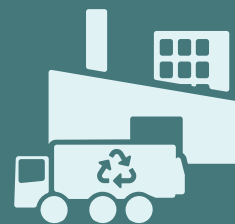




Annual Review 2024

Industry and Waste



Annual Review 2024: Industry and Waste

Submitted to the Minister for the Environment, Climate and
Communications on 24 May 2024

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Summary for All

In this second part of the 2024 Annual Review, the Climate Change Advisory Council outlines detailed observations and recommendations for the Industry and Waste sectors.^a Ireland needs to reduce and ultimately prevent emissions of greenhouse gases, including those arising from the Industry and Waste sectors.

The most recent data indicate a small reduction in industrial emissions in 2023. One of the primary sources of industrial emissions in Ireland is cement production; emissions from cement production decreased in 2023 due to lower production levels, with half of the cement produced being exported. Industrial investment in technologies to reduce manufacturing emissions more generally is still limited.

Unfortunately, the most recent data indicate an overall increase in waste emissions. The largest contributor to waste emissions is methane produced by decomposing waste in landfill sites. The volume of waste being produced remains too high, and the rates of reuse and recycling are insufficient and considerably below the EU average.

Key recommendations

- ▶ The Council has made recommendations for the Government to promote sustainable construction, which include:
 - ▶ developing a strategy to increase the use of timber in construction and introducing whole-life carbon assessments and associated targets in the planning process for public buildings,
 - ▶ agreeing targets and implementing measures to reduce emissions in cement production processes,
 - ▶ reducing cement demand by providing financial incentives to encourage retrofitting of existing buildings instead of demolition and rebuilding.
- ▶ The Government needs to ensure that the electricity demand of new data centres is entirely met with new renewable generation. Any new data centre development must allow for simple connection to future district heating networks so that its waste heat can be used to provide low-carbon heat for homes.
- ▶ The Government should develop a Just Transition Plan that identifies skill gaps and the reskilling required to achieve climate targets. This will also signal areas for investment in training.
- ▶ The Government should ensure sufficient funding support to allow businesses to develop products and services promoting new innovations in adapting to the impacts of climate change.

a Other sectors will be dealt with sequentially in subsequent publications.



Abbreviations

CAP	Climate Action Plan
CCUS	carbon capture, utilisation and storage
CSO	Central Statistics Office
CSRD	Corporate Sustainability Reporting Directive
DETE	Department of Enterprise, Trade and Employment
EPA	Environmental Protection Agency
ETS	Emissions Trading System
F-gas	fluorinated gas
LEU	large energy user
MMC	modern methods of construction
SEAI	Sustainable Energy Authority of Ireland
SMEs	small and medium-sized enterprises
UNIDO	United Nations Industrial Development Organization

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Key observations

Industry emissions and trends

- ▶ Industrial emissions covered by the EU Emissions Trading Scheme, which represent approximately 80% of the total, fell by 6% in 2023.
- ▶ Cement industry emissions decreased by 6.2% in 2023 because of lower production levels. Approximately 50% of cement produced in Ireland is exported, primarily to the UK, where fluctuations in demand and price differentials can impact cement production in Ireland.
- ▶ In 2023, emissions from food and drink decreased by 3%, and emissions from bulk manufacturing of pharmaceuticals decreased by 6%.
- ▶ Industrial production and turnover data indicate a decline in manufacturing industry output of 8% in 2023. Gas demand for the Industrial and Commercial sector also fell by 5% in the same period.

Waste and fluorinated gases emissions and trends

- ▶ In 2022 waste emissions increased by 7% and accounted for 1.4% of total emissions, while fluorinated gas (F-gas) emissions remained relatively stable and accounted for 1.2% of total emissions.
- ▶ Methane emissions from landfill are the main contributor to emissions from the Waste sector. The most recent data from 2021 indicate just a 1% decrease in the overall production of waste, a plateauing of the recycling rates for municipal waste and a 4% decline in the recycling of packaging waste.
- ▶ The main drivers of F-gas emissions are the use of air conditioning and refrigerant gases. In addition, the increasing demand for heat pumps will increase F-gas emissions.
- ▶ The circularity rate for 2022 declined to 1.8%, from 1.9% the previous year, significantly below the EU average of 11.5%.

Key recommendations

Sustainable construction

- ▶ Greenhouse gas emissions from cement production at four cement plants in Ireland dominate industrial process emissions. The Council recommends early implementation of measures in the Climate Action Plan 2024 (CAP24) that target a reduction in the clinker content of cement. Annual targets for sustainable alternative fuel use as part of the next update of the Climate Action Plan to reduce the carbon intensity of clinker production should also be introduced.



- ▶ The Government should ensure that economic incentives, including grants and taxation structures, encourage retrofitting of the existing commercial and residential building stock over demolition to reduce demand for cement and concrete and to minimise the generation of construction waste.
- ▶ 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^a and that all new planning applications incorporate a whole-life carbon assessment in line with the provisions of the recently adopted 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.

Industrial policy

- ▶ The Council recommends that new data centre connections should be permitted only in the following instances:
 - ▶ The developer can guarantee that sufficient new renewable capacity in excess of the maximum electricity demand of the data centre will be connected to the grid in advance of commissioning.
 - ▶ Heat export ability is provided for at the time of initial construction to enable simple connection to future district heating networks. Legislation mandating the supply of waste heat to district heating companies by industrial facilities whose total rated energy input is at least 1 MW must be introduced.

Just Transition

- ▶ A Just Transition Plan must be developed and include a coordinated Government assessment of the skills required to achieve the National Climate Objective so that SOLAS, other state education agencies and employers can make the necessary investment in training and ensure provision of a transition pathway for the Industry sector that does not disadvantage segments of the workforce and wider community.

