

# MI Power Grid New Technologies and Business Models Workgroup: Heat Pumps

| Identified Barriers   | Possible Solutions   |
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| 1. Traditional utility business model   | <ul style="list-style-type: none"> <li>Revising or newly establishing decoupling<sup>i</sup></li> <li>Shift in performance incentive mechanisms<sup>ii</sup></li> <li>Modernize utility business models.<sup>iii</sup></li> </ul>  |
| 2. Lack of consideration of HPs in energy system planning.  | <ul style="list-style-type: none"> <li>Expand energy system planning<sup>iv</sup> to include electric heat pumps.</li> <li>Manage infrastructure and stranded asset risk.<sup>v</sup></li> </ul>   |
| 3. Current cost-effectiveness testing may not value electrification appropriately.                            | <ul style="list-style-type: none"> <li>Include most updated guidance, such as the National Standard Practice Manual guidelines for electrification.<sup>vi</sup></li> </ul>  |
| 4. Difficult economics of heating electrification due to high cost of heat pumps                              | <ul style="list-style-type: none"> <li>Right policies greatly improve economics. Policies such as utility incentive, with energy efficiency upgrades, carbon price,<sup>vii</sup> or a statewide incentive rather than individual utility rebate programs<sup>viii</sup> help develop HP demand to create economies of scale.</li> <li>Customer education regarding which heating fuels/systems are more economical to have supplemental HPs.</li> <li>Provide incentives and financing options for heat pumps.</li> <li>Projected changes in electricity prices are expected to decrease or increase moderately while natural gas prices are expected to increase up to 125%.<sup>ix</sup> Enable long term view of the investments.</li> </ul> |
| 5. Lack of standardized per ton incentives.   | <ul style="list-style-type: none"> <li>Provide meaningful per-ton incentives like in NY, CT, and MA.<sup>x</sup></li> </ul>  |
| 6. Cold climate limits potential HP usage.  | <ul style="list-style-type: none"> <li>Update energy efficiency standards when electrifying homes.</li> <li>Provide education on modern HPs.</li> </ul>  |
| 7. Site feasibility limits applications of ground source heat pumps. <sup>xi</sup>                            | <ul style="list-style-type: none"> <li>Use new product innovations that that reduce required footprints, standardize installation, and drive down costs.<sup>xii</sup></li> </ul>  |
| 8. Perverse price signals and unlevel playing fields <sup>xiii</sup>  | <ul style="list-style-type: none"> <li>Mobilize state and local policymakers to expand support for ASHPs<sup>xiv</sup></li> <li>Enable promotion of climate appropriate ASHPs through improved performance metrics<sup>xv</sup></li> <li>Update electricity rate designs.<sup>xvi</sup></li> </ul>   |
| 9. Legislative barriers regarding fuel switching.   | <ul style="list-style-type: none"> <li>Encourage fuel switching or substitution through guidelines or fuel-neutral goals.<sup>xvii</sup></li> </ul>  |
| 10. MI utility EE statute (PA 342 of 2016) essentially precludes electrification/heat pumps. <sup>xviii</sup> | <ul style="list-style-type: none"> <li>Expand EWR legislation to look at fuel neutral energy waste reduction.</li> <li>Change building codes to eliminate natural gas furnaces/hookups.</li> </ul>   |
| 11. Education and knowledge of heat pump systems.   | <ul style="list-style-type: none"> <li>Provide technical information and registry of vendors<sup>xix</sup></li> <li>Develop more accurate tools to predict energy, cost and GHG savings associated with ASHP installation through collection and analysis of real-world performance data.<sup>xx</sup></li> <li>Michigan has great state-wide potential for emissions reductions from electric heat pump use and certain use cases (such as all electric systems in new construction, residential propane to HP</li> </ul>   |

