8 Performance of certain residential retrofit schemes

8.1 The Climate Action and Low Carbon Development (Amendment) Act 2021 (the Act) provides for the setting of sectoral emissions ceilings, which aim to limit the total amounts of permitted greenhouse gas emissions that each sector of the economy can produce during a specified time period.

8.2 The Act commits Ireland to a legally binding target of a 51% reduction in emissions by 2030, compared to 2018 levels. Reductions in each sector of the economy are required, varying from a 25% reduction in agriculture emissions to a 75% reduction in electricity emissions.

8.3 The Department of the Environment, Climate and Communications (the Department) funds a range of sustainable energy programmes to support the achievement of reductions in emissions, the meeting of sectoral emissions ceilings targets and reducing energy poverty. In order to achieve the required emissions reductions, the Act requires the preparation of five-year carbon budgets. The preparation of the sectoral emission ceiling targets is based on the approved carbon budgets.

8.4 The climate action plan 2023, which forecasts that emissions from the residential sector will need to be reduced significantly, is supported by the national retrofit plan.[1] The residential target under that plan is to retrofit the equivalent of 500,000 dwellings to a building energy rating (BER) score of B2/cost-optimal (or carbon equivalent standard) by 2030.[2,3] The national retrofit plan notes the need for an 'all of Government' approach for its implementation.

8.5 The Sustainable Energy Authority of Ireland (SEAI) has been designated as the national retrofit delivery body and is the lead agency in driving delivery of the majority of residential retrofit targets. The SEAI is funded from Vote 29 Environment, Climate and Communications, which included an estimate provision of €264 million for residential retrofit schemes in 2022.

Focus of the examination

8.6 This examination was undertaken to assess the systems, procedures and practices in place to monitor the performance of two of the key residential sustainable energy schemes funded from the Vote. The report

- provides an overview of the BER-assessed housing stock in Ireland
- examines the performance of two of the key residential retrofitting schemes within the sustainable energy programme — the 'better energy warmer homes' scheme and the 'better energy homes' scheme, and
- examines how the effectiveness of the schemes is assessed against the targets set.

1 The climate action plan 2023 is available here and the national retrofit plan is available here.

2 The target of the equivalent of 500,000 B2/cost-optimal (or carbon equivalent) upgrades by 2030 was also included as a target in the climate action plan 2019.

3 The cost-optimal level is defined as either primary energy performance of less than 125 kWh per unit floor area per year (B2) or an upgrade of the wall insulation, ceiling insulating and heating system. The term cost optimal is part of the building regulations.

8.7 The examination team interviewed staff from the SEAI and the Department, observed retrofit inspections carried out by a managing agent on behalf of the SEAI, documented the key controls and conducted walk through testing on the application process for both schemes. A range of documentation relating to the sustainable energy programme performance was also provided to and reviewed by the examination team.

BER assessed housing stock in Ireland

8.8 A valid BER certificate, issued following an assessment by an SEAI registered assessor, is required for most homes available for rent or sale, for new buildings and for the receipt of SEAI home energy grants. The BER score of an individual building can change over time e.g. following improvement, or deterioration, in the fabric or heating system of the building. Current and projected BER scores can also be used to assess the adequacy of an intervention programme, and the extent to which progress has been achieved by an intervention.

8.9 The Department of Housing, Local Government and Heritage has responsibility for the BER system. The SEAI is designated as the statutory authority for issuing BER certificates.[1] This includes responsibility for

- the registrations of BER assessors
- maintaining the register of BER assessments and certificates
- quality assurance of the BER scheme
- raising awareness and ongoing management of the BER scheme.

8.10 The BER is calculated based on the estimated amount of energy a dwelling would require for heating space and water, ventilation and lighting under notional occupancy. It is expressed as 'primary energy use per unit floor area per year' (kWh/m^2/yr), on a scale between A1 and G. A1-rated buildings are the most energy efficient (using less than or equal to 25 kWh/m^2/yr) while G-rated buildings are the least efficient (using over 450 kWh/m^2/yr). The BER rating is not a measure of the amount of energy actually consumed in a defined period, which depends on whether the building is occupied and how it is used.

BER data analysis

8.11 At the end of 2022, 827,634 domestic houses had a valid BER certificate. With a total of approximately 2.1 million dwellings in the State, this accounts for just under 40% of the housing stock. The rate of testing for BER purposes varies between counties, with the highest rate of assessment in the greater Dublin region (see Figure 8.1).

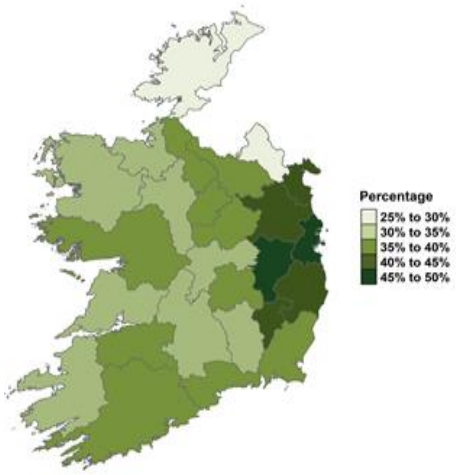
8.12 Of the properties that have been BER assessed, only 19% had a rating of B2 or better (see Figure 8.2). The proportion of residential units receiving those ratings has been increasing, reflecting high-efficiency new house completions, as well as some upgrading of older stock.

8.13 Dwellings built since 2015 are considerably more energy efficient than prior constructions. A BER score of A was given to 99% of dwellings built between 2020 and 2022, and to 96% of dwellings built between 2015 and 2019. In contrast, only one third of dwellings built between 2010 and 2014 received an A rating.[2] The SEAI stated that this is reflective of the changes to the building regulations over subsequent years.

1 Under Statutory Instrument 243 of 2012.

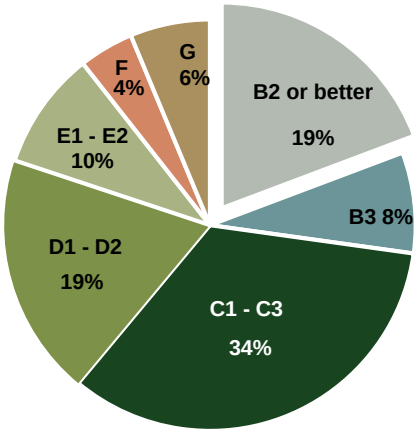
2 Central Statistics Office (CSO) Domestic Building Energy Ratings, Quarter 4, 2022.

