VIA EMAIL

May 1, 2023

Massachusetts Department of Environmental Protection
100 Cambridge Street, Suite 900
Boston, MA 02114

Re: **Massachusetts Clean Heat Standard Stakeholder Input**

Dear Commissioner Heiple,

We appreciate the opportunity to provide expertise to inform the development of a proposed Clean Heat Standard ("CHS") regulation and related heating fuel supplier reporting requirements. The undersigned thirty-seven organizations and fourteen individuals represent stakeholders with a strong interest in equitably cutting building sector emissions to ensure that we meet our greenhouse gas reduction requirements. **Our top priorities for a CHS for Massachusetts are ensuring adequate equity protections and an electrification-only compliance program, particularly for gas utilities.**

The Clean Energy and Climate Plan for 2025 and 2030 ("2025 and 2030 CECP") and the final report from the Massachusetts Commission on Clean Heat both recommended the immediate pursuit of a CHS. The report highlights that a CHS "can be a powerful tool for creating a new market for clean heating solutions by incentivizing obligated parties to deliver cleaner heating technology, electrify our building stock, increase building efficiency, and move away from fossil fuels."[1] A CHS for Massachusetts can only be useful for meeting our decarbonization and environmental justice mandates if such a program is properly implemented. It is critical that the Commonwealth gets the difficult details of this complex program correct, such as ensuring that equity informs every aspect of the proposal and prioritizing electrification over industry greenwashing like alternative combustion fuels.

The below represents our thoughts and recommendations on the stakeholder topics and questions provided in the MassDEP Stakeholder Discussion Document, dated March 2023. Thank you again for the opportunity to comment and we look forward to working with you as this process unfolds.

[1] https://www.mass.gov/doc/massachusetts-commission-on-clean-heat-final-report-november-30-2022/download, at vi.

I. FURTHER STAKEHOLDER PROCESS RECOMMENDATIONS

DEP should design the balance of its stakeholder process with different tracks for different types of stakeholder. First, we recommend that DEP work with DEP and EEA's in-house environmental justice and community engagement experts to design stakeholder input opportunities for people who would be impacted by the program who are not themselves or do not employ professional advocates.

Second, we recommend that DEP hold a series of technical sessions on key design questions for technical stakeholders including the undersigned clean energy experts and advocates. We recommend at least the following topics for exploration in technical sessions:

- Measure verification
- Compliance flexibility/banking
- Reporting
- Calculation of credits by technology
- Hybrid heat system credits
- Alternative Compliance Payment level
- Mass Save coordination

II. OVERARCHING COMMENTS

Before responding directly to the specific questions posed in the Stakeholder Discussion Document, we offer overarching comments on 1) program equity and energy justice considerations and 2) cost-effective long term emissions reduction strategies.

A. Center Equity and Advance Energy Justice

1. Program design should focus direct and indirect benefits on customers with the highest energy bill burden.

DEP should focus efforts in this program design and stakeholder consultation phase on soliciting input from environmental and energy justice advocates and communities, including the co-conveners of the Environmental Justice Table (Greenroots, Inc., Neighbor to Neighbor MA, Alternatives for Community & Environment (ACE), Coalition for Social Justice, Groundwork Lawrence, and the North American Indian Center of Boston), low income advocates, and housing justice advocates to inform program design for equity and energy justice.

In the interim, the undersigned offer the following preliminary comments based on our past work in collaboration with energy justice movement leaders. We posit that DEP should begin to

consider the burdens and benefits of CHS program design through the dual lenses of direct/immediate impacts and indirect/longer term or associated impacts.

Direct Burdens of a CHS

A market-based energy program without adjustment for income levels will lead to an inequitable distribution of burdens and benefits. Direct or immediate customer burdens under a CHS are likely to be experienced as increased costs for heating fuels, passed through to the customer from the obligated party that supplies their heating fuel. While higher income households can absorb increases in energy costs, energy bills take up a much higher share of a low or moderate income (up to at least 120% Area Median Income (AMI)) household's budget. Energy bill increases can force a choice for low and moderate income customers between paying those bills and buying sufficient food that month. In high cost of living areas like most of the Commonwealth, there are many customers who do not qualify for low income energy bill relief but who still struggle to pay to heat their homes (generally, those between 61-120% AMI). It is also important to note that low and moderate income energy customers represent a disproportionate share of Black and Brown residents of the Commonwealth.

Indirect Burdens of a CHS

Black and Brown communities are disproportionately burdened by the negative impacts on health and quality of life resulting from our current heating fuel economy, including production, refinement, transportation, storage, and end uses of combustion fossil fuels and bioenergy. On the one hand, a CHS can help alleviate some of these burdens if it significantly reduces combustion. On the other hand, increased incentives for bioenergy combustion fuels are likely to lead to continued or elevated negative impacts on host communities for those fuels' supply chains.

Another potential indirect burden of a CHS is housing displacement. Without protections for renters, landlords can use incentives subsidized by ratepayer or tax dollars like a CHS or Mass Save for building upgrades as a pretext for rent increases that force out low and moderate income renters from relatively affordable housing units.

A CHS that accelerates unit-by-unit electrification of housing, while necessary in the near term, will contribute to the indirect burden of an unmanaged gas system transition. Gas customers who are least able, either financially or legally, to electrify their own homes will have to pay higher and higher shares of the fixed cost of the gas system absent significant modifications to rate design. See Section II.A.2 below for further discussion of this issue.

Direct Benefits of a CHS

The most direct benefits of a CHS designed to address equity issues would be energy bill adjustments to eliminate the bill impact of the CHS on low and moderate income customers. Directing the revenues from a Just Transition Fee like the one mentioned in DEP's Stakeholder Discussion Document to provide further energy burden relief for low and moderate income customers would be an additional direct benefit that could begin to ameliorate the energy burden concern.

