

SEAI Programme Impact Report 2024

Measuring our impacts on the Irish energy transition



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Report prepared for SEAI by:

Energy Policy & Programme Evaluation Unit

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Sustainable Energy Authority of Ireland

SEAI is Ireland's national energy authority investing in, and delivering, appropriate, effective and sustainable solutions to help Ireland's transition to a clean energy future. We work with the public, businesses, communities and the Government to achieve this, through expertise, funding, educational programmes, policy advice, research and the development of new technologies.

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Executive summary

Each year, SEAI reports its annual output and impacts in an outturn table, provided to its parent department, the Department of Climate, Energy and the Environment. The outturn table indicates the exchequer spend and private spend supporting measures taken during the year, along with estimated new annual energy savings, grid electricity savings displaced, carbon dioxide equivalent savings and other impact metrics. The SEAI Programme Impact Report 2024 summarises the 2024 outturn table and provides context, commentary, and conclusions to guide future work to bring about Ireland's energy transition.



Among key findings from the 2024 Programme Impact Report are the following:

Overall findings

- Programmes delivered by SEAI on behalf of government achieved significant impact in 2024, where they financed energy efficiency and decarbonisation activities with over €540 million in supports, which leveraged private spending of over €650 million.
- The combined effect of supported activities led to estimated new annual final energy savings of approximately 434 GWh, roughly equivalent to the total annual energy consumption of 25,000 homes. They also led to new annual grid electricity displaced of over 150 GWh. Combined, these reduce carbon emissions by approximately 150 ktCO₂ annually.
- At average 2023 prices, these savings reduced the energy bills of householders and businesses by approximately €110 million in 2024 alone.
- We estimate that SEAI programmes supported nearly 14,500 jobs in the sustainable energy and related sectors during 2024, supporting growth in the wider economy and leading to greater tax receipts.
- While programmes administered by SEAI comprise only part of the strategies in Ireland's Climate Action Plan, all indications from this evidence, along with the SEAI projections report, suggest that significant gaps remain to the interim 2025 targets in the Climate Action Plan; and to meet the final 2030 targets, an unprecedented step-change will be required, combining both existing and new policies to vastly accelerate the energy transition.

Residential sector

- Household energy bills were reduced by approximately €72 million in 2024, on top of additional comfort and health benefits, as the indoor environment of homes is improved.
- Over 8,000 low-income homes were upgraded by SEAI programmes in 2024.
- Solar photovoltaics, particularly in the residential sector, saw very strong uptake during 2024, at a pace which makes it reasonable to expect the Climate Action Plan target of 1.6 GW installed micro-generation capacity by will be achieved by 2030.
- The rate of uptake of heat pumps in 2024 is far below that required to meet the 2025 target for heat pump retrofits.
- The 2030 targets both for B2/cost optimal or carbon equivalent upgrades and for heat pump upgrades will require an unprecedented acceleration in uptake beyond 2024 levels.
- Based on the heat pump uptake observed to this point, either a significant change in policy approach is required to achieve the necessary level of heat pump adoption by 2030, or a broader mix of measures in addition to heat pumps will be required to achieve the required level of carbon abatement.

Business sector

- SEAI supported almost 1,000 energy efficiency and renewable projects for businesses in 2024, reducing their energy demand by 96.4 GWh, displacing 29.6 GWh of grid electricity, and reducing CO₂ emissions by 26.2 ktCO₂.
- For the estimated business investment spend of just under €70M, combined with government spend of €14.6M, we estimate that the energy savings achieved by 2024 programme activity will save Irish businesses over €20M in annual energy costs.
- The impact of recent expansion and redesign of schemes, including the Support Scheme for Renewable Heat, the Non-Domestic Micro-Generation scheme, and the Excellence in Energy Efficient Design (EXEED) programme will become evident in future years. However, it is clear that ongoing policy development is needed to avoid exceeding the relevant sectoral emissions ceilings.

Public sector

- Working in tandem, the public sector energy efficiency programme and the Pathfinders projects are estimated to have achieved up to 92.5 GWh in new annual energy savings.
- This reduced the public sector energy bill by up to €11.6M.
- We estimate that Pathfinder projects supported over 800 jobs during 2024.

Electric vehicles

- Uptake of electric vehicle (EV) grants, as well as charger grants, was lower in 2024 than the previous year, in line with a global trend of reduced EV demand. SEAI capital expenditure on these grants was also lower than 2023, due to both the reduced 2024 demand, and the grant amounts having been reduced in mid-2023 for EVs, and at the start of 2024 for EV chargers.
- Battery electric vehicle (BEV) grants, together with un-aided streams such as Plug-in Hybrid Electric Vehicle (PHEV) sales, high-end BEV sales, and imports of second-hand EVs, are on-track to meet the Climate Action Plan target for 2025 for passenger electric vehicles, although a substantial increase above 2024 volume will be required to meet the 2030 target.
- BEV grants for commercial vehicles, combined with unsupported PHEV commercial sales and second-hand imports, have not yet reached a significant volume as is required to meet the 2025 target for commercial electric vehicles.

This report provides further detailed metrics for SEAI programmes. SEAI's Energy Policy and Programme Evaluation team work to refine the impact estimates over the course of the year. These impact estimates inform SEAI's annual National Energy Projections, which in turn feed the EPA National Emissions Projections releases. Further detail on the achievement towards sustainable energy targets is provided separately by SEAI in several related releases over the course of the year.

1. Introduction

SEAI is the expert authority on energy usage in Ireland, using robust, objective data and an evidence-based approach to help inform policy development and behaviours. This includes generation of comprehensive data on the impacts of programmes that SEAI delivers on behalf of Government, as part of its mission to shift Ireland away from fossil fuels. In doing so, a broad range of benefits will come from a society based on sustainable energy. In addition to reduced greenhouse gas emissions, we will see warmer and healthier homes, enhanced energy affordability, increased asset values, more competitive businesses, new and more jobs, reduced energy imports, enhanced security of energy supply and reductions in public spending including reduced compliance costs.

Each year, SEAI provides its parent department, the Department of Climate, Energy and the Environment, with data for SEAI programme spend and estimates of the impact of that spend. These impacts are used by the Department to report to central Government via the Revised Estimates Volume (REV) process and are published through various SEAI channels. An initial estimate of impact is made at the time of budget setting (budgeted outturn estimates), and subsequently on actual annual expenditure (outturn impacts). They are also used to track progress against various Government climate and energy obligations, as variously defined in the Climate Actions and Low Carbon Development Act, the Government's Climate Action Plans, and EU directives and regulations. The outputs further serve as inputs to SEAI's National Energy Modelling Framework and National Energy Projections outputs.

This new publication presents the SEAI outturn tables along with the background, context, and interpretation of the table's contents, to support a broader understanding of the impacts and progress SEAI is making in contributing to transforming Ireland's energy systems. Note that in this report we omit a number of programmes from the reporting scope, such as the Research, Development, and Demonstration funding programme, the Ocean Energy programme, and the Energy Efficiency Obligation Scheme.

Estimating programme outcomes

The impacts of a programme—whether it provides grant support for energy efficiency measures, mobilises communities to take part in the energy transition, or provides information on renewable energy generation—can be illustrated within a *programme logic model*¹. Put simply, the programme logic model illustrates how the inputs provided to a programme are intended to lead to fulfilling the programme's objectives, including the intervening steps of activities, outputs, outcomes, and impacts. The outturn from SEAI programmes comprises metrics across a variety of the programme logic elements. Figure 1 illustrates the components of the programme logic model, along with examples of programme metrics associated with each component, drawn from SEAI programmes.



Figure 1: An illustrative programme logic model for SEAI programmes with data examples

¹ See W.K. Kellogg Foundation 2004, *W.K. Kellogg Foundation Logic Model Development Guide* for comprehensive guidance on the use of programme logic models. Available at Logic Model Development Guide.

