

Challenge 2; Residential heating

Heating homes accounted for 20% of Kerry's energy demand in 2018, emitting 197 ktonne of CO₂ (11%). The All of Government Climate Action Plan published last year proposes to solve this by 2030;

- Retrofitting 450,000 houses to a BER rating of B2
- And 300,000 of these also installing a heat pump system

However, there are some problems with this, heat pumps require the house to have at least B2 BER rating and retrofits are expensive. It could cost €30,000 – €50,000 for an average home even with grant support;

- What other alternatives are there?
- And should all houses be treated the same?

	% Share	No. of houses	Avg. kWh / m ² per year			Year built	Avg. m ²
			Total energy demand	Lighting, Appliances, etc.	Heating & Hot water		
A	2%	1,086	34	13	21	Pre 1919	98
B1	2%	1,086	67	14	53	1919 - 1945	100
B2	3%	1,629	81	16	65	1946 - 1960	104
B3	7%	3,800	96	17	79	1961 - 1970	104
C	36%	19,544	113	18	95	1971 - 1980	106
D	25%	13,572	142	18	124	1981 - 1990	108
E	12%	6,515	179	19	160	1991 - 2000	110
F	5%	2,714	226	19	207	2001 - 2010	113
G	8%	4,343	265	21	244	2011 or 2016	231
Total		54,288				post 2016	225

Example calculations

The average age / BER rating for houses in Ireland and likewise Co. Kerry would be a C rated home built between 1981-1990. In Kerry, these would primarily be heated by heating oil, with some relying on electrical heaters or solid fuel. The savings from retrofitting to a B2 would be as follows;

$$\text{Oil heating} - 108 \text{ m}^2 \times (95-65) \text{ kWh/m}^2 \times 0.257 \text{ kgCO}_2/\text{kWh}^* = 832.7 \text{ kgCO}_2 \text{ per year}$$

$$\text{Solid fuel heating} - 108 \text{ m}^2 \times (95-65) \text{ kWh/m}^2 \times 0.348 \text{ kgCO}_2/\text{kWh}^* = 1,128.5 \text{ kgCO}_2 \text{ per year}$$

In addition, by installing a heat pump;

$$\text{B2 rated house} - 108 \text{ m}^2 \times 65 \text{ kWh/m}^2 = 7,020 \text{ kWh per year}$$

$$\text{Assuming heat pump has Coefficient of Performance of 2.5} - 7,020 / 2.5 = 2,808 \text{ kWh per year}$$

$$\text{Oil heating house} - (0.257 \text{ kgCO}_2/\text{kWh}^* \times 7,020 \text{ kWh}) - (0.375 \text{ kgCO}_2/\text{kWh}^* \times 2,808 \text{ kWh})$$

$$1,840 \text{ kgCO}_2 - 780 \text{ kgCO}_2 = 1,060 \text{ kgCO}_2 \text{ per year}$$

*provided in supplementary information

Useful sources of information

[Results from the 2016 Census for Co. Kerry](#)

[SEAI Energy in Residential Sector Report 2018](#)

[CSO Domestic Building Energy Ratings Q4 2019](#)