Indirect or Delayed Benefits of a CHS

Clean heat technology and building envelope changes in a customer's home that are incentivized through Clean Heat Credits are either indirect benefits to customers (electrifying homes generally help with progress toward avoiding the worst impacts of climate change), or direct but delayed benefits (if done on that customer's home) including reduced energy bills, improved thermal comfort, increased property value, and improved indoor air quality. Equity and energy justice deficits in the delivery of comparable measures have dogged programs like Mass Save for decades.

We appreciate that DEP has begun to consider equity topics generally at this stage of CHS program design. We urge DEP to continue to develop its understanding of the direct and indirect burdens and benefits of a potential CHS, and focus both direct and indirect benefits on customers with the highest energy burden.

2. DEP should coordinate closely with DOER and DPU on key complementary strategies for equity.

Implementing equity protections and energy justice initiatives under a CHS will require close coordination with agencies including the Department of Energy Resources (DOER) and the Department of Public Utilities (DPU).

Rate Design

For moderate income customers to be able to meaningfully access the indirect benefits of a CHS, we will need an electric rate for customers using efficient electric heating. Potential direct benefits of the CHS for low and moderate income customers whose residences have not been electrified may also be delivered most effectively via electric (or gas) rates or bill adders. To be in position to execute these program elements, the DEP should establish a cross-agency working group, or utilize the 2022 inter-agency Clean Heat task force staff connections.

Alternative Portfolio Standard

The Alternative Portfolio Standard ("APS") incentivizes some clean heat technologies via a surcharge on electric rates. The 2025 and 2030 CECP stated that DOER would be conducting a rulemaking to align the APS with CECP priorities. While we urge DEP to work with the legislature to eliminate the APS, as detailed more fully in response to the Interactions with Other Programs Topic below, DEP should work with DOER to ensure that efforts are not wasted on a futile program redesign.

Managed Transition Off of Gas

As mentioned in the indirect burden discussion in Section II.A.1 above, perpetuation in the medium to long term of the unmanaged transition off of gas that is already underway will be an inequitable disaster for low and moderate income gas customers. Gas rates are increasing due to increases in fixed costs of the system, even before implementing programs like the CHS.[2] As gas rate increases accelerate and those fixed costs are spread across fewer and fewer customers with increasing electrification, customers who can afford to electrify will do so and customers who can't afford to electrify, or whose landlords won't electrify, will be stuck with skyrocketing rates.[3] An equitable and least-cost transition off of gas will require creating and executing a plan for strategic decommissioning of street segments and neighborhoods and transition to thermal heating networks and individual home heat pumps based on local electric capacity data and maximizing for avoided costs. This transition will require a restructuring of the gas utility sector on the order of the Commonwealth's electric system restructuring.

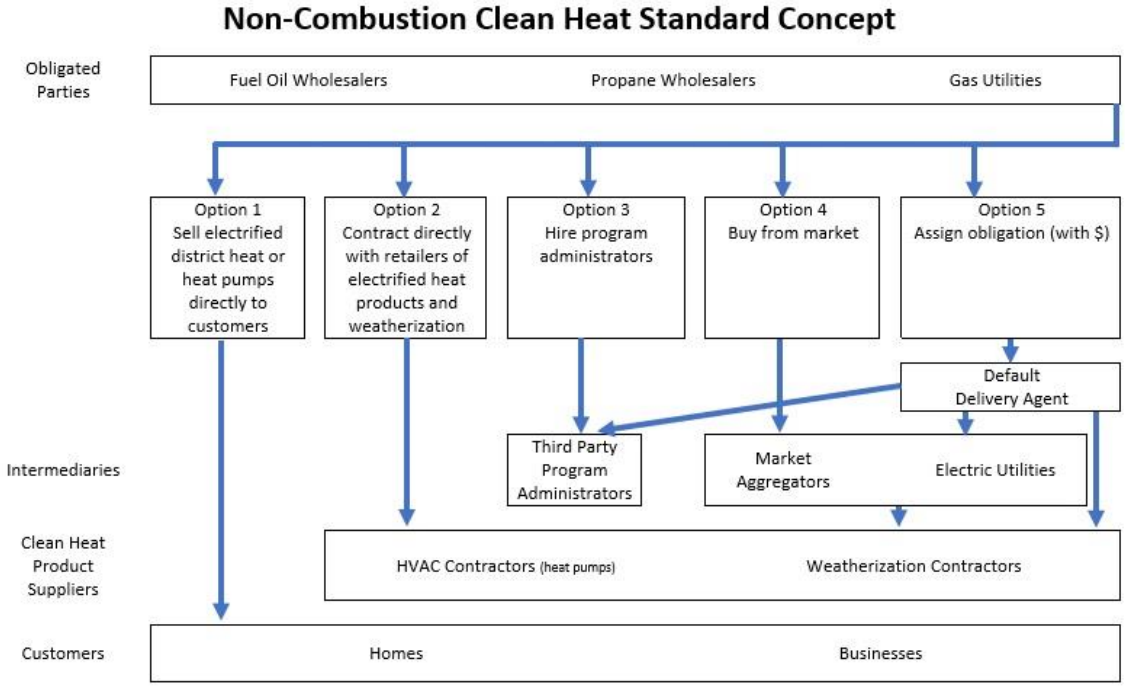
Despite nearly three years elapsing since now-Governor Healey filed her Future of Gas petition with the DPU, the Commonwealth has barely begun to reckon with this challenge. The Gas System Enhancement Plan Working Group required by the 2022 Act Driving Clean Energy and Offshore Wind[4] and the anticipated interim Order in DPU 20-80 may begin to make progress on gas utility restructuring, but in any event DEP should be working with DOER and DPU to force accelerated progress on equitable gas restructuring.

