Annual Review 2024

Built Environment

CLIMATE CHANGE ADVISORY COUNCIL

Annual Review 2024: Built Environment

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Summary for All

In this fourth part of the 2024 Annual Review, the Climate Change Advisory Council outlines detailed observations and recommendations for the Built Environment sector. The sector includes all residential, commercial and public buildings, and the majority of emissions arise from fossil fuels used for heating space and water. Reliance on fossil fuels needs to end for the sector to reduce its emissions in line with climate objectives. Emissions across the sector fell again in 2023 and included a 7.1% reduction in emissions from residential buildings.

The residential sector is currently on track to meet its sectoral emissions ceiling, but to do so it must rapidly scale up efforts to replace fossil fuel heating systems with low-carbon alternatives such as heat pumps and district heating. It will also be essential to continue upgrading and improving the energy efficiency of buildings. In 2023 there was a significant increase of almost 80% in the number of properties making use of existing grants for retrofitting, as well as an increase in the number of local authority funded retrofits. This positive acceleration in progress will need to be maintained.

Key recommendations

- There is an urgent need to reduce and ultimately end reliance on fossil fuels for heating. The Government needs to:
  - incentivise and encourage many more homeowners (particularly those with homes built after 2007 or which are already suitable for a heat pump system) to replace existing oil and gas boilers with heat pumps and district heating systems,
  - complete the heat policy and legislative reform necessary to accelerate the delivery of district heating schemes and to support the phasing out of all new fossil fuel heating systems.
- The Government must conclude the revised National Planning Framework in 2024 to support compact development, urban regeneration and the efficient use of vacant urban land.
- The Government needs to provide further financial support for lower income households that are unable to afford a deep retrofit with the existing home energy upgrade schemes and low-cost loans.
- The Government should consider additional incentives to increase the renovation of existing vacant and derelict buildings and promote the use of low-carbon materials such as timber.
- The Council has made recommendations for the Government to increase the resilience of the Built Environment sector to the future impacts of climate change (e.g. flooding, extreme rainfall events, droughts and intense storms). It is recommended that the Government develops a sectoral adaptation plan and ensures that existing Building Regulations account for the full range of climate risks.

Abbreviations

BER	Building Energy Rating
DHLGH	Department of Housing, Local Government and Heritage
ESRI	Economic and Social Research Institute
HLI	Heat Loss Indicator
IGBC	Irish Green Building Council
NZEB	Nearly Zero Energy Building
OSS	One Stop Shop
PV	photovoltaic
SEAI	Sustainable Energy Authority of Ireland
SMEs	small and medium-sized enterprises
URDF	Urban Regeneration and Development Fund

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Key observations

- Emissions for residential buildings were 5.35 Mt CO_2 eq in 2023, a decrease of 7.1% compared with 2022 based on the Environmental Protection Agency's provisional greenhouse gas emissions for 2023.
- Emission reductions in 2023 were caused by high fuel prices, a relatively mild winter and the introduction of nationwide Solid Fuel Regulations, in addition to fuel switching and energy efficiency improvements. A significant roll-out of decarbonised heating systems, particularly heat pumps and district heating, will be required to sustain these reductions.
- Census 2022 recorded that 71,000 households used heat pumps, with 57,198 using air source heat pumps and 13,958 using ground source heat pumps. In 2023, a total of 3,769 heat pumps were installed through national home retrofit programmes funded by the Sustainable Energy Authority of Ireland (SEAI).[a] Heat pumps are technically suitable for an estimated 78% of residential buildings without further energy efficiency improvements.
- Currently, just two district heating schemes are likely to be in operation by 2030 – the Tallaght District Heating Network (which is currently operating and looking to expand) and the Dublin District Heating Scheme – which are projected to deliver just 2.8% of the 2.7 TWh national target.
- Retrofitting activity increased by 78% in 2023, with 47,953 SEAI-supported property upgrades completed compared with 27,200 in 2022. Retrofits carried out by local authorities also increased from 2,283 in 2022 to 2,445 in 2023.
- Despite limited progress in some key areas in 2023, the residential sector is on track to meet its first sectoral emissions ceiling. Commercial and public sector buildings will require a reduction in emissions of 2.9% per annum to remain within the sectoral ceiling. The trajectory for the second sectoral ceiling is dependent on the large-scale roll-out of district heating and biomethane.

Key recommendations

- There is an urgent need to reduce and ultimately phase out Ireland's reliance on fossil fuels and replace heating systems with low-carbon alternatives such as heat pumps and district heating. The Government must ensure that incentives are designed to encourage homeowners to proactively replace their existing fossil fuel heating systems with heat pumps and district heating systems.

a This may not account for all heat pumps that were installed in existing dwellings in 2023 without grant support.

- This year the Government urgently needs to publish the National Heat Policy Statement and enact the Heat Bill to support the accelerated delivery of district heating schemes and to ensure a comprehensive approach to decarbonising the heat sector, building on interactions between district heating, heat pumps and the phasing out of all new fossil fuel heating systems.
- The Government and the Department of Housing, Local Government and Heritage must ensure that the revised National Planning Framework is completed in 2024 and includes higher targets for compact growth, urban regeneration and support for urban/infill development.
- The Council welcomes the recently launched Home Energy Upgrade Loan Scheme for consumers, which supports homeowners in retrofitting, allowing funds to be combined with SEAI grants and to be drawn down prior to works starting. However, further financial mechanisms are needed to support those just above the threshold for energy poverty but who cannot afford a deep retrofit.
- The renovation of derelict and vacant properties can support reductions in both operational and embodied carbon in the built environment, and funding measures to support this, such as the Urban Regeneration and Development Fund, Croí Cónaithe Towns Fund and Vacant Property Refurbishment Grant, are welcome. The Council recommends that additional measures are considered by the Government to encourage the renovation of derelict and vacant properties through further land activation and taxation measures while addressing existing barriers to refurbishment. These measures should also aim to reduce embodied carbon emissions, including by promoting increased use of timber.
- The Department of Housing, Local Government and Heritage should develop a sectoral adaptation plan for the built environment, so that coordinated action is taken to ensure the resilience of the sector to future projected climate impacts and that existing building design regulations are fit for purpose and account for a range of climate risks.