Figure 8.1 Percentage of Irish housing stock with a BER rating, by county

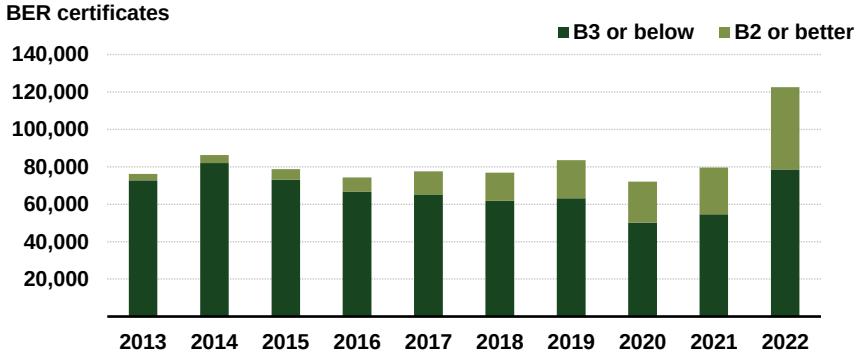


Source: SEAI and CSO. Analysis by the Office of the Comptroller and Auditor General.

Figure 8.2 Breakdown of the BER of domestic dwellings at the end of 2022



Age profile of BER certificates for domestic housing stock valid at end 2022



Source: SEAI. Analysis by the Office of the Comptroller and Auditor General.

Trends in expenditure on sustainable energy programmes

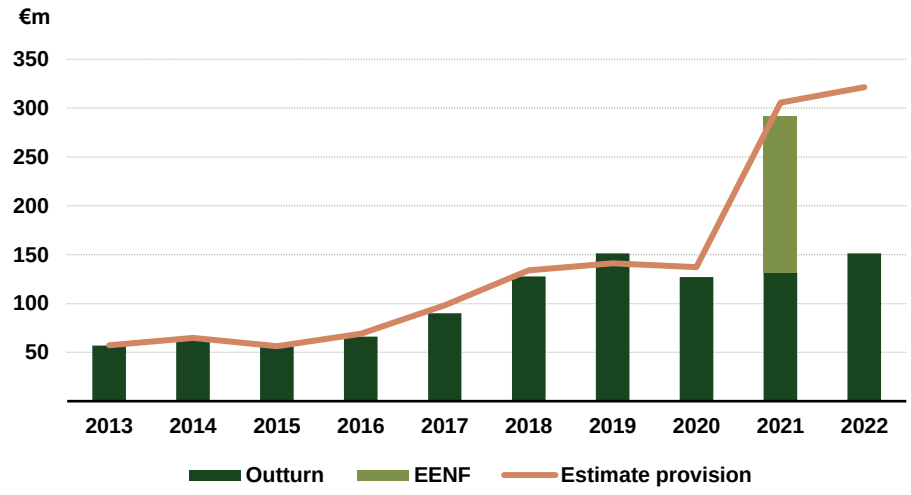
Vote expenditure

8.14 In the ten-year period to the end of 2022, the Department has provided funding of around €1.2 billion for sustainable energy programmes (see Figure 8.3).[1] The majority of this funding — €1.1 billion — was provided directly to the SEAI.

8.15 The funding provision in the vote estimate for 2021 was significantly higher than prior years. However, there was a significant underspend across the better energy schemes as a result of Covid-19 and supply chain and labour limitations. To avoid surrender to the Exchequer of the unused voted funding at the end of 2021 (required under normal vote management rules), €160 million was transferred to the Energy Efficiency National Fund (EENF).[2] Around €49 million was transferred from the EENF to the SEAI in 2022.[3]

8.16 There was a further underspend in 2022 of €170 million relative to the estimate provision of €321 million. The Department spent €151 million (47%) of the provision on residential/community retrofit programmes. The Department noted that industry supply chain and workforce constraints and delays in the ramping up of activity under two schemes — the new national home energy upgrade scheme and the better energy communities scheme — contributed to the underspend. In addition, it took a number of months for the 'One Stop Shops' to complete the registration process.[4] Two supplementary estimates were passed that diverted €168 million from the subhead to other subheads.[5]

Figure 8.3 Voted issues on sustainable energy programmes, 2013 – 2022



Source: Department Appropriation Accounts 2013 – 2022

1 Up to the end of 2021, the sustainable energy programmes subhead also included the funding allocations for the business schemes, the public sector energy efficiency scheme and electric vehicles (transferred to Department of Transport in 2021). In 2022, the programme subhead became the residential/community retrofit programme.

2 The transfer had the approval of the Minister for Public Expenditure, National Development Plan Delivery and Reform.

3 The balance in the EENF at the end of 2022 was €124 million. The fund is controlled directly by the Department, and accounted for in a note to the appropriation account.

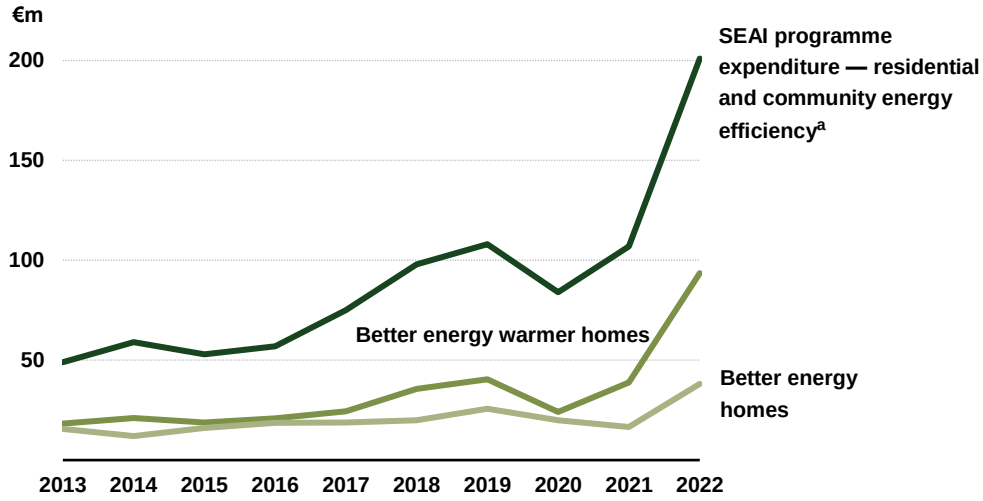
4 One Stop Shops is a new delivery model that was launched in February 2022. Registered contractors will manage the entire process for homeowners. Energy upgrades must bring the home to at least a B2 BER.

5 More information on the variance and movements is available in Vote 29 appropriation account.

SEAI expenditure

8.17 Programme expenditure by the SEAI increased fourfold from €50 million in 2013 to €200 million in 2022 (see Figure 8.4) with a near doubling of expenditure between 2021 and 2022. Expenditure on the better energy warmer homes and the better energy homes schemes over the last ten years amounted to €538 million in total. In each year, the two schemes accounted for an average of 60% of SEAI's total expenditure under residential and community energy efficiency. Conditions to qualify for the schemes and the upgrades supported under the schemes are detailed on the SEAI's website.[1]

Figure 8.4 SEAI residential and community energy efficiency expenditure 2013 – 2022



Source: SEAI

Note: a In 2022, SEAI received funding of €49 million from the EENF.

