Michigan Council on Climate Solutions: Buildings and Housing Workgroup Recommendations

September 2021

Co-chairs:
Charlotte Jameson, Michigan Environmental Council
Karen Gould, Michigan Public Service Commission

Table of Contents

Background

As of 2018, Michigan's residential and commercial buildings accounted for 19.8% of the state's total energy-related direct carbon dioxide emissions, excluding emissions from electricity produced to serve buildings (those emissions are being tackled under the Energy Production, Transmission, Distribution, and Storage workgroup).[1] The energy emissions from buildings are primarily due to natural gas combustion for space and water heating. Achieving net zero greenhouse gas emissions in residential and commercial buildings will require both increased energy efficiency and the use of fuels (including electricity) that emit no lifecycle greenhouse gas emissions.

Process-wise, the workgroup met thirteen times to hear presentations from local and national experts on a variety of topics related to Michigan's buildings and housing and strategies to support reducing GHG emissions. Each meeting included an opportunity for stakeholder questions and discussion. The co-chairs then drafted recommendations based on those discussions and solicited feedback on the draft language from the group in the final meetings.

Below, there are eight high-level recommendations to support achieving net zero emissions by 2050 in the buildings sector, each with its own subset of specific recommended actions. Of these, the co-chairs have prioritized what they believe to be the five highest impact recommendations, considering greenhouse gas emissions, equity and environmental justice, workforce, and economic development. These are preceded by an overarching recommendation to conduct a decarbonization pathways analysis, which the workgroup felt was important, but was unable to accomplish given limited time and resources.

The co-chairs have provided a fill list of the recommendations in each of the eight categories, followed by an individual template for each that describes the following:

- the timeframe in which each is achievable;
- estimated GHG reductions;
- impacts to environmental justice, labor, the environment, and economic development;
- relative costs
- who is empowered to implement
- notes on stakeholder perspectives around the recommendation; and finally
- considerations on achievability and feasibility.

Importantly, some of the recommendations seek actions by 2030 or 2035 that the co-chairs believe are necessary to put Michigan on a path to meeting its 2050 climate goals and to maximize emissions reductions over the next decade as instructed by EGLE.

[1] U.S. Energy Information Administration: https://www.eia.gov/environment/emissions/state/excel/table4.xlsx

Full List of Recommendations

Overarching Recommendation

The state should pursue economy-wide decarbonization pathways analysis to determine the least cost, technology agnostic, pathway to net zero for the State. The state should set sector specific decarbonization targets based on the economy-wide decarbonization analysis.

The state should adopt a climate-in-all-policies approach and the Governor should direct state agencies to integrate climate goals and greenhouse gas reduction targets into all state agency and department planning processes.

Top 5 Recommendations

I. ENERGY EFFICIENCY

The state should increase energy efficiency (EE, energy waste reduction, or EWR) for residential, commercial and industrial; and increase low-income energy efficiency including multi-family dwellings:

1. The legislature should extend, without sunset, energy waste reduction standards for all municipality and cooperative electric providers prior to them sunsetting in 2021.
2. The legislature should explore updating our energy waste reduction standard statute to 1) increase them from 1 percent to 2 percent for electric and from 0.75 percent to 1.5% for gas and increase the corresponding incentives to go beyond the minimum standards, 2) allow for fuel switching, and 3) include the opportunity for a fuel and technology neutral goal to supplement the energy savings goals. The new standard should set carbon emissions reduction and energy use reduction targets respectively. The legislature should look to the recently passed ECO Act in Minnesota as a potential model for a path forward to ensure carbon emissions reduction and energy use reduction targets are achieved concurrently without reducing the effectiveness of energy efficiency.
3. The MPSC should encourage utilities to increase spend on energy efficiency programs, in particular programs for low-income and energy burdened customers, to pursue all cost-effective energy waste reduction possible for their customers.
4. The MPSC should study what reforms or changes to the EWR programs might be needed to better target building shell improvements and/or what programmatic options are available to improve the building envelope and insulation of the current housing stock. This analysis should include, but not be limited to, an examination of the effectiveness of using a greater portion utility gas efficiency program dollars on building shell improvements and using less on appliances and low cost, shorter measure life programs as well as examining needed changes to the cost-effectiveness test.
5. The legislature should evaluate cost effectiveness tests other than the Utility System Resource Cost Test (USRCT or UCT) that better captures all benefits associated with energy waste reduction including carbon reduction and health benefits.

6. The MPSC or EGLE should collect and summarize the current energy efficiency and GHG reduction impacts of all existing energy waste reduction policies and programs in Michigan and calculate and document the gap between current funding levels, policies, and programs and the trajectory of needed GHG reductions.
7. Starting in 2025, begin phasing out incentives for fossil fuel appliances and equipment.

Low-Income and Energy Burdened Communities Energy Efficiency:

8. The legislature should annually appropriate the maximum allowable annual LIHEAP percentage to weatherization. The legislature should also appropriate funding for increased marketing and enrollment in the weatherization program
9. MDDHS should update the weatherization program in collaboration with energy providers and other stakeholders to better facilitate weatherization of low-income multifamily properties.
10. MDDHS should examine implementing the following changes to the weatherization program to increase contractor participation: (1) Ensure that compensation to small businesses for employee training time covers at least the full cost of labor, not just the hourly rate of employees; (2) Make available a statewide “participating contractors” list for weatherization projects; (3) Aggregate weatherization projects to achieve better economies of scale; and (4) Close the gap in profit margin between weatherization program and market rate projects.
11. MDDHS and the administration should ask the federal Department of Energy and, to the extent required, the Michigan congressional delegation to support reforming the weatherization program using a comprehensive approach delivery that includes funding to address health and safety barriers, weatherization, electrification, and renewable energy and includes non-energy benefits in the Savings-to-Investment ratio calculations.
12. The MPSC should direct utilities to partner with MSHDA to deliver energy savings and renewable energy offerings directly to affordable housing properties for which MSHDA allocates funding and/or provides oversight. MSHDA, utilities, and other stakeholders should examine ways to encourage and increase participation in existing utility multifamily programs.
13. MSHDA should develop an implementation plan for the Michigan Housing and Community Development Fund that specifies that energy and water efficiency, weatherization upgrades, and electrification of appliances are eligible uses. The implementation plan should also set minimum energy efficiency, water efficiency, electrification, and healthy building material standards for all projects receiving HCDF funding.

II. ELECTRIFICATION

Study and consider the electrification of building appliances as a pathway to reduce and eliminate direct emissions from the building sector; study and account for the impacts of building electrification on the grid, the gas distribution system, and on low-income and energy burdened

residents. Michigan's governor or legislature should set a goal of 100% of all new heating equipment sales to be electric by 2035 and set interim targets leading up to 2035 in order to achieve a phased in approach to building electrification. Below are the action steps to achieve this recommendation:

1. The Governor should direct the MPSC to conduct 3-5 city or county specific studies, in diverse climate zones, to identify the estimated total costs of upgrading the electric grid to handle higher electric loads due to electrification of buildings and transportation; the study should take into account potential reductions in peak load via robust demand response and reductions in overall load via aggressive energy waste reduction.

2. The Governor should require MPSC to conduct a study on the implications of an electrified Michigan. This would include cost and benefit ramifications, relative to different pathways to meeting the state's climate goals in the building sector. This study should also explore rate design and affordability for residential customers in the context of building decarbonization, with the goal of ensuring that as more Michigan residents shift to electric heat (and other electric appliances), affordability and fairness are retained and appropriate incentives for shifting to clean energy and electrification are created.

3. The Governor should direct the MPSC to open a gas planning proceeding to explore the future of gas distribution as aligned with Michigan's carbon neutrality goals.

4. The MPSC should request utilities to file for pilot incentive programs for water and space heating heat-pumps. These programs should be designed to identify beneficial electrification opportunities, understand costs to upgrade and operate equipment, understand challenges and opportunities faced by electrical infrastructure, identify and understand dual heating solutions. The pilots should include a prioritization of low-income and energy burdened customers and test rate designs, DR, and EWR offerings to ensure low-income and energy burdened customers' rates are affordable. More specifically, low-income and energy burdened customers participating in the pilot should be given a package of retrofits delivered together, including energy efficiency/building shell retrofits, electric appliances, health and safety walkaway remediation, and programs or rate designs aimed at maintaining energy bill affordability.

5. MSHDA should update the QAP to provide significant points for very efficient and new all-electric construction.

6. MSHDA should incorporate specific carbon reduction goals, based off of a statewide decarbonization pathways analysis, into the state housing plan and develop a roadmap for reaching net zero energy affordable housing in Michigan.