1. Introduction

The Built Environment sector includes residential, commercial and public buildings and accounted for 11.2% of total greenhouse gas emissions in 2023.[1] Emissions from the sector are primarily attributed to fossil fuels used for space and water heating, and decarbonisation brings many co-benefits in terms of improved indoor air quality, comfort and health, and in terms of energy security and reducing volatile energy costs for households and businesses.

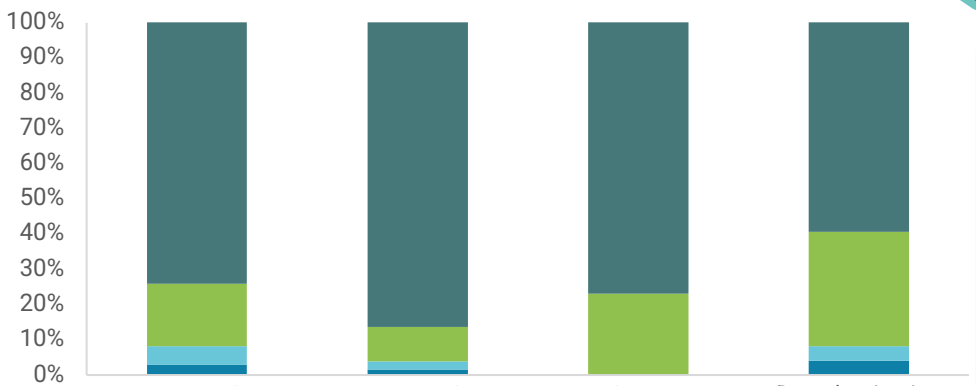
2. Sectoral emissions ceiling and key Climate Action Plan targets

The sectoral emissions ceilings for the residential and commercial/public Built Environment sectors are detailed in Table 1.

Table 1: Reported emissions for 2021–2022 and provisional emissions for 2023 in the context of the sectoral emissions ceiling (SEC) for the first carbon budget period, 2021–2025.
(Source: Ireland's Provisional Greenhouse Gas Emissions 1990–2023.[1])

Sector	Carbon budget period	SEC	Reported emissions 2021–2022	Provisional emissions 2023	SEC used 2021–2023 (%)
Residential	2021–2025	29 Mt CO_2 eq	12.62 Mt CO_2 eq	5.35 Mt CO_2 eq	62.0%
Commercial/ public	2021–2025	7 Mt CO_2 eq	2.89 Mt CO_2 eq	1.41 Mt CO_2 eq	61.4%

Despite limited progress in some key areas in 2023, the residential sector is on track to meet its first sectoral emissions ceiling. Commercial and public sector buildings will require a reduction in emissions of 2.9% per annum to remain within the sectoral ceiling.[1] Progress against key performance indicators in the Climate Action Plan is illustrated in Figure 1.



	National Residential Retrofit Plan – dwellings retrofitted to BER B2/cost optimal	National Residential Retrofit Plan – heat pumps installed in existing dwellings	Decarbonisation of residential, public & commercial heating – district heating (GWh)	Decarbonisation of residential, public & commercial heating – biomethane (GWh)
2030 target	500,000	400,000	2,700	1,100
2025 target	120,000	45,000	800	600
2023 achieved	36,115	10,596	–	75
2022 achieved	18,514	6,827	5	75

Figure 1: Progress on key Climate Action Plan targets as at the end of 2023.
2022 and 2023 National Residential Retrofit Plan targets achieved include data from 2019–2022 and 2019–2023. Biomethane targets achieved are based on the National Biomethane Strategy.[2]
(Sources: Domestic Building Energy Ratings,[3] Input Assumptions for Ireland's Greenhouse Gas Emissions Projections[4] and Statistics for National Home Retrofit Programmes.[5])

3. Progress on previous Climate Change Advisory Council recommendations

A number of the Council's recommendations in 2023 relating to district heating were reflected in the Climate Action Plan 2024. However, the Council is concerned about the delays in the publication of the National Heat Policy Statement and the enactment of the Heat Bill to establish a regulatory model for district heating systems, and the very slow deployment of district heating. A comprehensive approach to decarbonising the heat sector, including the interaction between district heating, heat pumps and the phasing out of all new fossil fuel heating systems, is urgently required through the publication of the National Heat Policy Statement in 2024 and the finalisation of the Renewable Heat Obligation.

The Council, alongside other organisations including the Irish Green Building Council (IGBC), has called for an increase in local authority retrofitting targets. While the Climate Action Plan aims to increase the number of social housing retrofits carried out in 2024, with annual increases also observed in 2022 and 2023, it maintains the target of 36,500 homes to be brought to a B2/cost optimal standard by 2030 as part of an ambition to have approximately 70% of local authority homes at an A or B rating by 2030.[6]

Quarterly reporting by the Sustainable Energy Authority of Ireland (SEAI) has shown a welcome increase in the delivery of retrofits. The Council is concerned, however, that targets for heat pump installation are not being met. The improved customer journey for homeowners to access grants for dwellings constructed after 2007 (owing to the abolition of the requirements of the Heat Loss Indicator (HLI) technical assessment) is useful. Further actions to address behavioural barriers to heat pump uptake need to be undertaken. The Council also welcomes the development of financing solutions to assist homeowners to access loans for home energy upgrades; this is discussed further in *Section 5.4*.

Ensuring that public databases such as the National Building Energy Rating (BER) Research Tool have the highest possible level of Eircode coverage would greatly enhance the potential to leverage other data sets such as Census 2022 and provide greater transparency to finance providers in the design and delivery of green financing solutions. The Council strongly endorses the National Statistics Board's[7] call for greater data integration to maximise the degree of geographical detail that can be extracted from these vitally important pieces of Ireland's National Data Infrastructure.