Sustainable energy residential schemes

Better energy warmer homes

8.18 The better energy warmer homes scheme supports upgrading the energy efficiency of privately-owned homes at risk of energy poverty and is 100% grant funded. The objective of the scheme is to make eligible homes warmer, healthier and cheaper to run. The Department noted that as such, a reduction in emissions is not the sole objective of the scheme.[2] The scheme is restricted to those in receipt of certain welfare benefits.

8.19 Once an applicant is deemed eligible, an SEAI surveyor will survey their home and make upgrade recommendations as appropriate. Work is offered to contractors by the SEAI according to their placement in the procurement competition, contractor delivery capacity (in terms of volume) and contractor performance.

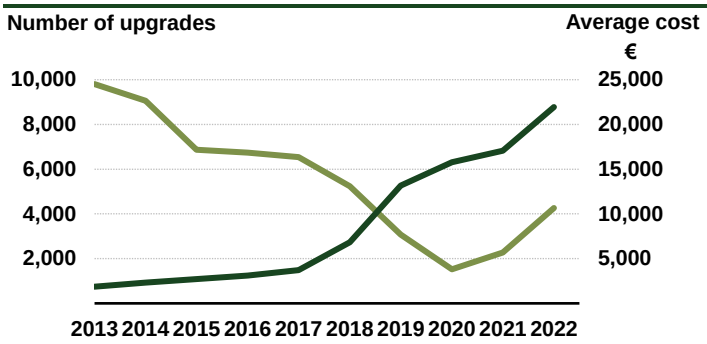
8.20 Over the last ten years, scheme expenditure amounted to €336 million on approximately 55,000 upgrades. The number of upgrades undertaken each year fell from 2013 until 2020, increasing again in 2021 and 2022.

1 Qualifying conditions and grants available

2 The Department noted that other SEAI schemes do target B2 retrofits.

8.21 Until 2018, the scheme mainly focused on delivering 'shallow' energy conservation measures such as attic and cavity wall insulation. In March 2018, the scheme expanded to include deeper measures such as internal and external wall insulation. Reflecting the greater depth of the average package of measures implemented, as well as general cost increases, the average cost per upgrade increased from €1,864 in 2013 to €21,942 in 2022 (see Figure 8.5).

Figure 8.5 Number and average cost of upgrades completed under the better energy warmer homes scheme 2013 – 2022



Source: SEAI. Analysis by the Office of the Comptroller and Auditor General.

8.22 Despite the introduction of deeper retrofits in 2018, only 228 dwellings have achieved a post-retrofit BER B2 under the scheme in the period 2019 to 2022.

8.23 The Department has stated that the scheme does not target the delivery of B2 retrofits. However, a pilot strand of the scheme did target a limited number of B2 upgrades in 2022. This pilot is gathering evidence to inform the appropriate process and approach to increase the number of B2 upgrades and heat pump installations delivered under this scheme. The Department also noted that Covid-19 had a significant impact on SEAI schemes.

8.24 Of the €336 million paid out to end 2022, €306 million (91%) has been paid to contractors procured by the SEAI for works carried out.[1]

8.25 There are a number of controls in relation to the scheme *inter alia*

- a requirement to have the application stamped by the Department of Social Protection proving eligibility
- works undertaken are determined in advance via a survey of each home and
- a post-works BER assessment (since 2022 a pre-works BER assessment is also required).

Better energy homes scheme

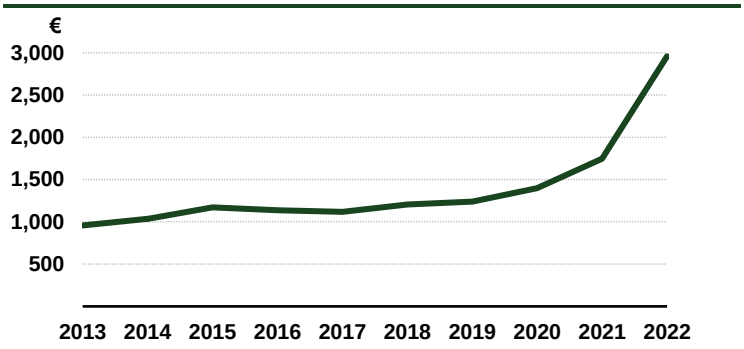
8.26 The better energy homes scheme is a national retrofitting programme available to all homeowners, including landlords, and is not means tested. The home must have been built and occupied before 2011 in order to qualify for insulation and heating control grants, and before 2021 for heat pump and renewable systems grants. The programme aims to incentivise homeowners to make their homes more energy efficient through the provision of grants.

1 The €30 million balance related to technical services and operational costs.

8.27 Grant amounts for the scheme were last reviewed in 2021 by way of a cost analysis conducted by external consultants and updated in February 2022. Of the €202 million expenditure in the past ten years, €176 million related to approximately 130,000 grant payments.[1] The average value of the grants, per application, has increased since 2019 to approximately €3,000 per application approved (see Figure 8.6). The SEAI stated that this is reflective of the changes to the scheme over this period in order to

- harmonise grant schemes
- encourage uptake by providing additional incentives to homeowners to undertake retrofitting works and
- assist with increased cost of living and inflation.

Figure 8.6 Average grant value per application — better energy homes scheme, 2013 to 2022



Source: SEAI. Analysis by the Office of the Comptroller and Auditor General.

8.28 All works under the better energy homes scheme must be completed by a contractor from the SEAI's register, which lists around 1,300 contractors. Homeowners directly engage and pay their contractors, and the grant partially offsets this cost. The SEAI does not approve, guarantee or provide a warranty for work of the registered contractors nor has it any role in setting the price for works carried out.

8.29 There are a number of controls in relation to the scheme which include a declaration of works signed by the contractor, homeowner and BER assessor by which the contractor confirms all works are fully compliant with grant requirements under the better energy homes scheme and the homeowner confirms they are satisfied with works carried out. A post-work BER assessment is also required.[2]

Inspections carried out under the schemes

8.30 An inspection unit established in 2014 selects properties retrofitted under the schemes for inspection based on risks such as

- contractors' average penalty point performance over the previous three months[3]
- lack of evidence of the contractor implementing their own quality assurance
- health and safety issues etc.

8.31 In 2022, inspections were carried out on 1,751 properties that had been upgraded under the better energy warmer homes scheme, and on 2,104 properties that benefited under the better energy homes scheme (see Figure 8.7). This represented inspection rates of 41%[4] and 18% respectively in 2022. These were slightly down from the inspection rates for the schemes in prior years.