Table 1. Overview of SEAI programme outturn for 2024

Programme	SEAI capital spend, €M	Estimated private spend, €M	Estimated new annual energy savings, GWh	Estimated new annual grid electricity displaced, GWh	Estimated new annual carbon savings, ktCO ₂	Value of energy savings, €M	Jobs supported (gross estimate)
Better Energy Warmer Homes	229.7	-	36.0	_	9.5	4.8	3,470
Community Energy Grants – Domestic	14.7	21.4	8.2	_	2.2	1.1	550
Community Energy Grants – Non-Domestic	26.5	38.5	68.6	-	18.1	9.2	980
National Retrofit Scheme (One-Stop Shop)	32.1	39.3	17.7	_	4.7	2.4	1,080
Better Energy Homes	48.5	59.3	84.6	-	22.3	11.4	1,630
Micro-generation Support Scheme	64.2	256.8	-	123.0	31.3	43.5	4,850
Large Industry Energy Network	-	-	93.4	-	19.4	11.2	-
Non-Domestic Micro-generation Scheme	9.2	44.7	-	29.6	7.5	5.7	680
Excellence in Energy Efficient Design (EXEED)	1.8	21.2	78.4	-	3.7	14.8	290
Support Scheme for Renewable Heat – Operational Aid for Biomass/Biogas	1.4	-	-	-	11.1	-	20
Support Scheme for Renewable Heat – Installation Grant	2.1	4.0	18.0	-	3.9	0.1	80
Public Sector Energy Efficiency	-	-	45.5	_	11.4	6.5	-
Public Sector Pathfinders	61.7	-	92.5	-	23.1	11.6	860
Electric vehicle purchase grant	44.2	144.8	29.6	_	14.8	5.3	-
Electric vehicle home charger grant	6.8	27.0	-	-	-	-	-
Electric vehicle apartment charger grant	0.97	0.22	-	_	-	-	-
Totals over SEAI programmes listed (excl. savings for Large Industry Energy Network, Public Sector Energy Efficiency, and Electric Vehicle charger grants)	543.9	657.2	433.6	152.6	152.0	109.9	14,490

2. SEAI 2024 outturn by sector

Residential sector programmes

Inputs

The outturn for residential sector programmes is summarised in Table 2. In 2024, a total of €416 million of SEAI capital spend provided the grant funding required to upgrade nearly 54,000 homes across all residential schemes, as well as other buildings as part of Community Energy Grants scheme.

As a 100% grant-funded programme, the <u>Warmer Homes Scheme</u> represented both the largest overall cost and cost per home upgraded. However, the programme specifically targets homes categorised as most vulnerable in their ability to make the energy transition. As part of a just transition, facilitating upgrades in this category is essential to ensure that they are not left behind. And as discussed in the *Wider Impacts* section below, this category derives substantial benefits from home energy upgrades beyond simply energy savings.

In 2024, the <u>Micro-generation Support Scheme</u> leveraged nearly €257 million in private spending due to sustained high demand. The National Retrofit Scheme saw the highest private spend per home, covering approximately 50% of the retrofit costs. This scheme typically requires significant efficiency improvements and the installation of renewable heating systems to qualify for funding.

Energy and emissions impacts

SEAI's residential programmes saved an estimated 215 GWh in 2024, an increase of 15% over 2023 when 187 GWh new annual savings were produced. <u>Better Energy Homes</u> contributed the largest share (40%) to these savings. The Warmer Homes Scheme made the most significant advancement in terms of homes completed, with a 31% increase on 2023 activity levels. The <u>National Retrofit Scheme (One Stop Shop)</u> had a slight increase in retrofitted homes (+10%) in 2024, having more than doubled the number of completions the previous year.

The Microgeneration Support Scheme delivered 31.3 ktCO₂ of savings by displacing an estimated 123 GWh of grid electricity through the placement of rooftop solar PV on homes in 2024. A combination of larger systems sizes and continued growth in the number of homes installing solar PV systems led to a 50% year-on-year increase in the calculated total carbon savings resulting from the programme. It should be noted that residential solar PV systems are primarily used to power appliances, lighting, and other electrical needs. They do not significantly contribute to decarbonising residential heat demand, which remains the most pressing challenge for reducing emissions in the residential sector. In this context, the contrast between the number of SEAI-supported solar PV installations and heat pumps (28,424 vs. 3,600) is noteworthy. Furthermore, as the national electricity grid continues to decarbonise, the emissions abatement contribution per unit of solar PV capacity will gradually diminish over time.

Wider impacts

Of the total number of homes retrofitted in 2024 (53,984), SEAI's residential programmes retrofitted 8,351 lowincome homes in 2024, with the overwhelming majority of these carried out under the Warmer Homes Scheme. All homes that qualify for the WHS programme are classified as low-income and qualify for social welfare payments, making them eligible for the scheme. All Approved Housing Body (AHB) homes that participate in the One Stop Shop and Community Energy Grant programmes are considered low-income. The number of these homes retrofitted through support from SEAI has increased by an average of 43% each year since 2020. A gradually increasing share of these upgrades are deep retrofits (72% in 2024) reflecting the installation of more extensive energy efficiency measures since 2020.

Grant-funded retrofit programmes support jobs by fostering long-term employment, supporting small businesses, developing supply chains, and boosting local economies. It is estimated that SEAI's residential programmes supported 12,560 direct and indirect jobs in 2024.

Table 2. SEAI programme outturn for 2024: Residential Sector Programmes

Metric	Better Energy Warmer Homes	Community Energy Grant (Domestic)	Community Energy Grant (Non- Domestic)*	National Retrofit Scheme (One-Stop Shop)	Better Energy Homes	Micro- generation Support Scheme	Total for residential sector programmes
Total number of homes upgraded	7,743	683	-	1,474	15,660	28,424	53,984
SEAI capital spend, €M	229.7	14.7	26.5	32.1	48.5	64.2	415.7
Estimated private spend leveraged, €M	-	21.4	38.5	39.3	59.3	256.8	415.3
Leverage factor (private € spend leveraged per € SEAI spend)	-	1.45	1.45	1.22	1.22	4.00	-
Total spend, €M	229.7	36.1	65.0	71.4	107.9	321.0	831.0
Estimated new annual final energy savings, GWh	36.0	8.2	68.6	17.7	84.6	_	215.1
Estimated grid new annual electricity displaced, GWh	-	-	-	-	-	123.0	123.0
Value of energy savings or generated solar (in- year), €M	4.8	1.1	9.2	2.4	11.4	43.5	72.4
Estimated new annual carbon savings, ktCO ₂	9.5	2.2	18.1	4.7	22.3	31.3	87.9
Heat pumps installed	49	650	-	1,359	1,542	-	3,600
SEAI capital spend per new annual energy saved, €/kWh	6.4	1.8	0.4	1.8	0.6	-	-
Jobs supported (gross estimate)	3,470	550	980	1,080	1,630	4,850	12,560
Number of homes upgraded that are low- income	7,743	63	-	545	0	0	8,351
Number of homes upgraded to B2	332	683	-	1,437	3,237	16,148	21,837
Total capital spend per new annual energy saved, €/kWh	6.4	4.4	0.9	4.0	1.3	-	-

* Includes only fully completed CEG projects in 2024. The methodology for CEGs is under review for 2025. Please see Appendix 1 Table 6 for assumptions behind impact calculations. SEAI's programmes deliver a wide range of benefits that are not included in this report or the impacts table. Residential energy efficiency and renewable energy programmes offer a range of non-energy benefits that significantly enhance the quality of life for homeowners². These programmes often lead to improved indoor air quality by reducing pollutants and allergens, which can result in better health outcomes and fewer respiratory issues³.

