator to support contractors and customers in understanding the long-term cost differences between the different kinds of equipment savings, not just initial investment.
- Tracking of heat pump installations based on zip codes to prevent different treatments of vulnerable and LMI communities. This is particularly important as the up-front costs for heat pump systems may dissuade LMI communities unless a full LCA of costs and savings, in addition to a payment system, is provided.

For neighborhood-wide clean heat upgrades, we recommend consideration of geothermal network options, as piloted pursuant to the 2024 WARMTH Act.

MDE may also consider directly negotiating with heat pump manufacturers to create interest free, multi-year payment plans with consumer financial services providers such as Synchrony and Nymeo, among others, while also ensuring that incentives and bulk-price purchase discounts are met. Contractors who prefer heat pumps already do this.

2. **Clean Heat Standard: Green Hydrogen and "Renewable Sources"**

Under the CHS, MDE should be curtailing the use of emissions-heavy alternative fuels. In contrast with clean electricity, alternative fuels are not affordable, scalable, or capable of meaningfully reducing climate pollution. Instead of facilitating the installation of highly polluting so-called "renewable" sources of heat, MDE should insist on efficient, electric installations where possible. **The alternative fuels that are being considered for inclusion in the CHS—green hydrogen, biomass, biogas, and biodiesel/renewable diesel—are polluting fuels that should not be included in the CHS for the reasons described in Appendix 1.**

3. **Closing**

In conclusion, the purpose of the Clean Heat Rules is to drive the transition to clean heat in Maryland homes and buildings, making us healthier and more resilient. We can accomplish this with a much higher threshold for waivers and by eliminating the energy intensive, highly polluting biofuel and green hydrogen options currently being promoted. It is imperative that Maryland's Clean Heat Rules put the health—and wallets—of Marylanders first and don't dilute this impressive collaborative effort with loopholes and support for inefficient and polluting fuels. Accordingly, Sierra Club asks that MDE (1) institutes the improvements to the waiver process in the ZEHES that is described above, and (2) removes any forms of hydrogen or biofuels from inclusion in the CHS.

Sincerely,

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Appendix 1. Drawbacks and Risks of "Alternative Fuels"

Green Hydrogen

Green hydrogen (GH_2) is hydrogen produced by the electrolysis of water using renewable electricity. GH_2 is inherently inefficient and financially non-viable. Heat pumps, for example, are three times more efficient than GH_2. Further, an entirely new infrastructure would need to be constructed in order to deliver GH_2 to buildings for heating. Maryland's clean energy resources should be directed toward cost-effective, highly efficient uses, and using significant electric resources to produce GH_2 does not meet those standards.

The International Energy Agency (IEA, 2023) follows a methodology that assigns zero emissions to renewable electricity use and excludes emissions from equipment manufacturing and transportation, yielding a footprint of 0 kg CO_2 equivalents (CO2e) per kg H_2. Yet, LCA studies show that median production emissions in the most optimistic configuration are closer to 2.9 kg CO_2 equivalents (CO_{2e}) per kg H_2. This increases considerably if we add storage and transportation.(Kleijne, et al. 2024). Per the 2023 Regulatory Assistance Report titled "Meeting the Thermal Challenge: A Clean Heat Standard for Maryland" (RAP Report), the combustion of hydrogen also has significant NOx emissions, and there are system efficiency concerns, not to mention the high flammability and volatility, which make the proposed "H2Hubs" a real concern for communities in which they are supposed to be installed.

Further, so-called "renewable" fuels are often highly-emitting sources of energy. The U.N. defines renewable energy as "energy derived from natural sources that are replenished at a higher rate than they are consumed." Despite the fact that biomass, biogas, and biodiesel cannot be replenished faster than they are consumed, they remain listed in the RAP Report as "renewable, less carbon intense sources of energy." Many of these sources—when life-cycle analyses are completed—are even more carbon-intense than fossil fuel sources. Now is our opportunity to look at all the Life Cycle emissions (LCA/LCE) of these fuels and be honest in our accounting, so we can meaningfully reduce and work towards eliminating the emissions.

Biomass

The RAP report mentions that Maryland considers woody biomass a carbon neutral energy source, while acknowledging that lifecycle emissions can vary greatly. In practice, woody biomass is not carbon neutral. To align with its core purpose, CHS must remain focused on sources that reduce emissions and protect public health, while prioritizing climate resiliency over forestry industry profits. Logging and burning forests to produce biomass for use as a fuel is harmful for the climate and biodiversity. Today, climate resiliency and the biodiversity crisis need to remain at the forefront, and we need to give far greater attention to protecting our forests from extractive management, which degrades them (i.e. "thinning," "regeneration cuts" a.k.a. clear cuts, etc.) and reduces their provision of ecosystem services.