Climate resilience

- ▶ The Council recommends that the Department of Enterprise, Trade and Employment provides sufficient support for businesses to integrate adaptation into their operations, including for the development of products, innovations and services that enhance resilience to climate change.

^a The Royal Institute of the Architects of Ireland's 2030 Climate Challenge asks clients, architects and design teams to reduce operational energy demand by between 33% and 66%, embodied carbon by 40% and potable water use by 24%, along with improving site biodiversity and achieving core health and wellbeing targets.



1. Introduction

The Industry and Waste sectors include emissions from four separate subsectors that are reported on as part of the national greenhouse gas inventory. These are mainly associated with production processes and include manufacturing combustion, industrial processes, fluorinated gases (F-gases) and the Waste sector.

- ▶ Industrial process emissions encompass emissions from mineral, chemical and metal industries, non-energy products and solvents. The majority of industrial process emissions come from the production of cement at four cement plants in Ireland.
- ▶ Emissions from manufacturing combustion arise from fuel combustion used in manufacturing industries and include emissions from combustion for combined heat and power systems for own use in these industries.
- ▶ Emissions from the Waste sector include those from landfill and open burning of waste, mechanical and biological treatment and wastewater treatment. Methane emissions from landfill are the main contributor to emissions from the Waste sector.
- ▶ The key sources of F-gas emissions in Ireland are the production, use and disposal of equipment containing these fluids (e.g. refrigerators, mobile air conditioning systems, heat pumps and electrical switchgear).

Emissions from manufacturing combustion and industrial processes together accounted for 10.9% of Ireland's total emissions in 2022, or 6.59 Mt CO₂ eq.^[1] In 2022, emissions from manufacturing combustion decreased by 6.8% as a result of significant fuel usage reductions, and emissions from industrial processes decreased by 7.4% due to a reduction in cement production. The biggest share of enterprise emissions comes from a small number of large companies involved in cement and alumina manufacturing, and food and beverage processing, with approximately 80% of industry emissions (manufacturing combustion and industrial processes) included in the EU Emissions Trading System (ETS).^b Industrial emissions covered by the EU ETS fell by 6% in 2023.^[2] Emissions from fossil fuels used for space and water heating in commercial buildings are included as built environment emissions, and therefore are not considered here.

Emissions from the Waste sector and F-gas emissions combined accounted for 2.7% of total national emissions in 2022, or 1.62 Mt CO₂ eq.^[1] In 2022, F-gas emissions were at similar levels to those in 2021, while emissions from the Waste sector increased by 6.6%, largely as a result of an increase in methane emissions from landfills.

2. Sectoral emissions ceilings and key Climate Action Plan targets

The Industry sector, as defined in the sectoral emissions ceilings,^[3] covers emissions from both manufacturing combustion and industrial processes. The sector has been set an emissions ceiling of 30 Mt CO₂ eq for the first carbon budget period (2021–2025; see Table 1) and 24 Mt CO₂ eq for the second carbon budget period (2026–2030). This equates to an overall target of a 35% reduction in

^b Based on authors' own estimate from a comparison between EU ETS submission data and the Environmental Protection Agency National Inventory Submission.



emissions in the sector from 2018 levels by 2030. A range of actions set out in CAP24 aim to achieve this reduction, and include a 75% share of carbon-neutral heating in industry, a 30% decrease in embodied carbon in construction materials and a 10% reduction in fossil fuel demand through energy efficiency measures.

Emissions from industry accounted for 7.1 Mt CO₂ eq in 2021 and 6.6 Mt CO₂ eq in 2022.^[1] This indicates that 45.6% of the sectoral emissions ceiling for industry has been used in the first 2 years of the first carbon budget period (2021–2025) (Table 1). Industrial emissions covered by the EU ETS, accounting for approximately 80% of the total, fell by 6% in 2023.^[2] Based on current trends, Industry sector emissions will need to be substantially reduced to stay within the sectoral emissions ceiling for the first carbon budget period.

The Other sector, as defined in the sectoral emissions ceilings,^[3] covers emissions from F-gases and waste as well as emissions from petroleum refining, and the sector has been set emission ceilings of 9 Mt CO₂ eq for the first carbon budget period (2021–2025; see Table 2) and 8 Mt CO₂ eq for the second carbon budget period (2026–2030). This equates to an overall target of a 25% reduction in emissions in the sector from 2018 levels by 2030. A range of actions set out in CAP24 aim to achieve this reduction, including targeting waste prevention, increasing recycling and reuse, and reducing emissions from F-gases and from petroleum refining. Other emissions accounted for 1.9 Mt CO₂ eq in 2021 and 1.9 Mt CO₂ eq in 2022,^[1] which means that 42% of the sectoral emissions ceiling for Other sector emissions has now been used in the first 2 years of the first carbon budget period (2021–2025). This suggests that further reductions in Other sector emissions are required to remain below the sectoral emissions ceiling for the first carbon budget period.

Table 1: Reported Industry sector emissions for 2021–2022 in the context of the sectoral emissions ceiling (SEC) for the first carbon budget period 2021–2025.

(Sources: 1, Sectoral Emissions Ceilings Summary Report.^[3] 2, Ireland's Final Greenhouse Gas Emissions: 1990–2022.^[1]) Provisional inventory data for 2023 are not yet available

Carbon budget period	SEC ¹	Reported emissions 2021–2022 ²	SEC used 2021–2022 (%)
2021–2025	30 Mt CO ₂ eq	13.7 Mt CO ₂ eq	45.6%

Table 2: Reported Other sector emissions for 2021–2022 in the context of the sectoral emissions ceiling (SEC) for the first carbon budget period 2021–2025.