1 The €26 million balance related to technical services and operational costs.

2 The BER assessor has to confirm a number of items including a) they have published the BER in full compliance with the BER Code of Practice b) that they have calculated the pre grant evaluation in line with SEAI guidance and c) that in undertaking the BER survey, they are satisfied that the grant aided works specified are in accordance with the contractor's indication on relevant declaration of works.

3 The penalty point performance of a contractor refers to points accrued when a contractor's performance in relation to a particular measure of work is deemed unsatisfactory. The more points a contractor accrues, the more inspections they are subject to.

4 **Corrected figure**. Inspection rate previously referenced was 39%. See Figure 8.7.

Figure 8.7 Inspections under the schemes[a]

	Year	Properties inspected[c]	Inspection rate	Pass rate	Reworks needed	Pass rate post reworks
Better energy warmer homes	2015	3,335	49%	87%	422	100%
	2016	1,938	29%	83%	331	100%
	2017	2,171	33%	77%	504	100%
	2018	2,073	40%	80%	429	100%
	2019	1,406	46%	71%	402	100%
	2020[b]	656	43%	61%	257	100%
	2021[b]	1,077	51%[e]	51%	529	100%
	2022	1,751	41%[e]	45%	971	98%[d]
Better energy homes	2014	1,957	20%	52%	944	93%
	2015	1,815	15%	54%	837	92%
	2016	3,179	21%	47%	1,700	91%
	2017	3,498	24%	41%	2,055	90%
	2018	3,696	26%	50%	1,841	90%
	2019	3,693	20%	54%	1,706	94%
	2020[b]	2,710	22%	58%	1,137	95%
	2021[b]	1,914	24%	54%	883	93%
	2022	2,104	18%	54%	970	95%[d]

Source: SEAI. Analysis by the Office of the Comptroller and Auditor General.

Notes:
a Data in relation to the number of inspections prior to 2015 for the better energy warmer homes scheme and 2014 for the better energy homes scheme are not readily available due to changes in the information systems used by the SEAI.

b Due to Covid-19 restrictions, included in the 2020 and 2021 figures are desktop audits 100 and 102 respectively for the better energy warmer homes scheme and 270 and 231 respectively for the better energy homes scheme.

c A number of measures may be inspected at a property, with multiple inspection checks per measure. In the relevant periods, a total of 37,279 measures were inspected for the better energy warmer homes scheme and 33,675 measures were inspected for the better energy homes scheme. SEAI noted that in the period less than 1.1% of all inspection checks did not pass in the better energy warmer homes scheme and less than 2% in the better energy homes scheme.

d Due to the timing of the examination, not all reworks relating to 2022 had yet been completed.

e **Corrected**. Rates adjusted to exclude from the calculation retrofits carried out under the warmth and wellbeing scheme.

8.32 On both schemes, the initial pass rate on the work inspected is low, with around half of the projects inspected on the better energy homes scheme requiring some re-work. Because the inspections are carried out on a targeted basis, the results are probably not representative of the standard of works overall. Nevertheless, they do indicate that there is a substantial risk of non-compliant work being carried out under both schemes.

8.33 The SEAI stated that retrofit works inspected can fail on a minor issue, or on one measure only when a number of measures have been inspected at a dwelling. It has a number of controls in place in relation to inspection fails such as if re-works are not complete within six weeks, contractors are subject to de-registration until re-works are completed.

8.34 Even after re-works were completed following inspections for the better energy homes scheme, between 5% and 10% of the properties still did not pass. Depending on the seriousness of the issues involved, grants may be withheld from homeowners, or repayment requested in the case of post payment inspections.

8.35 The SEAI noted that key differences in how the two schemes operate are the principal cause of the differences in pass rates between the schemes. The large number of contractors on the better energy homes scheme (1,300 versus 33 on the better energy warmer homes scheme) may also be a contributing factor, as these contractors are on average unlikely to be as familiar with SEAI requirements.

8.36 The examination team attended and observed four inspections of retrofit works: two relating to the better energy warmer homes scheme and two related to the better energy homes scheme. The inspector noted re-works were required in one of the better energy warmer homes scheme dwellings inspected; and for both homes inspected under better energy homes. The costs of such reworks are borne by the contractor in the better energy warmer homes scheme. The SEAI has no direct involvement in rework costs for the better energy homes scheme.

Scheme effectiveness

8.37 The SEAI calculates a number of outputs and outcomes relating to the performance of the retrofit schemes (see Figure 8.8).[1] However, prior to 2022, there were no corresponding targets to facilitate an assessment of performance.

8.38 The annual estimate for the Vote, which funds the retrofit schemes, includes some high-level output targets. For example, in 2019, the Vote estimate included a target of providing energy efficiency measures to 4,609 low income homes. However, for most years, the targets included in the annual estimates did not correspond to the scheme outputs and outcomes that were being reported upon by SEAI as set out in Figure 8.8.

8.39 The calculation of savings obtained as a result of retrofitting measures is not based on actual data from each retrofit. The energy and CO_2 savings for both schemes are based on technical estimates with a number of assumptions involved in the calculations. This approach aligns with the options allowable under the Energy Efficiency Directive. The formulas used in the SEAI's calculations of outputs in 2022 for both schemes is outlined in Annex 8A.

8.40 The base data used in the calculation for the better energy warmer homes scheme is underpinned by a consultant's report on engineering estimates of savings for 2017. A similar study was conducted in 2019, but SEAI stated it was deemed appropriate to continue with the 2017 estimates which are more conservative. SEAI confirmed that evidence of its assessment of the 2019 exercise was not available as it was not formally documented.

1 Scheme outputs are the number of homes retrofitted and the outcomes are the savings associated with the retrofits.

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Figure 8.8 Outputs and outcomes from the schemes[a]

	Year	Homes retrofitted	Estimated energy savings	Estimated CO_2 savings	Estimated SEAI spend (lifetime) per tonne CO_2 saved	Estimated SEAI spend in year per GWh saved
			GWh	kt	€	€m
Better energy warmer homes	2013	9,803	20.6	5.1	131	1.40
	2014	9,056	19.0	4.7	175	1.09
	2015	6,867	14.4	3.6	203	1.26
	2016	6,743	14.2	3.5	236	1.46
	2017	6,555	13.8	3.4	265	1.64
	2018	5,255	13.1	3.3	436	2.70
	2019	3,142	9.6	2.4	667	4.10
	2020	1,524	4.7[c]	1.2	808	5.00
	2021	2,126	9.6	2.4	635	3.99
	2022	4,264	18.7	4.7	791	4.96
Better energy homes	2013	13,710	68.6	17.0	—[b]	—[b]
	2014	9,927	54.6	13.5	32	0.20
	2015	12,227	61.1	15.2	39	0.24
	2016	14,972	74.9	18.6	38	0.23
	2017	14,618	80.4	19.9	35	0.22
	2018	14,238	78.3	19.4	38	0.20
	2019	18,531	100.1	24.8	39	0.20
	2020	12,227	66.0	16.4	45	0.30
	2021	7,928	42.8	10.7	56	0.35
	2022	11,806	63.8	16.0	90	0.57

Source: SEAI. Analysis by the Office of the Comptroller and Auditor General.