7. The Governor should commit government buildings, schools, and public housing to be fully retrofitted with efficiency upgrades and all-electric appliances by 2030. The legislature should appropriate funding necessary to support the electrification and efficiency projects in these buildings. Working with HUD, public housing residents, and other stakeholders, MSHDA should create a technical assistance and education program for public housing residents, developers, and others.

8. The state should partner with manufacturers of all electric appliances and other stakeholders to launch an education and marketing campaign around electric appliance technology and its efficacy.

III. FUNDING AND FINANCING

Funding and financing of all recommendations from this workgroup will be a vital tool to building out and implement the recommendations. Many of the recommendations from this workgroup will be costly to the state, the residents and the business owners, although some of that cost will be offset with decreased utility bills. It is important to utilize all funding and financing opportunities available but also to make more options for funding and financing to energy customers.

1. State departments and agencies should work with utilities to support the development of successful on-bill programs. Utilities should offer on-bill financing programs that would enable people who can financially take on a loan but have bad credit scores to access financing for energy efficiency, electrification, DG, and other improvements. Utilities should offer on-bill programs to support utility programs, pilots and to address market gaps (e.g. rental market, small commercial, homeowners that can take on a financial obligation but can't qualify for traditional credit). The legislature should act to require utilities to offer on-bill programs if utilities fail to offer them themselves.
2. All regulated and unregulated energy providers should advertise the benefits of the state-wide ability to make improvements to their homes and businesses through Michigan Saves financing of energy efficiency, renewable energy, and other climate resilient measures.
3. The legislature should allocate funding for a revolving grant and loan fund that serves those that don't qualify for low-income programs but are unable to financially bear the full cost (ALICE, credit-challenged, etc.). This funding should be in addition to existing programs not in replacement of existing programs. A combination of grants and loans from a revolving fund should be offered to those that cannot qualify for traditional credit and are at an income level just above that of qualifying for low-income programs.
4. The Governor and the legislature should create a fund for decarbonization retrofits of affordable and low-income housing. The legislature should appropriate at least $1 billion of federal American Recovery Act dollars into the fund and other state or federal funding available. Funding should be used to provide grants for deep energy efficiency projects, purchase and installation of electric appliances (including wiring upgrades), installation of EV charging, and mitigation of health and safety concerns in affordable and low-income housing. This funding should be in addition to existing programs not in replacement of existing programs.
5. The administration and legislature should leverage any and all available state and federal funding for increased energy efficiency implementation for Michigan’s businesses and residents above and beyond utility funded EWR programs. This funding should have a strong focus on small commercial, multifamily buildings and low-income housing as these are the most difficult structures to integrate energy waste reduction into due to their minimal resources available for such upgrades.

6. The administration and legislature should allocate $75 million in ARP funding toward upgrading school HVAC systems allocated in HB4011 that prioritizes efficient, electric HVAC systems.
7. The state should educate and encourage local county governments to authorize C-PACE financing programs within their localities. The state should encourage the county governments to integrate consumer protections against predatory lending.

IV. WORKFORCE, TRAININGS

There is currently a workforce shortage in almost every industry in the state and the nation. The Workforce available for technologically advanced green energy jobs and careers is even more scarce. Careers in energy and specifically in GHG emission reducing energy careers need advanced training and development. The careers in the green energy field are permanent, ever advancing, stable and provide security for persons with the ability and desire to hold these positions.

1. LEO and EGLE's energy office should study the creation and funding of additional training programs to prepare the contracting network for changes in the energy efficiency and HVAC systems of buildings. Specific outreach and market development efforts should be geared toward further diversifying contractor networks. There are emerging programs that exist (e.g. Market Diversity Initiatives in Chicago or San Mateo County) which identify diverse contractors and connecting them directly with utility or other resource opportunities that they may not be aware of.
    a. LEO and EGLE should offer increased opportunities for workforce development to train more ANSI-certified auditors to facilitate a statewide approach to on-bill financing. A lack of access to auditors is a barrier to on-bill financing.
2. EGLE should develop an education program for contractors, developers, local housing authorities, financing institutions, building trades, landlords and tenant groups that increases awareness of efficient and effective construction and retrofitting options for GHG emissions reductions.
3. Support enhanced coordination between building industry stakeholders and existing workforce development programs, resources and tools.
    a. LARA and/or EGLE Office of Climate and Energy (to provide information and access to existing programs, and possibly to lead a coordinated effort of stakeholders focuses on energy efficiency workforce development)
    b. MI Legislature (to appropriate funding for SOM and stakeholder efforts in EE WFD)
4. Help industry stakeholders develop a compelling "green building career pathways" narrative and outreach strategy to engage diverse workers, young people, and career-changers about job and training opportunities in the industry.
    a. LARA and/or EGLE Office of Climate and Energy (to either host and facilitate this industry discussion and outreach, or connect industry stakeholders to existing WFD resources that might be useful)

b. MI Legislature (to appropriate funding for SOM and stakeholder efforts in developing and conducting outreach around a “green building career pathways” narrative)

5. To strengthen the industry, the legislature should fund training programs for non-technical topics such as on-site health and safety, heavy vehicle operation, customer relations and other communication skills, and small business administration and management.

V. BUILDING CODES

The building energy conservation code adoption process is one of the few regulatory levers that state decision-makers have to improve our building stock over time to the benefit of Michiganders and our economy. Building codes ensure that new construction and major renovation projects are better and safer. They also influence what products are readily available on the market for contractors and help standardize construction practices across the industry even in projects where codes don't apply.

1. LARA should commit to a path of reaching net zero building codes no later than 2030. LARA should conduct an analysis of where the current trajectory of Michigan energy codes would take us, relative to what might be needed to meet the state’s GHG reduction targets.

2. The Governor and the legislature should allocate additional training, staffing, and funding to help local units of government enforce codes. This effort should augment EGLE energy office’s existing code compliance assistance effort.

3. Promote Mass Timber construction in Michigan by 1) Requiring building construction projects receiving State capital outlay to consider Mass Timber design; 2) fast-tracking adoption of the Mass Timber portions of the 2021 International Building Code; 3) Supporting ongoing research, development, and outreach to support Mass Timber construction as a carbon-storing and emissions-reducing alternative to more carbon intensive materials; and 4) Developing sunsetting incentives for early adopters of Mass Timber in Michigan.

4. The State should support research that measures the impact of embedded energy in structural materials and adopt modifications to the building code and structural material disposal, salvage and reuse policies that reduce embedded energy carbon emissions.

5. The Governor should enact a Buy Clean policy requiring all new government buildings to use low-embodied carbon materials and healthy building materials.

2021 Building Code Update:

6. LARA should adopt the 2021 IECC model building codes without weakening amendments.

7. LARA adopt building codes that encourage smart thermostats and other flexible-load technologies that facilitate demand response.

8. LARA should adopt an electric-ready requirement in the 2021 update to the commercial and residential building codes to ensure new construction and major renovation can easily accommodate electric appliances.
9. LARA should adopt an EV ready requirement in the 2021 update to the commercial and residential building codes.
10. LARA should examine the legal pathways to adopting a net-zero stretch code as part of the uniform code so that local units of government could enforce it if they so choose. The legislature and LARA should look to the recent Illinois Climate & Equitable Jobs bill (SB 2408) as an example of legislation where local governments can opt into a state-establish established stretch code.
11. Michigan should adopt building codes that require nominal amounts of solar on commercial code properties; commercial properties should also be allowed to meet this requirement via enrolling in a community solar project or participating in a utility voluntary green pricing program.
12. Michigan should adopt building codes that include solar-readiness and storage-readiness provisions.

Additional Recommendations

VI. ENERGY BENCHMARKING AND BUILDING PERFORMANCE STANDARDS

Michigan should facilitate broader energy benchmarking and set a statewide commercial building performance standard to decrease GHG emissions in existing commercial buildings.

1. Legislature should adopt a policy that requires energy use and energy efficiency to be listed on real estate listings and rental agreements. This disclosure should use established standards or rating systems, the specifics of which should be developed as the policy evolves.
2. The state should encourage and assist (via technical and/or financial assistance) local units of government with developing and adopting commercial and multifamily benchmarking ordinances, with streamlined and standardized data collection and reporting procedures at the state level.
    a. Michigan utilities should work with local units of government to ensure building owners and operators have access to streamlined energy data. Best practice is using an auto-upload feature between the utility and the client via Energy Star Portfolio Manager. The MPSC should include this recommendation as part of its MI Power Grid effort and work to help ensure utilities implement it. Small utilities where using Energy Star Portfolio Manager is not feasible should ensure that the data is in a manipulatable format (e.g. excel) and is provided on an ongoing basis.
3. The governor should reinstate energy and water benchmarking and transparency for all state-owned and operated buildings using Energy Star Portfolio Manager. MSHDA should expand or re-run the energy benchmarking pilot it conducted of MSHDA (low

income housing tax credit) funded properties. MSHDA should look to emulate the energy reporting requirements that federal agencies (Freddie, HUD) have in place for MSHDA LIHTC properties.