4. Indicators

4.1 Emissions and main trends

Following a reduction in 2022, emissions for residential buildings decreased by a further 7.1% in 2023 to 5.35 Mt CO_2 eq based on the provisional EPA greenhouse gas emissions inventories.

Residential gas use fell by 14% in 2023 compared with 2022 levels, with reductions in heating kerosene use of 0.3%. Coal and peat use decreased by 22% and 13%, respectively (see Table 2 for further indicators). However, as emission reductions associated with pricing and temperature effects may not be sustained, there is a need to roll out decarbonised heating systems and embed energy efficiency in the sector as soon as possible.[5] The final energy balance for 2023 will provide information on solid fuel combustion, including coal and peat, which have a higher carbon intensity.[8] In 2022, for example, coal and peat accounted for 10% of energy use but 21% of household CO_2 emissions.[9]

The revised Renewable Energy Directive ((EU) 2018/2001) raised the 2030 binding target for renewable energy in the EU's final energy consumption from 32% to 42.5%.[10] Ireland's draft National Energy and Climate Plan 2021–2030[6] sets out a trajectory for a renewable energy share in heat (RES-H) of 21.7% under the WEM scenario by 2030[11]. This represents a significant increase from the level of 6% achieved to date, as shown in Table 2. The revised Energy Efficiency Directive ((EU) 2023/1791) requires Ireland to cut energy demand significantly across all sectors by 2030. The interactions between requirements for reductions in energy demand, requirements for improved energy efficiency and binding targets for renewable energy will need to be addressed in the forthcoming National Energy and Climate Plan.

Table 2: Indicators of emissions as at the end of 2023.

(Sources: Monthly Energy Data,[12] Energy in Ireland 2023 Report,[13] National Retrofit Plan Full Year Report 2023,[14] Energy Efficiency Retrofitting Programme – Expenditure and Output,[15] Non-Domestic Building Energy Ratings 2018–2023,[16] BER Research Tool,[17] Gas Networks Ireland, personal communication, 15 April 2024, and Central Statistics Office, personal communication, 16 May 2024.) GNI, Gas Networks Ireland; LA, local authority; NDM, non-daily metered; SMEs, small and medium-sized enterprises

Name	Unit	2018	2019	2020	2021	2022	2023
Heating kerosene deliveries (SEAI)	ktoe	949	913	1,065	944	789	785
Residential gas demand (GNI)	GWh	7,790	7,626	7,605	7,673	6,793	5,994
NDM industrial and commercial gas demand (SMEs) (GNI)	GWh	4,789	4,809	4,510	4,273	4,087	3,990
Renewable heat (SEAI)	%	6.3	6.3	6.3	4.9	6.3	–
Capital expenditure under SEAI programmes	€ m	–	103.3	78.5	98.8	188.2	319.6
Heat pumps installed	No.	–	1,130	1,454	1,972	2,271	3,769
Solar photovoltaic panel installations	No.	–	–	–	–	10,017	22,214
Capital expenditure under LA programmes	€ m	12.9	23.4	10.0	21.7	54.2	70.2
Domestic buildings with A and B BER ratings	%	15.00	16.00	23.00	24.00	25.82	27.00
Commercial buildings with A and B BER ratings	%	16.52	17.09	16.66	19.70	22.86	30.18
New domestic dwellings using electricity as main space heating fuel	No.	6,313	12,622	12,528	13,904	19,965	17,112
New domestic dwellings using electricity as main space heating fuel	%	46.37	64.23	78.54	90.67	93.42	96.32
Existing commercial buildings with electricity as main space heating	No.	32,392	35,096	36,913	39,188	41,735	43,715

The downward trend in emissions per household over time (see Figure 2) demonstrates the importance of improvements in the Building Regulations and Solid Fuel Regulations. The Nearly Zero Energy Building (NZEB) standard was introduced in the 2019 Building Regulations, with 96.32% of new dwellings built in 2023 using electricity as their main space heating fuel[18] and 99% of homes built between 2020 and 2023 being A-rated.[19]

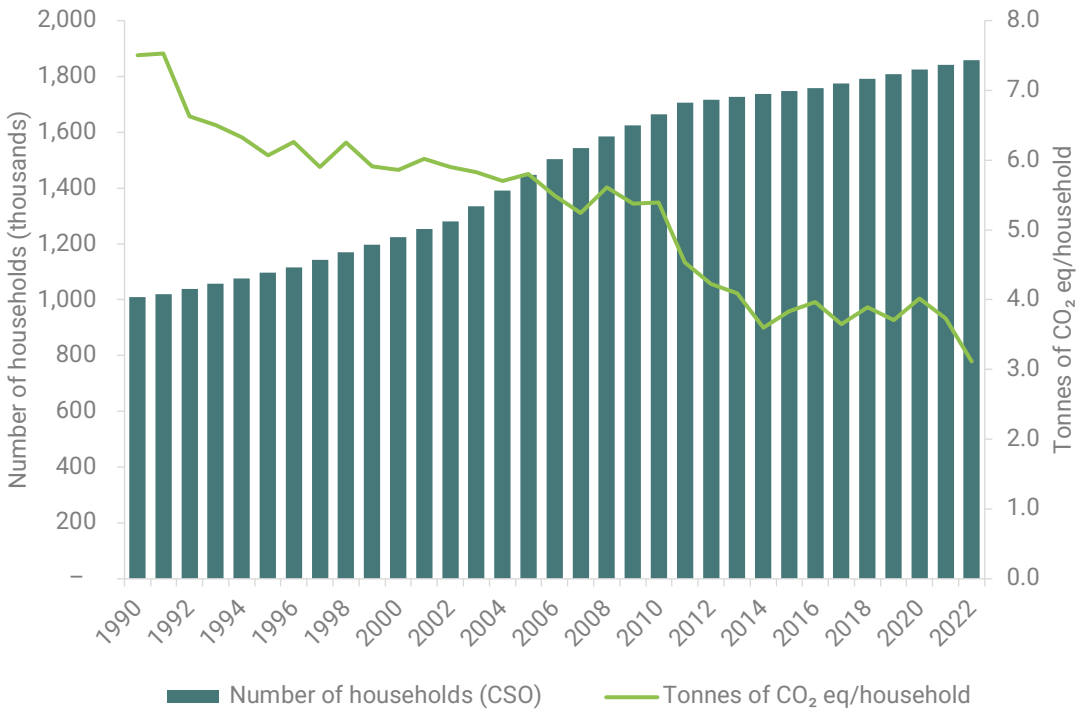


Figure 2: CO_2 emissions per household from 1990 to 2022.
(Source: Ireland's Final Greenhouse Gas Emissions 1990–2022.[20])