[2] See Conservation Law Foundation, Getting off Gas: Transforming Home Heating in Massachusetts at 7-9 (Dec. 2020), https://www.clf.org/wp-content/uploads/2020/12/CLF_GasWhitepaper_GettingOffGas.pdf.
[3] See Building Decarbonization Coalition, The Future of Gas in New York State, pages 43-45 https://buildingdecarb.org/wp-content/uploads/BDC-The-Future-of-Gas-in-NYS.pdf.
[4] Ch. 179 of the Acts of 2022, § 68.

B. Prioritize the Most Cost-Effective Long Term Emissions Reduction Pathway

1. DEP should focus compliance pathways on non-combustion technologies rather than biofuel blending, particularly for gas.

The CHS must be designed with an eye toward 2050 emissions limit compliance as well as 2030. Full efficient electrification of homes, whether by individual heat pumps or networked geothermal solutions paired with weatherization, should be the emissions reduction priority of the program. Allowing bioenergy blending strategies to qualify for Clean Heat Credits, particularly in the case of fuels in the gas distribution system, is not consistent with 2050 mandates. Rewarding alternative fuel blending in the gas system with Clean Heat Credits incentivizes the continued use of combustion-only and hybrid heating systems. It also incentivizes near-term, marginal reductions in emissions that don't support the overarching, long-term, most cost-effective pathway towards net zero. As the 2025 CECP and the 2030 CECP noted, "While partial electrification through the use of such hybrid systems can provide significant GHG reductions by 2030, a hybrid strategy alone makes achieving net zero in 2050 more difficult and expensive for all customers."[5] The graphic below demonstrates how any obligated party under the CHS who is not allowed to simply drop in alternative combustion fuels to earn Clean Heat Credits would still have a range of options for program compliance.



Adapted from original RAP White Paper for Clean Heat Standard in VT, Figure 10, page 32 https://www.eanvt.org/chs-whitepaper/

[5] 2025 and 2030 CECP at 58.

2. *DEP should define "Heat" broadly across electrification technologies.*

Rather than only allowing credits for electrifying space heating appliances, DEP should define the universe of electrification technologies that can qualify for Clean Heat Credits to include any piece of equipment that currently combusts fossil fuels delivered by the obligated entities, with the caveat that any qualified heating equipment must be highly efficient and engineered for cold climates. In addition to furnaces and boilers, this would include water heaters, stoves, and clothes dryers. The Clean Heat Credit value for the equipment would be based on its projected avoidance of carbon emissions over its lifetime.

3. *DEP should use the High Electrification Scenario, not the Phased Scenario.*

Use of the 2025 and the 2030 Clean Energy and Climate Plan "Phased" Scenario to design the CHS is not justified and will likely lead to under-achievement of necessary emissions reductions for the buildings sector. Acadia Center raised alarm about calibrating CECP implementation to the Phased Scenario immediately after the CECP was published in July 2022, particularly as it relates to the balance of near-term emphasis on whole-building versus hybrid electrification approaches.[6] In an analysis prepared for Conservation Law Foundation, Synapse found that the likely CHS compliance portfolio under the Phased Scenario would leave a substantial gap between achieved and required sector emissions for 2030.[7]

The question of how many whole-building heat pump installations the CHS is targeting is critical – particularly in the next seven years as we move towards 2030. The 2025 and the 2030 CECP emphasized the Phased Scenario as the preferred pathway, but as Acadia Center pointed out in a detailed fact sheet responding to the 2025 and 2030 CECP the CECP does not clearly articulate why this scenario was preferred over the "High Electrification" Scenario.[8] Moreover, the two scenarios have very different visions for the target level of electrification by 2030. The key differences between these two scenarios are important to understand, because although the CECP promotes the "Phased" scenario as the best path forward throughout the report, their own analysis shows that the net costs of the Phased and High Electrification scenarios are nearly identical, with the "Flexible Load Sensitivity" version of the High Electrification Scenario actually being the lowest cost of any scenario analyzed, and about $0.2 billion cheaper than the Phased Scenario (Figure A.17 on page 24 of CECP Appendix A: Technical Pathways Modeling).

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[6] Acadia Center, So Close, But Yet So Far: MA 2025/2030 Clean Energy and Climate Plan, https://acadiacenter.wpenginepowered.com/wp-content/uploads/2022/07/AcadiaCenter-CECP-Fact-Sheet.pdf.
[7] Synapse Energy Economics, "Massachusetts Clean Heat Standard: Policy and Regulatory Analysis" at slides 7-8, https://www.clf.org/wp-content/uploads/2023/03/Massachusetts-Clean-Heat-Standard-%E2%80%93-Policy-and-Regulatory-Analysis.pdf.
[8] See Note 6, at 3-5.

This is despite a number of charitable assumptions in the modeling that favor the Phased scenario – 1) Dramatically underestimating the level of methane leaks from the gas system; 2) Using an outdated (AR 4) global warming potential (GWP) for methane and failing to consider methane emissions on a 20-year timescale; 3) Not accounting for out-of-state GHG emissions from the production and transmission of both fossil fuels and biofuels; and 4) Making the blanket assumption that all biofuels (including 'renewable natural gas' and biodiesel) are GHG-neutral. Combined, these four assumptions are enough to significantly skew the analysis in favor of the Phased Scenario.