Additionally, energy-efficient homes tend to have better insulation and temperature regulation, providing a more comfortable living environment year-round. These improvements can also increase the overall value of the property, making it more attractive to potential buyers. Technology prices can be driven downwards through increased volume sales, making energy-efficient technologies more accessible to a broader audience. They also contribute to capacity and skills building, as homeowners and professionals alike gain valuable knowledge and expertise in implementing and maintaining energy-efficient solutions. Furthermore, upgrades can foster a sense of community and environmental responsibility, as residents become more aware of their energy consumption and its impact.

These considerations are important when interpreting programme impacts with regards to the cost of energy savings and emissions abatement. For example, fully-funded retrofits (such as those under the Warmer Homes Scheme) result in a relatively high cost per unit of energy saved compared to other programmes. However, it should be noted such programmes also encompass objectives beyond energy and carbon metrics. These impacts, while not analysed here, are crucial and intended.



² International Energy Agency 2019 *Multiple Benefits of Energy Efficiency 2019*. Published March 2019. Available at: <u>Multiple Benefits of Energy Efficiency 2019 – Analysis - IEA</u> (Accessed: 26 March 2025).

³ Milner, J., Hutchinson, E., Hamilton, I., Armstrong, B., and Wilkinson, P. 2024 *Evaluation of the 'Warmth & Wellbeing' Scheme on Health and Wellbeing: Final Report to the Department of the Environment, Climate and Communications, Government of Ireland*. Available at: <u>gov.ie - Warmth and Wellbeing Scheme</u> (Accessed: 26 March 2025).

Business sector programmes

The outturn for business sector programmes are summarised in Table 3. Here, totals given in the right-hand column refer to all programmes, except for the Large Industry Energy Network programme, to avoid double-counting as explained below.

Inputs

A total of €14.5M of SEAI capital spend was utilised by business programmes in 2024. As a peer-to-peer networking programme, <u>Large Industry Energy Network</u> is not associated with capital expenditure costs. The <u>Non-Domestic</u> <u>Microgeneration</u> scheme represented the largest capital spend at €9.2M, delivering 0.04 GW of solar PV peak capacity through 155 businesses.

Metric	Large industry energy network (2023 outturn)	Non- domestic micro- generation scheme	EXEED	Support Scheme for Renewable Heat Operational Aid for Biomass/ Biogas	Support Scheme for Renewable Heat Investment Aid for Heat Pumps	Total for business sector upgrade programmes (excludes Large Industry Energy Network)
# of members	206	-	-	-	-	-
# of upgrades	-	927	49	18	4	998
SEAI capital spend, €M	-	9.2	1.8	1.4	2.1	14.5
Estimated private spend leveraged, €M	-	44.7	21.2	-	4.0	69.9
Leverage factor (private spend leveraged per € SEAI spend)	-	4.86	11.78	-	1.9	-
Total spend, €M	-	53.9	23.1	1.4	6.1	84.5
Estimated new annual final energy savings, GWh	93.4	-	78.4	-	18.0	96.4
Estimated grid new annual electricity displaced, GWh	-	29.6	_	_	-	29.6
Value of energy savings or generated solar (in-year), €M	11.2	5.7	14.8	-	0.1	20.6
Estimated new annual carbon savings, ktCO ₂	19.4	7.5	3.7	11.1	3.9	26.2
Jobs supported (gross estimate)	-	680	290	20	80	1,070
Total capital spend per new annual energy saved, €/kWh	_	-	0.3	-	-	-

Table 3. SEAI programme outturn for 2024: business sector programmes

Please see Appendix 1 Table 7 for notes and assumptions behind impact calculations.

The <u>Support Scheme for Renewable Heat's</u> operational aid for biomass and biogas is based on usable heat output in biomass and biogas heating systems, supporting its operation for up to 15 years. Therefore, the capital expenditure of \in 1.4M associated with this programme does not relate to upfront infrastructure costs, but to the cost of tariff subsidies in 2024. A further \in 69.9M in private funding was leveraged by business programmes. The majority of private funding leveraged was through the Non-Domestic Micro-Generation scheme with \in 44.7M and the <u>Excellence in Energy Efficient Design (EXEED)</u> scheme with \in 21.2M invested by Irish businesses.

A capital expenditure of €3.3M was recorded for the Business Energy Efficiency scheme in 2024. This spend is linked to energy audits provided to small and medium enterprises (SMEs). These audits assess the energy performance of SMEs and indicate a set of actions that can be taken to improve energy efficiency. Energy audit support is an important enabling tool for business and facilitates no-cost measures and energy investments. However, to avoid double-counting, no savings are directly attributed to the energy audit support, as the recommended investments may be supported by:

- SEAI capital grants (i.e., the savings are captured within these grants),
- Energy efficiency obligation schemes (i.e., the savings are captured in EEOS), or
- May be made without state support.

For this reason, direct impacts for Business Energy Efficiency are not reported in this report.

The Business Energy Upgrade Scheme launched in November 2024. Given the limited run time in 2024, no awarded projects led to realised energy savings in 2024.

Energy and emissions impacts

SEAI's business support programmes saved an estimated 26.2 ktCO₂ in 2024 compared to 14.4 ktCO₂ in 2023. This does not include estimated 19.4 ktCO₂ of savings leveraged by the Large Industry Energy Network programme. The Non-Domestic Micro-Generation scheme, EXEED and Support Scheme for Renewable Heat Investment Aid for Heat Pumps resulted in €20.6M in avoided energy spend through energy savings and generated solar. The value of energy savings achieved through Large Industry Energy Network is estimated at €11.2M.

The Non-Domestic Micro-Generation scheme delivered 7.5 ktCO₂ of savings by displacing an estimated 29.6 GWh of grid electricity via solar PV installed by businesses in 2024. This is a sizable increase from the first year of savings in 2023, estimated to be 1.5 ktCO₂ by displacing an estimated 5.1 GWh of grid electricity. The programme launched in September 2022.

Support Scheme for Renewable Heat operational aid for biomass and biogas saved an estimated 11.1 ktCO₂ in 2024, up from 2023 savings of 8.9 ktCO₂. It does not, however, lead to significant energy savings. This support replaces fossil fuel based heating with renewables, which does not always result in an efficiency gain, though it does provide carbon savings. Support Scheme for Renewable Heat investment aid for heat pumps, which supports installation of commercial heat pumps, produced energy savings of 18.0 GWh and carbon savings of 3.9 ktCO₂. 2024 is the first year of reporting on investment aid for heat pumps within the Support Scheme for Renewable Heat.

The Large Industry Energy Network is a peer-to-peer network managed and supported by SEAI for companies with an annual energy spend of €1M or more. Due to the scale of measurement and verification required, savings associated with the Large Industry Energy Network are reported one year in arrears. As shown in Table 3, 93.4 GWh of energy savings are attributed to the Large Industry Energy Network programme for the 2023 time period. Savings for the Large Industry Energy Network are an assumed contribution of the programme towards overall energy savings achieved by industry entities involved in the network. To ensure the same savings are not counted twice, energy or carbon savings through the Large Industry Energy Network should not be totalled with other business programmes.

Wider impacts

SEAI's business programmes supported an estimated 1,070 jobs in 2024. This is an underestimate as it does not include jobs created through increased ambition to deliver energy savings enabled by the Large Industry Energy Network programme. Beyond energy savings and job creation, SEAI's business programmes delivers a broad range of benefits not quantified in this report.

An adoption in energy efficiency measures and renewable energy technology often leads to lower energy and production costs for SMEs and large industry. As a result, this can increase profit margins, production capacity, and create the potential for new revenue streams. Additionally, reducing energy costs can strengthen a business's resilience to external factors such as energy or material prices. Energy efficiency measures may also lower operationally costs for businesses that utilise machinery. Process optimisation often extends equipment lifetime; deferring capital investments, reducing maintenance costs, and decreasing machinery downtime.