(Sources: 1, Sectoral Emissions Ceilings Summary Report.^[3] 2, Ireland's Final Greenhouse Gas Emissions: 1990–2022.^[1]) Provisional inventory data for 2023 are not yet available

Carbon budget period	SEC ¹	Reported emissions 2021–2022 ²	SEC used 2021–2022 (%)
2021–2025	9 Mt CO ₂ eq	3.8 Mt CO ₂ eq	42%



3. Progress on previous Climate Change Advisory Council recommendations

Previous Climate Change Advisory Council recommendations to the Industry and Waste sectors include the need for rapid decarbonisation of construction materials, clear implementation pathways for mitigation of industry emissions and improved circularity in the economy.

Decarbonisation of construction materials will have a large impact on emissions from the sector, with cement plants comprising four of the top five industrial emitters in Ireland reporting to the EU ETS. The Council has repeatedly called for the reduction of cement emissions through clinker replacement, efficient use of cement and replacement of concrete with materials containing lower embodied carbon, such as timber. Unfortunately, Climate Action Plan 2023 (CAP23) actions related to reducing embodied carbon in construction materials, including a report with specific actions, have been delayed. While Government approval of the Green Public Procurement Strategy and Action Plan is a welcome milestone, the Council is disappointed that specification of low-carbon construction methods is not mandatory, as public procurement will play a large role in the adoption of low-carbon building practices and methods. Regarding timber use, the Department of Enterprise, Trade and Employment (DETE) has been leading the cross-department and cross-agency Modern Methods of Construction (MMC) Leadership and Integration Group, which includes a focus on sustainable construction. A roadmap for the increased adoption of MMC in public housing construction was published in 2023, and the recent clarification that the requirements of the building regulations do not prohibit the use of timber products in construction at any height is noted.

The Council has highlighted the repeatedly delayed publication of the roadmap for the decarbonisation of industrial heating and the need for relevant policies to be aligned with investment decision timeframes for enterprise. Industrial heat comprised 20.7 TWh in 2022,^[4] and the majority of this can be decarbonised through clear long-term policy that is cognisant of enterprise investment timeframes. Several relevant strategies, including the hydrogen and biomethane strategies, have been published, but others are still awaited, and implementation pathways for the Industry sector remain unclear. The decarbonisation roadmap for industrial heating is a critical first step in providing the necessary policy direction to guide industry in investment decisions and must be published without further delay.

Ireland's circularity rate remains extremely low compared with other European countries. While the end-of waste criteria for recycled aggregate and national by-product material for asphalt were published by the Environmental Protection Agency (EPA) in 2023, promotion of markets for these materials is required to facilitate and increase their use in construction. Similarly, the latest EPA municipal waste characterisation study highlighted that urgent action is still needed to improve Ireland's municipal waste segregation and recycling performance to facilitate greater transition to a circular economy.^[5]

The Council recommends that Government rapidly delivers the outstanding actions from CAP23 and ensures the timely publication of relevant policies and strategies to facilitate the necessary long-term planning and investment across the sector.

4. Indicators

4.1. Industry emissions and main trends

The EU ETS emissions for Ireland illustrate that the largest five CO₂ emitters account for 60% of industrial CO₂ emissions and that five sectors dominate the top ten largest industrial emitters; these



include metals, cement, refining, food and beverages, and lime. The 2023 EU ETS data show that the emissions of the participating companies have reduced by 6% from 2022, with cement industry emissions decreasing by 6.2% as a result of lower production levels, emissions from food and beverages decreasing by 3% and emissions from bulk manufacturing of pharmaceuticals decreasing by 6%.^[2] In 2023, the largest emitter was Rusal Aughinish Alumina refinery, which is part of the metals sector, producing 1.02 Mt CO₂ eq, a 7.1% decrease on 2022. Cement production accounts for the next four largest emitters – namely two Irish cement plants (Platin and Limerick) and Mannock and Breedon plants – with emissions totalling 2.70 Mt CO₂ eq.

In addition to EU ETS data, industrial production indices and gas demand have been used to provide information on 2023 emissions. Industrial production indices have previously been shown to be weakly correlated with CO₂ emissions^[6] and can provide information on changes in output from large emitting sectors. While gas demand is likely to be a reliable emissions indicator, the data also include gas demand from small and medium-sized enterprises (SMEs), outside the definition of the Industry sector used for the sectoral emission ceilings, and so are not fully reflective of this sector.

The United Nations Industrial Development Organization (UNIDO) Index of Industrial Production for manufacturing industries in Ireland indicates a decrease of 7% in cement manufacturing output in 2023. Conversely, the index indicates an increase in food processing output, of 9%, and in basic metals output, of 20%, compared with 2022 (Figure 1).^[7] Central Statistics Office (CSO) industrial production volume and turnover indices for manufacturing industries indicate an annualised decrease of 8% in 2023,^[8] suggesting reduced output. This reduced output may also be reflected by the decreased gas demand for the Industrial and Commercial sector in 2023, 5% lower than in 2022, at 14,862 GWh (Table 3). These indicators imply that it is likely that emissions for the Industry sector have decreased in 2023, in line with the decreases observed in EU ETS emissions. However, provisional inventory data for 2023 for the sector as a whole are not yet available, and therefore this is subject to confirmation.