4.2 Retrofitting and building energy ratings

Retrofitting activity increased by 78% in 2023, with 47,953 SEAI-supported property upgrades completed that year, compared with 27,200 in 2022. The number of retrofits carried out by local authorities also increased from 2,283 in 2022 to 2,445 in 2023 (Department of Housing, Local Government and Heritage (DHLGH), personal communication, 7 June 2024). While the number of heat pumps retrofitted in existing buildings increased in 2023 (see Table 2), current growth rates are not sufficient to meet the 2025 target.[9]

Similarly, to achieve a target of 500,000 dwelling upgrades to B2 by 2030, the number of B2-equivalent upgrades would need to increase more than four-fold to 75,000 per year from the 17,601 achieved in 2023. SEAI's first quarterly retrofitting report for 2024 noted that the cumulative number of applications for home upgrades across all schemes decreased by 1% compared with Q1 2023, highlighting the importance of further measures to drive demand for retrofitting.[21]

4.3 District heating

The Climate Action Plan 2024 includes a target of 2.7 TWh from district heating by 2030 and 0.8 TWh of district heating from residential and commercial building stock by 2025. With only two projects, representing 2.8% of the target (or a projected capacity of 0.075 TWh by 2030), at advanced stages of planning and development and with a high level of uncertainty over the roll-out rate of district heating, it is very likely that the targets will not be achieved.[4] This could place additional pressure on the sector to compensate with more ambitious targets in other areas such as retrofitting activity and heat pump deployment.

5. Analysis and discussion

5.1 Retrofitting programme and buildings

The Council welcomes the clear emission reductions in new homes through progressive improvements to the Building Regulations and the introduction of the NZEB standard in the 2019 Building Regulations. The development of standards and certification schemes through the National Standards Authority of Ireland for the Irish retrofit sector through the S.R. 50 Series of Irish Standard Recommendations is also welcome.[a] Electricity was the main space heating source for 90% of dwellings constructed between 2020 and 2023 (with gas being the main space heating fuel for the remaining buildings).[18,22,23] It will be critical for the Department of the Environment, Climate and Communications and the DHLGH to develop and publish a roadmap for the phase out of fossil fuel boilers in new and existing residential buildings by the end of this year, as set out in the Climate Action Plan 2024.[23]

SEAI has implemented a national One Stop Shop (OSS) scheme since 2022, with 20 service providers currently engaged in its delivery[14] and a target of 25 registered OSS providers by the end of 2024. The OSS scheme aims to simplify the retrofitting process for homeowners, including the design, installation, grant processing and after-care service.[24] The OSS providers deduct the SEAI grant values for each measure of the works up front on quotation to the homeowner. Ensuring that this scheme keeps up with demand by expanding the pool of registered service providers will be essential to keep pace and achieve retrofitting targets.

As recommended in the Council's 2023 Annual Review, targeted area-based approaches to energy renovation could deliver more with less resources, build industry capacity and support communities to retrofit. The Community Energy Grant scheme administered by SEAI is an example of aggregation of a diverse set of energy upgrade projects across community, public and private projects.[21] The Council also notes the ongoing research, carried out by the Economic and Social Research Institute (ESRI) in 2024, to address the misalignment of incentives to invest in energy efficiency upgrades in the private rental sector and inform policies addressing this issue.[25]

A number of actions relevant to decarbonising the commercial buildings sector have been delayed,[26] notably the development and publication of a roadmap for long-term decarbonisation of the commercial built environment[b] and SEAI's Non-Domestic Retrofit scheme. To meet energy

a The S. R. 50 Series is a new collection of standard recommendations that cover water-based heating systems in thermal solar systems and heat pumps in dwellings, to be used by engineers, architects, surveyors, contractors, installers and inspection authorities involved in the supply, installation, operation and maintenance of plumbing and heating systems in buildings.

b Action BE/23/31 in Climate Action Plan 2023.

efficiency targets, as well as reporting obligations arising from the Corporate Sustainability Reporting Directive ((EU) 2022/2464), in full, businesses require certainty and awareness about available support, as well as more support to transition effectively.[27]

The Council welcomes the publication of the Public Sector Climate Action Strategy, which requires the calculation and disclosure of the life cycle global warming potential of buildings through their energy performance certificates, along with instructions for public bodies to review their portfolio of buildings and set out a pathway to achieve A-rated BERs and a management strategy aligned with the emission reduction target of at least 41–51% by 2030.[28]

A study commissioned by the Council in 2023 noted the opportunity to further develop rooftop solar photovoltaic (PV) panels for commercial and public buildings.[29] The Council supports the roll-out of solar PV panels in schools through the Schools Photovoltaic Programme[30] and welcomes the School Sector Technical Climate Action Roadmap 2023–2030.[31] Following the Commission for Regulation of Utilities' decision on proximity requirements for renewable energy communities, the potential for schools and other public buildings to participate in renewable energy communities through peer-to-peer energy trading to support those in energy poverty should be explored, particularly during the summer months and other times when schools have less energy demand.[32] Modelling has indicated that the potential for rooftop solar PV adoption in Ireland is far from saturated, and policies should seek to extend successful uptake to apartment building residents, lower income households and those in local authority housing.[29]

The approval of the recast Energy Performance of Buildings Directive ((EU) 2024/1275) also marks a significant shift towards addressing embodied carbon, with both operational and embodied carbon (i.e. whole-life carbon[c]) to be calculated and disclosed for all new buildings from 2030. Member States will also be required to establish policies that aim to progressively reduce whole-life carbon for buildings within their building renovation plans, bringing together targets for reducing greenhouse gas emissions embodied in construction products with direct and indirect emissions from the use stage.[27] Measurement of embodied carbon is intricately connected with the circular economy and can influence design choices towards adopting lower-carbon and more circular solutions in the Built Environment sector.