Further benefits include, but not limited to:

- Increased asset value of buildings,
- Enhanced employee productivity as a result of improved physical work environment⁴, and
- Increased supply chain capacity.

It can also stimulate the technology market and impact the technology prices through driving volume sale.

Business energy efficiency and renewable energy programmes deliver benefits to the wider society such as improved air quality from reduced greenhouse gas emissions (GHG).

Public sector programmes

The outturn for Public Sector programmes is shown in the first two columns of Table 4.

Table 4. SEAI programme outturn for 2024: public sector programmes

Metric	Public sector energy efficiency (2023 outturn)	Public sector pathfinders
SEAI capital spend, €M	-	61.7
Estimated new annual final energy savings, GWh	45.5	92.5
Estimated new annual carbon savings, ktCO ₂	11.4	23.1
Value of energy savings or generated solar (in-year), €M	€6.5	€11.6
SEAI capital spend per new annual energy saved, €/kWh	-	0.7
Jobs supported (gross estimate)	-	860
Please see Appendix 1 Table 7 for notes and assumptions behind impact	calculations.	·

Inputs

<u>SEAI's Pathfinder programme</u> supports public bodies to deliver sustainable solutions including deep retrofits and renewable heat. In 2024, the programme amounted to €61.7M in SEAI capital. Public sector partners provide the remaining 50% of project costs through exchequer funding.

The Public Sector Energy Efficiency Programme supports public bodies to achieve public sector energy targets outlined in the Climate Action Plan and the Public Sector Energy Efficiency Strategy (2017). The programme provides bespoke energy management advisory, training and networking supports, built on a partnership with public bodies. The programme operates a monitoring and reporting system which tracks the progress of 350 public bodies and approximately 3,700 schools. This represents zero effective capital cost for SEAI. The costs of implementing measures and initiatives as a result of the programme are borne by other public sector bodies and Government Departments as part of fulfilling their obligations.

Energy and emissions impacts

We estimate that SEAI's Pathfinders programme saved an estimated 92.5 GWh in 2024, based on an assumption of unit energy savings per capital spend.

Due to the scale of measurement and verification required, Public Sector Energy Efficiency savings are reported one year in arrears. The public sector Monitoring & Reporting system (M&R) indicated that the energy consumed in 2023 was 156.8 GWh less than in 2022. Assuming that the programme is responsible for 29% of savings, we estimate that it saved an estimated 45.5 GWh. Savings are an assumed contribution of the programme towards overall energy savings achieved by public sector entities involved in the network.

⁴ IEA 2019, Multiple Benefits of Energy Efficiency 2019, IEA, Paris https://www.iea.org/reports/multiple-benefits-ofenergy-efficiency-2019, Licence: CC BY 4.07

Pathfinders and the Public Sector Energy Efficiency programme should not be totalled to limit the potential of double-counting.

Wider impacts

The International Energy Agency report on Multiple Benefits of Energy Efficiency⁵ found that energy efficiency and renewable energy programmes invest in long term energy savings, resulting in a decrease in public expenditure, providing a public benefit. A holistic consideration to building and energy use, space optimisation and long term infrastructure aim to deliver better public services using less energy and carbon. Furthermore, improvements to public buildings through the programmes can also support accrual of value in capital stock.

The same International Energy Agency report also found that energy efficiency measures contribute to better building quality, leading to improved temperature regulation, air quality and lighting. These improvements directly benefit public sector employees, with a better physical work environment linked with increased employee productivity. Additionally, the general public benefits from increased comfort and broader health benefits when accessing public services in buildings such as hospitals, schools and libraries. Energy efficient lighting upgrades implemented in public spaces through the programmes can also improve public safety.

Supports delivered through the public sector programmes are likely to have a broader benefit on households and businesses. This can occur through a spillover effect on employees, where workplace promotion of sustainable solutions are adopted at home. Additionally, a number of awareness campaigns were funded through the public sector programmes promoting behaviour change in the wider community.

Electric vehicle programmes

The outturn for electric vehicle programmes is shown in the right-most two columns in Table 5. SEAI offers grant supports for new battery electric vehicle purchases, including passenger cars, light commercial vehicles, and large panel vans. While e-moped and electric motorcycle grants are now included, these were not yet available in 2024. Grants are also available for home chargers, as well as to support multi-unit dwellings to install charging infrastructure.

Metric	Electric vehicles purchase grant	Home charger grant	Apartment charger grant	Total for electric vehicle programmes
Number of vehicles	12,304	-	-	12,304
SEAI capital spend, €M	44.2	6.8	0.97	52.0
Estimated private spend leveraged, €M	144.8	27.0	0.22	172.1
Leverage factor (private spend leveraged per € SEAI spend)	3.28	3.97	0.23	-
Total spend, €M	189	33.8	1.19	224.0
Estimated new annual final energy savings, GWh	29.6	-	-	-
Estimated new annual carbon savings, ktCO2	14.8	-	-	-
Value of energy savings (in-year), €M	5.3	-	-	-
SEAI capital spend per new annual energy saved, €/kWh	1.49	-	-	-
Total capital spend per new annual energy saved, €/kWh	6.39	-	-	-

Table 5. SEAI programme outturn for 2024: electric vehicle programmes

Please see Appendix 1 Table 8 for notes and assumptions behind impact calculations.

⁵ IEA 2019, Multiple Benefits of Energy Efficiency 2019, IEA, Paris https://www.iea.org/reports/multiple-benefits-ofenergy-efficiency-2019, Licence: CC BY 4.07

Inputs

Electric vehicle grants awarded in 2024 totalled \in 44.2M (including both private and commercial applicants), while \in 6.8M was awarded for home chargers and \in 0.59M for apartment charging infrastructure projects. We estimate that the private spend leveraged by these grant awards were \in 145M for electric vehicles, \in 27M for home chargers, and \in 0.22M for apartment chargers. For the 2024 estimates for private spend leveraged for electric vehicle grants, we focus exclusively on the "electric vehicle price premium". In other words, instead of counting the full cost of the vehicle, we consider only the additional cost of an electric vehicle, relative to a comparable internal combustion engine vehicle. We regard the remaining cost of the vehicle as being likely to have been spent regardless. The level of this premium was set at 38% based on findings from the International Energy Agency⁶.

Grants awarded are down significantly from 2023, when €74.9 was awarded for EVs and €12.2 was awarded for home chargers. The reduced spend is partly due to the simple reductions in the grant amounts for electric vehicles and home chargers that took effect in mid-2023 and the start of 2024, respectively. A global downturn in electric vehicle purchases through 2024 also likely played a role, due to the depletion of pent-up demand accumulated during the COVID-19 pandemic. In Ireland specifically, demand may have also diminished to the reduced grant levels. However, evidence is already emerging that EV demand is strengthening again at the end of 2024 and in the first few months of 2025, even if this new trend does not appear in the 2024 totals.

Energy and emissions impacts

We only estimate the energy savings for electric vehicle grants, since electric vehicle chargers generally support the same energy savings as already achieved by grant-funded electric vehicles themselves. We estimate the annual energy saved from electric vehicles supported in 2024 to be 29.6 GWh. Applying a carbon factor based on the expected fuel mix of an internal combustion engine vehicle alternative, this equates to an annual abatement of 14.8 ktCO₂. The annual carbon emission abatement achieved by new electric vehicles sold in 2024 is expected to increase in future years as grid electricity generation increases its use of renewable sources.

The 2024 annual energy and emissions savings estimates from electric vehicles are down from 37.6 GWh and 18.8 ktCO₂ from 2023. This is a direct result of the reduction in demand for EVs in 2024, as referred to above.