4. The legislature should adopt a minimum efficiency standard for multi-family rental properties across the state. Experience with existing municipal level requirements, such as Boulder Colorado's, could be leveraged in developing the standard.

5. The Whitmer administration should develop and adopt a statewide building performance standard centered around annual GHG reduction targets, in the commercial building sector. This is intended to complement building code updates by ensuring strong performance to achieve GHG reductions.

6. EGLE should use its Catalyst Communities program to help and encourage and provide technical and financial assistance to local units of government in adopting energy benchmarking ordinances and building performance standards based on GHG emissions targets.

7. LARA, MSHDA, EGLE, and MPSC should work together to create a standard assessment that could be used statewide to collect information on the health, safety, and energy needs of homes in a consistent manner. Streamlining the process of addressing non-energy issues that preclude households from participating in energy efficiency programs will increase EE adoption (especially in the low-income sector) and contribute directly to GHG reductions.

VII. DEMAND RESPONSE

1. Demand Response (DR) programs have the ability to shift on-peak load usage onto off-peak times. There may not be very much implications to load shifting, but as Michigan sees increased electric appliances and devices on the system, in its ability to reduce GHG emissions, it will be important provide security of available energy to Michigan’s customers at all times of the day. Load shifting also has the ability to keep energy bills low for all customers.

2. The MPSC should conduct a study of demand programs with the goal of identifying those best suited to managing load and reducing peak load as buildings electrify. In any rate case, after the study is complete, the MPSC should direct regulated utilities to propose implementation of those recommended DR programs if they are not already being implemented. The Commission should also continue to use the IRP process to determine the scope of demand response programs and load forecasts.

3. MPSC should assess how DR resources/flex resources should change and evolve as Michigan’s electricity becomes increasingly supplied by renewable energy, where the need for DR expands from its current role of peak load-shaving to also balancing the system to manage the non-dispatchability of renewable power.

4. The MPSC should encourage utilities to invest in projects/pilots to implement and demonstrate flexible demand assets to reduce GHG emissions. The administration should also identify other funding opportunities for investments in DR pilots. The pilots should focus on testing DR strategies for future electrification (heat pumps, heat pump

water heaters and EVs) as devices with substantial potential to supply flexible demand to the grid.

5. The administration and the legislature should express support for energy internet of things (IoT) communication protocols at the federal level that allow for broad interoperability, such that DR devices from different manufacturers can communicate with one another and with the utility.
6. The MPSC should require utilities to assess how to better coordinate their EWR and DR programs and budgets to jointly promote appliances/devices that can provide both energy savings and grid flexibility.
7. The MPSC should require all utilities to implement rate structures that can best achieve net zero GHG emissions as more buildings are electrified, such as time of use (ToU) pricing, dynamic tariffs, and/or real time pricing. Low-income customers should be allowed to opt-out of the DR tariff and opt-in to percentage of income rates if those prove to be more affordable. Broad education is needed to implement effective advanced rate designs while maintaining customer satisfaction.
8. The MPSC should establish a standardized way of valuing DR not just as system peak resource, but as a local distribution resource. When evaluating distribution system investments (such as substation upgrades, etc.), the MPSC should require utilities to evaluate GHG-reducing non-wires alternatives (which include DR, DER, and energy efficiency) to avoid, mitigate, or delay that distribution need.

VIII. PUBLIC HEALTH

Improve public health and protect vulnerable populations and overburdened, EJ communities by creating strong standards that reduce indoor and outdoor air pollution.

1. The Governor should direct the air regulators in EGLE to develop a low- to zero-NOx appliance standard for residential and commercial buildings.
2. EGLE and MDHHS should investigate the means by which indoor air quality standards, including ventilation, could be developed for residential and commercial facilities.

Templated Recommendations

I. Energy Efficiency

1) **Overview of recommendation (250-word limit).**
The state should increase energy efficiency (EE, energy waste reduction, or EWR) for residential, commercial and industrial; and increase low-income energy efficiency including multi-family dwellings. Currently, Michigan's major electric utility providers are achieving about a 1.75% reduction in energy use, year over year, with programs legislatively required by PA 295. There is still more achievable potential that is untapped. The gap between what the utilities stated achievable potential is and what is actually the states beneficial maximum achievable potential is the gap that needs to be addressed and implemented. The gap between what Michigan utilities are doing and what the most successful utilities in the nation are achieving suggests that much more could be accomplished. Stronger policies, programs and funding will need to be developed to achieve the Governor's aggressive GHG reduction goals.

   Stronger policies, programs and funding will need to be developed to achieve the Governor's aggressive GHG reduction goals. Potential studies accomplished both in the state of Michigan and nationally tend to be conservative and are based on specified inputs. Changes to these inputs to address GHG reductions in lieu of inputs to address energy reduction would produce different results. Cost benefit tests used to discount measures and programs are just an example of selection criteria that can alter the results of energy potential in specific areas.

   The state should collect and summarize the current energy efficiency and GHG reduction impacts of all existing energy waste reduction policies and programs annually and calculate and document the gap between current funding levels, policies, and programs and the trajectory of needed energy efficiency to maximize GHG reductions through beneficial energy efficiency for all buildings and homes.

   The state should leverage any and all available state and federal funding available for increased energy efficiency implementation for Michigan's businesses and residents. This funding should have a strong focus on small commercial, multifamily buildings and low-income housing as these are the most difficult structures to integrate energy waste reduction into due to the minimal resources available for such upgrades.

2) **In what timeframe is this recommendation achievable?**
By 2025 and beyond, annually:

   For calculation purposes, we estimate that Michigan's utility programs could have a maximum achievable potential of energy efficiency of about 0.50% or more above current annual electric and natural gas savings levels each year. These potential annual savings would be cumulative, and the results below are based on the average measure life of 10 years. In other words, MWh savings in 2025 would be in addition to savings achieved in 2026 through 2034 by utility funded EWR programs. This is based on an estimate of 1,559 lbs. of CO2 per MWh. The estimated 0.50% additional reduction to annual sales is equal to 575,021 MWh. Achievable potential is a difficult concept to precisely quantify. Potential studies for utility ran EWR programs tend to be

conservative. An arguably better estimate would be the proven savings achieved by utilities in the most successful states. That is the basis for the 0.50% possible savings improvement for Michigan estimated above. It should be noted that the newly released Michigan EWR potential study only utilizes potential which falls into the Utility System Cost Test (USRCT or UCT) benefit calculation. That cost benefit test does not include the many benefits to Michigan customers such as health impacts, which we know are greatly improved with GHG emission reductions. The current potential study also does not take into account Governor Whitmer's- Executive Directive 2020 - 10 (michigan.gov). The aggressive goals to reduce GHG emissions in Michigan within this executive directive would increase Michigan's energy efficiency potential greatly.

Any achievable potential for additional energy efficiency utilizing other state or federal dollars outside of Michigan's legislatively mandated EWR programs have unknown timeframes.

3) **What is the relative magnitude of this recommendation, in terms of GHG emissions reductions?**

448,229 metric tons of CO2 equivalent per year; _2.2 million_ metric tons of CO2 equivalent **by 2030.**

448,229 metric tons of CO2 equivalent per year; _2.2 million_ metric tons of CO2 equivalent **by 2040.**

448,229 metric tons of CO2 equivalent per year; _2.2 million_ metric tons of CO2 equivalent **by 2050.**

Estimates for achievable reductions in CO2 should be updated based at a minimum on actual experience in Michigan and other leading states.
The estimates shown here were based on numbers provided in DTE Energy's electric annual report filing. These estimates are based on electric energy efficiency programs only. Estimates for GHG emissions reductions from Michigan energy efficiency programs are not available at this time.

Any achievable potential for additional energy efficiency utilizing other state or federal dollars outside of Michigan's legislatively mandated EWR programs have unknown GHG reduction implications due to lack of information regarding the levels achievable from outside funding sources.