The Phased Scenario calls for about 6% of Massachusetts homes to rely solely on heat pumps for space heating by 2030 and 21% of homes to rely on a hybrid heating system by 2030 (Table E.3 Appendix E). This is in stark contrast to the High Electrification Scenario, which calls for about 18% of homes in the Commonwealth to rely solely on heat pumps for space heating by 2030, with an additional 10% of homes relying on hybrid heating systems (Figure A.6 Appendix A). **In other words, the Phased Scenario envisions about *one third* as many homes heated solely by heat pumps in 2030 and *twice* as many homes relying on hybrid heating systems in 2030.**

The Phased Scenario is also much less bullish on near-term full electrification of commercial buildings when compared to the High Electrification Scenario. The Phased Scenario calls for about 11% of commercial buildings to rely solely on heat pumps for space heating by 2030, with about 8% of commercial buildings relying on hybrid heating. The High Electrification Scenario calls for about 20% of commercial buildings to be heated solely by heat pumps in 2030, with about 3% of commercial buildings relying on hybrid heating. (Figure A.7 Appendix A). **In other words, the Phased Scenario envisions about *half* as many commercial buildings heated solely by heat pumps in 2030 and over *twice* as many commercial buildings relying on hybrid heating systems in 2030.**

Further, the 2025 and the 2030 CECP largely abstains from taking a position on whether decommissioning of the gas distribution system will be necessary to achieve climate goals and at what scale decommissioning will need to occur. The CECP instead makes inconclusive statements like, "Although Docket 20-80 has not yet been finalized, targeted decommissioning of the gas distribution system may be necessary to support a just and equitable transition toward electrified heating." There are, for example, no metrics in the 2025 and the 2030 CECP regarding miles of gas distribution pipes decommissioned. The Phased Scenario envisions the number of homes relying on some level of natural gas heating actually *increasing* 13% by 2030 compared to 2020 levels, while the High Electrification Scenario envisions the number of homes relying on some level of gas heating decreasing about 11% by 2030 compared to 2020 levels (Figure A.6 Appendix A). A clear vision for the future of the natural gas system is absolutely essential to accurately set whole-building electrification targets that inform the CHS.

III. SPECIFIC STAKEHOLDER QUESTION RESPONSES

Topic #1 – Setting the Standard

- **Does this general approach [described in Topic 1] to setting the stringency of the standard makes sense? If so, how could it be refined? If not, what alternative would be preferable?**
    - It is essential that the Commonwealth reduce emissions in the building sector to 15 MMT by 2030 as required in the CECP for 2025/2030. This figure includes emissions from residential, commercial, and industrial heating applications. We bring to your attention page 4 of the Discussion Document, paragraphs 1 and 2, which are inconsistent on whether industrial emissions are to be included in a CHS. Our position is that emissions from all three sectors must be included.
    - Assuming that industrial emissions are factored in, then we agree that building emissions should fall by 5.1 MMT over 5 years, or very close to 1 MMT per year. However, we recommend taking a different approach than requiring emissions to fall by a flat 7% per year. The problem with that approach is that the absolute emission reductions in the first year would be much higher than in the fifth (and subsequent years going out to 2050), much higher than 1 MMT in the first year, decreasing each year until the absolute emissions would be less than 1 MMT per year.
    - We favor an approach that would smooth out the absolute reduction in MMT to 1 per year by varying the percentage requirement as necessary. If industrial emissions are included and the starting point is 20.1 MMT in 2025, then a steady 1 MMT per year reduction could be achieved with a 5% standard in 2025, increasing to 7% by 2030.
    - An important reason to smooth out the absolute reduction is that the market for electrification will take time to mature. The supply chain and consumer demand will both be much stronger in 2030 than they will be in 2025.

Massachusetts Building Sector Emissions Reduction Pathway Assuming Constant

Year	Emissions Target (MMT CO_2e)	Annual Emissions Percent Decrease	Annual Emissions Absolute Change (MMT CO_2e)
2025	17.2	6%	N/A
2026	16.2	6%	1
2027	15.2	6%	1
2028	14.3	6%	0.9
2029	13.3	7%	1
2030	12.2	7%	1.1
Cumulative 6-Year Emissions Reduction	5.0		

- DEP also needs to develop a plan for optimal use of hybrid heat pump systems. Gas utilities currently lobby for a switchover point as high as 30-35° F, while the appropriate point based on modern heat pump efficiency should be no higher than 10° F. Gas heating systems that are retained as part of hybrid set-ups, controlled by the installer to be the primary source of space heating during the winter heating season,[9] cannot be misleadingly labeled "back-up" systems. These partial set-ups will not meaningfully contribute to a reduction of greenhouse gas emissions. DEP should hold technical sessions to work out how different hybrid systems function, what role consumers will play, and what type of controls will be in homes, among other topics.

- **Should the standard be expressed in terms of GHG emissions reductions, clean heating energy supplied, or something else such as square feet of conditioned space converted to clean heat?**
  - We agree that the standard should be set in terms of GHG reductions, but year-by-year GHG reductions through 2030 cannot be the only guiding principle for establishing the overarching structure of the CHS. In addition to program design elements that solve for equity, the CHS must be designed in a way that fully complements the most cost-effective path to economy-wide net zero emissions in 2050, including the most-cost effective path for strategic decommissioning of the natural gas system as the Commonwealth moves towards net zero.
  - With regard to understanding the GHG emissions reduction from an electrification measure, DEP should look to Mass Save's methodology for evaluating energy savings and benefits.