Wider impacts

Electric vehicles bring a number of established benefits to their users; for example, the convenience of home charging, the reduction in operating costs, and increased reliability due to simpler mechanical technology compared to internal combustion engine vehicles. Depending on typical usage patterns, some electric vehicles may lead to inconveniences due to range limitations and scarcity of public charging points.

Aside from reduced greenhouse gas emissions associated with electric vehicles, they bring a number of social benefits in terms of improved air quality due to reduced emissions of nitrous oxides, carbon monoxide, and sulphur oxides. Particulates should also decrease, although it should be noted that trye and brake wear contribute considerably to particulate emissions, and these cannot be expected to decrease when switching to electric vehicles. Noise disturbance at low speeds is considerably lower both for electric vehicle occupants and external road users in the vicinity, although at high speeds tyre noise tends to dominate, and these would not be diminished.

As with any other private vehicle, electric vehicle usage contributes to transport system congestion, which in turn can lead to greater emissions from the internal combustion engine vehicles sharing the road with electric vehicles. As such, the benefits of increased adoption of electric vehicles can only be maximised if overall automobile usage levels can be managed appropriately.

Wider adoption of electric vehicles has the potential to enhance the flexible usage and resilience of the electricity grid, for example through the use of bidirectional charging, the use of electric vehicles for battery storage and peak shifting while connected for long periods. Depending on how effectively this potential can be realised, this flexibility could lead to a reduced need for fossil fuel electricity generation during peak demand periods.

⁶ IEA 2024, Battery electric car price premium compared to internal combustion engine cars, 2018-2023, IEA, Paris https://www.iea.org/data-and-statistics/charts/battery-electric-car-price-premium-compared-to-internal-combustion-engine-cars-2018-2023, Licence: CC BY 4.0

3. Discussion

Contributions toward Climate Action Plan targets

Ireland's Climate Action Plans (CAPs) set out a range of Key Performance Indicators (KPIs) with targets for 2025 and 2030, each designed to contribute to achieving carbon savings required to avoid exceeding sectoral emissions ceilings, as set out in legislation. While SEAI programmes are not the exclusive measures in place to achieve these targets, they do play a central role in building markets and supply chains, and in driving activity and impact.

Here we consider the outputs from SEAI programmes in 2024 in the context of the trajectory for the Climate Action Plan targets up to 2030 in the residential sector, for electric vehicles, and for renewable microgeneration. We do not provide projections of future outputs here, as in Ireland's National Energy Projections⁷; instead, the cumulative progress lines to date give a visual comparison in reference to that target line.

Residential sector targets

The suite of programmes administered by SEAI in the residential sector primarily contribute to two KPIs. The first of these is retrofitting a certain number of homes to a B2/cost optimal level in the Building Energy Rating scale or, alternatively, retrofitting a greater number of homes to a lesser performance level that is equivalent to that same number of B2 upgrades.

To help reduce emissions in the residential built environment from 7 MtCO₂e per annum in 2018 to 3.5-4.5 MtCO₂e per annum by 2030, the Climate Action Plan 2021 set a target of 500,000 B2 upgrades (or carbon equivalent) by 2030, with an interim target of 125,000 B2 upgrades by 2025. The 2025 target was assumed to combine 83,000 upgrades to a B2/cost optimal level, with the carbon equivalent of an additional 37,000 provided by 102,000 shallower upgrades. In other words, each shallower upgrade would represent 36% of a B2/cost optimal upgrade. Here, we apply this 36% factor to shallower upgrades and add them to the full B2/cost optimal upgrades to arrive at the B2 carbon equivalent totals.

As of the end of 2024, almost 63,000 B2 carbon equivalent SEAI-supported upgrades had been implemented, as shown in Figure 2. Aside from a slowdown during the COVID-19 pandemic, the pace of upgrades has gradually increased. However, recent upgrade rates suggest that the grant programme on its own is not sufficient to reach the 2025 target. Rather, additional upgrades, not accounted for in this report, are expected both from local authorities carrying out their own retrofit programmes, and from a residual number of private homeowners upgrading homes outside SEAI programmes for individual reasons. The trend beyond 2025, however, will require a significant acceleration in upgrades to reach the 2030 target for B2 carbon equivalent upgrades.

The results for heat pump installations across SEAI grant-funded upgrades shows a similar trend in Figure 3, although these figures exclude local authority upgrades and homeowners installing heat pumps without grant aid for individual reasons. Still, it is clear a significant acceleration in heat pump deployment is required to meet the 2030 target, with an unprecedented delivery rate.

Evidence so far has shown that most upgrades to a B2/cost optimal level do not include a heat pump, whereas according to the Climate Action Plan 2021, 88% of B2 upgrades would need to include a heat pump to meet the 2030 target. This trend is concerning as it is evident that existing policies are not sufficient to incentivise heat pump uptake at the level required to meet residential sector targets. To encourage widespread installation of heat pumps, a comprehensive set of solutions is necessary. This will require a policy mix that includes market-based approaches, regulatory measures, and government incentives.

⁷ See Sustainable Energy Authority of Ireland (November 2024): *National Energy Projections: 2024 Report*, for comprehensive projections of Ireland's future energy savings and energy system characteristics. Available at: <u>National Energy Projections | Key Publications | SEAI</u>



Figure 2: SEAI programme contributions towards 2025 and 2030 KPIs for B2 carbon equivalent upgrades



Figure 3: SEAI programme contributions towards 2025 and 2030 KPIs for heat pumps installed in existing homes

Electric vehicle targets

In its transport chapter, the Climate Action Plan 2021 set out targets for deploying battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs) into the national motor vehicle fleet, including reaching 845,000 passenger EVs and 95,000 electric commercial vans by 2030. The Climate Action Plan 2022 elaborated this to include interim 2025 targets of 175,000 passenger electric vehicles and 20,000 electric commercial vans. The Climate Action Plan 2024 updates these KPIs to focus on share of new car registrations, where all new passenger car registrations would be EVs and 30% of these BEVs. However, because the EV share of new sales depends critically on Internal Combustion Engine (ICE) vehicle sales, and because to date those sales have not yet been seen to diminish

in absolute terms⁸, we are unable to provide a reasonable comparison between outturn at the programme level and these registration share-based KPIs.

The SEAI electric vehicle grant programme contributes partially to the absolute KPI targets by supporting new BEV purchases for models with a full price in the range €14,000 to €60,000. As shown in Figure 4, the combination of those grants with sales of PHEVs and other BEVs outside that price range, along with first-time registration of second-hand PHEVs and BEVs imported into Ireland, leads to cumulative growth that appears sufficient to meet the 2025 target for passenger electric vehicles. However, considerable further growth will be needed toward 2030 for the target in that year to be met.



Figure 4: SEAI programme contributions towards 2025 and 2030 KPIs for passenger EVs

Progress toward the 2025 and 2030 targets for commercial EVs has been considerably more modest, as shown in Figure 5. While data for non-grant-aided EVs for 2024 is not yet available, cumulative progress based on new registrations up to 2023 combined with grant-aided commercial BEVs up to 2024 suggests that a significant increase in the rate of new registrations will be required to meet the 2025 target, with an even more significant acceleration in the remaining years toward 2030.



Figure 5: SEAI programme contributions towards 2025 and 2030 KPIs for commercial EVs

⁸ Data for ICEs, BEVs, PHEVs, and HEVs newly registered in Ireland is obtained from the Central Statistics Office, tables TEA27 and TEM27. Note that for passenger HEVs prior to 2021, and for commercial HEVs in all years, PHEVS cannot be distinguished from other HEVs, so these overestimate somewhat the number of vehicles contributing toward the CAP target.