4) **Describe the potential impacts of this recommendation on environmental justice (250 word limit).**
Low income and BIPOC (Black, Indigenous, and People of Color) communities face greater challenges with energy bills and the health and safety of their homes due to energy's environmental impacts. These residents spend an average of about 8% of their household income on energy bills – almost 4 times higher than most residents. There are health impacts that result from greater efficiency in homes that are not measured at this time. The cheapest energy is the energy you don't use. Utility EE programs along with federal weatherization programs have made a great impact on addressing these statistics. There is still more to do specifically with the number of walk-away, or untreatable, homes that are not applicable for many of these programs due to the expense in mitigating mold, asbestos, roof repairs, etc. If funding could be unbridled from restrictions as to what the funds can be spent on these homes could be included with the many that have received multiple EE upgrades subsequently creating cleaner,

safer, more efficient homes with reduced energy bills. Low income multi-family housing energy upgrades are still a challenge due to many barriers and should be specifically addressed with any additional EWR spending. cause

5) **Describe the potential impacts of this recommendation on labor (250 word limit).**
Energy Efficiency creates jobs. DTE electric represents 47% of Michigan's electric sales and in 2020, DTE contracted with 336 employees through implementation contractors, as filed in their most recent Annual Report on program implementation. This number is much greater when you consider those implementation contractors have a numerous number of trade-allies working on the installation and implementation of energy efficiency measures and appliances. The trade-ally network of energy efficiency contractors will continue to expand as technology changes coupled with training and education expands. Gathering the same information from other regulated utility providers similar to the information found in DTE electric's annual report should be a required by the MPSC going forward to continue to assess the labor impacts of EWR jobs.

6) **Describe the potential impacts of this recommendation on the environment (250 word limit).**
Not only will this recommendation produce carbon reduction in Michigan, it will also reduce great levels of NOx and SO2 reduction. See above for GHG reduction estimates. Utility providers should be required by the MPSC to report information on GHG reductions along with NOx and SO2 as DTE electric provided in this year's annual report. Information gathered from current health and safety pilots currently being implemented by most regulated utilities should be gathered to assess the additional health impacts to customers who receive robust whole home upgrades, specifically in the low income households as these households tend to not only be the least efficient, safe or healthy, they are also found in some of the most negatively impacted environmentally communities.

7) **Describe the potential impacts of this recommendation on economic development (250 word limit).**
As mentioned above, there are many employment opportunities in the energy efficiency field. Many of the contractors who work with Michigan utilities have opened offices here in Michigan. More contractors are beginning to open offices in the Upper Peninsula as well. Information on businesses that have moved to Michigan or have been created and established in Michigan due to EWR projects and programs should continue to be assessed not only in utility provider annual reports, but also other EWR programs across the state including but not limited to the DHHS weatherization programs and any others from potential additional state and federal funding. It should also be noted that Michigan has to import all of the coal, and nearly all of the natural gas it consumes from other states. This results in an annual 'dollar drain' of several billion dollars. Energy efficiency would retain more of those energy dollars within the state by reducing the amount of energy fuels imported, and would thus provide additional economic benefits to Michigan beyond the direct energy efficiency jobs created.

8) **What are the relative costs of this recommendation? Unknown, or different timeframe – explain why (150-word limit):**

This amount is unknown. The MPSC is currently finishing up a comprehensive state-wide energy efficiency and demand response study which should provide a valuable framework so that the costs for this recommendation could be through 2040. This study is slated to be completed by the end of September and should be researched by the Council at that time. In 2020, the utilities spent a little over $400 million on programs for residential customers, commercial and industrial customers, and of that $400 million, $57 million was spent on low income customers across Michigan. The costs provided in utility annual reports could be used to scale up costs for additional programming provided by any additional state or federal funding. DHHS receives close to $10 million in federal funding annually for low income weatherization programs.

9) **Who is empowered to implement this recommendation?**
   - Local government
   - State government – Executive
   - State government – Legislative
   - Federal government – Executive
   - Federal government – Legislative
   - Private sector
   - Other (150 word limit):

   All of the above entities should assist in implementation of this recommendation as budgets allow. Coordination of funding between the above listed entities will increase the amount of energy efficiency possible and will also enhance the services provided to all customers but specifically the low income homes and multi-family homes.

10) **What are some of the notable perspectives shared and questions raised with respect to this recommendation? (250 word limit)**
   There is broad consensus of increased energy efficiency within the stakeholder group, and many believe this is the first steppingstone to reducing the carbon emissions in Michigan. Energy efficiency is the least expensive way to reduce carbon emissions in homes and buildings and is also a prep for electrification. Reducing the load on Michigan's grid will prepare the state for electrification with subsequent clean renewable energy which could also be costly and create reliability issues. Putting any other recommendation before energy efficiency would be doing things in the wrong order.

   The only differing perspective would be from utility providers who historically have not seen EE as a typical utility function. It should be noted that utility providers are allowed a generous incentive for offering programs that reduce their load beyond the legislative target and their receptiveness to these programs has increased since the passing of PA 295, these incentives should continue to be used to encourage the market to pursue energy efficiency.

   This workgroup recommends multiple entities adopt this recommendation and work in coordination with the utility energy efficiency programs to accelerate the implementation and adoption, along with increasing the funding available for this recommendation until legislation amendments can be considered and/or implemented.

Utility providers believe natural gas will continue to play an important role in Michigan's energy future.

Utility providers believe utility energy efficiency program levels should be determined through the Integrated resource planning process, and that electric and natural gas EWR levels should be informed by a Michigan-centric energy efficiency potential study.

11) What are the most important considerations for achievability and feasibility of this recommendation (500 word limit)?

It will be important to consider the costs, both in absolute and relative terms. Low-income customers and small businesses face absolute cost challenges in terms of affordability. Funding or incentivizing customers outside of the utility EWR program incentives will be vital. Increased marketing and education highlighting the benefits of energy coupled with implications of reliability and environment to increase customer's willingness to participate. Continuing to educate the state's citizens on our need to address climate change will be key to expanded adoption.

Increasing the wholistic approach to address the entire structure's building shell with insulation, lighting, energy efficient appliances and HVAC equipment the first time an implementation contractor enters the building will be more cost effective for the customer and ultimately the state. Constant interruptions, specifically in businesses, can create hesitancy to participate.

Amendments to Public Act 295 will be necessary to increase the amount of EWR projects that can be accomplished through utility EWR programs. The current legislation only has a requirement of 1% annual sales reduction by Michigan's regulated utilities. As of December 31, 2021, municipality and cooperative utility providers are no longer required to offer EWR programs and rebates to their customers, nor are they required to meet any energy reduction goals. Along with this, the Act specifically sets goals that are centered around energy reduction rather than greenhouse gas emission reductions. This disallows an electric utility provider to offer EWR rebates, collected through the surcharges approved by this Act, for measures that would allow a customer to switch from natural gas (or any other fuel source such as propane, oil, etc.) to energy efficient electric measures and appliances.

Specific recommended actions for implementation are included in the full list of recommendations above

II. Electrification

1) Overview of recommendation (250-word limit).
Recommendation: Study and consider the electrification of building appliances as a pathway to reduce and eliminate direct emissions from the building sector; study and account for the impacts of building electrification on the grid, the gas distribution system, and on low-income and energy burdened residents.

Electrification – switching from combustion equipment to efficient, electric alternatives – presents an opportunity to eliminate direct emissions in buildings. For heating, which is the primary use of fossil fuels in homes and businesses, electric heat pumps are an

efficient modern technology capable of heating and cooling buildings. These efficient technologies eliminate onsite emissions and will be increasingly emission free as more renewable electricity is added to the grid. In order for building electrification to be one of the most effective climate solutions, it will be critically important to combine electrification, where possible, with investments in the energy efficiency of buildings and demand response. This will be necessary to minimize the heating needs of buildings, limit growth in peak demand, ensure energy rate affordability, and maximize comfort and safety for Michigan residents.

Many instances of beneficial electrification, replacing direct fossil fuel use with electricity in a way that reduces overall emissions and energy costs, exist in Michigan today. When examining a homeowner's costs over the lifetime of the appliances when compared with performing the same functions with fossil fuels, costs are reduced for customers in several retrofit scenarios: for customers switching away from propane or heating oil, for gas customers who would otherwise need to replace both a furnace and air conditioner simultaneously, and for customers who bundle rooftop solar with electrification. New homes and homes currently lacking natural gas service also avoid the cost of gas mains, services, and meters not needed in all-electric neighborhoods.

Overall, it is clear that cost effective electrification of gas appliances relies on infrequent opportunities to change out heating, ventilation, and air conditioning (HVAC) equipment, including equipment end-of-life or major renovation. Policies and programs that take advantage of these opportunities are essential for keeping costs low and hitting our 2050 GHG targets.