Just recently, once again, Maryland was engulfed in smoke from wildfires. Smoke from biomass is no different—it's burning wood. Whether we pelletize it first or not, burning wood has far-reaching health impacts on our lungs, cardiovascular, and immune systems. In addition to the greenhouse gas carbon dioxide (CO_2), burning wood emits benzene, benzo(a)pyrene and dibenz (a,h) anthracene, carbon monoxide, formaldehyde, organic gases (including aldehyde gases and other respiratory irritants), nitrogen oxides, polycyclic aromatic hydrocarbons (PAHs), and dioxin. The science is clear: woody biomass for energy is less effective and more polluting than coal per unit of energy (or heat) produced (PFPI, 2024). Yet, Maryland is still promoting pellet stoves for low- and moderate-income (LMI) communities, because they are cheaper. This is an environmental justice issue that needs to be corrected. Vulnerable and LMI communities deserve to breathe clean air inside and outside their homes, and should be assisted in a transition to heat pumps or geothermal energy instead.

In addition, sourcing biomass affects the ecological integrity of our forests. Forestry is the provision of timber and fiber from forests and management of forests for human needs; forest ecology, on the other hand, is the scientific study of the interrelated patterns, processes, flora, fauna, fungi, and ecosystems in forests—to maximize the health of forest ecosystems and biodiversity. Studies of forest ecology show that in general leaving forest ecosystems to unfold their natural processes without human intervention maximizes forest and biodiversity health in addition to ecosystem services provision (clean air, water, soil generation, CO_2 sequestration, etc. Moomaw, et al. 2019). Degrading our forests to obtain biomass during these climate and biodiversity crises would exacerbate both crises, not to mention eliminating carbon sequestration by logging the trees that were actively sequestering CO_2.

The RAP report also asserts that sawdust from sawmills can provide a zero-emission energy source. This would be accomplished by forming the sawdust into biomass pellets that can be burned to provide energy. This suggestion is misguided. Pellets are sourced from large logs, not debris, because large logs provide the density required (Catanoso, 2022) and combusting pellets still produces the same emissions as combusting wood. Worse, pellet production plants also release toxic polycyclic aromatic hydrocarbons (PAHs) during wood preparation, which are known carcinogens. In a recent lawsuit, the Environmental Integrity Project lists hundreds of tons of illegal Volatile Organic Compound (VOC) pollution and dozens of tons of hazardous air pollutants emitted by pellet manufacturing plants per year - all of which violate the Clean Air Act. Maryland should not consider usage of sawdust when the state's goal is to eliminate emissions to improve the health of our communities and increase climate resiliency.

Biogas

Biomethane, per the RAP report, can be sourced by recapturing methane from biogas or biomass that would otherwise be vented into the atmosphere. Sources of biogas include landfills, livestock operations, wastewater treatment plants, coal mine mouths, and

anaerobic digesters. Including biogas in the CHS allows waste treatment plants, mining operations, and facilities such as Concentrated Animal Feeding Operations (CAFOs) to profit from their waste, creating an incentive to generate more waste instead of cleaning up their operations, even as neighboring communities live with the pollution generated by CAFOs, including noxious odors and contaminated water sources. Including biogas in the CHS becomes a give-away to the industries that are already having harmful effects on surrounding communities and the environment.

According to the Climate Clean Energy Equity Fund, biogas is made up of approximately 50-70% methane, 30-40% carbon dioxide, and small amounts of other gases, such as VOCs including lead and benzene. These trace gases vary based on the source material for the biogas. For example, biogas created from municipal solid waste would have different trace gases than biogas created from livestock waste. This is due to the type of the waste as well as impurities present in the waste stream.

Furthermore, whether we call it biogas, renewable gas, biomethane or just plain gas, these substances are mainly methane (CH_4), which has a 80% higher heat trapping potential than CO_2 in the first 20 years of its release (Mar, et al., 2022). In addition, biomethane can be more expensive than regular gas and contains contaminants that interfere with combustion control technologies for reducing other pollutants, such as nitrogen oxides (NOx) (Pera et al., 2024).

A recent study found that children in homes using gas heating—regardless of whether that gas is 100% fossil gas or a blend of fossil gas and biogas—face a higher risk of asthma, cardiovascular damage, learning deficits, and changed lung function (Seals & Krasner, 2020). In short, biogas is neither healthy, cheap, clean, nor renewable and should not be part of the CHS.

Biodiesel/Renewable Diesel

The RAP report suggests including both biodiesel and “renewable diesel” as qualifying biofuels in the CHS. Biodiesel can be derived from vegetable oils, soybeans or other food byproducts, and in some cases from nonfood crops and residues. However, biodiesel has up to 86% of the emissions of regular diesel (Li et al, 2023). These emissions are a class one carcinogen according to the International Agency for Research on Cancer. Also, biodiesel is not renewable. For both these reasons, biodiesel does not belong in the CHS.

Renewable diesel, on the other hand, is a hydrotreated vegetable oil (HVO) fuel, derived from the same feedstocks as biodiesel but further refined into the same chemical form as fossil diesel fuel. As a result, renewable diesel can be used as a blend or a replacement for fossil heating oil. Net emissions are primarily driven by feedstock use, but also include energy consumed for processing, transport, and distribution. Indirect emissions include increasing feedstock production or replacing feedstock in existing uses, including land use changes. When including indirect emissions, HVO fuels have higher greenhouse gas emissions than fossil fuels, according to the Stand Up to Oil coalition.

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