Installed micro-generation capacity

The Climate Action Plan 2024 introduced a target for installed capacity of micro-generation (<50 kW, e.g. rooftop solar PV) of 1.6 GW by 2030. Two SEAI programmes contribute to this target: the Microgeneration Support Scheme in the residential sector, and the Non-Domestic Micro-Generation scheme in the business sector. Figure 6 depicts the progress to date, including contributions from both programmes. Clearly, deployment of solar PV in the residential sector has accelerated significantly since 2022, and the cumulative progress through 2024 suggests that the 2030 target is achievable. The Non-Domestic Micro-Generation scheme was only introduced in 2023 and has yet to reach widespread use, so its future growth is uncertain. In any case, both programmes exhibit the potential to grow to reach 1.6 GW in time for 2030.



Figure 6: SEAI programme contributions towards 2030 KPI for installed micro-generation capacity

Programmatic strategies

SEAI programmes are contributing substantially toward Climate Action Plan targets, as well as toward other objectives corresponding to individual programmes. Investments in energy efficiency and decarbonisation projects have supported job growth, the energy savings achieved have brought about energy costs savings and carbon emissions reductions, and the transition to electrical heating and transport has led to improvements in local air quality, even if not quantified in this report.

Despite this, as evident in the comparisons above, SEAI programmatic spend at current levels will not (and may never fully) be enough on their own to cause full target achievement in time i.e. sectoral ceilings, carbon budgets, renewable energy or energy efficiency targets. This is demonstrated best in SEAI's latest National Energy Projections report⁹. Other significant contributing actions include the fuller suite of policies and measures outlined in the Government's Climate Action Plan, to name a few:

- Deployment of wind, solar and gird infrastructure
- Reducing car dependency
- Plans for district heating roll-out
- Development of significant renewable electricity generation
- Decarbonisation of industry
- Public housing retrofit supported by Department of Housing, etc.

⁹ SEAI 2024. *National Energy Projections: 2024 Report*. Available at: <u>National Energy Projections | Key Publications | SEAI</u>

Whilst programme spend could be scaled in some areas, e.g. business and public sector programmes, other sectors, such as housing, face supply side constraints and broader barriers to uptake – for example, affordability, information gaps, time etc. – that mean increased funding allocation to programmes will not necessarily translate to greater impact, at least in the short term. To enhance supply-side capacity for delivering retrofits, it is crucial to focus on workforce development and the supply chain. This entails establishing high-quality training programmes and certification processes to equip workers with the necessary skills for retrofitting.

In the context of agreed net-zero targets, all (unabated) fossil fuel, from all sectors, must be eliminated. Scheme refinement is possible and any and all intelligence to enable this is welcome – for example, that which comes from programme and policy evaluation. However, our fundamental focus must remain on building the markets that are essential to deliver the transition away from fossil fuels, and supporting the necessary system and societal changes required in parallel. Any slowing of current markets for sustainable energy technologies and services will be detrimental to target achievement. In other words, a strategy of spending Government's limited budgets on cheapest cost per tonne savings will not support development of all necessary markets, nor will it yield sufficient savings against targets. It would further forgo the multiple benefits of a broader policy package.

It is clear that a fuller suite of policies will be required including, but beyond, grant based incentives to drive the required level of activity. This should encompass a range of mutually reinforcing incentives, information provision activities and regulations, where a clear pathway is set out from an incentive-based approach while market failures dominate, to a more regulation-based approach as markets and technologies mature.

Continuous improvement of estimation methods

Realised energy savings and, consequently, carbon emissions, are dependent on a number of factors outside the specific characteristics of the measures implemented, all of which create challenges for estimates. We continuously seek new evidence and methodologies that can improve our estimates, providing more informed guidance on how our programmes can most effectively achieve their objectives. Those improvements are designed to address a number of challenges, primarily in estimating energy savings, such as:

- Moving from average effect data to individualised data and making use, where available, of individual data on energy performance and of the improvements supported by SEAI programmes.
- Seeking to access new data sets to enable a shift from estimation of impact to measurement e.g. via before and after billing analysis.
- Accounting for energy performance gap and behavioural effects by leveraging targeted studies to better understand the gap behind rated energy performance according to Ireland's Building Energy Rating system and real-world energy consumption. This includes but is not limited to the role of behaviour in transforming energy efficiency improvements into improved indoor conditions, which may reduce realised energy savings but provide other benefits.
- Establishing appropriate baselines for energy savings by improving our access to historical data and improving our understanding of comparable homes, businesses, etc. that can be used as "counterfactuals" against which SEAI programme participants are compared.
- Disentangling the effects of multiple programmes working in tandem, as their specific contributions toward energy savings are difficult to isolate. Together with ongoing work to improve reporting on energy savings obligations as required by the Energy Efficiency Directive, new systems will help identify measures that have received support from multiple programmes.
- Similarly, understanding the role of engagement and enabling programmes in contributing toward awareness, interest, and investment in energy projects both through other SEAI programmes and through other channels.

4. Conclusions

Programmes delivered by SEAI on behalf of Government have demonstrated the capacity to bring about substantial progress in improving energy efficiency and decarbonising energy systems through financial support and capacity building. Through over €540 million in supports, combined with over €650 million in private spend leveraged through SEAI programmes, energy efficiency and decarbonisation projects have led to new annual energy savings of approximately 434 GWh and new annual grid electricity displaced of over 150 GWh. These represent energy cost reductions of approximately €110 million, as well as an annual reduction in carbon emissions of approximately 150 ktCO₂. These investments have also supported nearly 14,500 jobs in the sustainable energy sector.

In compliance with the Climate Action Plan and Ireland's international obligations, these programmes contribute to Ireland's climate change efforts in two key ways: first, by the direct emissions abatements resulting from actions taken through participation in these programmes, and second, through the market development in terms of supply-side capacity and customer awareness and demand, which can, and ideally will, lead to actions even beyond those directly supported by SEAI programmes. As these markets develop, and typically with incentives to address market failures, the support delivered through SEAI will play a diminishing role in achieving Ireland's targets.

Clear progress in our impact can be recognised across the range of programmes. However, the level of market development achieved clearly varies, with solar panels and electric vehicles achieving high levels of adoption, while heat pump adoption in 2024 has been below programme targets set for the year. As markets develop, a greater share of progress is made outside SEAI programmes, as seen especially for electric vehicles. However, given the short time remaining to develop other markets toward 2030, a broader portfolio of programmes including incentives, awareness raising and policy regulation is likely required to achieve Ireland's climate commitments.

Further analysis that incorporates the estimates presented in this report, is included in Ireland's National Energy Projections annual publication¹⁰. It is evident from the data in this report and the National Energy Projections that a multi-faceted policy approach is required to drive the required rates of technology deployment, supported by the International Energy Agency's work, which has indicated in its Energy Efficiency Policy Toolkit¹¹ that a mutually reinforcing policy package encompassing information, incentives and regulation is required to speed up the pace of change.

 ¹⁰ SEAI 2024. *National Energy Projections: 2024 Report*, for comprehensive projections of Ireland's future energy savings and energy system characteristics. Available at: <u>National Energy Projections | Key Publications | SEAI</u>
 ¹¹ IEA 2024, Energy Efficiency Policy Toolkit 2024, IEA, Paris https://www.iea.org/reports/energy-efficiency-policy-toolkit-2024, Licence: CC BY 4.0

Appendix 1: Estimating programme impacts

To estimate the impacts provided in this report, SEAI applies a variety of methods depending on the type of programme, the nature of the impact estimated, and the data available to us. The primary source is our own programme administrative data, for example data on the grant amounts awarded and the specific measures supported by those grant awards. In all cases, we make use of the best data and methodologies available to us, while at the same time ensuring we meet our obligations to protect personal data.

Overview of indicators

The SEAI outturn tables provide high-level statistics that are broadly common across SEAI programmes. The focus is on outcomes that are essential to SEAI's organisational mission, where energy savings and energy-related carbon abatement are front and centre.

