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Poster Title: This Home Checks All the Boxes! Using On-Site Home Checklists to Assess Heat Pump Technical Potential

Abstract: Program administrators interested in efficient electric heating and cooling systems are increasingly focusing on ductless minisplit heat pumps (MSHP), but is it reasonable to expect MSHPs to replace many customers' existing systems? How much heating and cooling load can MSHPs reasonably offset in a typical home? A recent study in a Northeastern state developed a unique and flexible scoring system designed to help on-site inspectors estimate the proportion of a home's conditioned floor area suitable for an MSHP installation. Using the results of real-world home inspections, the study developed bottom-up estimates of the technical (rather than economic) potential of MSHP installations in the state, focusing on the parts of the home where MSHP installations were most feasible.

This study developed a checklist-style scoring rubric and used this tool at 75 on-site visits (single and multifamily homes) recruited for a residential appliance and mechanical system saturation survey. The scoring tool allowed technicians to make quick, systematic, and replicable assessments of a home's suitability for an MSHP installation based on room-level assessments. The rubric incorporated factors such as room type and size, age of the existing heating/cooling system, whether rooms were uncomfortable in the summer or winter, and the presence of electric resistance heating. Room-level scores were aggregated to create an overall MSHP feasibility score for each home. The poster will display an easy-to-follow decision tree that visually demonstrates the scoring criteria.

The on-site visits also included energy assessments based on HERS rating protocols, covering building envelope, mechanical systems, lighting, appliances, and qualitative assessments of air infiltration and duct leakage. Using these data, the study calculated Manual J heating and cooling loads for each home and apportioned the loads into high, medium, and low MSHP feasibility tiers using the room-level assessments made in the field. The study showed that 60% of the average home's floor area would be a strong candidate for MSHP installations. This represents tremendous technical potential for program sponsors to consider shifting homes to efficient, electric heating and cooling systems. The poster will also display the digital schematics the study created that color-coded each home's floor plan based on the room-level feasibility assessments.

This poster will show program administrators and evaluators how to use the MSHP scoring system to analyze their housing stock to make assessments of the likely MSHP potential in their territories. A key focus of the poster will be to include suggestions for other customizable scoring criteria that researchers can use to develop their own modular scoring systems, depending on their electrification priorities. Program stakeholders can readily incorporate these tools in on-site visits for evaluations or weatherization programs and also in surveys that supplement on-sites. The poster will show how to systematically implement these tools in the field and turn the results into home-level scores. Finally, for studies without on-site visits, this poster will also suggest simple tools that can be used to inform MSHP potential efforts in other states, based on the room and home-level results of this study.