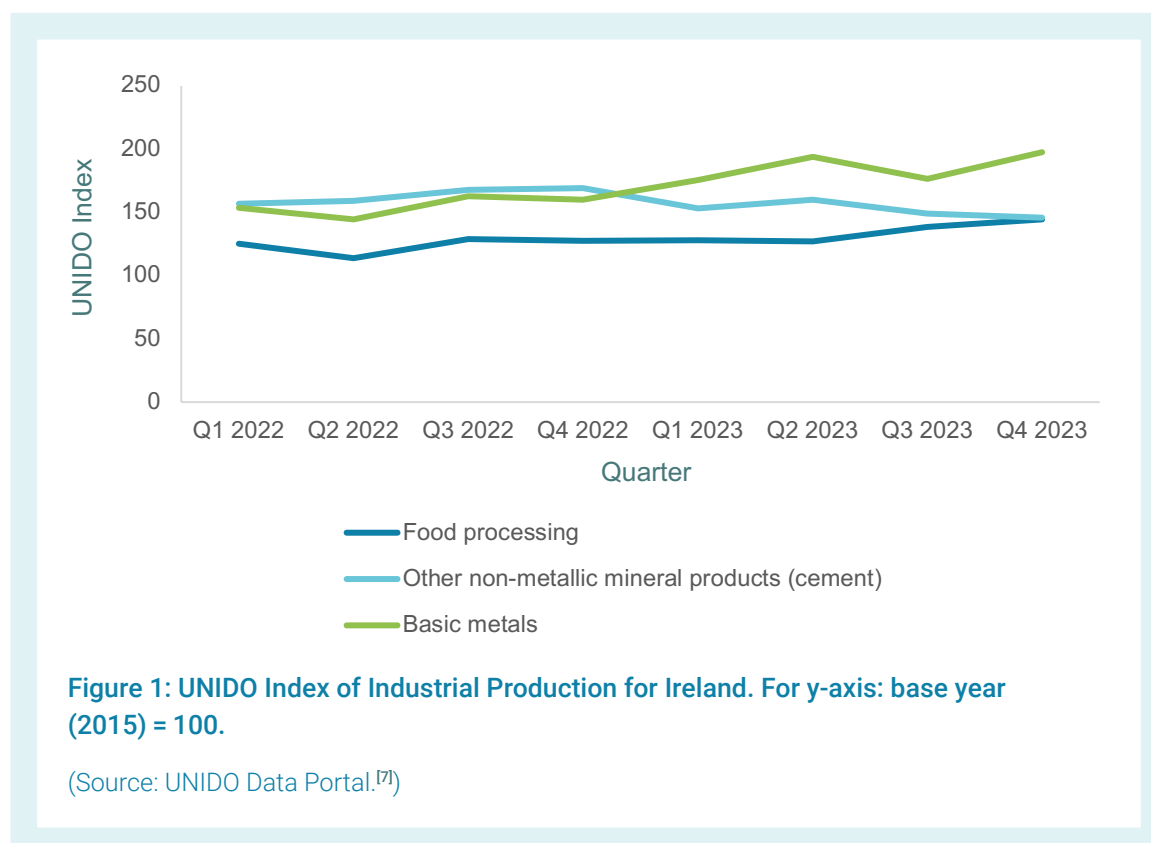




Table 3: Monthly gas demand report for Ireland

(Source: Gas Networks Ireland’s Gas Transportation Management System, personal communication, December 2023.) *5-year average relates to data from January 2018 to December 2022

Gas demand (GWh)	5-year average*	2022	2023	Change year on year (%)	Change vs 5-year average (%)
Industrial and Commercial sector (approx. 25% SMEs)	16,610	15,673	14,862	-5%	-11%

4.2. Limited industry investment in decarbonised technologies

Fuel switching from carbon-intensive energy sources is an essential strategy for decarbonisation of the Industry sector. This encompasses switching from fossil fuels to a diverse range of alternative energy sources, including renewable electricity, hydrogen, bioenergy and waste. The Sustainable Energy Authority of Ireland’s (SEAI’s) national energy balance, published annually in September, records fuel quantities consumed by the Industry sector in support of its primary activities and is broken down by fuel type, including electricity, renewables and non-renewable waste. In 2022, the most recent year for which statistics are available, industry consumed 2,148 ktoe,^c accounting for 17.8% of total energy demand.^[9] Based on the fuel consumption mix, the sector remains slow to convert to decarbonised technologies. Increased electrification of processes appears slow, with the share of electricity usage increasing only slightly to 27.5% in 2022, from 26.3% the previous year (Figure 2). The share of on-site renewables consumption has also not experienced significant growth, comprising 9.0% of energy consumption, largely unchanged from the 5-year average of 8.5%. Fossil fuel use (primarily natural gas) has also been slow to decline. Compared with the 5-year average of 63.1%, the proportion of fossil fuel declined to 60.8% in 2022, down from 63.3% in 2021. The fall in fossil fuel use is correlated with the increased use of both electricity and renewables. While some of this decline may have been driven by decarbonisation technologies, it remains problematic to disentangle this from changes in manufacturing processes and output. The remaining energy use, comprising non-recyclable waste, was 2.7% in 2022, up from 2.4% the previous year and above the 5-year average of 2.5%.

^c ktoe = kilotonnes of oil equivalent: the amount of energy released by burning 1,000 tonnes of crude oil.