Embodied carbon can be reduced in two ways: firstly, through the repurposing of existing buildings and, secondly, by using low-carbon construction materials such as timber. In the Industry and Waste 2024 Sectoral Review,[33] the Council recommends that the Government should ensure that economic incentives, including grants and taxation structures, encourage the retrofitting of the existing commercial and residential building stock over demolition to reduce the demand for cement and concrete and to minimise the generation of construction waste. In addition, the Council recommends that all publicly supported construction should meet the requirements of the Royal Institute of the Architects of Ireland's 2030 Climate Challenge and that all new planning applications incorporate a whole-life carbon assessment in line with the provisions of the recently adopted recast Energy Performance of Buildings Directive. Furthermore, updates to the Building Regulations that support increased use of timber in construction should be consolidated with the establishment of a high-level cross-departmental task force to prepare an overarching national strategy for all aspects of the timber industry (production, processing and use) in Ireland.[33]

c Whole life cycle greenhouse gas emissions are greenhouse gas emissions that occur over the whole life cycle of the buildings, including production of construction products and their transport, construction site activities, use of energy in the building and replacement of construction products, as well as demolition, transport and management of waste materials and their reuse, recycling and final disposal.

Recent quantification of the number of houses needed to meet population growth has estimates in the region of 42,000–80,000 houses required per annum to 2050,[34,35] a figure significantly larger than previously estimated as part of the National Planning Framework. Given the scale of the housing requirements, efforts to address embodied carbon must be accelerated.

The renovation of derelict and vacant properties can support reductions in both operational and embodied carbon in the built environment; funding measures to support these renovations, such as the Urban Regeneration and Development Fund (URDF), the Croí Cónaithe Towns Fund and the Vacant Property Refurbishment Grant, are welcome. The third round of URDF provision has been officially designated as another financial mechanism to address long-term vacancy and dereliction across cities and towns, with individual financial allocations for each local authority based on its size and number of URDF towns in the local authority area, as well as the level of vacancy and dereliction within those towns. This focus on and adjustment to the accessibility of the fund is welcomed by the Council.[36]

In 2023, the Vacant Property Refurbishment Grant received 6,034 applications, of which 3,166 were approved. However, just 100 of these approved applications received the grant within the year.[37] As at April 2024, over 7,300 applications had been received, over 4,200 applications had been approved and 250 grants had been paid upon the completion of works (DHLGH, personal communication, 7 June 2024). The GeoDirectory Residential Buildings Report for 2023 provides an estimate of approximately 81,712 vacant residential units and buildings in Ireland.[38] According to the report, 21,134 residential properties were classified as derelict as at June 2023 along with 29,798 vacant commercial units.[d] A recent report by the ESRI[39] notes that a large proportion of vacant units could potentially be added to the housing stock quickly, with relatively low demand for labour and materials. While assessments of the condition of these units and timeliness of delivery would need to be considered, they present an opportunity to increase supply in the short term while also addressing the climate crisis, thereby presenting a mutually beneficial outcome. The Council welcomes the Compulsory Purchase Orders Activation Programme for Local Authorities and awaits updated reporting on progress, due at the end of Q2 2024.[40,41]

The Council recommends that additional measures are considered by the Government to encourage the renovation of derelict and vacant properties through further land activation and taxation measures while addressing existing barriers to refurbishment. This should also aim to reduce embodied carbon emissions, including through promoting increased use of timber.

5.2 Heat pumps: solutions and barriers

There is an urgent need to reduce and ultimately phase out Ireland's reliance on fossil fuels and replace heating systems with low-carbon alternatives such as heat pumps and district heating systems. The Government must ensure that incentives are designed to encourage homeowners to proactively replace their existing fossil fuel heating system with a heat pump or to connect to a district heating system. The SEAI's National Heat Study indicated that heat pumps are technically suitable for 78% of existing residential buildings and for 66% and 47% of existing commercial and

d Census 2022 recorded a total vacant stock of 163,433 properties; however, this is a point-in-time measure, as these dwellings were classed as vacant on Census night, 3 April 2022. The 163,433 vacant properties include short-term vacancies (dwellings for sale, rent or renovation, or owner in a nursing home, for example).

public buildings, respectively, without any further energy efficiency improvements.[e][19,42] A total of 3,769 heat pumps were installed in 2023 through SEAI-funded programmes, adding to the 57,198 air source heat pumps and 13,958 ground source heat pumps installed across all Irish households (including new builds and retrofitted dwellings) as at Census 2022.[43] While this represents a significant increase, it is significantly short of the levels required to reach targets in this decade.[9]

The median cost of heat pumps in 2023 was €14,868, with a median grant of €6,500 available.[14] The purchase and installation costs of heat pumps remain significantly higher than those of conventional oil and gas boilers. The high upfront cost of heat pumps has been highlighted as a barrier to adoption,[44] along with ongoing running costs,[45] building and space requirements, trust in and awareness of the technology, and a lack of suppliers.[46] Modelling of increasing grants for heat pump installation in support of 2030 targets resulted in a projected uptake of 322,000 heat pumps in existing dwellings against the 400,000 target.[9] An increase in grant support may be merited for lower income households.[47] While reductions in the upfront costs and savings on heating bills can increase uptake,[46] grants alone will not provide sufficient incentive to achieve that.

