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Differences in household responses to feedback on their gas consumption[1]

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INTRODUCTION

Between 2019 and 2024 households in Ireland are due to receive new "smart" electricity and gas meters. These meters will provide more information on each household's patterns of energy use and they should allow suppliers to provide households with better usage information and a wider range of pricing options. Some analysts believe that the additional information and price plans will help encourage energy efficiency and reduce carbon emissions. For instance, smart metering should make feedback on energy consumption more effective by increasing the frequency and availability of information to households. Then households can use this additional information to avoid unnecessary consumption and cost whilst also helping to reduce environmental damage. In previous research, it was found that providing more detailed feedback on natural gas usage to households reduced average daily gas consumption.

Our research examined how different sorts of households respond when they are given more feedback on their use of natural gas. It could be that some types of households respond more strongly than others, which would help policymakers and suppliers predict how much gas will be conserved when smart meters are introduced. We also asked whether feedback has a persistent effect in households; for example, it could be that users tend to react to the extra information at first but eventually revert back to their previous energy use habits.

DATA AND METHODS

This research was based on daily household gas consumption data for 1,294 Irish households over a period of 539 days collected as part of Ireland's Smart Metering Gas Consumer Behavioural Trial. During the trial, households were randomly

[1] This Bulletin summaries the findings from: Harold, J., S. Lyons and J. Cullinan (2018). Heterogeneity and persistence in the effect of demand side management stimuli on residential gas consumption. *Energy Economics 73*, 135-145. Available online: https://doi.org/10.1016/j.eneco.2018.04.034

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assigned to two groups. One group had no changes to their normal bi-monthly bill, while the other group received additional feedback on their overall gas use. Households in the feedback group were assigned to receive gas use information more or less frequently (monthly or bimonthly) or in different ways (via a printed energy usage statement or an electronic device displaying usage information). We applied statistical methods to the data collected in the experiment, with the aim of discovering whether socioeconomic, household level and dwelling characteristics of households helped explain how they responded to the additional feedback. Also, similar methods were used to examine whether the feedback had persistent effects over time.

RESULTS

The effects of energy use feedback on gas consumption varied a lot depending upon the socio-economic and dwelling characteristics of the household. Older and larger households or those with older and bigger dwellings were much more responsive to feedback, with these household types reducing their gas use by far more than younger and smaller households, or those with newer or less spacious dwellings. For example, feedback reduced gas usage most on average in houses built pre-1980 or those with four or more bedrooms. In addition, those renting their homes responded much less strongly to gas consumption feedback compared to homeowners.

Feedback also seemed to have a habit-forming effect on gas consumption behaviour; the effects found in the study persisted after an initial learning or adjustment period.

POLICY IMPLICATIONS

Knowing how different groups are likely to react to improved consumption information should help with the design of energy conservation policies and commercial service offerings. For example, consumer education and publicity campaigns around the launch of smart metering should not assume consumers will react to the information provided by metering in a uniform way. Also, it may be necessary to consider other alternatives to encourage energy conservation among groups that are less responsive to feedback on usage.

Nevertheless, it should be encouraging for policymakers that the effects of feedback on consumption behaviour seem to be persistent beyond the initial novelty phase. Only if consumption habits are changed in a sustained way will informational measures such as these make a significant contribution to reducing household energy use and greenhouse gas emissions.

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