

Thank you for the opportunity to suggest edits to the Building Energy Transition Plan. CLPP's suggested edits are detailed below, in the order they are found in the document.

1. *Executive Summary, 2<sup>nd</sup> page:* Change “This plan includes five core recommendations (and 13 additional recommendations) that are designed to facilitate achievement of the Electrification with Fuel Backup scenario while being adaptable for greater electrification of building heating demand.” to “This plan includes five core recommendations (and 13 additional recommendations) that are designed to advance building electrification while keeping options open to move in the direction of either the Electrification with Fuel Backup scenario or the High Electrification scenario, as developments dictate.”
  - **Rationale:** There are many questions about the assumptions underlying the assertion that Electrification with Fuel Backup is the least-cost scenario, as have been raised in previous comments related to the Building Energy Transition Plan. It may be that the low- and zero-carbon fuels envisioned to replace natural gas in existing systems turn out to be expensive, scarce, and more needed in harder-to-decarbonize sectors. In the near term, policy is needed to accelerate electrification; combustion systems are the current norm and do not need further policy assistance. As such, the aim of the policy recommendations should not be to advance the Electrification with Fuel Backup scenario per se. Rather, the aim should be to accelerate electrification (which is needed under either scenario). This would also further the call in the GGRA Plan to decarbonize buildings through energy efficiency and conversion of fossil fuel heating systems to electric heat pumps.
  
2. *Executive Summary, 2<sup>nd</sup> page:* Change recommendation 2c: “Target 50 percent of residential air conditioner and water heater sales to be heat pumps by 2025, 100 percent by 2030” to “Target 50 percent of residential HVAC system and water heater sales to be heat pumps by 2025, 100 percent by 2030”
  - **Rationale:** Converting central AC units to bidirectional units that can provide both cooling and heating only gets Maryland partway to its goal of decarbonizing buildings. For example, residences that have other systems (e.g., window units for ACs, fossil-fuel-fired boilers that feed radiators) would not be covered under a goal and incentives that focus only on AC and water heater sales. Also, if there is an opportunity over the next several years to replace an aging/failing piece of HVAC equipment – whether space heater, boiler, AC system, or something else – with an efficient electric heat pump, that opportunity should be seized. Such equipment is replaced infrequently, and it is certain that heat pumps will be needed. It is possible, but not certain, that fueled backups will also be needed. The goal should be to pursue the certainty. If it turns out that a fueled backup system is needed for broader grid purposes, such a system could always be added at a future date. Realistically, given the slow turnover of HVAC equipment, it will take a long time to decarbonize the existing building stock, which means there will be a mix of electric, fossil fuel, and electric-fossil residences in the system for many years—a mix that should not cause more strain on the grid.

3. *Page 3:* Change “Furthermore, if low-carbon fuel costs come in on the high end of the range, then the High Electrification pathway could become the lowest-cost pathway for Maryland.” to “Furthermore, if low-carbon fuel costs come in on the high end of the range—given that they may be available in very limited quantities and will be needed in harder-to-abate sectors—then the High Electrification pathway could become the lowest-cost pathway for Maryland.”
  - **Rationale:** It is worth making clearer the reasons why fuel costs could be very expensive. The assumption that there will be sufficient availability of low-carbon fuels to meet almost 40% of the current natural gas load in Maryland seems dubious, given other analyses that show such fuels to be very expensive, available to meet only a small fraction of current natural gas usage, and needed more in other sectors where emission abatement is more difficult (see, for example, the article [here](#)).
  
4. *Page 7:* Change “Note that capital costs are lower for buildings with fuel backup based on the assumption that these buildings would avoid expensive shell improvements.” to “Note that, in E3’s modeling, capital costs are lower for buildings with fuel backup based on E3’s assumption that these buildings would avoid expensive shell improvements.”
  - **Rationale:** Building shell improvements should be pursued under any scenario. Pursuing all cost-effective energy efficiency options must be the first step, which will in turn affect the size of any heat pump system, the level of low-carbon fuels needed, and more. It should be emphasized that the absence of building shell improvements in the Electrification with Fuel Backup scenario—which is one of the main reasons that it ended up as the “low-cost” scenario—is simply an artifact of E3’s modeling approach and assumptions.
  
5. *Page 10, Conclusions bullet #1:* Change “The Electrification with Fuel Backup pathway shows lowest overall costs while also reducing reliance on technologies that have not yet been widely commercialized or that are uncertain in their scalability.” to “The Electrification with Fuel Backup pathway shows lowest overall costs, *assuming* no building shell upgrades are pursued, substantial federal funding is not directed toward grid upgrades and heat pump deployment, and adequate supplies of affordable low-carbon fuels exist.”
  - **Rationale:** The Electrification with Fuel Backup pathway is only lowest-cost in the modeling based on a very specific set of assumptions, which should be clearly reflected in this Conclusion bullet. These are somewhat addressed in bullet #6, but they should be expressed clearly here as well, particularly as this is the very first bullet in the Conclusion. In addition, the Electrification with Fuel Backup pathway very much relies on technologies that have not yet been widely commercialized and that are uncertain in their scalability. Indeed, there have been numerous studies that show very limited RNG (and SNG) availability and ability to scale. Maryland should be adopting policies that other states could emulate, and it is doubtful that there will be sufficient quantities of low-carbon gas in the future to accommodate a similar Fuel Backup approach on a national scale.