The action steps outlined in the full list of recommendations above seek to create a phased in approach to building electrification whereby the state and stakeholders focus in the near term on pilot programs that maximize instances of beneficial electrification, focus on "leading by example" in state and public buildings, develop and test mechanisms to prioritize low-income and energy burdened residents for electrification while also providing affordable energy to these customers, study the costs and benefits of electrification of buildings on our grid, our gas sector, other customers classes, and create roadmaps for needed changes to achieve net-zero building codes and affordable housing.

While a phased-in approach to electrification is critical, there is a point at which in order to meet our net-zero goal by 2050, the state must commit more robustly to fully eliminating direct emissions. Analysis after analysis of building sector decarbonization demonstrates that maximizing electrification of buildings is key to decarbonizing this sector. Reducing emissions from energy end uses therefore will require electrification and increased efficiency, which is fundamentally a problem of scale requiring the replacement of millions of pieces of equipment. The timing of these replacements, primarily in buildings and vehicles, is essential if costs and burdens are to be minimized and economic benefits maximized. Furnaces, water heaters, dryers, and stoves account for at least 95% of residential building emissions but are replaced just once every 10-25 years. If we take the average HVAC and water heating equipment life of about 15 years, we will need to ensure 100% HVAC and appliance sales are electric equipment by circa 2035 to hit 2050 net zero.

Specific recommended actions for implementation are included in the full list of recommendations above

2) **In what timeframe is this recommendation achievable?**
Multi-step process- many steps are achievable by 2030, but overall decarbonization of buildings operates in line with a 2050 timeframe.

3) **What is the relative magnitude of this recommendation, in terms of GHG emissions reductions?**
16.25 million metric tons of CO2 by 2030.

32.5 million metric tons of CO2 by 2050.

Modeling by RMI shows that to meet carbon neutrality goals, Michigan will have to act boldly and quickly to decrease direct building emissions. To limit warming to scientist-recommended 1.5°C by 2030, Michigan must reduce direct emissions from buildings by 50% compared to 2005 levels. Effective strategies to reach this goal include the following by 2030:

- Zero new gas customers
- 100% of new homes and commercial buildings are heated with electricity and meet a high standard of energy efficiency
- At least 50% of existing fossil buildings are retrofitted to use electric heating technologies, in concert with weatherization upgrades
- At least 80% of new heating appliance sales are all-electric by 2030

Our recommendations would put Michigan on a path to achieve these strategies and therefore we expect that if acted on our recommendations would reduce direct building sector CO2 by 50% by 2030. The EIA estimates the building sector in Michigan accounts for 32.5 million metric tons. Thus, a rough estimate of the total impact of our recommendations would be a 50% reduction of the total by 2030, which equals out to 16.25 million metric tons of CO2. Additionally, our recommendations are in line with the Governor's carbon neutrality goal. To meet that goal by 2050, we expect that all direct emissions from the building sector should be eliminated to the greatest extent possible and that indirect and embodied carbon emissions should also be drastically reduced.

4) **Describe the potential impacts of this recommendation on environmental justice (250 word limit).**
Electrification provide benefits for the health and economy of communities and households. Installing electric appliances eliminates in-home pollutants decreasing health risks. We spend 90 percent of our time indoors where there is little to no regulation of air quality and often, indoor air can be more polluted than outdoor air. Gas appliances, like gas stoves, are a primary source of combustion pollution inside the home, especially when unvented. Cooking on gas stoves can spike emissions of nitrogen dioxide (NO2) and carbon monoxide (CO) to levels that would violate outdoor pollution standards. In fact, in comparison to homes with electric stoves, homes with gas stoves can have 50 to 400 percent higher average NO2 concentrations.

Children are at higher risk for the impacts of poor air quality due to their activity levels and increased respiratory rates, ratio of body area to lung surface area, and immaturity of lung development. In a meta-analysis analyzing the connections between gas stoves and childhood asthma, the connection was clear: children in homes with gas stoves have a 42 percent increased risk of asthma symptoms and a 24 percent increased risk of being diagnosed with asthma by a doctor than children living in homes with electric stove.

Not only does cooking with gas stoves impact our children more than adults, it also disproportionately impacts our lower socioeconomic status residents and frontline communities because they often live in smaller spaces, with higher occupancy rates, and decreased ventilation making for poorer indoor air quality. Efficient and electric buildings are specifically important in affordable housing because low-income residents often face energy burdens three times greater than an average household, and a 50% higher pollution burden compared to average.

Additionally, when gas appliances are vented outside they can have negative impacts on outdoor air quality, in particular leading to the formation of harmful ground level ozone pollution otherwise known as smog- a serious air pollutant that disproportionately impacts EJ communities in Michigan. A recent study from the Harvard Chang School of Public Health shows that in Michigan in 2017, air pollution from burning fuels in buildings lead to an estimated 841 early deaths and $9.419 billion in health impact costs. Moving towards all-electric appliances in our buildings is a critical measure to reduce air pollution and protect public health.

Electrification of appliances however can exacerbate energy unaffordability if the state doesn't approach it by prioritizing energy burdened and low-income communities. As more people and businesses move off of the gas system the system costs get spread to a smaller pool of customers, thus increasing those costs for the residents who remain. To mitigate this risk to all customers, but especially energy burdened and low-income customers, our recommendations call for prioritizing low-income and energy burdened customers in utility heat pump pilots and packaging other programs and reforms to keep costs low, including energy efficiency, demand response, and potential rate changes. We also recommend that MSHDA ensure equitable access to healthy, affordable buildings and ensuring that low-income communities are included in the transition away from fossil fuels by allocating points in the Qualified Allocation Plan (QAP) for efficient, all-electric new construction and mapping out how to reach net-zero affordable housing in Michigan. Furthermore, our recommendations call on the Commission to address the future of gas infrastructure to achieve a managed transition to a decarbonized energy system for Michigan.

5) **Describe the potential impacts of this recommendation on labor (250 word limit).**

Electrification also provides opportunities for the state to expand the building decarbonization job sector. Upgrading buildings with efficient, electric technologies can produce an estimated 7,500 secure well-paying jobs in Michigan (see https://map.rewiringamerica.org/data/fact-sheets/michigan-mi/bringing-infrastructure-home-fact-sheetmichigan-mi.pdf). Additionally, members of electrical

unions and utility workers focused on the electric grid stand to benefit from increased demand for their services and expertise.

Increasing electrification of housing will having impacts on the gas distribution system, the gas sector and the propane industry, which would likely result in job losses. To mitigate these losses, our recommendations encourage a phased in approach to building electrification as well as a robust planning process at the MPSC to study the ramifications of building electrification on the gas sector and other customer classes in Michigan.

6) **Describe the potential impacts of this recommendation on the environment (250 word limit).**
The primary benefit to the environment from building electrification would be the significant reduction in greenhouse gas emissions described earlier in this template. We would also see reductions in air pollutants that lead to the formation of smog (also as described below) and improvements in indoor and outdoor air quality.

As we move away from depending primarily on gas for heating our homes, we would also reduce the need for distribution pipelines, which would have beneficial impacts on reducing negative land use and water use impacts from pipeline construction. Upstream environmental benefits would also be achieved by reducing the need to drill for gas and reducing methane emissions from gas drilling and distribution.

7) **Describe the potential impacts of this recommendation on economic development (250 word limit).**
Increasing electrification of buildings in the state would likely boost economic development as it necessitates an investment in our homes, businesses, and communities. Electrification will also require additional investment in our electric grid to support any new load that isn't reduced or eliminated via efficiency and demand response and to increase the reliability of our electric system. The exact scale and scope of the economic benefit from these investments however has yet to be studied in Michigan, so we cannot offer any concrete dollar figures.

There is also an economic cost to electrification of buildings. We expect the cost to largely accrue in losses in the propane and gas sector. Some losses could be mitigated by investment in and work done to remove unnecessary gas lines. Economic costs and benefits to customers and effects on business competitiveness should be studied to identify the least cost pathway to achieve net zero. Understanding the impact different levels of electrification could have should inform the optimal level that State should strive towards.

We strongly recommend the state conduct a robust economic development analysis of building electrification.

8) **What are the relative costs of this recommendation? Unknown, or different timeframe – explain why (150-word limit):**
Unknown

9) **Who is empowered to implement this recommendation?**
    - State government – Executive
    - State government – Legislative

10) **What are some of the notable perspectives shared and questions raised with respect to this recommendation?**

    There is broad understanding of the role that beneficial electrification can and should have as the state moves to meet the Governor's net zero ambition. Additionally, there is support and agreement on the numerous studies and analysis that are suggested to be undertaken.