Notes:
a The methodology for calculating the figures is set out in Annex 8A.
b The SEAI noted the range of metrics/calculations has evolved over the years and for 2013 these metrics were not calculated
c **Corrected.** Previously stated as 4.4, due to a typographical error.

8.41 On the better energy homes scheme, the base data arises from analysis conducted in 2013 which compared energy use in retrofit recipient homes to a control group. This provided an estimated average saving figure that is applied to all scheme retrofits. In 2018, the SEAI increased the assumed saving from a scheme retrofit by 47%. The SEAI stated that the increase in assumed savings arises from the deeper retrofit measures being undertaken. However, it has not updated the 2013 analysis nor has it documented how it verified the accuracy of the uprating of 47%.

Availability of actual energy consumption data

8.42 In July 2023, the EU issued an energy efficiency directive that allows a number of methods for calculating energy savings including

- metered savings — recording the actual reduction in energy use in buildings
- scaled savings — use of engineering estimates carried out by independent experts on the basis of nationally-established methodologies and benchmarks.

8.43 Actual data relating to residential electricity and gas consumption in Ireland is collected by utility providers as a matter of course. However, due to data protection obligations, detailed metered electricity consumption for household recipients of SEAI grant schemes has not been made available to the SEAI.

8.44 However, the SEAI noted that the Commission for Regulation of Utilities (CRU) is currently developing a smart meter data access code which will facilitate the transfer of domestic electricity consumption to them, under certain conditions with the consent of the electricity account holder.

8.45 The SEAI also noted they are in discussions with Gas Networks Ireland to establish a data sharing agreement, for a limited sample of 200 dwellings, and are discussing other data sharing agreements with CSO and Electricity Supply Board (ESB) respectively.

Assessing effectiveness against targets

8.46 Ireland's overall climate target is to achieve a 51% reduction in greenhouse gas emissions by 2030. However, given current trends, this is unlikely to be achieved. In a report published in June 2023, the Environmental Protection Agency (EPA) projects that, based on current rates of progress, a reduction of only 29% in greenhouse gas emissions will be achieved by 2030.[1]

8.47 The Department stated that sufficient data is not yet available to allow all actions in the climate action plan 2023 to be modelled and that, if these are factored into the EPA's calculations, the projected emissions reduction by 2030 would be 42%. The 2023 annual review of the Climate Change Advisory Council notes that in the scenario that the climate action plan 2023 is fully implemented, the residential built sector is projected to stay within its second sectoral ceiling.

8.48 In that context, it is vital to ensure that spending on greenhouse gas reduction is as effective as possible. This requires available resources to be directed to the activities and interventions that deliver the maximum reductions for every euro that is spent, and regular and timely reporting on what is being achieved relative to targets.

8.49 The key measure of emissions is $MtCO_2eq$ i.e. million tonnes of carbon dioxide equivalent. As a benchmark, greenhouse gas emissions from the Irish residential sector in 2018 was an estimated 7 $MtCO_2eq$. The target is for this to fall to not more than 4 $MtCO_2eq$ by 2030 (which is the final year of the second sectoral emission ceiling) — a target 40% reduction.[2] The June 2023 EPA report notes that with full implementation of the climate action plan 2023, emissions in the residential sector are projected to fall to 3.7 $MtCO_2eq$ by 2030 which will meet the target.

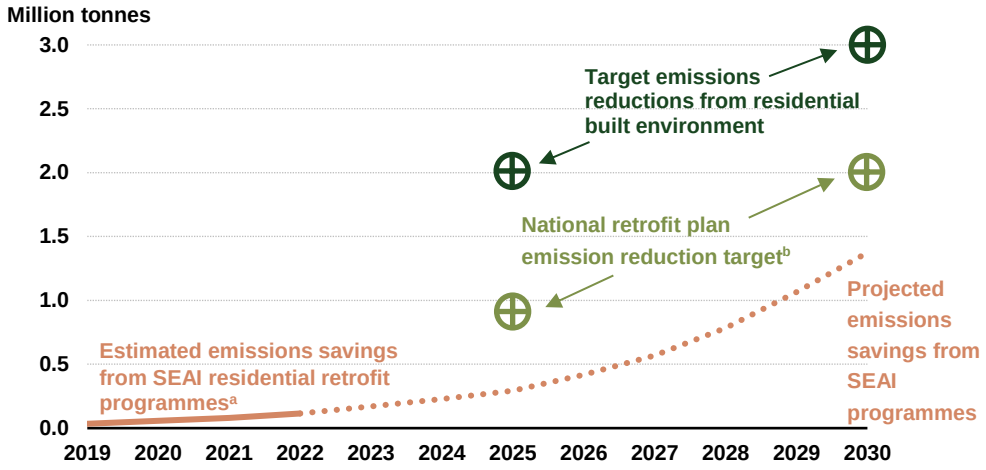
1 *Ireland's Greenhouse Gas Emissions Projections 2022 – 2040*, Environmental Protection Agency (2023).

2 Table 3.2, climate action plan 2023.

8.50 The SEAI stated that on an annual basis climate action plans are developed to define pathways to achieving the sectoral emissions ceilings targets and that the actions set out in the annual climate action plan reflect the challenging and evolving nature of the journey to decarbonisation. Each year actions are formulated and/or adjusted in response to outcomes to date, building capacity, new and emerging policy initiatives and consumer sentiments and behaviours.

8.51 Figure 8.9 outlines the 2030 national target and the national retrofit target, and the SEAI's projected emissions reductions from all SEAI residential schemes to 2030. This indicates that spending in recent years on SEAI residential schemes has so far contributed very modestly to the required emissions reduction, and will deliver less than half of the overall residential target reduction of at least 3 $MtCO_2eq$ by 2030. The Department and the SEAI have noted that other measures are also expected to contribute to reductions in emissions in the residential built environment, including district heating schemes and changes in consumer behaviour.

Figure 8.9 Target reduction in emissions in residential built environment sector and contributions made by SEAI residential/community retrofit programmes, 2019 to 2030



Source: Target emissions reductions from residential built environment – sectoral emissions ceilings September 2022; National retrofit plan emission reduction targets – climate action plan 2023 Table 14.5; Projected emissions savings from SEAI programmes – SEAI. Analysis by the Office of the Comptroller and Auditor General.