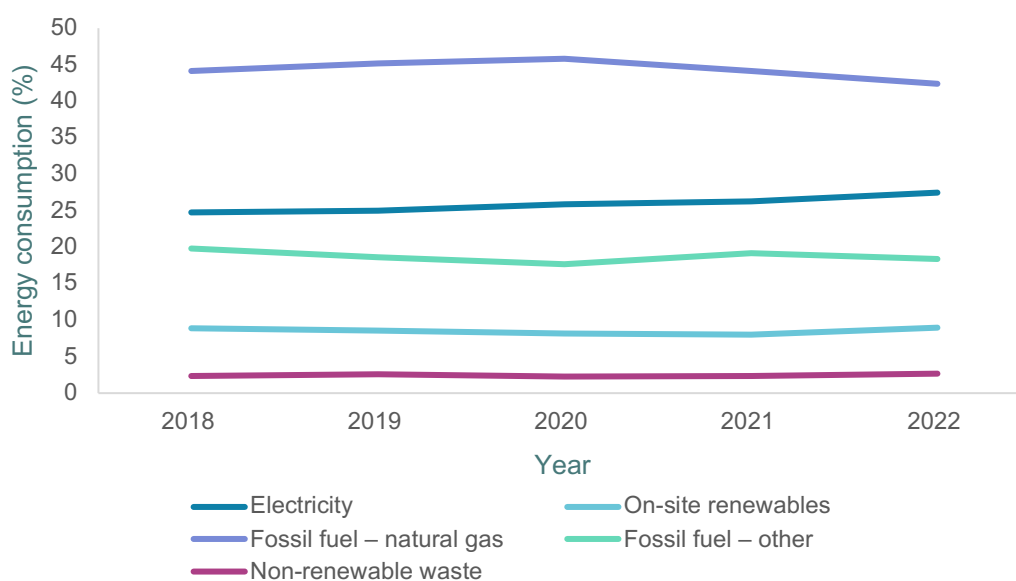


Figure 2: Industry energy consumption by source in Ireland 2018–2022.

(Source: SEAI National Energy Balance.^[9])

4.3. Waste statistics

The latest EPA inventory data indicate that emissions from the Waste sector accounted for 1.4% of overall emissions in 2022, representing an increase of 6.6% from 2021, largely as a result of an increase in emissions of methane from landfills by 7.6%. The most recent official statistics on waste generation and management in Ireland are from 2021,^[10] highlighting the need for more recent data on waste management and emissions to be publicly accessible to allow monitoring of progress against targets. The statistics also continue to indicate high volumes of waste generation, low recycling rates and worsening metrics for recycling rates of packaging waste and waste to landfill. Ireland produced 17.6 million tonnes of waste in 2021, of which 3.17 million tonnes was municipal waste, down just 1% from the previous year.^[10] Biodegradable municipal waste to landfill increased from 109,000 tonnes in 2020 to 129,500 tonnes in 2021. Recycling rates in Ireland have plateaued, with 41% of municipal waste recycled in 2021, far below the 2025 target of 55%, and the recycling rate of packaging waste declining from 62% in 2020 to 58% in 2021. Achieving a recycling rate target of 55% by 2025 will be a challenge, and significant progress must be made over the next 2 years to accomplish this.

The circularity rate for 2022, a measure of the share of material that is recovered and returned to the economy, remains very low, estimated at 1.8%, a decline from 1.9% in the previous year, which is much lower than the EU average of 11.5%.^[11] This highlights the significant challenge of achieving the Whole of Government Circular Economy Strategy, which aims to improve Ireland’s circularity performance to above the EU average by 2030.



5. Analysis and discussion

2024 is a critical year for the delivery of Ireland's national climate action, and businesses are well placed to take advantage of opportunities as Ireland transitions to a climate-neutral sustainable economy. Case studies of recent projects receiving SEAI grant support for the certified standard for Excellence in Energy Efficiency Design highlight the significant potential to reduce operational energy costs and carbon emissions; for example, a milk processing plant with significant thermal demand was able to achieve an 11% reduction in annual energy bills and a 7.7% decrease in site energy consumption.^[12] The Council urges all businesses to show leadership and treat climate action like any other business objective by setting ambitious targets to decarbonise their operations, developing a plan to achieve these, and transparently monitoring and reporting on their progress. The Government must ensure the consistent and long-term availability of funding to support businesses and accelerate their transition to low-carbon technologies.

5.1. Sustainable construction

MMC have the potential to dramatically improve the Construction sector's productivity, innovation, speed of delivery, sustainability and costs. MMC encourages products such as cross-laminated timber and timber frame that can replace concrete and steel in many applications, such as floors, roofs, walls and stairs, due to their strength and versatility. One of the biggest benefits of building with timber is that it can sequester large amounts of carbon from the atmosphere and store it within a building for as long as it stands. This can help achieve carbon-negative buildings by offsetting the carbon emissions generated through construction and operation. In this regard, the Council welcomes the establishment of the interdepartmental Timber in Construction Working Group in 2023 and awaits its recommendations for action. In Ireland, in 2022, about 24% of new builds were constructed using timber frame, which is significantly lower than the 83% of new builds constructed using timber frame in Scotland.^[13] Research^[13] has demonstrated that increased use of timber in construction results in greater annual abatement of greenhouse gas emissions. However, the type and mix of dwellings has a large influence, with larger emissions savings associated with the construction of apartments where masonry and concrete have been replaced with mass timber. The recent update to the building regulations^[14] and accompanying information note,^[15] which states that the requirements of the building regulations do not prohibit the use of timber products in construction at any height, is a noted development in this regard.

The challenge of satisfying housing demand in the coming years while decarbonising the Construction sector can be partially mitigated with an increase in the use of timber in construction projects. Furthermore, the expansion of timber frame construction in Ireland could also provide a strong market for domestically produced timber. For example, in 2022, Ireland produced approximately 700,000 m³ of construction-grade timber, but 265,000 m³ (or 35%) was exported. To increase the number of housing units built with timber frames in Ireland to 80%, an additional 200,000 m³ of construction-grade wood would be required to service that market.^[16] Therefore, there is huge potential to increase the use of home-grown timber, and the timber industry in Ireland must be supported to meet increasing demand for timber products. There is an urgent need for more detail in terms of how the expansion of timber frame construction will be realised and its linkage to commercial forestry in Ireland. The Council recommends that the Government establishes a high-level cross-departmental task force to prepare an overarching national strategy for all aspects of the timber industry in Ireland, including the production, processing and use of timber in construction.