    There is substantial questions raised in the workgroup about the extent and timing of some of the recommendations. Phasing in building electrification and studying and accounting for its impacts is critical to addressing many of these concerns. Also some individuals in the workgroup advocated more strongly for a “technology agnostic approach,” while others indicated they felt strongly electrification would play a key role in building decarbonization and we should therefore move forward robustly with embracing this technology. Conducting a Michigan-specific decarbonization pathways analysis will be critical to determining the timeline around building electrification in Michigan and the overall extent of the role should play.

11) **What are the most important considerations for achievability and feasibility of this recommendation (500 word limit)?**

    To the extent practical, but in particular for low-income and energy burdened residents, electrification should be done in tandem with robust and deep energy efficiency and demand response programs. Without undertaking these measures, electrification could have very negative impacts on load growth (including peak load growth) and exacerbate energy unaffordability for low income customers. If electrification is done incorrectly electric load could, resulting in a substantial capacity build out as well as significant transmission and distribution investments to deliver the reliability and resiliency needed to ensure heat during the winter months.

    In addition, the success of an electrification strategy requires a concurrent commitment to greatly increase the proportion of Michigan electricity generation from renewable energy.

    Furthermore, implementation of widespread electrification will likely run into significant opposition from the propane and gas industries, which will see losses in market share. Developers and homebuilders will also likely oppose requirements placed on them that influence how homes and buildings are constructed.

    When implemented properly, however, building electrification could be a huge benefit to the state by protecting public health through drastically improved indoor air quality, driving job growth, and growing our economy, in addition to significantly reducing building sector emissions.

Feasibility and proper implementation will require study, pilot programs, and an all-hands-on-deck approach with the state and stakeholders working together to help Michigan residents and businesses move towards an all-electric, net-zero future.

III. Funding and Financing

1) **Overview of recommendation (250-word limit).**
   Funding and financing of all recommendations from this workgroup will be a vital tool to building out and implementing the recommendations. Many of the recommendations from this workgroup will be costly to the state, the residents and the business owners, although some costs will be offset with savings on utility bills. It is important to utilize all funding and financing opportunities available but also to make more options for funding and financing to energy customers.

2) **In what timeframe is this recommendation achievable?**
   By 2025 or sooner

3) **What is the relative magnitude of this recommendation, in terms of GHG emissions reductions?**
   Reduction in GHG emissions is generated from recommendations from this workgroup and other workgroups of the Council. Funding and financing are a necessity for the successful implementation of all recommendations surrounding an environment free from GHG emissions, especially in low-income communities, BIPOC communities, and other disenfranchised communities and underserved markets.

4) **Describe the potential impacts of this recommendation on environmental justice (250 word limit).**
   Funding to integrate Council recommendations should be offered to low-income communities through state and federal grant funds. Utility Energy Waste Reduction programs should complement grant programs to ensure that low-income communities, BIPOC communities and other disenfranchised communities receive the benefits of these recommendations. Financing is the biggest barrier for residents and businesses when considering energy efficiency, renewable energy, electrification, etc. A comprehensive suite of financing tools that include existing financing mechanisms, revolving loan funds, on-bill programs and commercial PACE programs should be funded to help offset the costs of making deep energy improvements and electrifying homes and businesses.

5) **Describe the potential impacts of this recommendation on labor (250 word limit).**
   When funding and financing are easy and accessible to residents and businesses the necessary upgrades can be made to their homes and buildings. When this funding becomes available, the workforce can be put to work on the increase in green energy projects now available through this increased funding and financing.

6) **Describe the potential impacts of this recommendation on the environment (250 word limit).**

The impact to the environment will be the result of the opportunities made possible with available funding and financing for workforce development, energy efficiency, electrification, etc.

7) **Describe the potential impacts of this recommendation on economic development (250 word limit).**
When the funds are available, Michigan's green energy businesses can robustly integrate these recommendations to the homes and businesses and Michigan will benefit expeditiously. There are great economic benefits to an influx of funding and financing to the local contractor businesses that cannot be outsourced, keeping dollars invested in our state.

8) **What are the relative costs of this recommendation? Unknown, or different timeframe – explain why (150-word limit):**
Unknown

9) **Who is empowered to implement this recommendation?**

- Local government
- State government – Executive
- State government – Legislative
- Federal government – Executive
- Federal government – Legislative
- Private sector
- Other (150 word limit):

10) **What are some of the notable perspectives shared and questions raised with respect to this recommendation?**
There was widespread agreement that the state should increase funding and financing available to Michiganders to retrofit buildings. In particular workgroup participants highlighted the enormous opportunity the state has to make large scale investments in improving and decarbonizing our building stock with the federal ARP funding.

There was some concern voiced over on-bill financing. This concern was centered around wanting to ensure the nuances of such a complex financing program are thought through. Utilities indicated that they have no desire to "be a bank" but were open to an on-bill program if their concerns could be worked through.

11) **What are the most important considerations for achievability and feasibility of this recommendation (500 word limit)?**
Specific recommended actions for implementation are included in the full list of recommendations above

IV. Workforce Training and Development

1) **Overview of recommendation (250-word limit).**
There is currently a workforce shortage in almost every industry in the state and the nation. The Workforce available for advanced technologically advanced green energy

jobs and careers is even more scarce. Careers in energy and specifically in GHG emission reducing energy careers need advanced training and development. The careers in the green energy field are permanent, ever advancing, stable and provide security for persons with the ability and desire to hold these positions.

2) **In what timeframe is this recommendation achievable?**
   By 2025 or sooner

   This step should be done first and foremost to prepare for the increase in green energy jobs with a strong focus on GHG emissions reductions. Ongoing training and development should also be considered for the technology integration and implementation of other recommendations as the state transitions to net zero.

3) **What is the relative magnitude of this recommendation, in terms of GHG emissions reductions?**
   Reduction in GHG emissions is generated from this recommendation. This recommendation is necessary for the successful implementation of all recommendations surrounding an environment free from GHG emissions, especially in low-income communities, BIPOC communities, and other disenfranchised communities and underserved markets. Workforce training and development is a necessity for the successful implementation of all recommendations surrounding an environment free from GHG emissions..

4) **Describe the potential impacts of this recommendation on environmental justice (250 word limit).**
   Workforce training and development centered around green energy jobs should be offered at no cost to the unemployed and the underemployed along with residents of BIPOC communities. Low-cost training should be offered in all of Michigan's community colleges and training centers. Introductory courses could and should be introduced to high school students so that they have the possibility to learn about these technical fields that will be dominating the workforce of the near future.

5) **Describe the potential impacts of this recommendation on labor (250 word limit).**
   Today's labor force along with Michigan's future labor force should increase in these technologically advanced fields that center around career opportunities with businesses that offer programs and measures centered around GHG reduction such as energy efficiency, electrification and renewable energy.

6) **Describe the potential impacts of this recommendation on the environment (250 word limit).**
   There is no direct impact on the environment from workforce development other than the impacts resulting from the increased implementation of the recommendations from the Council Workgroups. A speedy development of a better workforce development in these fields will help to speed the reduction of GHG emissions. When the workforce is ready and is able to robustly integrate these recommendations, Michigan will benefit expeditiously.

7) **Describe the potential impacts of this recommendation on economic development (250 word limit).**
The sooner this workforce can be developed, the sooner Michigan's businesses can take advantage of the ability to hire technologically advanced and trained employees. These businesses will be able to quickly put those employees to work in the green energy field.

8) **What are the relative costs of this recommendation? Unknown, or different timeframe – explain why (150-word limit):**
Unknown, some colleges and current green energy businesses may be able to assess the financial needs to improve Michigan's workforce.

9) **Who is empowered to implement this recommendation?**

- Local government
- State government – Executive
- State government – Legislative
- Federal government – Executive
- Federal government – Legislative
- Private sector
- Other (150 word limit):

10) **Is there consensus among the subgroup for this recommendation, or are there differing perspectives? If differing perspectives, what are they? (250 word limit)**
There is broad consensus for advancing training programs and relevant funding required to help Michigan meet the workforce needs of a net zero future.

11) **What are the most important considerations for achievability and feasibility of this recommendation (500 word limit)?**
Specific recommended actions for implementation are included in the full list of recommendations above

V. Building Codes

1) **Overview of recommendation (250-word limit).**
A cost-effective and essential starting point to building decarbonization in Michigan would be ensuring that all new buildings are highly efficient and all-electric to the greatest extent possible. Building new inefficient and conventional gas dependent buildings today would effectively "lock in" emissions far into the future or mean the new construction would require an immediate or near term retrofit in order to reduce GHG emissions in line with Governor Whitmer's 2050 carbon neutrality goal.