Several research studies into the incentives, barriers and behavioural change elements that influence heat pump uptake point to incentives that would encourage homeowners to proactively consider replacing their existing fossil fuel heating system with a heat pump before the existing system breaks down: a fast-track process for grants for homeowners who urgently need to replace their heating system; targeting homeowners with older boilers at risk of breaking down; better information on the requirements for heat pumps; grants for radiator replacement; and a scrappage scheme for fossil fuel boilers.[44,48] Heat pumps also provide health and air pollution benefits associated with reduced fossil fuel combustion in homes.[19] The Council recommends that this research is followed up by the Government and SEAI in designing further incentives for heat pump uptake.

Greater education on the operation of heat pumps and a focus on user experience could also improve overall perceptions and uptake.[44,49,50] The Council recommends that SEAI and OSS providers provide better information for homeowners on the requirements for the installation and operation of heat pumps on the SEAI website and via public information campaigns. A recent study considering the barriers to individuals taking climate action in Ireland[51] also found that there is considerable scope to improve awareness of how energy is consumed in homes to support effective climate action.

Of dwellings constructed since 2010, 98.8% are A and B rated, and a technical assessment is no longer required for dwellings constructed since 2007 to avail of a heat pump system grant.[52,53] There is an opportunity for approximately 250,000 homeowners in Ireland who are still using oil to easily obtain a heat pump grant.[54] The Council recommends that SEAI launches an information campaign to target these homeowners to raise awareness of the recent relaxation in technical assessment requirements.

A recent case study[55] considered the current HLI requirements for heat pump installation in Ireland, with ongoing innovation in heat pump technologies leading to increased efficiencies. The Council welcomes the expansion and delivery of the SEAI's HLI pilot project, which is investigating the

e SEAI's Low Carbon Heating and Cooling Technologies report notes that 'this is significantly higher in the residential sector than is considered suitable using typical Heat Loss Indicator (HLI) thresholds. The National Heat Study has used a more optimistic and ambitious threshold for technical suitability in order to explore what may be possible for decarbonisation given the scale of the challenge ahead.'

appropriate maximum HLI that homes should achieve prior to installing a heat pump[f][56] up to a maximum of 3.0 W/K/m^2 compared with the current range of 2–2.3 W/K/m^2 under SEAI-funded programmes. The Council also welcomes the deployment of solar PV panels in tandem with heat pumps on a pilot basis for certain local authority housing, which would reduce electricity bills and could contribute significantly to targets for the roll-out of solar technology. A study commissioned by the Council estimated that, if 50% of local authority housing had PV systems installed by 2023, this could add approximately another 0.3 GW of capacity.[29]

5.3 District heating solutions and barriers

The Council's Annual Reviews in 2022 and 2023 recommended the development of concrete plans for the deployment of district heating, the publication of heat demand maps for urban areas and an action plan for their delivery. The publication of the National Heat Policy Statement and the enactment of the Heat Bill are urgently required to support the accelerated delivery of district heating schemes, implement the recommendations of the District Heating Steering Group[57] and respond to the findings of SEAI's Heat Study in a national policy for district heating. This should ensure a comprehensive approach to decarbonising the heat sector, building on interactions between district heating, heat pumps and the phasing out of all new fossil fuel heating systems.

Progress to date on district heating deployment has been limited (see *Section 4.3*). Currently, two schemes are likely to be in operation by 2030 – the Tallaght District Heating Network (which is currently operational and looking to expand) and the Dublin District Heating Scheme – which are projected to deliver 0.075 TWh/annum of district heating by 2030, or just 2.8% of the 2.7 TWh target. Even with additional district heating projects, for example in Blanchardstown and Grangegorman, there will still be a significant gap in meeting the 2030 target. Several challenges need to be addressed, including land use planning, enabling legislation, regulation, governance, financing and support for roll-out, including capital and revenue grant aid for projects and consumer connections.[58] Project development must be urgently and significantly scaled up and barriers to deployment removed to meet the ambitious targets for district heating adoption.

Based on a recently commissioned study,[59] the Council highlights the importance of synchronising legislation on energy efficiency with policy for district heating expansion to ensure that they are complementary.[59] There is currently a lack of clear rules for access to laying pipes in public ground and an absence of an effective consenting process for the roll-out of networks under public roads. The Council stresses the importance of the rapid adoption of the Planning and Development Bill[60] which would provide for the carrying out of works for the purpose of inspecting, repairing, renewing or altering district heating systems as exempted development, in line with other underground pipes for utilities.

Increased targets for compact growth, urban regeneration and support for urban/infill development would support the development of district heating by increasing both the intensity of heat demand and the availability of heat sources. The Government and DHLGH must ensure that the revised National Planning Framework is completed in 2024 and that it addresses these requirements.

District heating has the potential to play a key role in smoothing out the supply of renewable electricity by providing grid-balancing services and by drawing down power at times of surplus generation

f Currently, an HLI of less than 2.3 W/K/m^2 is required to obtain grant support for heat pump installation. The Residential Heat Pump and Heat Loss Indicator research pilot project aims to test the performance of heat pumps in homes with a higher level of heat loss than is currently required by SEAI for grant support.

into cost-effective thermal storage.[61] The addition of thermal storage to the design of a district heating network can also reduce the capacity required and the overall capital cost by providing heat storage for different customer heat demand profiles.[62] Policymakers need to maximise the potential role of district heating within the overall decarbonisation of the energy system and the interactions required within the remainder of the energy system.[63]

5.4 Finance

The financial sector has a key role to play in the decarbonisation of the Built Environment. Green mortgages are now a well-established product in the Irish market and provide borrowers with lower interest rates on the purchase of properties within the BER range A1–B3,[64] as well as on completed retrofitting works.[65,66] However, more retail banks need to offer a full range of BER A1 to G-linked green lending products to reach borrowers with properties that are below B3 and incentivise upward movement on the BER scale. Research shows that there is a much lower green mortgage uptake among low-income borrowers, who also tend not to have the means to adapt to the climate-related risks they are exposed to.[67]

Research carried out by the Banking and Payments Federation of Ireland[45] found that cost is one of the factors deterring people from investing in home energy upgrades via retrofitting and that many of the poorest performing homes are likely to be owned by older people and householders least likely to be able to afford a retrofit.[45] Banks also face challenges in directly accessing BER information at the Eircode level, so they rely on customers to provide this information in respect of historical mortgages. Better access to domestic building-level information for finance providers would allow a more accurate measurement of progress towards decarbonising financed housing stock.