Notes:
a Details of how estimates are calculated in relation to the better energy warmer homes and better energy homes schemes is outlined in Annex 8A. The other main residential retrofit programmes include One Stop Shops and the Solar PV Scheme.

b The Department noted that both direct and indirect measures will contribute towards this target.

Retrofitting output target

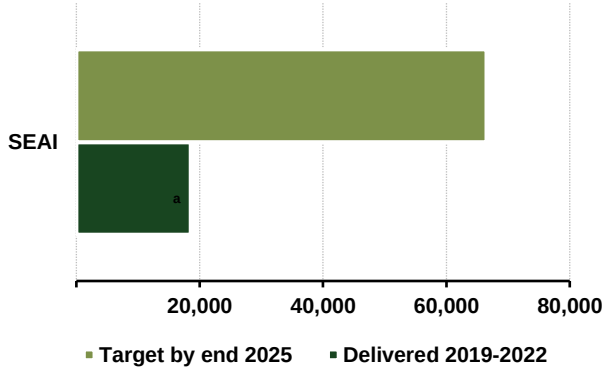
8.52 The national retrofit plan includes a target of retrofitting the equivalent of 500,000 dwellings to BER B2 or cost optimal equivalent by 2030. An interim target is to retrofit the equivalent of 120,000 dwellings to B2 or cost optimal equivalent by the end of 2025. The aim is that this will be achieved through

- retrofits of 83,000 homes to B2 or cost optimal equivalent, and[1]
- retrofits of a further 102,000 homes to bring them to BER ratings of B3 or lower, to yield energy savings equivalent to retrofitting 37,000 homes to a level of B2 or cost optimal level.

1 66,500 of this is to be delivered by the SEAI by 2025.

8.53 As of end 2022, the SEAI had delivered 28% of its B2 or cost optimal target (see Figure 8.10). Achievement of the remainder of almost 48,000 upgrades by the SEAI will require a very significant increase in activity level.

Figure 8.10 2025 target and actual by end 2022 retrofitting of homes to BER B2



Source: National retrofit plan, Department of Environment, Climate and Communications and SEAI. Analysis by the Office of the Comptroller and Auditor General.

8.54 The SEAI publishes quarterly reports on its progress on delivering on the national retrofit plan. In its March 2023 report, it notes that achieving the targets will require a significant increase in delivery. The Department stated that the approach to achieving the retrofit targets is set out in the national retrofit plan and that the growth in the number of upgrades seen in 2022 has continued into 2023.

8.55 The Department of the Taoiseach regularly publishes progress reports on the climate action plan. The latest report published in July 2023, notes that for the KPI of 500,000 B2 retrofits by 2030, 28,661 was achieved, representing only 6% of the target.[1]

Local Authorities

8.56 While the SEAI has been designated as the national retrofit delivery body, the target to retrofit homes to BER B2 or cost optimal equivalent is not the sole responsibility of the SEAI. The national retrofit plan states that 36,500 local authority homes will be retrofitted to B2 or cost optimal equivalent by 2030.[2]

8.57 The Department of Housing, Local Government and Heritage has noted that, since 2013, local authorities have upgraded 75,000 dwellings with shallow retrofits. All local authority upgrades prior to 2021 were shallow retrofits, and therefore did not reach B2 or cost optimal equivalent standard. In 2021 and 2022, local authorities delivered 3,321 retrofits to the B2 or cost optimal equivalent standard. This represents just over 9% of the total retrofits of social housing units required by 2030 under the climate action plan.

SEAI scheme key performance indicators

8.58 A service level plan is one of the mechanisms used to ensure that there is clarity between a funding department and a funded agency on what is to be achieved and what budget is being made available for that purpose.

1 An amendment was made to the originally published report to note that the 6% of the target achieved does not include the impact of non-B2 retrofits.

2 The Department of Housing, Local Government and Heritage provides funding to local authorities to improve the energy efficiency of their housing stock through the energy efficiency retrofit programme.

8.59 The Department and the SEAI agree an annual service plan. The plan submitted to the Department by the SEAI in February 2022 was the first to set detailed, scheme-specific KPI targets (see Figure 8.11). Higher-level — i.e. less detailed — output targets are set in the annual estimates for the Vote.

Figure 8.11 KPIs for SEAI retrofit schemes, 2022

Better energy warmer homes		
Measures	**Target**	**Outturn**
Number of homes retrofitted to BER B3 or less	4,500	4,118[a]
Number of homes retrofitted to BER B2	300	146
Emission reduction ($ktCO_2eq$)	3.7	**4.7**
Energy saving (GWh)	14.7	**18.7**
Better energy homes		
Measures		
Number of homes retrofitted to BER B3 or less	9,570	9,457
Number of homes retrofitted to BER B2	2,580	2,349
Emission reduction ($ktCO_2eq$)	17.1	16.0
Energy saving (GWh)	68.0	63.8

Source: Service level plan 2022 and SEAI. Analysis by the Office of the Comptroller and Auditor General.
Note: a **Corrected.** Previous figure was the total number of upgrades in the year (4,264).

8.60 Comparison of the reported values for the two schemes indicate that performance was close to, or better than, the target values. Five of the eight metrics were within 90% of the targets, and two targets were exceeded. For the target KPIs that were met (on the better energy warmer homes scheme), the outturn was calculated using the 2017 report on engineering estimates of savings.

8.61 The targets set in 2022 for both schemes envisage that the majority of retrofitted homes would be brought to a BER level of B3 or less — 94% for retrofits under the better energy warmer homes, and 79% for the better energy homes scheme. The Department has stated that this reflects the fact that neither scheme has a requirement for the delivery of B2 upgrades.

Monitoring KPIs and evaluation of effectiveness

8.62 The scheme KPIs are monitored on a monthly basis through meetings between the Department and the SEAI. The SEAI provides the Department with reports showing the targets and outputs. Factors expected to impact the performance of the schemes were also included in the monthly reports submitted and were discussed at the monthly meetings. In a number of cases, actions were taken to deal with the issues. The examination team reviewed the minutes and while one reference was made in relation to an update on targets, there was no detail recorded of actual progress on annual targets. The Department stated that the minutes of the meeting should be read in conjunction with the detailed SEAI reports which set out progress against targets. In addition, no documentation was provided which outlines procedures, steps to be taken or what the consequences of missing targets are, if any.

8.63 The Department did however provide evidence of a range of challenges that were identified as part of this process and the steps taken to address them.

8.64 The SEAI stated that assessing the effectiveness of expenditure may initially achieve more emissions savings per euro spent, but focusing solely on this would ultimately not achieve the long-term climate targets of net zero by 2050. It noted evidence from reports such as the *National Heat Study*, the *Energy in Ireland* report and the analysis provided to support the climate action plan 2023 which suggest that all measures are required in order to achieve the long-term target (which is net zero emissions) rather than focusing only on the short-term.[1]

8.65 The Department stated that it monitors the effectiveness of expenditure on the schemes on an ongoing basis through the monthly performance reports and meetings. The Department also noted that two external reviews were undertaken by the Irish Government Economic and Evaluation Service in the Department of Public Expenditure, National Development Plan Delivery and Reform

- Social impact assessment – SEAI programmes targeting energy poverty.
- Grant schemes for energy efficiency: Better energy homes and better energy communities.