The building energy conservation code adoption process is one of the few regulatory levels that decision-makers have to improve our building stock over time to the benefit of Michiganders and our economy. Building codes ensure that new construction and major renovation projects are better and safer. They also influence what products are readily available on the market for contractors and help standardize construction practices across the industry even in projects where codes don't apply.

Specific recommended actions for implementation are included in the full list of recommendations above

2) **In what timeframe is this recommendation achievable?**
   Multi-step process

3) **What is the relative magnitude of this recommendation, in terms of GHG emissions reductions?**
   Unknown

4) **Describe the potential impacts of this recommendation on environmental justice (250 word limit).**
   Any and all increased building and home codes regarding the efficiency, health and safety of residents of individual or multi-family dwellings would inherently have an impact on low-income and residents of BIPOC communities. To the extent that we are building more comfortable, healthier, and efficient homes and businesses low-income and BIPOC residents would benefit if they purchase or rent a new home or a home that has undergone major renovation after the code is updated.

   There is also a "trickle down" effect with building codes because they impact what products and building standards contractors employ and therefore could and likely would impact even projects where codes don't apply.

5) **Describe the potential impacts of this recommendation on labor (250 word limit).**
   Michigan's labor force would need to be educated and trained to implement the new building standards. Local building code enforcers would need to be educated and diligent in the implementation and compliance of these codes and standards.

6) **Describe the potential impacts of this recommendation on the environment (250 word limit).**
   Increased building codes and standards that effect the efficiency of homes and buildings would inherently reduce those structure's direct emissions.

7) **Describe the potential impacts of this recommendation on economic development (250 word limit).**
   Unknown at this time.

8) **What are the relative costs of this recommendation? Unknown, or different timeframe – explain why (150-word limit):**
   Unknown until a study to assess the pre and post changes to Michigan's homes and buildings are assessed and evaluated.

9) **Who is empowered to implement this recommendation?**

   - State government – Executive
   - State government – Legislative
   - Private sector

- Other (150 word limit): Interested stakeholders who are willing and able to lobby for such changes at both the federal and state level.

10) **What are some of the notable perspectives shared and questions raised with respect to this recommendation?**
It is clear from workgroup discussions that building codes for new buildings will have a large role in in assisting the state in reaching the Governor's net zero ambition. This begins with adopting the 2021 IECC model building codes without weakening amendments.

There are differing perspectives within the group regarding requiring electrification ready provisions; workgroup members indicated that customers can be influenced through education and incentives and oppose mandates. They also voiced general concern about policies that support electrification of buildings (supporting a “technology neutral” approach instead). Others indicated they thought that the building code requirements were needed to achieve the scale of uptake required and that the “readiness” allowed for flexibility for people to choose which technology they wanted to use.

Ample discussion occurred around the need for a uniform statewide codes or a statewide code that allows stretch local codes. Many in the group support statewide codes to assist in the enforcement and implementation benefits provided, while some in the group are in favor of allowing locals to go further than the statewide minimum.

11) **What are the most important considerations for achievability and feasibility of this recommendation (500 word limit)?**

Impacts on the housing markets should be studied and weighed against lifecycle GHG emissions reductions and energy savings.

Political considerations will have the biggest impact on the feasibility of this recommendation.

Homebuilders and potentially other developers are opposed to the requirements around electrification readiness, storage/renewable readiness, and EV readiness siting concerns about upfront costs and indicating these provisions do not go to the structural safety of a home.

A diverse set of interests, including local governments, energy experts, environmental groups, and some building industry, strongly support these provisions.

In terms of feasibility of implementation, ensuring local governments have funding, training, and other resources to enforce the code will be critical. As will training for contractors to build to the new code.

VI. Energy Benchmarking and Building Performance Standards

1) **Overview of recommendation (250-word limit).**
Recommendation: Facilitate broader energy benchmarking and set a statewide commercial building performance standard to decrease GHG emissions in existing commercial buildings.

Energy benchmarking means assessing and analyzing the energy use and greenhouse gas emissions of a building and then comparing it to the building's past performance, similar buildings, or modeled simulations of a reference building at a certain standard. It is a critical first step in being able to improve the efficiency of a building and/or reduce emissions from that building. Benchmarking is useful for state and local governments, property owners and facility operators, managers, and designers. It facilitates energy accounting, comparing a facility's energy use and/or GHG emissions to similar facilities to assess opportunities for improvement, and quantifying/verifying energy savings and reduce emissions.

A building performance standard is a policy that requires existing building owners to meet performance targets by making improvements to their building overtime, often with interim targets that drive action. Standards can be set around energy use, carbon intensity, or GHG emissions or some combination. To-date, one state and 3 major US cities have adopted building performance standards with a growing number actively exploring setting standards.

Although programs to encourage energy efficiency improvements in existing buildings have operated for decades, even the best programs result in upgrades of only 1–2% of eligible buildings each year. Clearly, we need a more ambitious strategy if we are going to meet the goals of the Paris Agreement to limit the rise in global average temperature to below 1.5 degrees C°. Local and state leaders have several policy options when it comes to addressing the energy use of existing buildings. Compared to other policies, Building Performance Standards have the potential to vastly increase the number of retrofits completed to lower energy demand and reduce the associated carbon emissions of those buildings.

The direct emissions from burning fossil fuels in commercial buildings account for 7% of Michigan’s total energy related emissions. A commercial building performance standard (BPS) is a cost-effective and manageable method for reducing direct emissions in commercial buildings. A commercial BPS would set emission intensity limits on all buildings greater than 25,000 sq ft. These standards should be attainable but follow the state climate objectives by incrementally tightening standards over time. Similar laws have already been implemented across the country in Washington State and cities like New York, Washington DC, and St. Louis. Alongside reducing greenhouse gas emissions by up to 7% without significant impacts to the electric grid, this policy could add up over 10,000 in-state jobs and avoid 500 premature deaths.

Specific recommended actions for implementation are included in the full list of recommendations above

2) **In what timeframe is this recommendation achievable?**
   Multi-step process

3) **What is the relative magnitude of this recommendation, in terms of GHG emissions reductions?**
   Unknown

4) **Describe the potential impacts of this recommendation on environmental justice (250 word limit).**
   Any and all increased building and home upgrades centered round the efficiency, health and safety of residents of individual or multi-family dwellings would inherently have an impact on the income challenged and residents of BIPOC communities.

5) **Describe the potential impacts of this recommendation on labor (250 word limit).**
   Michigan's labor force would need to be educated and trained to implement the increased building standards. Local business owners would need to be educated and supported to implement changes centered around energy efficiency and any and all GHG reduction actions for their businesses.

   Financing and funding would be necessary, especially in multi-family properties, to ensure building owners can undertake the necessary retrofits while keeping rental costs contained.

   Local governments would need technical assistance from EGLE to craft and implement successful programs.

6) **Describe the potential impacts of this recommendation on the environment (250 word limit).**
   Increased energy efficiency, electrification, renewable energy, etc. in buildings would inherently reduce those structures GHG emissions.

7) **Describe the potential impacts of this recommendation on economic development (250 word limit).**
   Unknown at this time. Improvements to buildings and businesses that center around the measures necessary to obtain the benchmarking levels would inherently increase the number of employees and businesses necessary to provide those services.

8) **What are the relative costs of this recommendation? Unknown, or different timeframe – explain why (150-word limit):**
   Unknown until a study to assess the pre and post changes to Michigan's homes and buildings are assessed and evaluated.

9) **Who is empowered to implement this recommendation?**
   - Local government
   - State government – Executive
   - State government – Legislative

10) **What are some of the notable perspectives shared and questions raised with respect to this recommendation? (250 word limit)**
    There was general interest in this recommendation area from workgroup members. BPS are fairly new policy tools and many folks were learning for the first time about them in the workgroup. We expect concerns and questions to arise as the state more fully explores these action steps, but there was not enough or sufficient awareness in the workgroup to elevate those questions now.

11) **What are the most important considerations for achievability and feasibility of this recommendation (500 word limit)?**
Utilities have concerns about sharing energy data with local governments and that has been a major impediment to energy benchmarking efforts by Michigan municipalities to date. This hurdle would need to be overcome for benchmarking to be successful.

Likewise costs for building owners to do retrofits would need to be considered and funding and financing made available to help owners comply with a BPS.

