

# Deep Energy Retrofit Case Study – who pays, who benefits, and how best to inform Policy

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## Overview

This paper provides an economic analysis of a recent 12-unit (1 bed 31m<sup>2</sup>) Deep Energy Retrofit (DER) social housing project (See Table 1). Based on real costs and monitored post retrofit performance, it updates the projected benefits described in a previous in-depth analysis paper [Colclough, 2021]. Through quantification of financial, economic and societal benefits, a stakeholder analysis is enabled, unveiling a key barrier to DER in Ireland.

Measure	Before	After	Cost {€ '000}
External insulation	1.8 W/m <sup>2</sup> K	0.2 W/m <sup>2</sup> K	60
Attic Insulation	0.16 W/m <sup>2</sup> K	0.12 W/m <sup>2</sup> K	10
Windows and Doors	2.8-3.1 W/m <sup>2</sup> K	0.8 W/m <sup>2</sup> K	60
Heating	Oil / Fire & Back Boiler	4 kW HP	84
Renewable energy	None	6 x 285W PV	60
Ventilation	Natural	Demand Controlled	24
BER / Overall	4 x "F", 8 x "G"	1 x A1, 10 x A2, 1 x A3	€339 (298 + VAT)

Table 1 Energy Efficiency Upgrade Measures

## Costs and Benefits (15 year period)



Figure 1: Costs & Direct and Indirect Benefits per Stakeholder/Beneficiary

Figure 1 gives a breakdown of the costs (which total €339k), the direct benefits (totalling €341k) and indirect benefits (€501k to €542k) for each stakeholder/beneficiary. The Local Authority (or Housing Association) (LA/HA) invested €146k, with €193k being met by the state

via a DER pilot funding scheme (which is no longer available). Direct benefits of €249k are realised by the tenant €188k in avoided heating costs plus in avoided CO2 taxes (€61k). The LA/HA saves €31k in direct costs (avoided maintenance costs on the oil boiler and chimney fire call out charges), and the Central Exchequer avoids €61k in direct costs (carbon tax penalties). Indirect benefits of between €83k and €142k are enjoyed by the Central Exchequer in reduced healthcare cost for the social housing tenants and benefits to the local economy. The HA/LA also accrue indirect benefits of €420k due to the increase in the property value (as determined by auctioneers valuation).

## **Key finding**

The financial analysis is apposite given the urgent need for effective policy development in order to re-orient society and industry and enable the achievement of the low-energy retrofit mandated by the EU. Effective policy has the potential to simultaneously realise ongoing financial benefits, “seed” the capability within industry and crucially increase the knowledge and understanding of low energy dwellings which is necessary to enable the appropriate market valuations so widespread adoption can be achieved.

Overall for the project, the direct costs (€339k) are more than covered by the 15 year direct benefits (€341k), and when the indirect benefits (€501k to €542k) are included, the project returns more than twice the investment. The project is therefore financially attractive.

The tenant enjoys the vast majority of the direct benefits (€249k), and the state benefits significantly enjoying direct and indirect returns of €182k. However the stakeholder who makes the upgrade decision (e.g. the Housing Association) sees the lowest direct benefits (of €31k) over a 15 year period.

In addition, it is noted that the Deep Energy Retrofit pilot project funding scheme is no longer available, meaning that the project costs of €339k total more than 10 times the direct benefits seen by the Housing Association. Therefore the project is very difficult to justify based on direct cost-benefit analysis, and would probably not proceed based on the analysis above.

However, there was a significant indirect benefit of €420k in increased property valuation for this specific project. While the increase in property value is due to specific market conditions in this case, typical property valuation increases of 83k to €193k would typically be achievable for standard market conditions [Colclough 2021]. However Local Authorities and Housing Associations cannot readily benefit from the increased asset values, as the properties are not sold.

Given the urgent need to retrofit our existing building stock, the analysis above signposts that policy needs to be formulated which will financially support the key decision-makers of Local Authorities or Housing Associations to enable the required DER uptake. This is especially the case given that the DER funding scheme which enabled this project is no longer available.

## **References**

[Colclough 2021] Colclough, S: The Costs, Benefits and Stakeholder Analysis of an Irish Social Housing Deep Energy Retrofit Case Study. International Buildings Physics Conference 2021, Denmark (DTU) 25-27 August 2021.

## **Summary**

While this analysis shows that Deep Energy Retrofit is financially attractive, it also indicates that policy development needs to focus on incentivising the key decision-maker if Irelands targets are to be achieved in the key social housing arena.