- **Is the carve out approach the best way to ensure progress on electrification, or are there other options that should be considered?**
  - Electrification and weatherization should be the only compliance options allowed, particularly for gas utilities. See Section II.B.1 above. Given the markedly different regulatory postures of gas utilities and delivered fuel companies, we recommend that DEP consider the two categories of obligated entities separately. For gas utilities, whether investor- or municipally-owned, the suite of compliance measures must consist entirely of electrification and weatherization and not include alternative combustion fuels, whether bioenergy or hydrogen-based.
    - Biofuels, and RNG in particular face several key fundamental challenges when considering any possible role in decarbonization of building heating: **1)** Limited availability of truly sustainable (e.g. non-energy crop) biomass feedstocks, particularly in New England. **2)** Opportunity cost associated with using a high-value resources (limited biomass feedstocks) in a relatively low-value decarbonization end use (building heat, a sector that is relatively easy to electrify) **3)** Wide

[9] See D.P.U. Docket 22-149, Responses to the Attorney General's Second Set of Information Requests, Information Request AG-2-4, at 2, available at https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/17101289.

variations in lifecycle emissions associated with biofuels based on production pathway **4)** High fuel cost that will increase as demand for biofuels across multiple sectors continues to increase **5)** Inability to solve core methane leak problem associated with the gas distribution system **6)** Lack of viable, long-term role in full decarbonization of the gas distribution system is incompatible with net zero targets.

- Hydrogen also faces several key fundamental challenges when considering its role in decarbonization of building heating **1)** Opportunity cost associated with using clean electricity to produce hydrogen for a sector of the economy (building heat) that is relatively easy to electrify. This opportunity cost applies both to renewable electricity generation land use and required capital investments. **2)** Overall inefficiency of the hydrogen production, transmission and combustion process relative to building electrification via heat pumps **3)** High fuel cost that will increase as demand for hydrogen across multiple sectors continues to increase **4)** Pipeline compatibility issues with hydrogen blends exceeding 7% of energy flowing through the gas distribution system **5)** Safety issues associated with combustion of hydrogen, particularly in residential settings **6)** Lack of low cost geological hydrogen storage in the northeast. **7)** Lack of a viable, long-term role in full decarbonization of the gas distribution system is incompatible with net zero targets.
- To the extent that any waste-derived gas bioenergy is available in the Commonwealth, the energy required to refine it to pipeline quality methane and methane leaks from the process and subsequent pipeline delivery mean that the waste gas bioenergy would be better flared or utilized on-site in electricity generation, high efficiency combined heat and power, or co-located industrial processes.[10] And hydrogen produced via renewable energy is simply an extremely low efficiency energy storage mechanism in the context of an end use that could otherwise be electrified. Alternative gasses are not a long term solution for the buildings sector, so incentives should not encourage buildout of these wasteful processes in the near term.[11]

- With regard to delivered fuels, we reserve the right to comment on whether delivered fuel companies should be allowed to earn Clean Heat Credits for biofuels delivered to existing customers until more information is gathered

[10] See D.P.U. 22-32, Conservation Law Foundation, Direct Testimony of Michael J. Walsh and Jonathan Krones at 6-9 (July 15, 2022), https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/15198064, and Acadia Center, D.P.U. 20-80 Alternative Regulatory Proposal Comments at 8-12 (May 6, 2022), https://acadiacenter.wpenginepowered.com/wp-content/uploads/2022/05/Acadia-Center-DPU-20-80-Regulatory-Proposal.pdf.

[11] See Bakkaloglu, et al., *Methane emissions along biomethane and biogas supply chains are underestimated*, ONE EARTH 5, 724–736 (2022) https://www.sciencedirect.com/science/article/pii/S2590332222002676 and D.P.U. 22-149, Statement of Robert W. Howarth, Ph.D (Jan. 4, 2023), https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/16840893. Conservation Law Foundation will be releasing a comprehensive bioenergy report in the coming months with modeling and analysis on this issue.

about the supply of the biofuel stocks, including incremental costs, available volume, GHG accounting, and provenance.

- **How should the standard accommodate clean heat that is deployed before the program takes effect; should these systems count toward required "reductions"?**
    - Qualifying clean heat that is deployed before a CHS takes effect must be incorporated into the baseline for emissions reductions, and the standard should be annually reset according to the best available knowledge of the emissions inventory in the building sector. The Commonwealth is too far behind on necessary building sector emissions reductions to allow obligated entities to further delay compliance actions by pulling in past activity.

- **Is a carve-out a good approach to ensuring equity, and if so how could the specific requirement be determined?**
    - Carve-outs could help achieve equity goals but are insufficient alone to address equity issues created by the program. While carve-outs might be a valuable tool to direct weatherization and electrification toward customers who are not being adequately served by existing programs or who would not be served by a strict least-cost market approach to a Clean Heat Standard, DEP must do more to ensure that customers with the highest energy burden are not harmed by the program. See Section II.A above and responses to Topic 4 below for additional content on this topic.

- **Should the CHS be supported by a separate declining cap on emissions to ensure emissions outcomes, such as a "cap-and-invest" program for the building sector?**
    - We request further clarification from DEP on their understanding of a cap and invest program relative to a CHS. If a CHS is going to drive emission reductions towards 2030 and beyond, then the amount of clean heat credits that an obligated entity must create or obtain each year should correspond to an annual cap on emissions. The CHS and the declining cap support each other. Whether there should be a separate cap and invest program is another question.

Topic #2 – Regulated Heating Energy Suppliers

- **Which companies should be subject to the standard?**
    - First, it is imperative that electric utilities NOT be included as obligated entities. A properly designed CHS needs to focus on driving efficient electrification and weatherization that is not already happening under existing programs, and needs to help shift the costs of this transition from electric bills to fossil fuel bills.
        - Replacement of less efficient heating under the purview of electric utilities (electric resistance) is already robustly cost effective under the Green Communities Act (i.e. Mass Save). While the Commonwealth needs to continue to make it easier for electric resistance customers who have not yet switched to access heat pumps, this can be done via the

compliance measures element of CHS program design. See Option 2 in the graphic included with Section II.B.1 above.