The outturn tables also provide selected associated metrics that are common across several programmes and fulfil on a range of Government targets and broader ambitions—for example, number of low-income homes upgraded, and number of (gross) jobs supported. The tables include the spend associated with programme outturn, including both the spend from the exchequer via SEAI's capital budget, and private investment that is leveraged when householders and businesses engage in SEAI programmes.

Finally, for certain programmes we list additional outcomes that are among those programmes' key objectives, but for which we are not presently able to provide quantitative estimates due to data availability or methodological issues.

Inputs

For programmes to function, several key inputs are required, including capital budget and staff resourcing by Government. Here we report on programme *capital expenditure* from the exchequer, as well as *private investment* made on the part of applicants to SEAI programmes. Assumptions for applicant investment vary by programme, with some estimates based on actual costs incurred by applicants (after grants), while for other programmes we assume a fixed ratio between grant level and total cost, based on historical cost data. The estimates of private spend also include any supports received from obligated parties within Ireland's Energy Efficiency Obligation Scheme, which SEAI also administers on behalf of Government.

Energy and emissions impacts

Estimates of *new annual energy savings, grid electricity displaced*, and *carbon emissions abated* are provided for all programmes where such outcomes are evident. These shed light on the progress made in the last year to reduce Ireland's dependence on fossil fuels through energy efficiency measures, and renewable energy generation deployed via the programmes listed. It should be noted that the estimates cover SEAI delivered programmes, and not the full suite of actions being delivered across Government in the name of climate action. A broader suite of impacts is accounted for in SEAI's National Energy Projections¹², and includes the anticipated future impact of, for example, building regulations, EU transport regulations, and others, as detailed in that report, in addition to those presented in the tables that follow.

Energy savings

The new annual energy savings are expressed in annual delivered energy, which is the amount of energy consumed at the point of use. Focusing on "new" energy savings, they do not include energy savings achieved in past years. Similarly, by focusing on "annual" savings, they do not include energy savings in future years stemming from these same measures – for example, the continuing energy savings from building insulation measures in years after it was first installed. The consequence is that the new annual savings reported here could be added across years to obtain an estimate of the cumulative energy savings from that span of years, that could be expected on an ongoing annual basis, for the lifetime of the measures installed. However, any lifetime total would need to adjust for other developments, for example the expected reduction in emissions from grid electricity generation.

¹² SEAI 2024. *National Energy Projections: 2024 Report*. Available at: <u>National Energy Projections | Key Publications |</u> <u>SEAI</u>

Energy savings for residential programmes have been adjusted to account for rebound effects, whereby some energy savings are not realised due to adjustments in occupant behaviour post-retrofit. Those behavioural responses may be for a variety of reasons, but it is important to note that for many home occupants, energy efficiency improvements alleviate a prior situation of underheating below healthy levels, so some part of the benefits is borne out in improved comfort and health outcomes rather than energy savings.

No rebound adjustment has been made for non-domestic programmes as there is a lack of reliable data to inform this, and because many non-domestic buildings use automated energy management systems, so there is less of a role for behavioural responses.

Grid electricity displaced

Alongside energy savings, we report the contribution from renewable generation programmes in terms of "grid electricity displaced", with the final energy savings from these programmes reported as zero. This is because the electricity produced by these systems constitutes an extra generation capacity, rather than an actual reduction in energy consumption. As such, these initiatives do not yield any reduction in final energy consumed. While they may produce energy savings through avoided electricity transmission losses, we do not currently have an established approach to estimating this.

Programmes affected include the residential Microgeneration Support Scheme, and the Non-Domestic Microgeneration scheme, both of which primarily support solar photovoltaic systems (Solar PV). The reported carbon savings of 31.3 ktCO₂ are associated with the electricity sector and represent a contribution to Ireland's renewable energy share for that sector (RES-E). They do not facilitate emissions reductions in the residential and business sector.

Carbon emissions abatement

We also calculate new annual emissions abatement from the same new annual energy savings for most programmes. For these, we apply emissions factors for each energy source as estimated in the Energy in Ireland report¹³. Note, however, that while programme outputs reference 2024 data, the Energy in Ireland 2024 report uses 2023 energy consumption data.

Sectoral totals and shared impacts

In the residential and business sector outturn tables, we provide some statistics for total outturn across programmes. Note however that the totals for business sector programmes do not include the Large Industry Energy Network. Similarly, we do not include totals for the Public Sector or Electric Vehicle programmes.

The reason for this is that in these cases, multiple programmes work in tandem to produce the energy savings estimated. Consequently, the energy savings reported for certain programmes may overlap with part of the energy savings reported for another programme, so that a sum of these would not be an accurate measure of the combined impact. Examples of programmes working in tandem include: EXEED and Large Industry Energy Network; Public Sector Energy Efficiency and Public Sector Pathfinders; and Electric Vehicle Purchase Grants and Electric Vehicle Home Charger Grants.

Note also that we do not report here the contributions of the Energy Efficiency Obligation Scheme (EEOS), where obligated energy suppliers support the deployment of a variety of energy efficiency measures. As part of Ireland's reporting for the Energy Efficiency Directive, work is ongoing to systematically account for the overlaps between the EEOS and other programmes, but it is likely that a substantial share of the energy savings in the EEOS are already accounted for in SEAI grant-funding programmes, such as Better Energy Homes and the National Retrofit Scheme.

¹³ SEAI 2024. Energy in Ireland: 2024 Report. Available at: Energy In Ireland | Key Publications | SEAI

Wider impacts

Value of energy savings

To help interpret the benefits of energy savings and renewable generation, we estimate the value to consumers (both residential and business) of energy savings and grid electricity displaced based on energy prices as of the end of 2024.

Low income homes upgraded

For certain residential programmes, we provide estimates of low-income homes upgraded. This is only an estimate – for personal data protection reasons, we do not normally use data on household-specific income to determine whether the upgrade was for a low-income home. Rather, we use programme characteristics to make general assumptions about the target group.

Jobs supported

For programmes that directly support energy upgrade projects, we also provide estimates of gross jobs supported, based on an assumed share of costs attributed to labour, an average wage rate, and an assumed multiplier effect based on the literature.

Multiple benefits

Besides targeting low-income homes and supporting jobs, SEAI programmes are recognised as providing a wide range of benefits; however, these benefits vary significantly across programmes. For this reason, and because these benefits are difficult to quantify with confidence, we do not include quantitative estimates in this report. However, we do list the most essential other benefits in the *Wider Impacts* section of each sector. Many programmes have additional benefits, beyond total energy or emissions savings, as central objectives to their design and delivery. Those benefits will be reviewed using periodic evaluations of programme-specific impacts.

Costs and cost savings of energy savings and carbon abatement

Using indicators for new annual energy savings and carbon abatement as well as annual programme capital expenditures from the exchequer as well as private investment, we provide estimates of cost per kWh of new annual energy saved and per tonne of new carbon abatement. However, these estimates must be read with caution, for several reasons:

- Average energy savings and carbon abatement costs are not necessarily indicative of marginal costs of varying the level of investment in a programme.
- Different programmes target markets and technologies with different levels of maturity, hence different levels of grant support may be warranted to encourage the necessary market development, capacity and skills building to cause a full transition away from fossil fuels.
- For several programmes investing in decarbonisation, such as heat pumps and electric vehicles, carbon abatement effects will increase as grid electricity is increasingly produced by renewable sources.
- For other programmes, such as microgeneration, the marginal carbon abatement effects from avoided grid electricity consumption will diminish somewhat as grid renewables increase.
- The original aim of the various programmes must be considered when contextualising their impacts. It is often more costly per tonne for programmes designed to kick start nascent markets, or those supporting those most in need.