Research has also identified gaps in current policies and proposes an expansion of fully funded energy efficiency retrofits to reach a wider cohort of the population, particularly those experiencing fuel poverty and difficulty paying bills.[68] The Council recommends that SEAI, in tandem with the Central Statistics Office and the Department of Finance, undertakes an analysis of funding gaps to identify cohorts of homeowners that remain unable to access finance to help inform additional targeted measures, including intergenerational approaches to financing retrofits.

The Council welcomes the recently launched Home Energy Upgrade Loan Scheme supporting homeowners to undertake retrofitting. The scheme was launched in April 2024[69] through the Strategic Banking Corporation of Ireland[g] with State support. This scheme provides access to loans with reduced interest rates for homeowners via the European Investment Bank loan guarantee and a Government-funded interest rate subsidy. It also enables consumers to combine the funds with available SEAI grants and draw down the loan before works begin. Low-cost loans for retrofitting in Ireland are the first example of the European Investment Bank backing such a scheme.[70] There is a need to investigate further public–private partnerships and ensure that finance will be available beyond 31 December 2026 for those wishing to undertake retrofitting. Further financial mechanisms are also needed to support those just above the threshold for energy poverty but who cannot afford a deep retrofit.

It is recommended that, in addition to the development of the recently launched low-cost loan scheme, the Department of Finance should consider a stamp duty rebate scheme to encourage

g Homeowners (including small, non-corporate landlords) may borrow between €5000 and €75,000 for up to 10 years. The home energy upgrade works must qualify for a home energy grant from SEAI and must be projected to result in a minimum 20% improvement in the energy performance (BER) of the property.

people buying homes with a lower BER to retrofit them within a specified time period (e.g. within 2 years of purchase) to qualify for the rebate.

There is also a need to create greater demand for the current range of business grants and supports available through SEAI for commercial buildings.[71] Recent research[72] that considered the challenges and opportunities for improving energy efficiency in small and medium-sized enterprises (SMEs) across Europe found that, in Ireland, SMEs experience lower barriers to making improvements than those in other European countries as a result of free energy audits and the availability of grants for installation of energy efficiency measures. However, lack of finance remains a barrier to achieving energy efficiency in Ireland, and the research suggests that further policies focused on facilitating energy efficiency financing for enterprise are needed. These could be supported by sharing knowledge of currently available products and EU frameworks, along with addressing barriers such as reporting requirements.

5.5 Skills gaps

The ESRI has estimated a requirement for an additional 15,000 employees on an annual basis to deliver energy efficiency targets.[39] A shift in the construction sector is also expected, with the increased adoption of modern methods of construction necessitating specialised technical skills. SEAI's Q1 2024 retrofit report[21] notes that the further scaling up of the sector at present may be difficult when the labour market is approaching capacity, although its Annual Report for 2023 noted that inflation and material supply chain constraints have eased.[12]

An additional €117 million was provided for in Ireland's Budget 2023 to upskill and reskill the labour market, bringing the overall budget for skills to €592 million, rising to €1.4 billion overall when combined with the National Training Fund.[73] Within this budget package was an additional €30 million specifically for increasing the capacity for apprenticeships.[74] Budget 2024 saw increased funding for apprenticeships as well as a one-off reduction of 33% in the contribution fee for apprentices in higher education.[75,76]

The Climate Action Plan 2024[23] outlines a number of actions in this area, including developing green skills through Education and Training Board programmes such as Springboard+[77] and Human Capital Initiative Pillar 1[78] as well as supporting the design and implementation of apprenticeships tailored to meet future green skills demands. Specifically, the plan advocates integrating NZEB fundamentals into construction apprenticeship curricula, expanding training opportunities to cover modern methods of construction, increasing learner engagement in NZEB centres and expanding outreach through initiatives such as the NZEB mobile unit. Monitoring the progress of these initiatives will be crucial in informing actions for skills development within the next Climate Action Plan.

In 2024, the National Apprenticeship Office aims to establish a performance framework for apprenticeships, including collecting data on apprentice demographics, retention rates and graduate tracking. There is a critical need for data on retention to monitor completion rates effectively.[76] Currently, there are over 70 apprenticeship programmes[76] available, with streams related to the built environment in construction, electricity and engineering contributing to a target of 10,000 registrations annually by 2025.

The Council acknowledges the critical significance of ongoing investment in education and vocational training and welcomes the shift in the approach to apprenticeships under the Action Plan for Apprenticeship 2021–2025.[55,60,79] However, it is imperative to address the attractiveness of apprenticeships critical for the green transition to encourage further expansion and uptake. Adequate allocation of financial and human resources for the administration of the National Apprenticeship Office is required to ensure the success of climate-related apprenticeships, along with expansion of

the bursary scheme to encourage uptake and provide financial assistance for living costs. In addition, the Council supports the advancement of campaigns aimed at promoting gender balance in apprenticeships, including initiatives such as the gender bursary.[76] The Council welcomes and supports the National Upskilling Roadmap 2030 as a guide to proactively addressing the challenge of skills and construction worker shortages.[80]

5.6 Energy poverty

Ireland's Energy Poverty Action Plan 2022[81] is currently being revised.[82] The recently published IGBC report Bridging the Gap Between Energy Poverty and Energy Renovation[83] presents a set of recommendations aimed at facilitating energy renovation for all households as a means of addressing energy poverty, making renovations more financially accessible and prioritising investment in energy renovation for social housing.