- Gas utilities, including municipal gas utilities, must all be obligated entities under a properly designed CHS. We are currently agnostic as to whether gas suppliers should also be obligated entities, as long as every gas therm delivered in the Commonwealth is accounted for in setting a gas utility and/or supplier's compliance obligation and alternative gas fuel blending is disallowed as a compliance pathway. It may be most administratively efficient to regulate only the delivery utilities, while including suppliers as obligated entities could create a more robust market for Clean Heat Credits generated by third party heat pump and weatherization vendors.
- Oil and propane providers should also be subject to the standard. According to the Energy Information Administration "Residential Consumption Survey released in March 2023, delivered fuels serve 27% or 690,000 homes in Massachusetts. Exempting suppliers of these fuels would almost certainly make it impossible to achieve the aforementioned 1 MMT of GHG reduction per year necessary. It would also be unfair to low- and moderate- income consumers of gas utilities who would be affected by the imposition of the standard on gas entities.

- **How can compliance be streamlined for small fuel suppliers?**
  - As stated above, we will withhold judgment on whether the obligation should be on wholesalers or retailers until further information is provided. This is an example of a topic that could be addressed in technical stakeholder sessions.

- **Should municipally-owned gas and electric utilities be treated differently under the standard? If so, how can this be accomplished in a manner that is fair to customers of fossil fuel suppliers that operate in multiple utility service territories?**
  - All electric utilities should be excluded from obligated party status, including municipal electric utilities. The Commonwealth's four municipal gas utilities should be regulated alongside the other gas utilities for the purposes of the CHS. It would be particularly unfair to impose another obligation on investor-owned utilities (that would be passed onto their customers) while exempting municipal gas utilities.

Topic #3 – Credit Generation

- **Which clean heat technologies should be eligible for crediting under the CHS? When and how should new options, such as hydrogen and advanced biofuels, be evaluated?**
  - The CHS should credit efficient electrification and weatherization only, particularly in the context of gas utilities and/or suppliers. We are opposed to crediting biomethane, hydrogen, or synthetic fuels blended into the gas distribution system. See discussion in Section II.B.1 and in response to Topic 1 above. DEP states in Topic 3 that "clearly… bioenergy that is manufactured from waste feedstocks and does not adversely affect local air quality" should

be credited. To the extent that this refers to biomethane, we strongly disagree. To the extent that this refers to liquid biofuels, we are withholding a definitive position regarding advanced biofuels as "drop-in" replacements for #2 heating oil and propane until a thorough analysis is conducted by DEP on the supply and emissions profile of these fuels. Specifically, it is important to understand the cost of biodiesel before and after federal incentives, the quantity of potential feedstocks, and the provenance of potential feedstocks. If DEP considers allowing liquid biofuel blending to qualify for Clean Heat Credits, it could consider requiring the obligated entity to prove that a certain percentage of their customers use oil as backup for a heat pump.

- **How should the amount of credits be calculated for the eligible technologies? What existing calculation methods could MassDEP consider, reference, or adopt?**
    - As a starting point, we recommend that DEP consult with DOER to reference the Technical Resource Manual used by Mass Save to determine the energy savings and GHG reduction attributable to heat pumps and weatherization. This question is truly key to the whole program design. To get it right, we recommend that DEP and DOER jointly conduct a focused set of technical sessions with stakeholders.
    - We propose the following grounding principles for consideration: 1) any methodology must take into account projected declines in electricity sector emission factors over the coming years; 2) lifecycle accounting must be used if any biofuels are deemed an eligible technology, and if DEP uses existing models for lifecycle accounting they must adjust for local conditions; and 3) DEP needs to closely examine how to credit hybrid heating systems, as two homes with identical "hybrid" set ups could be using 100% electric heat or 100% fossil heat in the winter.

- **Is it necessary to develop emission factors for electricity, or can electricity be counted as a zero- emissions energy supply for crediting purposes given the CES requirement to decarbonize the electricity supply? Are there other aspects of electrification emissions that should be incorporated in the standard, such [as] seasonal emissions factors or refrigerant emissions?**
    - In order to drive the levels of electrification called for in the 2025 and 2030 CECP and Commission on Clean Heat Final Report, and given that electric sector emissions are already counted in a different sector of the Commonwealth's emissions inventory, for the purposes of a properly designed CHS electricity should be counted as zero-emissions in the case of qualifying electric heat pumps and appliances replacing fossil fuel heating equipment and appliances. How to treat both 1) Heat pumps replacing resistance heating and 2) weatherization of partially/fully electrically heated buildings will require further coordination with MassSave that should be discussed in technical sessions.

- Given the more pressing local public health impacts from co-pollutants released in combustion appliances, DEP should still assume zero emissions from heat pumps in the initial design of the program despite the GWP of leaked refrigerants. DEP should continue pursuing refrigerant emissions reduction strategies in the supply chain and installer community, including incentivizing factory sealed heat pumps, refrigerants with lower GWP, contractor retraining, and higher payments for returning the refrigerant post decommissioning.

- **Should weatherization be credited in the absence of other clean heat? How can weatherization crediting be calculated for projects that include clean heat?**
  - DEP should use Mass Save's generally accepted energy efficiency accounting of avoided emissions for crediting weatherization in the absence of other equipment installations.