6. *Page 10, Conclusions bullet #2:* Change “Achieving the Electrification with Fuel Backup pathway would require careful policy design that incentivizes some consumers to use dual fuel heating systems.” to ““Achieving the Electrification with Fuel Backup pathway would require careful policy design that incentivizes some consumers to use dual fuel heating systems even as the price of gas rises significantly.”
  - **Rationale:** As less gas is used in the system, and as demand increases for the limited supplies of low-carbon fuels, gas prices will rise, as the Plan notes on pp.8-9. The Conclusion should make clearer that pursuit of the Electrification with Fuel Backup pathway depends on incentivizing customers to keep using gas anyway.
7. *Page 10, Conclusions bullet #5:* Change “Space and water heating loads should be met with efficient electric heat pumps, at least to the point when winter and summer peak electricity demand are roughly equal.” to “Space and water heating loads should be met with efficient electric heat pumps, at least to (and probably beyond) the point when winter and summer peak electricity demand are roughly equal.”
  - **Rationale:** The limitation on winter peak to not exceed summer peak is somewhat arbitrary. As the Plan notes on p.3, Pepco is of the view that the grid buildout needed for electrification is entirely manageable. Also, it seems likely that the cost of RNG will be high enough to justify some amount of winter peaking in excess of summer peaking. While “at least” could be read to imply that beyond that point is possible, it would be better to state that explicitly, which would also lead more directly into bullet #6.
8. *Page 10, Conclusions bullet #6:* Change “Achieving greater electrification of heating loads (when winter peak electricity demand would exceed current electricity system capacity) could become the lowest-cost pathway if federal funding for electricity system improvements becomes available, building shell improvement costs are reduced, utility demand management is enhanced, and/or low-carbon fuel costs come in on the high end of the price range.” to “Achieving greater electrification of heating loads (when winter peak electricity demand would exceed current electricity system capacity) could become the lowest-cost pathway if federal funding for electricity system improvements becomes available, building shell improvement costs are reduced, utility demand management is enhanced, battery storage is more widely utilized, and/or low-carbon fuel costs come in on the high end of the price range.”
  - **Rationale:** This change adds “battery storage is more widely utilized” to the list. Battery storage, which is expected to increase under any scenario as the price of batteries continues to drop, will provide low-cost backup power for buildings that install them to help meet additional demand on the coldest days.
9. *Page 10, Conclusions bullet #7:* Change “Planning for both the Electrification with Fuel Backup and High Electrification scenarios could be wise.” to “Planning for both the Electrification with Fuel Backup and High Electrification scenarios could be wise, where that is possible, but where it is not, electrification should be the priority.”

- **Rationale:** It makes sense to pursue measures that keep both possible pathways available as options, but that may not always be the case. As stated earlier, in the near term, policy is needed to accelerate electrification; combustion systems are the current norm and do not need further policy assistance. As such, the aim of the policy recommendations should be to accelerate electrification, which is needed under either scenario.
10. *Page 14, Recommendation 2C:* Change “Target 50 percent of residential AC and water heater sales to be heat pumps by 2025, 100 percent by 2030 (modified MCCC recommendation from 2020) – Require that incentives (for consumers, contractors, and manufactures) through EmPOWER and other programs are sufficient to meet a target of 50 percent of AC and water heater sales to be electric heat pumps by 2025 and 100 percent by 2030.” to “Target 50 percent of residential HVAC system and water heater sales to be heat pumps by 2025, 100 percent by 2030 (modified MCCC recommendation from 2020) – Require that incentives (for consumers, contractors, and manufactures) through EmPOWER and other programs are sufficient to meet a target of 50 percent of residential HVAC system and water heater sales to be electric heat pumps by 2025 and 100 percent by 2030.”
- **Rationale:** See suggested edit #2, earlier. In addition, it is worth noting that changing the language in 2C to focus on replacing all HVAC equipment, not just ACs and water heaters, aligns better with recommendation 2A (and to an extent 2B), which includes promotion of replacing existing fossil fuel systems with electric heat pumps.
11. *Page 15, Recommendation 2C Discussion:* Change “In 2020, the MCCC approved a recommendation that 50 percent of space heater sales should be heat pumps by 2025. The target probably makes more sense as an AC sales target to align with E3’s conclusion that heat pumps should provide all cooling and all or most heating for existing buildings, and that existing fuel systems could stay in place for backup space heating. High-efficiency electric water heaters are added to the proposal this year. If 100 percent of AC and water heater sales are heat pumps in 2030, then most existing buildings should be retrofit with heat pumps by 2045 based on typical equipment replacement schedules.” to “In 2020, the MCCC approved a recommendation that 50 percent of space heater sales should be heat pumps by 2025. The target probably makes more sense as a sales target for all HVAC systems, whether space heaters or ACs. High-efficiency electric water heaters are added to the proposal this year.”
- **Rationale:** See suggested edits #1, #2, and #10, earlier.
12. *Page 15, Recommendation 2E:* Change “Provide funding to enable the Maryland Department of Housing & Community Development (DHCD) to provide a little-to-no upfront costs comprehensive retrofit program to install heat pumps, improve weatherization, and otherwise address health and safety concerns in 100 percent of low-income households statewide by 2030.” to “Provide funding to enable the Maryland Department of Housing & Community Development (DHCD) to provide a little-to-no upfront costs comprehensive retrofit program to install heat pumps, improve

