Independent Study (“Why is weatherization important?”) Literature Review Excerpt

What

An excerpt of a literature review written for an independent study on weatherization programs in the United States under Dr. Janet Smith at UIC. I reviewed the most pertinent literature on weatherization and its positive benefits to program participants and society. The independent study contributed to an ongoing study of a weatherization program in Knoxville, Tennessee and its role as a capacity-building exercise for current weatherization work in the city.

Work Performed

- Reviewed literature on weatherization and its positive impacts.
- Wrote a summary of the relevant literature on the benefits of weatherization.

Why

- Literature review & analysis
- Report & proposal writing
- Health and build environment

Why is weatherization important?

Weatherization has three broadly defined benefits: improved health and safety, sustainability, and social justice. Federally-funded weatherization programs have traditionally been targeted towards low income households in order to reduce their energy (or fuel) poverty, which contributes to the broad social justice goal. The U.S. residential sector accounts for 22% of national energy consumption (Energy Information Administration, 2012, from Reames, 2016, p. 1449). Efficiency improvements in residential energy consumption could have a significant impact on national energy consumption and greenhouse gas emission reductions. Allcott and Greenstone have investigated the "Energy Efficiency Gap" which they define as the "wedge between the cost-minimizing level of energy efficiency and the level actually realized" (Allcott & Greenstone, 2012, p. 4). The energy efficiency gap is the difference between optimal energy efficiency and the current situation. Allcott and Greenstone find that while the energy efficiency gap is "less pervasive" than previous studies estimated, the gap is largely caused by information and investment inefficiencies in low-income and marginalized communities that require targeted policies to pursue (2012).

Health & Safety

Weatherization can improve environmental air quality within the home. This improvement has associated benefits to better respiratory health and reduced respiratory illness. National insulation retrofits alone could result in 6,500 fewer asthma attacks and health savings of $1.3 billion annually (Levy, et al., 2003; EIA, 2013). Increased temperature control in a home can improve sleep and physical and mental well-being. Weatherization reduces the number of days that participants feel physically or mentally not well by approximately 48% (Tonn, et al., 2018, p. 286). Finally, because households pay less for heating and/or cooling, they may be able to spend more on necessary food and medicines significantly boosting overall wellness (Tonn, et al., 2018, p. 287; Harrison, Popke, 2011).

Sustainability

Weatherization generally increases energy efficiency and reduces energy consumption at a household level. These aggregated savings may stave off future increases in energy use. However, current funding levels for national weatherization programs do not represent a significant reduction in greenhouse gas emissions. Improving the energy efficiency of the existing housing stock could be one strategy (national or local) for emission reductions and climate change mitigation.

Locally, reducing household energy consumption may diminish the need to build additional power generation facilities. Power generation facilities - whether coal, nuclear, or renewable - are expensive to build, and mitigating the need for an additional facility increases the financial and environmental sustainability of a city or region. Furthermore, as detailed below, weatherization programs can contribute to a more just society, leading to positive social outcomes. Weatherization programs (as currently administered in the United States) satisfy all three parts of the economic-social-environmental sustainability model (the 'three-legged' theory of sustainability).

Social Justice

Weatherization programs have the potential to promote a more just society. Weatherization programs are generally targeted to low-income residents, following the model of the national Weatherization Assistance Program. Barring an increase in rates or fees, the reduction of energy consumption will reduce energy bills annually. These annual savings put money back into the pockets of low-income residents and have the potential to greatly reduce financial strain on participating households (Harrison & Popke, 2011; Tonn, et al., 2018).

Increasing energy efficiency from weatherization may allow households to use heating or air conditioning in extreme conditions, or even at all (Harrison & Popke, 2011). This increased utilization greatly improves quality of life for participating households, but may see increases in

energy bills as the per unit cost heating or cooling their home becomes more affordable. Finally, weatherization programs ensure a steady supply of work for energy auditors and retrofit contractors, increasing job prospects for working class households.

While weatherization programs can improve the lived experience and economic condition of low-income households, there are barriers to households enrolling in weatherization programs. Fowlie, Greenstone and Wolfram report that “individuals and households bypass opportunities to improve energy efficiency that require zero out-of-pocket expenditures and are widely believed to be privately beneficial” (2015, p. 201), and suggest that “information and process costs borne by the potential beneficiaries induces households with higher incomes to participate” (2015, p. 203). The non-monetary costs of time (in application and screening stages) and effort required (in energy audits and extensive applications) combined with limited information about weatherization programs in target communities limits take-up.