- **Should MassDEP require third party verification? If so, what specific requirements are appropriate?**
  - Verification will be critical to the credibility and emissions reduction efficacy of a CHS, and also one of the more challenging aspects of program design. DEP should first consider the data that can be obtained from gas and electric utilities. Historically, the Commonwealth's utilities have been more protective of their customers' data than they are of their customers' planet and future. DEP and partner agencies should not settle for the utilities' usual prevarication on this subject. Additional verification options may be surfaced via a technical session. The best approach for verifying the extent to which electric heating is being utilized in hybrid heating arrangements or "fully electrified" buildings in which the "emergency only" fossil fuel heating system is still operable will be a topic of critical importance that demands further attention in technical sessions.

- **How should MassDEP define and identify credits that support equitable outcomes?**
  - As we discuss in Section II.A.1 above, credits that support equitable outcomes are a potential indirect benefit of a CHS. In addition to consultation with stakeholders with lived experience of the equity pitfalls of programs like Mass Save, DEP could consider the following incomplete list of potential equity priorities for delivery of indirect benefits: Title I schools, community health centers, food pantries, homeless shelters, and warming centers. Per Section II.A.2 above, DEP should also consider enhanced incentives for networked geothermal projects that migrate entire street segments off of gas.

Topic #4 – Compliance Flexibility and Revenue

- **Should the standard include an ACP option? If so, how should the payment level be established?**
  - Yes, there must be an ACP option. It is unclear how the program would work cost effectively without one. The level should be sufficient to provide the incentive needed to electrify one home.

The ACP payment level will not necessarily match the current $10,000 incentive level established by Mass Save. We note that while DEP states in the Topic 4 discussion that "[T]he Mass Save program has already established $10,000 as an appropriate incentive for conversions to a fully electrified home", Mass Save's incentive levels have not demonstrated the ability to scale heat pump adoption, particularly among LMI households, at the speed and scale necessary to match the levels of adoption necessary to achieve the CECP emissions targets. The appropriate methodology for determining the proper ACP level to achieve the building electrification goals necessary to comply with CECP Buildings Sector GHG emissions targets is a topic of critical importance that should be further discussed in technical stakeholder sessions.

- **Are other revenue generation options, such as a building sector "cap-and-invest" program, necessary or desirable for addressing equity or other revenue needs?**
    - Other revenue generation programs or opportunities will definitely be necessary to fund equitable building sector electrification (however, these are generally outside the purview of DEP):
        - As mentioned above, electric utilities should continue to work towards reducing emissions associated with electric heating, both by targeting resistance electric heat to heat pump conversion opportunities and improving envelope efficiency of all-electric buildings.
        - A state appropriation in support of the Zero Carbon Renovation Fund.
        - Issuance of bonds to decarbonize public buildings.
    - Additional mandates will be necessary to drive private sector funding toward building sector electrification:
        - A statewide Building Performance Standard, starting with buildings greater than 20,000 sf.
        - All-electric building codes so that HVAC systems installed this decade will not have to be replaced in the 2040s.
    - Please refer to our response to the final question under Topic 1 regarding the relationship of a cap and invest program to a CHS.

- **What are the best ways to use revenue? For example, should all revenue be used to fund new clean heat or would it be appropriate to provide ongoing support to LMI customers that fully electrify their homes (e.g., direct bill assistance, free routine maintenance, etc.).**
    - CHS program revenues (primarily from Alternative Compliance Payments) are a variable funding stream that can be directed toward remedying the direct burdens of a CHS with a direct benefit to customers in the form of bill relief

for LMI customers through existing programs run by the Low Income Energy Assistance Network and community action agencies. It will also be necessary to direct portions of the revenue to installations of clean heat equipment to keep making progress toward the program's emission reduction goals. Prioritizing low and moderate income customers for at least 40% of those benefits (see Section II.A.1) is appropriate from an equity perspective.
    - In the longer term, DEP should work with DOER, DPU, and the Attorney General's Office to pursue electric rate reform strategies for equity and energy justice.

- **Are there other flexibility components that may be appropriate, such as multi-year compliance or credit banking?**
    - Generally yes, but we reserve the right to make further comment upon seeing a more detailed proposal. This is an important topic that should also be covered in a series of technical sessions. A certain amount of flexibility may be required to deliver resource-intensive distributed electrification. Less to no flexibility should be granted if DEP allows liquid bioenergy blending.

- **Are the flexibility options presented here sufficient to address weather variability, or will some other approach be needed, such as weather-normalization of reported data?**
    - It will be necessary to weather-normalize reported data in order to adjust each year's Clean Heat Credit quota. We recommend that the quota be set in the first few years assuming heating degree days below the average of the last five years in order to reduce the chances that emission reductions will come in lower than desired.

Topic #5 – Reporting Requirements for Heating Energy Suppliers

- **How should MassDEP structure the reporting requirements for delivered fuels to ensure that all emissions from heating homes and businesses in Massachusetts are reported while minimizing the administrative burden of reporting?**
    - As we noted in response to Topic 2, we would need to see more information before providing an opinion on this topic. We recommend that DEP hold technical sessions on this topic.

- **Should any exceptions or special requirements be included, such as for cooking fuel or for synthetic fuels such as "renewable diesel"?**
    - No. The emissions and equity impacts of special fuel types should be handled through other aspects of program design.

- **How often should reporting be required (monthly/quarterly/annually)?**
    - Reporting should be required quarterly from all obligated entities. The data that is currently required to be reported under Mass Save, including which customers were served along the parameters of measures delivered, residential vs. commercial, building type, residential vs income-eligible, by town or zip code,

should be considered the baseline. Reporting for hybrid heating situations will be complex and should be developed via technical sessions.

Interactions with Other Programs

- **Are there cases where "double dipping" to earn incentives from multiple programs should be prevented, or possibly encouraged such as to support LMI energy consumers?**
    - DEP should avoid "double dipping" from an emissions accounting perspective, but enhanced incentives should be used to help achieve equity priorities. The CHS should be well coordinated with Mass Save for several reasons, one of which is to ensure that LMI consumers are well-served.