| Identified Barriers  | Possible Solutions  |
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|  | <p>retrofits,<sup>xxi</sup> and residential fuel oil to HP retrofits<sup>xxii</sup>) are likely cost effective now.<sup>xxiii</sup> Provide education regarding these benefits and economical use cases.</p> <ul style="list-style-type: none"> <li>• Utilities are well positioned to provide HP education.<sup>xxiv</sup></li> </ul>                        |
| <p>12. Lack of contractor availability in Michigan due to lack of demand and education.<sup>xxv</sup></p>  | <ul style="list-style-type: none"> <li>• Customer education.</li> <li>• Optimize customer and market offerings.<sup>xxvi</sup></li> <li>• Contractor training in cold climate heat pump performance, maintenance, etc.<sup>xxvii</sup></li> <li>• Target upstream incentives for contractors or distributors<sup>xxviii</sup></li> </ul>                      |
| <p>13. Misinformation from incumbent supply chain installers and fuel dealers.<sup>xxix</sup> Impression of customer satisfaction low due to past HP experiences<sup>xxx</sup></p> | <ul style="list-style-type: none"> <li>• Provide customer education and materials to promote positive consumer experience.<sup>xxxi</sup></li> <li>• Quality assurance through registration, training, and inspections.<sup>xxxii</sup></li> </ul>  |
| <p>14. Misunderstanding about how to optimize ASHP performance when retrofitting as partial heating solution in existing home<sup>xxxiii</sup></p>                                 | <ul style="list-style-type: none"> <li>•</li> </ul>   |
| <p>15. Most home heating system replacements are bought in emergency situation (i.e., furnace breaks in winter), no time to research/make major retrofits</p>                      | <ul style="list-style-type: none"> <li>• Education and pre-planning for heat pump retrofits for consumers and dealers/installers</li> <li>• Provide incentives that make heat pumps the lowest cost system so when these cases occur, heat pumps are installed.</li> </ul>  |
| <p>16. Many considerations of HPs focus on only residential applications.</p>  | <ul style="list-style-type: none"> <li>• Heat pumps can also be applicable in the commercial setting. Development of the right policies can improve the economics of commercial space heating electrification, even in cold climates.<sup>xxxiv</sup></li> </ul>  |
| <p>17. Carbon savings from HPs unclear or variable in utility system with carbon-based fuel generation.</p>  | <ul style="list-style-type: none"> <li>• Convert electrical system away from carbon-based fuel and utilize energy storage.</li> </ul>   |
| <p>18. Lack of holistic approach to decarbonization.</p>   | <ul style="list-style-type: none"> <li>• Align decarbonization regulatory work across state and local agencies.<sup>xxxv</sup></li> <li>• Align efficiency policies with decarbonization<sup>xxxvi</sup></li> <li>• Establish clear guidelines for alternative fuels<sup>xxxvii</sup></li> <li>• Plan for workforce development.<sup>xxxviii</sup></li> </ul> |
| <p>19. Use of HPs can cause winter peaking in a highly electrified future.<sup>xxxix</sup></p>   | <ul style="list-style-type: none"> <li>• Building envelope efficiency cannot be ignored especially in cold climates.<sup>xl</sup> Provide corresponding efficiency education.</li> <li>• Encourage development of mitigating strategies such as weatherization and demand response programs.<sup>xli</sup></li> </ul>   |

## Applicable and Emerging Business and Ownership Models

- Transformation of gas utility business models to thrive in carbon-free future with new offerings<sup>xlii</sup>
- Manage transition of gas utilities to more electrified future.<sup>xliii</sup>
- Financing for new HP systems and energy efficiency