Efficiency in design and construction is another approach that is crucial for achieving a reduction in the emissions associated with construction. The recent Council of the EU's adoption of the revised Energy Performance of Buildings Directive^[17] will make zero-emission buildings the new standard



for new buildings. All new buildings will be required to have zero on-site emissions from fossil fuels by 1 January 2028 for publicly owned buildings and by 1 January 2030 for all other buildings.^[18] The Royal Institute of the Architects of Ireland's 2030 Climate Challenge^[19] asks clients, architects and design teams to reduce operational energy demand for all new and retrofitted buildings by between 33% and 66%, embodied carbon by 40% and potable water use by 24%, along with improving site biodiversity and achieving core health and wellbeing targets. The analysis shows that constructing retail buildings that comply and even improve on the Royal Institute of the Architects of Ireland's 2030 Climate Challenge targets is practical, and relatively low-impact changes can improve the embodied energy performance of construction. The Council recommends that all publicly supported construction should adopt the Royal Institute of the Architects of Ireland's 2030 Climate Challenge as standard, and that all new planning applications incorporate a whole-life carbon assessment in line with the provisions of the recently adopted Energy Performance of Buildings Directive.

In addition to reducing Ireland's use of cement and concrete through efficiency in design and MMC, a greater focus on efforts to reduce the emissions associated with cement manufacturing is also required. Cement is the most widely used material on Earth and is responsible for over 7% of global emissions, more than shipping, aviation and long-haul trucking combined, producing 2.5 billion tonnes of CO₂ every year.^[20] Most of the emissions associated with cement and concrete come from the production of clinker, the critical ingredient in traditional cement, which is extremely carbon intensive and makes up 90% of overall cement emissions in the fabrication of concrete.^[21] Greenhouse gas emissions from production at four cement plants in Ireland dominate industrial process emissions, and targeted measures are needed to address these.

Based on a comparison of CSO trade data with information contained in Ireland's National Inventory Report, it is estimated that around half of the production at these four sites is exported, the majority of which is UK bound. UK demand for cement and any possible price differentials arising can therefore have an impact on cement production in Ireland. Notwithstanding this, and comparing these data with the EU ETS benchmarks for grey cement clinker,^[22] it would appear that there is scope for reducing the emissions per tonne of cement produced. Measures in CAP24 focus on substituting low and net zero carbon products for traditional construction materials and a reduction in the clinker content of cement. The Irish Green Building Council has recommended that the Government should work with the cement industry to support innovation in clinker replacement.^[23] It is also important to reduce the carbon intensity of clinker by switching to alternative fuels to achieve maximum fossil fuel replacement and reduce the overall emissions associated with cement production. A range of alternative fuels is available to replace fossil fuels in the manufacture of cement, including, for example, solid recovered fuel (a mixture of shredded paper, card, plastics and textiles made from non-recyclable residual waste), tyres (chipped and whole), secondary liquid fuel (solvents) and biosolids (dried sewage sludge pellets).^[24,25] As well as early implementation of measures in CAP24 relating to a reduction in the clinker content of cement, the Council calls for the introduction of targets to increase the use of sustainable alternative fuels to replace fossil fuels and reduce the carbon intensity of cement clinker as part of the next update to the Climate Action Plan. Case studies from other jurisdictions^[26] have shown that the expansion of alternative fuel use in the Cement sector will require the industry to grasp alternative fuel market opportunities as they emerge, establish mid- and long-term contracts with the Waste Management sector, and develop skills in operating kilns that can accept low-quality alternative fuels.

The reuse and recycling of construction and demolition waste can reduce the demand for the production of virgin 'primary' construction materials and reduce the emissions from the production of cement clinker and concrete as a result. Construction and demolition waste represents the largest



waste stream in Ireland, in terms of both volume and weight, and accounts for more than one-third of all waste generated in the EU. In Ireland, 9 million tonnes of construction and demolition waste was generated in 2021, an increase of 10% since 2020.^[27] The Council welcomes the EPA's recent publication of the national end-of-waste criteria for recycled aggregates^[28] and the national by-product criteria for site-won asphalt.^[29] The end-of-waste criteria for recycled aggregates apply to aggregates recycled from construction and demolition waste, including soil and stone, concrete, bricks and ceramics. The criteria allow the replacement of virgin aggregates with recycled aggregates in uses such as general fill, road construction, railway ballast and other non-structural uses. The national by-product criteria apply to site-won asphalt (road planings) from road developments. These decisions give the construction industry the opportunity to demonstrate, with an appropriate level of rigour, that these recycled cementitious materials can be used as a secondary resource in place of a non-waste-derived virgin 'primary' resource. These criteria allow the safe reclassification of recycled aggregates and road planings from a waste to a product that can be subsequently placed on the market and help meet the demand for secondary construction products to support the development of new infrastructure with a lower carbon footprint. The Council recommends that the construction industry and Waste sector adopt, implement and build on the end-of-waste criteria for recycled aggregate and national by-product criteria for site-won asphalt (road planings). The Green Public Procurement Strategy and Action Plan should support the development of markets for the reuse of construction and demolition waste as secondary raw materials and reduce the use of virgin materials in construction.

