

Domestic energy efficiency in Ireland: correcting market failure

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Abstract

If the benefits of domestic energy efficiency are so great, why are they not reaped in actuality and what can be done about it? This paper deals with these crucial questions. It is based on the findings of a recent comprehensive study evaluating the costs (labour and materials) and benefits (energy cost savings, environmental benefits, including reductions in emissions of CO₂, NO_x, SO₂ and PM₁₀, comfort gains and mortality and morbidity impacts) to Irish society of bringing the entire housing stock up to the latest Building Regulations. The reasons for the lack of take-up of energy-conservation measures are discussed. The paper formulates policy proposals to address the impediments to effective action in the market for domestic energy efficiency. The various policy instruments available to overcome these barriers are outlined. Past performance, citing specific exemplars, both from abroad and from experience in Ireland, is reported. The final section suggests a mix of policy instruments to assist the realisation of the potential benefits of the energy-conservation programme. The principal initiatives recommended include the provision of a combination of grants to low-income households and a clear State-led information campaign explaining the benefits of conserving energy to the household. © 2000 Elsevier Science Ltd. All rights reserved.

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1. Introduction

Many studies have demonstrated the tangible net benefits of energy efficiency in the domestic sector. Studies at the micro level, including those of Pezzey (1984), Henderson and Shorrock (1989) and van Harmelen and Uytendyl (1999), show the clear net benefits of individual retrofitting technologies. At the macro level, Arny *et al.* (1998), Blasnik (1998), Brechling and Smith (1994), Goldman *et al.* (1988), Skumatz (1996) and others demonstrate the benefits of comprehensive retrofitting programmes. However, two questions arise: why, if the net benefits of domestic energy efficiency are so great, are the take-up responses of such measures and programmes so disappointing? What can be done about it?

Having demonstrated the clear net benefits to Irish society of a programme to bring the entire housing stock up to the thermal standards of the latest Irish Building Regulations, the paper answers the following questions:

- Why does the market fail to ensure that society captures these benefits?
- What policy instruments are available to correct this market failure?
- What does past experience tell us?
- What mix of policy instruments would assist Irish society to capture the full benefits of the recommended domestic energy-efficiency programme?

2. Programme for domestic energy efficiency in Ireland

Ireland's housing stock has been identified as being among the least energy efficient in Northern Europe (Brophy *et al.*, 1999). Recent evidence also suggests that the rate of fuel poverty¹ in Ireland (at 12%) is among the worst in Northern Europe (Whyley and Callender, 1997). Energy consumption in the domestic sector is greater than necessary, as people living in inefficient dwellings

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¹ The inability to heat the home to an adequate (safe and comfortable) temperature owing to low income and poor (energy-inefficient) housing standards.

must consume more energy to heat their homes². Consequently, environmental emissions are also greater. This is of considerable importance given that Ireland is having extreme difficulty in meeting its agreed target for stabilisation of greenhouse gas emissions under the European Union 'Luxembourg Agreement'. In addition, Ireland has a disproportionately high rate of excess winter mortality caused, in part, by failing to keep warm indoors (Brophy *et al.*, 1999) and the inability to heat the home to an adequate temperature results in sub-optimal levels of comfort.

With these issues in mind, a study³ was undertaken to evaluate a programme to retrofit the entire housing stock in Ireland with insulation and heating measures so as to bring it to the thermal standards of the latest Building Regulations⁴. The study contained the most comprehensive economic analysis of domestic energy-conservation opportunities in Ireland. Costs comprised of labour (€720 m) and materials (€881 m)⁵. The former was priced using an optimal mix of personnel from commercial and non-profit organisations, thereby overcoming capacity constraints in the heated Irish labour market. The retrofitting measures were chosen on the grounds of cost-effectiveness and include:

- Roof insulation
- Lagging jacket
- Draught stripping
- Cavity-wall insulation
- Central heating and controls upgrade
- Low-emissivity double glazing

The benefits of the programme include energy cost savings (€2712 m), health benefits (€1158 m), comfort benefits (€461 m) and environmental benefits (€396 m). The programme as a whole was shown to yield a net social benefit (NSB) of some €3124 m, with an internal rate of return of 33%, a benefit–cost ratio of 1.7 (energy savings alone) and 3.0 (aggregate programme benefits) and a pay-back period of just seven years. Fig. 1 summarises the key findings.

3. Why does the market fail to deliver energy efficiency?

The question arises as to why, if the benefits of the energy-conservation measures resolutely outweigh their costs, these measures are not adopted by individuals. The

² It has also been shown that the poorest individuals tend to spend three times more than the average on energy relative to income (Clinch and Healy, 1999).

³ Brophy *et al.* (1999).

⁴ Department of the Environment and Local Government (1997).

⁵ All costs and benefits are discounted at 5%. At time of writing €1 = \$1.07 = £0.66 = IR£0.79.

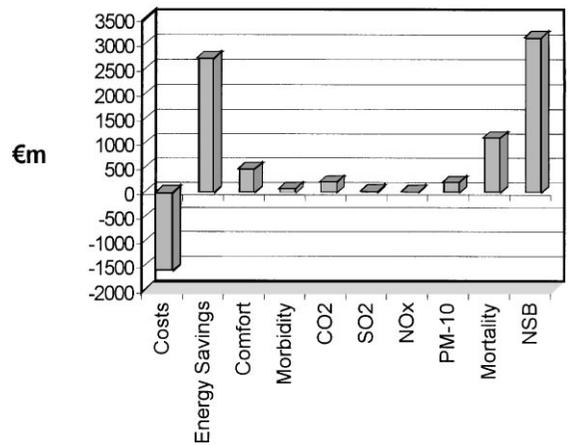


Fig. 1. Costs, benefits and net social benefit.

reasons can be explained by considering the following impediments to effective action.

3.1. Barriers to action

There are five barriers to action regarding domestic energy conservation:

1. The full nature, extent and magnitude of the benefits of domestic energy efficiency in Ireland were a matter for speculation until this study was undertaken.
2. The programme is expensive, costing in total (public and private) about €292 m (undiscounted) annually over 10 years. Heretofore, public finances were such that fiscal rectitude, combined with the need to meet the Maastricht Criteria, limited the extent and willingness on the part of the State to embark on substantive investment programmes in energy efficiency.
3. For private households, the recessions of the 1980s resulted in declining disposable income and a subsequent unwillingness to finance new retrofit investment; it is only in the past five to seven years that growth in real household income has been significant (Convery, 1999) and so this constraint has been relaxed considerably.
4. Policy responsibility is spread across about 10 departments and agencies. Under the prevailing institutional arrangements, there is no one institutionally or politically positioned to 'champion' such a programme.
5. Irish energy policy has traditionally focused on supply-side interventions and neglected demand-side options, despite numerous government policy statements to the contrary (Lawlor, 1995; McSharry, 1993).

3.2. Private vs. social benefits

A social cost–benefit analysis considers all the benefits to society of a programme to retrofit the entire housing

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