VII. Demand Response Programs

1) **Overview of recommendation (250-word limit).**
Demand Response (DR) programs have the ability to shift load of on-peak usage onto off-peak times. There may not be very much implications to load shifting, but as Michigan sees increased electric appliances and devices on the system, in its ability to reduce GHG emissions, it will be important provide security of available energy to Michigan's customers at all times of the day. Load shifting also has the ability to keep energy bills low for all customers.

2) **In what timeframe is this recommendation achievable?**
by 2025 and beyond, annually

3) **What is the relative magnitude of this recommendation, in terms of GHG emissions reductions?**
Reduction in GHG emissions is generated from this recommendation. This recommendation is necessary for the successful implementation of all recommendations surrounding an environment free from GHG emissions, especially in low-income communities, BIPOC communities, and other disenfranchised communities and underserved markets. Estimates for achievable reductions in CO2 should be updated based on the results of the current Michigan Demand Response Potential Study.

4) **Describe the potential impacts of this recommendation on environmental justice (250 word limit).**
Low income and BIPOC (Black, Indigenous, and People of Color) communities face greater challenges with energy bills and the health and safety of their homes due to energy's environmental impacts. These residents spend an average of about 8% of their household income on energy bills – almost 4 times higher than most residents. Utilities should enroll all residential customers on time of use rates with a large peak-off peak differential. Low-income customers should be allowed to opt-out of TOU rates and opt-in to percentage of income rates if those prove to be more affordable.

5) **Describe the potential impacts of this recommendation on labor (250 word limit).**
No obtainable information is available to respond to this question at this time.

6) **Describe the potential impacts of this recommendation on the environment (250 word limit).**

No obtainable information is available to respond to this question at this time.

7) **Describe the potential impacts of this recommendation on economic development (250 word limit).**
No obtainable information is available to respond to this question at this time.

8) **What are the relative costs of this recommendation? Unknown, or different timeframe – explain why (150-word limit):**
This amount is unknown. The MPSC is currently finishing up a comprehensive state-wide energy efficiency and demand response study which should provide a valuable framework so that the costs for this recommendation could be through 2040. This study is slated to be completed by the end of September and should be researched by the Council at that time. In 2020, the utilities spent a little over $400 million on programs for residential customers, commercial and industrial customers, and of that $400 million, $57 million was spent on low income customers across Michigan. The costs provided in utility annual reports could be used to scale up costs for additional programming provided by any additional state or federal funding. DHHS receives close to $10 million in federal funding annually for low income weatherization programs.

9) **Who is empowered to implement this recommendation?**

- State government – Executive
- State government – Legislative
- Michigan Public Service Commission (MPSC)
- Interested Stakeholders intervening in contested rate cases and Integrated Resource Plan cases before the MPSC.
- Local Governments who regulate municipality electric providers
- Michigan Electric Cooperative Association (MECA)

10) **What are some of the notable perspectives shared and questions raised with respect to this recommendation? (250 word limit)**
There is consensus in the group of using DR to help manage the grid and maintain the lowest cost system possible. It has been noted in the group that DR options will continue to evolve over time and as such, available solutions will evolve too. Therefore, regular potential studies that examine the availability, costs and compensation needed to achieve various levels of penetration should be the foundation of future program design.

11) **What are the most important considerations for achievability and feasibility of this recommendation (500 word limit)?**
Specific recommended actions for implementation are included in the full list of recommendations above

VIII. Public Health

1) **Overview of recommendation (250-word limit).**

Recommendation: Improve public health and protect vulnerable populations and overburdened, EJ communities by creating strong standards that reduce indoor and outdoor air pollution.

We spend 90 percent of our time indoors where there is little to no regulation of air quality and often, indoor air can be more polluted than outdoor air. Gas appliances, like gas stoves, are a primary source of combustion pollution inside the home, especially when unvented. Cooking on gas stoves can spike emissions of nitrogen dioxide (NO2) and carbon monoxide (CO) to levels that would violate outdoor pollution standards. In fact, in comparison to homes with electric stoves, homes with gas stoves can have 50 to 400 percent higher average NO2 concentrations.

Children are at higher risk for the impacts of poor air quality due to their activity levels and increased respiratory rates, ratio of body area to lung surface area, and immaturity of lung development. In a meta-analysis analyzing the connections between gas stoves and childhood asthma, the connection was clear: children in homes with gas stoves have a 42 percent increased risk of asthma symptoms and a 24 percent increased risk of being diagnosed with asthma by a doctor than children living in homes with electric stove.

Not only does cooking with gas stoves impact our children more than adults, it also disproportionately impacts our lower socioeconomic status residents and frontline communities because they often live in smaller spaces, with higher occupancy rates, and decreased ventilation making for poorer indoor air quality. Residents in affordable housing have a 50% higher pollution burden compared to average.

Additionally, when gas appliances are vented outside they can have negative impacts on outdoor air quality, in particular leading to the formation of harmful ground level ozone pollution otherwise known as smog- a serious air pollutant that disproportionately impacts EJ communities in Michigan. A recent study from the Harvard Chang School of Public Health shows that in Michigan in 2017, air pollution from burning fuels in buildings lead to an estimated 841 early deaths and $9.419 billion in health impact costs. Moving towards all-electric appliances in our buildings is a critical measure to reduce air pollution and protect public health.

Michigan has substantial NOx emissions from fossil fuel appliances and an effective appliance standard and indoor air quality standards can help the state improve air quality and attain the ozone National Ambient Air Quality standard. An appliance standard restricts the amount of NOx an appliance can emit to improve air quality and improve community health. These appliance standards would only apply to new appliance sales and would not require that existing appliances be removed. Appliance standards could be implemented in stages that were aligned to state-wide climate goals allowing the most cost-effective replacements of appliances to happen first. Air regulators in states like California, Utah, and Texas have already enacted low-NOx appliance standards to address pollution from buildings.

Specific recommended actions for implementation are included in the full list of recommendations above

2) **In what timeframe is this recommendation achievable?**

Multi-step process- both actions steps could be phased in over time.

3) **What is the relative magnitude of this recommendation, in terms of GHG emissions reductions?**
We do not have measurements for how much carbon and other GHG pollution would be eliminated by appliance standards and indoor air quality standards. This recommendation is necessary for the successful implementation of all recommendations surrounding an environment free from GHG emissions, especially in low-income communities, BIPOC communities, and other disenfranchised communities and underserved markets.

4) **Describe the potential impacts of this recommendation on environmental justice (250 word limit).**
Air quality protections that reduce indoor and outdoor air pollution would have huge benefits for EJ communities. Air pollution from indoor fossil fuel appliance use disproportionately impacts our lower socioeconomic status residents and frontline communities because they often live in smaller spaces, with higher occupancy rates, and decreased ventilation making for poorer indoor air quality. Residents in affordable housing have a 50% higher pollution burden compared to average.

Additionally, when gas appliances are vented outside they can have negative impacts on outdoor air quality, in particular leading to the formation of harmful ground level ozone pollution otherwise known as smog- a serious air pollutant that disproportionately impacts EJ communities in Michigan.

5) **Describe the potential impacts of this recommendation on labor (250 word limit).**
This is a technology neutral recommendation. It is unclear what impacts it would have on labor.

6) **Describe the potential impacts of this recommendation on the environment (250 word limit).**
The recommendation would have significant benefit on the environment by improving indoor and outdoor air quality. This includes reducing both GHG emissions and also other toxic air pollutants.

7) **Describe the potential impacts of this recommendation on economic development (250 word limit).**
A recent study from the Harvard Chang School of Public Health shows that in Michigan in 2017, air pollution from burning fuels in buildings lead to an estimated 841 early deaths and $9.419 billion in health impact costs. Reducing this air pollution would have dramatically beneficial impacts on health and reduce economic losses due to health-related causes.

8) **What are the relative costs of this recommendation? Unknown, or different timeframe – explain why (150-word limit):**
Unknown- needs quantification

9) **Who is empowered to implement this recommendation?**
    - State government – Executive

10) **What are some of the notable perspectives shared and questions raised with respect to this recommendation? (250 word limit)**
    Many workgroup members voiced strong support for improving air-quality and public health and discussion underscored the importance of improving air quality especially for EJ communities. Low NOx standards combined with high efficiency would result in an improvement of air quality and cost savings for customers over the life of appliances.

    Some members of the working group raised concerns with the zero-NOx standard as they believe it would preclude numerous technology options that could be used to meet the Governor's net zero goal. Others in the workgroup saw this as a technology neutral goal that could allow for multiple compliance pathways.

11) **What are the most important considerations for achievability and feasibility of this recommendation (500 word limit)?**
    This is a flexible policy option that could be phased in over time to allow for industry compliance. There are other states Michigan can look to for guidance to ease implementation hurdles.