Tables of conversions and assumptions

The following tables provide additional details on the assumptions and sources of those assumptions as part of impact estimates, by sector: Table 6 for residentials sector programmes, Table 7 for business and public sector programmes, and Table 8 for electric vehicle programmes.

Table 6: Residential sector impact calculation assumptions

Assumption	Value	Unit	Source
Better Energy Homes delivered energy savings per home	5,400	kWh/year	Adapted from: Scheer, J., Clancy, M. & Ní Hógáin, S., 2013. Quantification of energy savings from Ireland's Home Energy Saving scheme: an ex post billing analysis. Energy Efficiency, 6, pp.35-48. doi:10.1007/s12053- 012-9164-8.
Warmer Homes Scheme delivered energy savings per home	3,867 for shallow measures, 11,400 for deep measures	kWh/year	XD Sustainable Energy Consulting Ltd, 2019. Better Energy Warmer Homes and Warmth & Wellbeing Schemes: Study of the Schemes' Impacts in 2019. Sustainable Energy Authority of Ireland
National Retrofit Scheme (One Stop Shop) and Community Energy Grant delivered energy savings per home	12,000	kWh/year	Estimated by SEAI's Energy Modelling Unit. Assumes that 88% of homes install a heat pump and all homes reach B2 BER
Micro-generation Support Scheme delivered electricity generated per solar PV installation per annum	4,326	kWh/year	Median delivered energy generation for participating Microgeneration Support Scheme homes in 2024. Data obtained from Building Energy Rating and Microgeneration Support Scheme programme databases
Warmer Homes Scheme homes with shallow and deep measures	28% shallow measure 72% deep measures	%	Warmer Homes Scheme data
CO₂ emissions factor for the residential sector	0.263	kt/GWh	Weighted average calculated using the National Energy Balance and emissions factors from SEAI: <u>Conversion Factors SEAI</u> <u>Statistics SEAI</u>
Average annual wage of retrofit sector	57,600	€	CSO Earnings and Labour Costs Table 6c Average hourly total labour costs by economic sector and other characteristics and quarter
Share of retrofit costs covered by grant in Better Energy Homes and One Stop Shop	45	%	Historical SEAI programme cost data
Share of retrofit costs covered by grant in Community Energy Grants	41	%	Historical SEAI programme cost data
Share of retrofit costs covered by grant in Warmer Homes Scheme	100	%	Programme design
Energy cost (weighted average)	13.44	¢/kWh	Estimated from SEAI energy price statistics: https://www.seai.ie/data-and-insights/seai- statistics/prices

Table 7: Business and public sector impact calculation assumptions

Assumption	Value	Unit	Source
Large Industry Energy Network and Public sector energy efficiency Attribution factor	29%	%	SEAI reporting
Value of energy savings per GWh	50,000	€	SEAI programme data
CO ₂ emissions factor for the public and business sector	0.250	kt/GWh	Weighted industry average calculated using the National Energy Balance and emissions factors from SEAI: <u>Conversion Factors SEAI</u> <u>Statistics SEAI</u>
Support Scheme for Renewable Heat payment years	15	years	SEAI programme data
Average annual wage of retrofit sector	57,600	€	CSO Earnings and Labour Costs Table 6c Average hourly total labour costs by economic sector and other characteristics and quarter
EXEED (grants & certification)	2	kt CO₂/€m	SEAI programme data
Energy cost (weighted average) Large Industry Energy Network	11.97	cent/kWh	
Energy cost (weighted average) EXEED	18.45	cent/kWh	Estimated from SEAI
Energy cost (weighted average) Public Sector Programme	12.53	cent/kWh	https://www.seai.ie/data- and-insights/seai-
Energy cost (weighted average) Heat pump non-domestic	6.98	cent/kWh	statistics/prices
Energy cost (weighted average) Solar PV non- domestic	19.25	cent/kWh	

Table 8: Electric vehicle impact calculation assumptions

Assumption	Value	Unit	Source
Electric vehicle price premium for 2023	38%	%	IEA (2024), Battery electric car price premium compared to internal combustion engine cars, 2018-2023, IEA, Paris https://www.iea.org/data-and- statistics/charts/battery-electric-car-price-premium- compared-to-internal-combustion-engine-cars-2018- 2023, Licence: CC BY 4.0
Average grant spend per passenger vehicle	3561	€/vehicle	SEAI grant data
Average grant spend per small to medium commercial van	3767	€/vehicle	SEAI grant data
Average grant spend per large panel commercial van	7478	€/vehicle	SEAI grant data
Energy savings per vehicle	2,400	kWh/year	Internal SEAI Electric vehicle unit calculations
Share of diesel / petrol in ICEV fleet	55% / 45%	%	Central Statistics Office
Average diesel cost	170.8	c/litre	AA Ireland
Average petrol cost	174.4	c/litre	AA Ireland

Appendix 2: Abbreviations

Table 9 provides a table of explanations for abbreviations used in this report.

Table 9: Table of abbreviations

Abbreviation	Explanation
BEH	Better Energy Homes scheme
BER	Building Energy Rating system, Ireland's Energy Performance Certificates scheme
BEUS	Business Energy Upgrade Scheme
BEV	Battery Electric Vehicle
САР	Climate Action Plan
CEG	Community Energy Grants scheme
CO ₂	Carbon dioxide
CSO	Central Statistics Office
EED	Energy Efficiency Directive
EEOS	Energy Efficiency Obligation Scheme
€M	Million Euro
EV	Electric Vehicle
EXEED	Energy Efficient Design scheme
GHG	Greenhouse gas
GW	Gigawatts
GWh	Gigawatt-hours
HEV	Hybrid Electric Vehicle, including Plug-In Hybrid Electric Vehicles
kt	Kilotonnes
ktoe	Kilotonnes of oil equivalent
kWh	Kilowatt-hours
LIEN	Large Industry Energy Network
IEA	International Energy Agency
MSS	Microgeneration Support Scheme
NDMG	Non-Domestic Microgeneration scheme
OSS	National Retrofit Scheme (One-Stop Shop)
PHEV	Plug-In Hybrid Electric Vehicle
RES-E	Renewable Energy Share target for Electricity
RES-H	Renewable Energy Share target for Heat
REV	Revised Estimates Volume process
SEAI	Sustainable Energy Authority of Ireland
SME	Small or Medium Enterprise
Solar PV	Solar Photovoltaic System

Abbreviation	Explanation
SSRH	Support Scheme for Renewable Heat
WAM	With Additional Measures, a policy scenario under the National System for Policies and Measures used for national energy projections
WEM	With Existing Measures, a policy scenario under the National System for Policies and Measures used for national energy projections
WHS	Better Energy Warmer Homes scheme

Appendix 3: Programme details

Programme-specific details can be found at the SEAI web site using the links in Table 10.

Sector	Programme	Link		
Residential	Better Energy Warmer Homes Scheme	Fully Funded Energy Upgrades		
	Community Energy Grant – Domestic	Community grants and funding		
	National Retrofit Scheme (One-Stop Shop)	One Stop Shop services for homes		
	Better Energy Homes	Individual Energy Upgrade Grants		
	Micro-generation Support Scheme	Solar Electricity PV Grants		
Business	Large Industry Energy Network	Large Industry Energy Network		
	Non-domestic micro-generation scheme	Non-Domestic Microgen Scheme		
	Excellence in Energy Efficient Design (EXEED)	EXEED Grant Scheme		
	Support Scheme for Renewable Heat	Support Scheme for Renewable Heat		
Public sector	Public sector energy efficiency	Public Sector Energy Programme		
	Public sector pathfinders	Pathfinder Programme		
Electric vehicles	Electric vehicles purchase grants	Electric Vehicle Grants		
	Electric vehicles home charger grants	Electric Vehicle Charging Grants		

Table 10: Links to programme details



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Rialtas na hÉireann Government of Ireland