In addition to the environmental benefits, there are also financial benefits to the management and reduction of waste during construction and demolition projects.^[30] The EPA has published Best Practice Guidelines on the Preparation of Resource and Waste Management Plans for Construction and Demolition Projects.^[30] Furthermore, the prioritisation of retrofitting over demolition and rebuilding can both reduce demand for cement and concrete and minimise the generation of construction waste. Some measures aimed at promoting a retrofit-first approach include cutting the VAT rate on refurbishment, repair and maintenance, promoting the reuse of existing building stock and recycled construction and demolition waste by introducing new clauses into planning guidance and building regulations, and insisting that all publicly funded projects look to retrofit solutions first. The Government should ensure that economic incentives, including grants and taxation structures, encourage retrofitting of the existing commercial and residential building stock over demolition to reduce demand for cement and concrete and also minimise the generation of construction waste.

5.2. Promote investment in decarbonised industrial heat

Industrial heat decarbonisation can be achieved through the three strategies of improving energy efficiency, switching to lower carbon fuels, and carbon capture, utilisation and storage (CCUS). The suitability of heat decarbonisation strategies is dependent on the heating process, heat grade and technology type. Barriers to decarbonisation exist across economics and financing, policy and regulations, technical and technology, and the availability of information for relevant stakeholders. The Council has repeatedly called for policies aimed at decarbonising industrial heat demand to provide clear signals to industry to make investment decisions in required technologies (see *Section 3*). Clarity on policy and regulatory expectations on the future availability of unabated fossil fuels for heat is crucial for industry to assess and select the most relevant infrastructure investment options for decarbonisation. Early action is crucial for limiting the growth in cumulative emissions to meet Ireland's climate obligations. The SEAI has stated that focusing industry decarbonisation on renewable and electrification technologies that are commercially available today will result in lower cumulative emissions than alternative pathways that wait for technologies that will not be available at scale this decade.^[31] For example, in Ireland, the annual heat recovery potential from



waste heat sources is 2.2 TWh,^[32] approximately 10% of the current industrial heat demand of 20.7 TWh^[4] and not currently utilised.

Recent progress on the decarbonisation of industrial heating is difficult to measure, as the metrics applied (carbon-neutral heating and electrification of heat) are not comprehensively measured and monitored. To address this, it is important that industrial heat data collected by SEAI for its National Heat Study are updated annually or alternative measurable metrics that record heat decarbonisation are adopted and monitoring is implemented. Although this would not directly lead to decarbonisation, it would ensure that Climate Action Plan targets and policy measures can be analysed.

Support for the implementation of decarbonisation technologies currently exists from both the Irish Government and via EU schemes.^[33] However, several funds, including the Climate Action Fund and the Renewable Heat Support Scheme, will cease to accept new applications from 2027, and it is currently unclear what upfront grant or financing support will be available in Ireland thereafter. To ensure uptake of new technologies, a consistent funding stream is essential. Therefore, DETE should explore the nature and extent of future capital and operational expenditure grant supports for inclusion in the revised National Development Plan and provide clarity on support available beyond 2027. Decarbonisation technologies, particularly for high-temperature applications, are diverse in terms of technology readiness and emissions savings potential. Demonstration projects in Ireland must be supported to provide context-specific solutions with the highest carbon and cost savings.

Biogas, biomass, district heating, hydrogen, electrification and CCUS can all contribute to industrial heat decarbonisation in Ireland. These approaches require complementary infrastructure and resources outside serviced industry sites, but the future availability of these options is uncertain. As a result, stakeholders may be poorly aligned to develop the decarbonisation infrastructure and manage interdependences. To de-risk investments in infrastructure, the Government must engage with industry to identify cost-effective decarbonisation solutions by strengthening the evidence base. This should include facilitating sharing data on future energy supply and demand and infrastructure opportunities to enable stakeholders to assess and select the most relevant infrastructure investment options. DETE must also support heat-intensive businesses and infrastructure developers to understand and plan for options available through feasibility, techno-economic and engineering studies. Platforms and support for these should be available by the end of 2025. Regardless, given the target to reduce the share of fossil fuels used in industry to 25–30%, there is an urgent need to support decarbonisation technologies along with funding for pilot and demonstration projects before the end of 2024.

Electrification remains a primary method for heat decarbonisation in CAP24. However, the National Planning Framework lacks specific national policy objectives for industrial heat electrification, and, while CAP24 acknowledges this, it is critical that the National Planning Framework is revised and published as soon as possible to support the integration of renewables and address grid capacity issues. To scale up industrial heat electrification, it is essential that opportunities to reduce electricity costs for industrial users are understood and implemented. High-temperature electric heating systems have limited availability and readiness. There are often high upfront costs associated with novel technologies, and electrification of heating requires low electricity prices, or compensatory ongoing support. To facilitate rapid electrification, supports must exist that reduce electricity costs for industrial users, including capital and operational expenditure, which are consistent with the associated carbon savings.



5.3. Industrial policy on data centres

EirGrid's median demand forecast for the 2022–2031 Generation Capacity Statement^[34] estimates a 34% increase in demand for electricity by 2030, with the largest growth coming from data centres, which are projected to account for 23% of electricity demand by 2030. Increasing electricity demand from data centres offers economic benefits but also makes the climate targets harder to meet. As previously stated by the Council,^[35] accelerated deployment of onshore renewable electricity generation will be crucial for the Electricity sector to meet its sectoral emissions ceiling for the first carbon budget period (2021–2025). The delay in the expansion of Ireland's onshore renewable capacity in line with CAP23 targets, and the continued use of coal in electricity generation, means that steeper emissions reductions will be required in future to remain within the carbon budget. The Council has recommended^[36] that new data centre connections be permitted only when the data centre developer can guarantee that sufficient new renewable capacity, in excess of the maximum electricity demand of the data centre, will be connected to the grid in advance of commissioning the data centre. A Corporate Power Purchase Agreement alone would be insufficient in this case. The developer must demonstrate that additional new renewable capacity will be built in addition to that already planned, in line with the principle of renewables additionality, as set out in the Government statement on the role of data centres.^[37]