Census 2022[84] indicated an overall stock of 153,192 local authority homes with a BER breakdown of 41.3% being C rated, 32% being D–E rated and 6.6% being F–G rated.[85] About 25% of homes, or approximately 35,000, are at the target B2 level (DHLGH, personal communication, 7 June 2024). 36,500 local authority-owned homes are targeted for renovation to a B2/Cost Optimal Equivalent BER standard by 2030, with €90 million made available to local authorities through Budget 2024 for the Energy Efficiency Retrofit Programme. While funding drawdowns and delivery of retrofits have scaled up since 2021,[15] the Council recommends a review is carried out to increase this target in the Climate Action Plan to ensure that support for retrofitting goes to the most vulnerable and energy-poor households in both urban and rural communities. Funding certainty is required for the energy renovation of local authorities' social housing stock to both prioritise the worst performing part of the stock and provide greater advance clarity on targets and formal budget allocations, for example by continuing to provide assurances to local authorities of funding in 2025 ahead of formal allocation sign-off.

Lower income households and elderly individuals living alone often reside in homes requiring substantial renovation.[86,87] In Census 2022, nearly 50% of householders aged 65 and over used oil for central heating; this reliance increased with the age of the head of the household.[88] In Census 2016, it was found that people aged 75 or over, farmers, sole occupants and people with a disability lived in the least energy-efficient dwellings.[89] Some individuals within these cohorts may not meet the current criteria for fully funded upgrades through the Warmer Homes Scheme (supported by carbon tax receipts), while others might be reluctant to undertake these projects because of the inconvenience involved and might not be eligible to access finance including the recently launched low-cost loan scheme discussed in *Section 5.4*. New financial mechanisms are needed to better support those just above the threshold for energy poverty but who cannot afford a deep retrofit, including targeted area-based approaches to retrofitting at a local authority level. The IGBC has recommended a pilot of new schemes to better support energy-poor households that fall just above the threshold for the Warmer Homes Scheme, including a potential sliding scale for the rate of grants provided based on household income to fund a greater proportion of the cost of retrofits for these cohorts.

The issue of the split incentive in the private rental sector, where tenants and landlords both lack incentives to upgrade buildings, needs to be addressed effectively to support the full decarbonisation of the housing stock.[90] The Council awaits the publication of the ESRI's report on the split incentive for rental properties and its report estimating the typical costs of energy efficiency-related investments in the private rental sector. The Government has legislated for a tax deduction of up to €10,000 for small-scale landlords registered with the Rental Tenancies Board who undertake retrofitting works using the home energy grants from the SEAI while the tenant remains in situ.[23,91]

The Housing Commission has recommended an initial minimum BER requirement to be introduced for all rented dwellings over the next 5 years, taking into consideration implications for the rental sector.[92]

The ESRI was tasked to prepare a map of the deprivation and energy efficiency distribution in Ireland within the Energy Poverty Action Plan; once published, this work has the potential to serve as a valuable tool to inform local authorities and guide future localised mapping.

5.7 Climate resilience and biodiversity

Extreme weather events, which are increasing in frequency and intensity as a result of climate change, cause significant damage to housing and lead to negative impacts on the health and wellbeing of residents. Some of the main risks to buildings in Ireland and their occupants include flood damage, heat stress, structural damage due to wind and driving rain, and coastal erosion. Structural damage, increased weathering of surfaces, subsidence, and impacts on air quality and thermal comfort are among the impacts expected at building scale.[93]

In 2022, the Council recommended developing a Built Environment Sectoral Adaptation Plan; however, to date there is no sectoral adaptation plan for the built environment, and this is a critical gap in adaptation policy. It is strongly recommended that the DHLGH built environment and planning scoping exercise, confirmed as an agreed action in the 2024 National Adaptation Framework, results in a sectoral adaptation plan for the built environment being finalised and rapidly implemented.

More action is needed to prepare Ireland's buildings to withstand the impacts of climate change and for technologies and the design of residential, public and commercial buildings to deliver benefits for climate resilience, environmental sustainability and biodiversity conservation. The current focus of the retrofit programme has been on energy and heat efficiency, and it should be expanded to incorporate adaptation, nature-based solutions and biodiversity-friendly considerations into the design, renovation and retrofitting of public buildings, housing and commercial properties. Examples of interventions that could be supported are:

- water use efficiency technologies and devices,
- green roofs and walls,[94]
- reinforcing walls and roofs,
- rainwater harvesting and use of rain gardens and swales,
- biodiversity-enhancing landscaping and planting,
- shutters or other approaches to reduce solar load accumulation in summer.

Research commissioned by the Irish Water Forum outlined the lack of resilience in Ireland's water supplies and the risks from climate change to water quality and quantity.[95] It is estimated that 58% of public water supplies have a supply–demand deficit in normal years and that this increases to 66% during drought conditions. Increased frequency and magnitude of drought events will place additional pressure on water availability during the summer months, while increased population growth and economic activity will further increase the demand for water. Water demand in the Greater Dublin Area has increased steadily since 2019 and reached a record high in January 2024.[96]

With the public sector to lead by example on climate action, as per the Climate Action Plan 2024,[23] the design and retrofitting of public buildings should target water use efficiency, and future housing and developments should also be designed to be water efficient. Lessons should be learnt from

schemes such as the national retrofitting scheme of SEAI and the Water Conservation Business Hub of Uisce Éireann[97] to determine the best approach to reduce water consumption and to promote greater water use efficiency.

Green infrastructure planning presents an opportunity for developments in the broader built urban environment to deliver multiple benefits for human health and wellbeing, climate resilience and the environment, as set out in the National Planning Framework. The fourth National Biodiversity Action Plan also prioritises the Office of the Planning Regulator's development of best practice guidance for biodiversity, green infrastructure and nature-based solutions in planning and development in 2024. This will be an important and necessary step to further integrate and mainstream these issues into the preparation of land use plans.

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