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# **LOW RATES OF FREE-RIDING IN RESIDENTIAL ENERGY EFFICIENCY RETROFIT GRANTS**

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# Low rates of free-riding in residential energy efficiency retrofit grants<sup>1</sup>

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## OVERVIEW

The Sustainable Energy Authority of Ireland (SEAI) administers the Better Energy Homes (BEH) grant scheme to encourage households to invest in residential energy efficiency retrofits. All grant schemes are subject to free-riders, where a proportion of those being grant-aided would have undertaken the activity (i.e. energy efficiency retrofits) in the absence of any grant aid, which is often referred to as deadweight loss. This research finds that just 7% of participants in the BEH scheme would have undertaken a retrofit even in the absence of grant aid, and a further 8% would have occurred with a lower level of grant aid than was available. These free-rider rates are very low compared to similar schemes internationally, which have free-riding rates ranging from 40% to as much as 96%.

Free-rider rates vary by retrofit type, lowest for households investing in solar panels and highest for those investing in central heating controls. Of households that received grant aid for heating controls only, 33% were estimated as free riders (i.e. would have invested in absence of the grant) and a further 27% would have undertaken a retrofit with a lower level of grant aid.

The analysis also estimates how much households are willing to pay for certain types of energy efficiency retrofit improvements. For retrofits that specifically improve the efficiency of energy used for space and water heating (e.g. boiler upgrades, heating controls) estimated willingness-to-pay equals €0.127/kWh/yr. Households that have previously undertaken an energy efficiency upgrade are willing to pay twice this amount. Additionally, households in the least energy efficient properties (i.e. properties with the greatest potential energy efficiency gains) are willing to pay less for retrofits than households in more energy efficient properties.

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<sup>1</sup> This Bulletin summarises the findings from: Collins, M., Curtis, J., "Willingness-to-pay and free-riding in a national energy efficiency retrofit grant scheme", *Energy Policy*, 118, 211–220: Time limited open-access hyperlink: <https://authors.elsevier.com/a/1Wq~p3Hb~0Ek-T>. Permanent hyperlink (paywall): <https://doi.org/10.1016/j.enpol.2018.03.057>

## **BACKGROUND**

The research is based on the anonymised Better Energy Homes (BEH) grant scheme administrative dataset. The analysis compares costs and benefits of retrofit options but focuses specifically on retrofits that improve the efficiency of energy use (e.g. boiler upgrades, solar collector, heating controls) rather than retrofits improving building energy efficiency (e.g. attic and wall insulation). The insulation retrofits were excluded from the analysis because non-monetary benefits associated with improved warmth and comfort in the home following installation of insulation could not be accurately measured.

To calculate free-riding or deadweight loss associated with the grant scheme we compare the total cost of the completed retrofit, the cost to the household of the retrofit following receipt of grant aid, and the willingness-to-pay for that retrofit. Willingness-to-pay is calculated as the product of the average marginal willingness-to-pay associated with the application and the observed total yearly energy efficiency improvement gained as a result of engaging in the chosen retrofit. Free-riders are grant applicants for which a household was willing to pay more than the total cost of the retrofit, i.e. they would have completed the relevant retrofit work even in the absence of a retrofit grant.

## **POLICY AND MANAGEMENT IMPLICATIONS**

Households that had previously engaged in a retrofit are willing to pay, on average, twice as much as first time grant applicants. This potentially indicates that quite a large degree of information asymmetry exists with regard to the benefits of retrofitting for those investing for the first time and that closing this information gap may lead to more and deeper retrofits. It also suggests that lower levels of grant aid may be sufficient to encourage repeat retrofit investments, or alternatively, a bonus payment may encourage first-time retrofits.

The least energy efficient properties, i.e. those with the greatest energy saving potential, are also the properties whose occupants have the lowest willingness to pay for energy efficient retrofits. However, the retrofit grants are fixed irrespective of the grant applicant or efficiency gains achieved. One justification for publicly funding the grant scheme is to reduce carbon emissions, which might be more efficiently achieved if the grant was proportionate to improvements in energy efficiency, or ideally to reductions in carbon dioxide emissions.

The highest rate of free riding in the BEH scheme is for retrofitting heating controls only, with 60% of grant recipients estimated to be either full or partial free-riders. When the BEH grant scheme is being reviewed levels are re-evaluated the level of grant support available for heating controls only retrofits could potentially be reduced on the basis of the estimated free-riders rates.

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