weatherization, eliminate indoor combustion from gas appliances, and otherwise address health and safety concerns in 100 percent of low-income households statewide by 2030.” Also, add to the end: “Consideration should also be given to establishing some kind of focused, comprehensive retrofit program (beyond just the incentives in 2A-2C) for other households in the state, to overcome behavioral/inertia hurdles.” (Alternatively, this could be made into a stand-alone *Recommendation 2F*.)

- **Rationale:** With respect to the first suggested change, we suggest including elimination of indoor combustion from gas appliances because it has been shown to have severe health impacts that should be spotlighted. Science Times [reported](#) that gas cooking increases risk of childhood asthma by 42%. With respect to the second suggested change, there are many reasons that homeowners and other households in the state will not actually take action to install heat pumps, even with incentives available. Some kind of focused program to drive adoption and implementation would be helpful and could complement the recommendation in 2A for electric utilities to proactively encourage heat pump adoption.

13. *Pages 16-17, Recommendation 3:* Change “Fees for non-compliance should be reasonable, perhaps corresponding with the cost of implementing additional carbon sequestration or negative emissions technologies in Maryland, but not less than the federal Social Cost of Carbon.” to “Fees for non-compliance should be reasonable, but high enough that they achieve a high level of compliance and do not encourage building owners to pay for non-compliance rather than comply, simply because it is cheaper. At a minimum, the fee should equal the federal Social Cost of Carbon.” (Also, the preceding sentence appears to contain a typo. It probably should read “... allow the state to meet its emerging 2045 net-zero emissions goal.”)

- **Rationale:** The State should determine a minimum level of emission reduction that must be achieved onsite and set non-compliance fees high enough to ensure that level is achieved.

14. *Page 17, Recommendation 3 Discussion:* Change “Note: If Maryland implements a Clean Heat Standard, then it could become the default pathway to net-zero emissions by 2045 for all buildings (including single-family homes)” to “Note: If Maryland implements a Clean Heat Standard that includes energy efficiency, beneficial electrification, and distribution system leak reduction, it could become the default pathway to net-zero emissions by 2045 for all buildings (including single-family homes).”

- **Rationale:** We suggest adding “energy efficiency, beneficial electrification, and distribution system leak reduction” for clarity. The text seems to recommend a broad view of what should be included in a Clean Heat Standard, and the reference to Colorado’s Standard reinforces this. However, some parts of the text (e.g., “E3’s Maryland Building Decarbonization Study shows that in any scenario, replacing fossil fuels with low-carbon renewable fuels is essential for achieving net-zero emissions within the building sector.”) could be read to suggest that the Standard might only include measures to decarbonize fuels.

15. *Page 17, Recommendation 4* appears to contain a typo. The second sentence probably should read "... improved efficiency and electrification of fuel end-uses."
16. *Page 20, Recommendation 8*: After "The Governor, State Agencies, Commissions, and General Assembly should ensure that all policy decisions to reduce GHG emissions from the building sector in Maryland, including those within these recommendations, prioritize an equitable level of benefits to limited income households, the state's affordable and multifamily housing stock, and low-income ratepayers, and concurrently with the benefits provided to others." add: "At a minimum, limited income households and ratepayers should receive a level of benefits proportional to the amounts they pay into related State programs, such as EmPOWER."
  - **Rationale:** LMI households pay into EmPOWER at the same rate as other households (or, it could be argued, a higher rate due to their inefficiency) but receive far fewer benefits. While EmPOWER reduces electricity consumption in the State by 2% per year, LMI households receive as little as 0.1% efficiency improvement. Simple fairness dictates that LMI households should receive benefits in proportion to (or greater than) what they pay in.
17. *Page 22, Recommendation 17*: Change "Electricity utilities should provide information about locations where the grid is not sufficient to serve new construction of multi-story, all-electric commercial buildings with electric vehicle charging and a method to determine the cost and timetable for necessary upgrades." to "Electricity utilities should provide information about locations where the grid is not sufficient to serve new construction of multi-story, all-electric commercial and residential buildings with electric vehicle charging and a method to determine the cost and timetable for necessary upgrades."
  - **Rationale:** We suggest adding "and residential buildings" because there is no obvious reason why this recommendation should apply only to commercial buildings.