Poster title: Finding Untapped Weatherization Savings from Secondary Fuel Usage

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Poster summary

To determine the impact of residential weatherization measures, evaluators typically perform billing analyses to estimate savings associated with program participants' primary heating fuel. However, the improvements to the building shell caused by air sealing and added insulation yield energy savings beyond just primary heating.

Consider this scenario: In a drafty, unweatherized home with a natural gas furnace, household members use electric plug-in heaters to provide supplemental heat in parts of the home that the primary heating system cannot sufficiently keep warm. After a weatherization program installs insulation and conducts air sealing, the improved building shell keeps the temperature more even and eliminates drafts, so household members no longer need to use space heaters.

Another scenario worth considering involves a home that did not use secondary heating before weatherization. Post-weatherization, this home maintains temperature better, and rather than cranking up the primary system to heat the entire home, household members can run a space heater to boost comfort in only the area they are occupying. In both scenarios, a traditional primary-heating-only billing analysis would not tell the full story of weatherization's impact on customers' overall heating usage.

Though several studies have attempted to account for secondary or supplemental heating fuels when evaluating weatherization savings, the industry's experience in estimating the total savings of weatherization measures that include the impact of secondary heating is limited.

In this poster presentation, the authors will demonstrate a methodology used as part of Rhode Island Energy's two impact evaluation studies (EnergyWise Single Family and Income Eligible Single Family) to estimate total energy savings associated with weatherization, including primary heating, secondary heating, cooling, and fan/pump usage. The key poster element will demonstrate that identifying and then focusing billing analysis on a subset of participants with known secondary heating reduces the total usage variance in an analysis sample, which increases the likelihood of accurately detecting changes in winter electric consumption associated with heating systems before and after weatherization.

Understanding these savings is important since roughly a third of U.S. households use secondary heating. Moreover, accounting for the full range of energy impacts is critical given programs' increasing focus on weatherization as a complement to heat pumps, especially as some programs face cost-effectiveness concerns due to declining average weatherization savings.