8.66 Furthermore, the Department stated that retrofitting homes and installing heat pumps were determined to be among the most cost effective measures to reduce emissions and more generally a range of measures are monitored that allows the Department to assess effectiveness.

Limitations of available data

8.67 The examination noted a number of limitations to the data captured and provided by the SEAI which meant that certain types of analysis to quantify the impact of different retrofit measures on the reduction in energy consumption, emissions and potential cost savings could not be undertaken.

8.68 While details of specifications and costs per measure is provided to the SEAI during the grant application process for both schemes, it is not captured on their internal database. In addition, no information is captured on the impact or quality of the measures. For example, dry lining wall insulation can have varying thicknesses which impacts on the heat loss from a house. Recording the thickness of the insulation (20mm, 100mm, etc.) would allow for better analysis on the potential energy savings and emissions reductions associated with the financial support provided.

1 The *National Heat Study* is available here and the *Energy in Ireland* report is available here.

Conclusions and recommendations

8.69 The development of sectoral emissions ceilings and the introduction of carbon budgets were provided for in the Climate Action and Low Carbon Development (Amendment) Act 2021. Ireland is committed to a legally-binding target of reducing greenhouse gas emissions by 51% (from a 2018 baseline) by 2030. This will necessitate reductions in each sector of the economy, including the residential sector. A target of reducing greenhouse gas emissions from the residential sector by 40% by 2030 has been set, notwithstanding the increase in the number of dwellings expected to occur over the same period. This target is to be achieved by a wide range of actions and interventions, including enforcement of high energy efficiency standards for new residential units, and retrofitting of existing housing stock.

Measuring the energy efficiency of residential property

8.70 The BER system provides a useful measure of the energy efficiency of individual buildings, although it does not measure actual energy consumed. It potentially provides a relevant and reliable measure of the energy efficiency of the overall stock of housing, and of how it is changing over time. It also provides a useful measure of the impact of retrofitting interventions on individual properties.

8.71 The current stock of housing is, in general, not energy efficient. At the end of 2022, only 39% of the housing stock had a valid energy efficiency (BER) rating, and of these, fewer than one in five dwellings had BER scores of B2 or above.

Funding for energy efficiency upgrades

8.72 In the ten-year period to the end of 2022, the Department of the Environment, Climate and Communications (the Department) has provided funding of around €1.2 billion for sustainable energy programmes. The majority of this funding — €1.1 billion — was provided to the SEAI for its programmes.

8.73 Up to end 2022, expenditure on two schemes — the better energy warmer homes scheme, and the better energy homes scheme — totalled €538 million, or almost half of the SEAI's expenditure on sustainable energy programmes in the period reviewed. This was utilised mainly for 'shallow' retrofitting work that had a limited impact on the energy efficiency of the properties in question.

8.74 The better energy warmer homes scheme supports the upgrade of the energy efficiency of homes for those experiencing energy poverty. Improvement works approved under the scheme are fully grant funded. Grants on energy efficiency works totalled €306 million between 2013 and 2022 in respect of 55,000 cases.

8.75 The better energy homes scheme provides fixed value grants to homeowners to incentivise them to increase the energy efficiency of their homes. In the period 2013 – 2022 approximately 130,000 grants with a value of €176 million were issued.

8.76 Significant steps have been taken to deepen the level of retrofitting interventions undertaken in grant-funded cases, so as to achieve greater energy efficiency impacts. This has contributed to a significant increase in the average level of expenditure per case.

Scheme inspections

8.77 As a quality control measure, a requirement of the retrofit schemes is that the works supported financially must be carried out by an SEAI procured contractor for the better energy warmer homes scheme and a registered contractor for the better energy homes scheme.

8.78 Inspections of retrofits carried out by contractors under the schemes are conducted by the SEAI. Year on year, the inspection rate fluctuated — between 29% and 49% of funded cases on the better energy warmer homes scheme, and between 15% and 26% on the better energy homes scheme. In general, cases for inspection were selected on a targeted basis e.g. based on risk factors.

8.79 The better energy warmer homes scheme uses contractors whose services are procured by the SEAI. In 2022, 41%[1] of the cases funded were inspected, and the work was found to be satisfactory in 45% of the cases examined. Following rectification, almost all cases were found to have been resolved.

8.80 On the better energy homes scheme, where the majority of the costs are borne by homeowners, a similarly high proportion of dwellings do not pass the inspection. Based on an inspection rate of 18% of cases in 2022, the pass rate was just 54%. Following rectification works, the pass rate increased to 95% (to date) with not all reworks yet completed.

8.81 The pattern of failure of retrofitting works inspected suggests that a higher rate of inspection may be required for these schemes, and especially for the better energy homes scheme. Grant cases not inspected may also be at risk of non-compliant work, which homeowners — and even BER assessors — may not be able to identify.

Recommendation 8.1

The SEAI should review its inspection practice. In addition to the existing risk-based selection of cases for inspection, a programme of inspection of randomly selected cases should be considered. A programme of structured feedback of lessons learned from inspections should be developed, to better inform contractors, BER assessors and homeowners on the quality of works required, and when re-work should be required.

Response of the Accounting Officer (SEAI)

Agreed. SEAI accepts the recommendation to increase random sampling. SEAI will review its inspection practices as schemes grow in depth and scope. SEAI has also recently set up a new quality management function. This will facilitate more structured feedback to contractors and continuous improvement.

Timeline for implementation

2023-2024

Scheme effectiveness

8.82 As well as helping those at risk of energy poverty, the intended outputs of both residential retrofitting schemes are reduced emissions of greenhouse gases and energy consumption savings. These form part of the SEAI's performance management and reporting system. This approach aligns with the options allowable under the Energy Efficiency Directive.

1 **Corrected figure.** Inspection rate previously referenced was 39%. See Figure 8.7.

8.83 Currently, estimates of the outcomes are calculated using assumptions that are based on aged data sources which have not been updated since first introduced — for the better energy homes scheme, this was ten years ago and for the better energy warmer homes it was six years ago. While the assumptions may continue to be valid, the lack of periodic testing of their basis casts doubt over the reliability of the output estimates.

Recommendation 8.2

The Department and the SEAI should periodically (at least every three years) formally review the estimation techniques and data bases they use to calculate the energy consumption savings and emissions reductions attributable to the home retrofitting schemes.