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- <sup>i</sup> ACEEE.02/24/2021 workgroup PPT, slide 16.
  - <sup>ii</sup> ACEEE.02/24/2021 workgroup PPT, slide 16.
  - <sup>iii</sup> Billimoria. 02/24/2021 workgroup PPT. slide 17.
  - <sup>iv</sup> Billimoria. 02/24/2021 workgroup PPT. slide 17.
  - <sup>v</sup> Billimoria. 02/24/2021 workgroup PPT. slide 17.
  - <sup>vi</sup> ACEEE. 02/24/2021 workgroup PPT slide 15.
  - <sup>vii</sup> ACEEE.02/24/2021 workgroup PPT, slide 7.
  - <sup>viii</sup> Mayernick. 02/24/2021 workgroup PPT. Q&A/chat.
  - <sup>ix</sup> Mayernick. 02/24/2021 workgroup PPT, slide 12.
  - <sup>x</sup> Dandelion. 02/24/2021 workgroup PPT, slide 11.
  - <sup>xi</sup> Dandelion. 02/24/2021 workgroup PPT, slide 4.
  - <sup>xii</sup> Dandelion. 02/24/2021 workgroup PPT, slide 8.
  - <sup>xiii</sup> Burnes. 02/24/2021 workgroup PPT slide 23.
  - <sup>xiv</sup> Lis. 02/24/2021 workgroup PPT slide p. 7.
  - <sup>xv</sup> Lis. 02/24/2021 workgroup PPT slide p. 7.
  - <sup>xvi</sup> Billimoria. 02/24/2021 workgroup PPT. slide 17.
  - <sup>xvii</sup> ACEEE. 02/24/2021 workgroup PPT slide 14.
  - <sup>xviii</sup> ACEEE. 02/24/2021 workgroup PPT slide 19.
  - <sup>xix</sup> Burnes. 02/24/2021 workgroup PPT slide 1.
  - <sup>xx</sup> Lis. 02/24/2021 workgroup PPT, slide 7.
  - <sup>xxi</sup> ACEEE. 02/24/2021 workgroup PPT slide 5.
  - <sup>xxii</sup> Dandelion. 02/24/2021 workgroup PPT, slide 10.
  - <sup>xxiii</sup> Mayernick. 02/24/2021 workgroup PPT, slide 8 and 11.
  - <sup>xxiv</sup> Panel: Learnings, Opportunities, and Barriers. 02/24/2021 workgroup meeting.
  - <sup>xxv</sup> Panel: Learnings, Opportunities, and Barriers. 02/24/2021 workgroup meeting.
  - <sup>xxvi</sup> Billimoria. 02/24/2021 workgroup PPT. slide 17.
  - <sup>xxvii</sup> ACEEE. 02/24/2021 workgroup PPT slide 17.
  - <sup>xxviii</sup> ACEEE. 02/24/2021 workgroup PPT slide 17.
  - <sup>xxix</sup> Burnes. 02/24/2021 workgroup PPT slide 23.
  - <sup>xxx</sup> Lis. 02/24/2021 workgroup PPT slide p. 3.
  - <sup>xxxi</sup> Burnes. 02/24/2021 workgroup PPT slide 4.
  - <sup>xxxii</sup> Burnes. 02/24/2021 workgroup PPT slide 7.
  - <sup>xxxiii</sup> Burnes. 02/24/2021 workgroup PPT slide 23.
  - <sup>xxxiv</sup> ACEEE. 02/24/2021 workgroup PPT slide 7.
  - <sup>xxxv</sup> Billimoria. 02/24/2021 workgroup PPT. slide 17.
  - <sup>xxxvi</sup> Billimoria. 02/24/2021 workgroup PPT. slide 17.
  - <sup>xxxvii</sup> Billimoria. 02/24/2021 workgroup PPT. slide 17.
  - <sup>xxxviii</sup> Billimoria. 02/24/2021 workgroup PPT. slide 17.
  - <sup>xxxix</sup> Billimoria. 02/24/2021 workgroup PPT. slide 13.
  - <sup>xl</sup> Mayernick. 02/24/2021 workgroup PPT, slide 7.
  - <sup>xli</sup> Billimoria. 02/24/2021 workgroup PPT. slide 13.
  - <sup>xlii</sup> Billimoria. 02/24/2021 workgroup PPT. slide 22.