- **How can the APS program best be accommodated in the CHS program design?**
    - The initial program design of the CHS should ignore the APS. The APS should be eliminated, as the clean energy incentivization purpose of the program will be subsumed within the CHS and the current design of the APS is not aligned with the Commonwealth's emissions goals. As the Commission on Clean Heat stated in their Final Report, "Given that the APS was designed to incentivize combined heat and power, which it is now phasing out, and it is weak incentive for heat pump technology, we further recommend that the state consider eliminating the APS program and using the new Clean Heat Standard as a more effective program to reduce GHG emissions and support electrification in the thermal sector."[12] Removing the APS would help reduce electric rate impacts as more and more customers heat their homes with electricity. Logistically, DEP should encourage the legislature to repeal the APS while in the near term designing the CHS to ignore the APS. There should be no alternative gas blending qualified as a compliance measure in a properly designed CHS, so this would primarily result in a temporary additional incentive for electrification until the APS ends.

- **Should the program be supported by a declining cap on emissions/cap and invest program for the heating sector?**
    - See responses to prior cap and invest questions in Topics 1 and 4.

Economic Analysis

- **Consumers will incur energy costs, including costs of the clean energy transition, regardless of whether MassDEP pursues a CHS. How can incremental impacts of a CHS be isolated from these costs?**
    - From now through 2050, it will be extremely difficult to sort out to what extent heating costs will change as a result of policies like the CHS, Building Performance Standards (BPS), appliance standards, building codes, technological advancements, changes in electricity costs (which impact the

[12] Final Report of the Clean Heat Commission, at 46.

cost of electrification), various market factors, and exogenous factors such as geopolitical situations (i.e. Russia vs. Ukraine). It is more important for DEP to monitor all aspects of the clean energy transition and to determine whether benefits and costs are being allocated fairly and efficiently.

- **What information sources could MassDEP consider or rely on if there is a need to project future prices of fuels, heat pump installations, etc.?**
    - It is impossible to project fuel prices on a long-term basis to a degree of certainty that would guide good policymaking. Further, most consumers make their decisions on heating equipment based upon their understanding of current equipment costs and their intuition about the long-term cost of fuel. They do not make purchase assumptions based upon a forecast from EIA or DOER. To achieve the requisite GHG reductions, Massachusetts must install about 100,000 heat pumps per year until every building is electrified. For that reason, it would be of great value to continually monitor developments in the markets for air-source and ground-source heat pumps (including networked geothermal). At present, there are no credible predictions of where heat pump costs will be in 5 or 10 years. The purpose of trying to project future heat pump costs is to help determine what, if anything, government can do to reduce the costs of installation, operations, and maintenance.

- **How could economic benefits be quantified, such as the macroeconomic benefit to Massachusetts of substituting spending on local heat pump contractors for spending on imported fossil fuels?**
    - One potential approach is to quantify economic benefits leveraging a similar approach as the Massachusetts 2050 Decarbonization Roadmap. The Roadmap utilized IMPLAN, a widely used input-output economic analysis software package, to evaluate expected economic impacts in the state for various net-zero complaint pathways. The Roadmap found that pathways that invested in local energy resources, including renewable electricity generation, electrification, and energy efficiency, created more jobs and demonstrated greater economic benefits by keeping money local than the pathways more reliant on imported energy. For example, the "All Options" pathway from the Roadmap (which emphasized deep electrification and broad renewable electricity buildout) had 17% higher economic "output" (the broadest measure of economic activity) in Massachusetts per dollar invested than the "Pipeline Gas" pathway (which relied heavily on imported alternative fuels).[13]

- **How can economic analysis be structured to inform equitable program design that benefits LMI energy consumers?**

[13] Massachusetts Decarbonization Roadmap, Economic and Health Impacts Report, Figure 7, page 14 https://www.mass.gov/doc/economics-and-health-impacts-report/download.

- The analysis should be holistic in nature taking into consideration upfront capital cost, operating cost, maintenance cost, air quality health benefits, job creation benefits, etc.

- **How can recent changes in federal incentives be incorporated into the analysis.**
  - The most relevant provisions of the Inflation Reduction Act with respect to clean heat are the following for residential consumers:
    - The HOMES rebate (Home Energy Performance-Based, Whole-House Rebate) offers generous support to homes that reduce energy usage by 25% or more. However, funding allocated to Massachusetts for this rebate is $73,233,910, which is tiny compared to what Mass Save spends in a year.
    - Similarly, the HEEHRA rebate(High Efficiency Electric Home Rebate) offers generous support to the electrification of low- and moderate-income households. However, funding allocated to Massachusetts for this is just $72,809,130. This is also tiny compared to what Mass Save spends in a year.
      - Note: Both rebates, HOMES and HEEHRA, will likely be spent before CHS goes into effect.
    - The federal tax credit (Section 25C) offers a 30% tax credit of up to $2000 per year for air-source heat pumps, heat pump waters, and electrical panel upgrades. Tax credits are also available for weatherization. Section 25D makes available at 30% tax credit, uncapped, for geothermal installations (both residential and commercial).
    - The Greenhouse Gas Reduction Fund (aka the Green Bank) is funded with $27 billion and an explicit mandate to promote equity and environmental justice. A Massachusetts version of the Green Bank can provide low-interest capital to projects capable of earning Clean Heat Credits.

    With all those resources, the Inflation Reduction Act will significantly help to defray the cost of electrification.

* * *

Thank you for the opportunity to comment. We look forward to working with DEP on additional stakeholder dialogue on this important topic.

Signed,

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