Response of the Accounting Officer (SEAI)

Agreed. SEAI accepts this recommendation and will implement a formal review process of estimation techniques and data bases used to calculate the energy consumption savings and emissions reductions attributable to the home retrofitting schemes.

Response of the Accounting Officer (Department)

Agreed. The Department accepts this recommendation and will work with the SEAI in this regard.

Timeline for implementation

2024 and will follow three yearly cycles from that point onwards.

8.84 The actual reduction in energy consumption can be established using data showing annual energy consumption before and after a retrofit has taken place. This data is available to energy suppliers but is not currently available to the SEAI. Such data would facilitate an update of estimates used and confirm assumptions.

Recommendation 8.3

The Department and the SEAI should continue to explore opportunities for access to and use of actual energy consumption data at individual property level, to inform its measurement of the impact of retrofitting of homes.

Response of the Accounting Officer (SEAI)

Agreed. SEAI accepts this recommendation and will continue to explore all opportunities for access to and use of actual energy consumption data.

Response of the Accounting Officer (Department)

Agreed. DECC accepts the need to continue to explore opportunities for access to and use of actual energy consumption data.

Timeline for implementation

Ongoing.

Assessing effectiveness against targets

8.85 The Department and the SEAI implemented a service level plan in 2022 that was prepared on the basis of targets and budgets — essentially an agreed business plan for the SEAI. The 2022 plan is the first to incorporate detailed performance indicators that allow a deeper assessment of performance for all schemes.

8.86 For both residential retrofitting schemes examined for this report, actual performance against targets was reviewed for 2022. Five of the eight measures were within 90% of the target, and two targets were exceeded. For the two achieved targets, the outturn figures reported are estimates based on assumptions and modelling, rather than on measured values.

8.87 The level of progress in achieving B2 ratings from homes that receive grants for retrofits under the schemes considered in this review is limited. The Department stated the schemes considered do not specifically target B2 upgrades and that the reduction of emissions is not the sole objective of the schemes.

8.88 The SEAI has a target of supporting the retrofitting of 66,500 properties to achieve a BER of B2 by end 2025. It had achieved just over a quarter of the target level by end 2022. At that rate, it is not clear how or if the SEAI will deliver the balance of the targeted retrofits in the three years 2023-2025.

8.89 Progress reports on the climate action plan 2023 published by the Department of the Taoiseach report progress against 2030 targets, with only 6% of the 2030 B2 target being achieved as at July 2023. (This does not include the impact in terms of energy savings of non-B2 retrofits.)

8.90 Since 2022, detailed KPIs are agreed by the Department and the SEAI and are included as part of the SEAI's service level plan. The Department stated that these targets are reviewed monthly as part of progress meetings between the two bodies. The SEAI supplies monthly reports for these meetings and factors expected to impact the performance of the schemes are included in the monthly reports.

8.91 Factors that would affect progress towards meeting targets were noted in both the monthly reports and in the minutes, along with steps taken to address these issues. The minutes make one reference to an update on targets, but there was no detail recorded of actual progress on annual targets. In addition, no documentation was provided which outlines procedures, steps to be taken or what the consequences of missing targets are, if any. The Department did however note that challenges to the achievement of targets were discussed on a monthly basis with SEAI.

Annex 8A Calculation of scheme outcomes

Better energy warmer homes scheme 2022 calculations

Energy savings are based on engineering estimates of savings for 2017 scheme data carried out by consultants on behalf of the SEAI. Measures carried out were categorised as being either shallow or deep. Shallow measures included attic insulation only, cavity wall insulation only and attic and cavity wall, while deep measures included heating upgrades and insulation.

CO_2 savings are based on the total energy savings from homes in the scheme multiplied by the emission factor. An emission factor is a coefficient that describes the rate at which a given activity/fuel releases greenhouse gases. The CO_2 factor (weighted) was updated in March 2021 and is based on the 2020 national energy projections.

When calculating the SEAI spend per lifetime, the SEAI have assumed a 25-year lifetime for residential measures.

Average energy savings per home

% of homes with shallow measures: **35**%[a] x savings per home with shallow measures: **3,867** kWh = **1,353** kWh

plus

% of homes with deep measures: **65**%[a] x savings per home with deep measures: **11,400** kWh = **7,410** kWh

= total **8,763** kWh (1,353 + 7,410) x comfort factor (**50**%) = **4,382** kWh

Estimated energy savings[b]

Number of homes upgraded: **4,264** x average energy savings per home (kWh): **4,382** = 18,684,848 / 1,000,000 (to bring to Gigawatt-hours) = **18.684** GWh

Estimated CO_2 savings[b]

Estimated energy savings: **18.684** GWh (see above) x **0.251**: CO_2 emission factor weighted = **4.6896**kt

Estimated SEAI spend (lifetime) per tonne CO_2 saved[b]

SEAI scheme spend 2022: **€92.7m** (excluding administrative costs) / **117,240** [**4.6896** (estimated CO_2 savings) x **25** (estimated lifespan of works) x 1,000 (converting kilotonne to tonne)] = **€791**

Estimated SEAI spend in year per GWh saved[b]

SEAI scheme spend 2022: **€92.7m** (excluding administrative costs) / **18.684** GWh (see above) = **€4.96 million**

Source: SEAI. Analysis by the Office of the Comptroller and Auditor General.

Notes:
a The 35% and the 65% split relate to 2022 only i.e. the number of homes that were deemed to have shallow and deep measures respectively which varies year on year.
b Figure 8.8 includes rounded figures, these figures have been unrounded for calculation purposes.

Better energy homes scheme 2022 calculations

The savings in the below calculation were based on an ex-post billing analysis conducted in 2013 which compared energy use in retrofit recipient homes to a control group. The savings from this analysis was 3,664 kWh per home with the SEAI now assuming savings of 5,400 kWh (47% uplift) per home to reflect deeper measures.

Estimated energy savings

Number of homes upgraded: **11,806** x average energy savings per home (kWh): **5,400** = 63,752,400/1,000,000 (to bring to Gigawatt-hours) = **63.8** GWh

Estimated CO_2 savings

Estimated energy savings: **63.8** GWh (see above) x **0.251:** CO_2 emissions factor weighted = **16**kt

Estimated SEAI spend (lifetime) per tonne CO_2 saved

SEAI scheme spend 2022: **€36.1m**[a] (excluding administrative costs) / **400,000** [**16** kt (estimated CO_2 savings) x **25** (estimated lifespan of works) x 1,000 (converting kilotonne to tonne)] = **€90.25**

Estimated SEAI spend in year per GWh saved

SEAI scheme spend 2022: **€36.1m**[a] (excluding administrative costs) / **63.8** GWh (see above) = **€0.565m**

Source: SEAI. Analysis by the Office of the Comptroller and Auditor General.

Note: a The above calculation includes SEAI expenditure only and does not include the expenditure of the homeowner.