The Council has also previously recommended that each system operator should work with large energy users (LEUs) to facilitate accurate hourly emissions reporting, grid carbon-intensity transparency, and allow LEUs, such as data centres, to optimise computing loads to maximise use of renewables and minimise carbon emissions. The inclusion of a new action in CAP24 regarding the implementation of an enhanced emissions reporting framework for electricity emissions for LEUs and the system operators dispatch actions is a welcome development. However, this enhanced emissions reporting framework for LEUs must be delivered without delay by Q4 2024, as outlined in CAP24. The Council has repeatedly recommended the urgent publication of the demand-side strategy, which underpins several CAP24 actions specifically aimed at reducing demand and increasing the flexibility of LEUs. The demand-side strategy should facilitate the roll-out of local flexibility markets and contain measures to incentivise LEUs, including data centres, to increase the flexibility in their electricity demand.

Data centres can be designed to capture waste heat for distribution and reuse. The Council is disappointed about the limited reference to the potential for data centres to support local energy system decarbonisation in the Government's Statement on the Role of Data Centres in Ireland's Enterprise Strategy. Waste heat from a data centre is currently being used successfully at the Tallaght District Heating Scheme. The network uses excess heat from Amazon Web Services' data centre to provide low-carbon heating to the network customers, currently South Dublin County Council and Technological University Dublin. The number of data centres, particularly in the Dublin area, presents an untapped source of waste heat eligible for use in district heating systems. The proposed recast of the Energy Efficiency Directive sets out minimum requirements to monitor and publish the energy performance of data centres, which would ensure that energy consumption and waste heat utilisation information is made publicly available. The Council recommends that new data centres and other LEUs located near densely populated urban areas build in heat export ability at the time of initial construction, for simple potential connection to future district heating networks. The District Heating Steering Group Report 2023^[38] recommends that the Department of the Environment, Climate and Communications brings forward proposals for legislation to mandate the supply of waste heat to district heating companies by industrial facilities whose total rated energy input is at least 1 MW, where technically and economically feasible.



5.4. Waste management

The largest source of waste emissions is from solid waste disposal in landfill sites and, as a result, policies aimed at reducing waste emissions are centred around waste minimisation and recycling to reduce the volume of waste sent to landfill. However, Ireland is on course to miss 2025 EU waste recycling targets for municipal, total packaging and plastic packaging wastes.^[39] The recent launch of the deposit and return scheme is a welcome initiative to help achieve national targets. As of 15 May 2024, the Re-turn scheme has collected over 100 million drinks containers since its launch on 1 February, with over 3 million drinks containers returned on Sunday 12 May alone, demonstrating growing public support for the scheme.^[40] Progress has been made in combating illegal waste activities; however, household and commercial waste management was the poorest performing area in the recent EPA assessment of national enforcement priorities.^[41] The EPA's recent waste characterisation study shows that many households and businesses are still failing to properly segregate their waste.^[42] Improving recycling rates through better segregation of wastes into the general, recycling and organics bins is essential if Ireland is to reduce the amount of waste it is sending to incineration facilities and landfills. Local authorities have a key role to play in improving segregation and increasing recycling of both household and commercial waste, by targeting their enforcement of the roll-out and proper use of the three-bin system. A Government-led initiative to identify and prioritise evidence-based strategies that support behavioural change and individual action on recycling targets for municipal, total packaging and plastic packaging wastes is required. In addition, authorised waste collectors should be required to do more to ensure the roll-out of the three-bin system and support their customers in their proper use.

Food waste is a global problem that has environmental as well as social and economic consequences. More than one-quarter of the food produced globally is wasted. It is a significant contributor to climate change, as food loss and waste contribute to 8–10% of greenhouse gas emissions.^[43] Households are the biggest producers of food waste, accounting for 29% of the total in 2021 (221,000 tonnes), closely followed by the Food and Beverage Manufacturing and Processing sector, which accounted for 29% (215,000 tonnes). Ireland is committed to reducing food waste by 50% by 2030, in line with the United Nations Sustainable Development Goals. Ireland's National Food Waste Prevention Roadmap 2023–2025^[44] outlines several priority actions aimed at consolidating efforts to prevent food waste across key sectors in the food supply chain. The Council welcomes the roadmap's commitment to delivering an overarching communications and awareness plan on food waste prevention, covering all stages of the food supply chain, principally through Ireland's Stop Food Waste Programme led by the EPA, and awaits the publication of a report on the roadmap's implementation.

5.5. Just Transition

DETE has a key role to play in building the required ecosystem for a Just Transition across the sectors the department is responsible for. For example, DETE is responsible for ensuring that employees who are at risk as a result of the transition are not negatively impacted. The Council recommends that DETE develops a Just Transition Plan to provide a pathway on how the sectors will transition to a carbon-neutral economy without disadvantaging segments of the workforce and the wider community. The foundation of a transition plan should embed the Just Transition principles and support justice, equity, decent work and social inclusion outcomes. When established, the Just Transition Commission can play a role in supporting the development of a Just Transition Plan. A similar approach to ensuring a Just Transition across sectors can be observed in other jurisdictions, such as New Zealand^[45] and Scotland.^[46]

Ensuring that people are equipped with the right skills to be able to participate in and benefit from the future carbon-neutral economy is at the core of a Just Transition. Identifying the skills required for new



employment opportunities will support targeted investment for upskilling and reskilling of employees at risk. The Council recommends an assessment of the skills required to support the achievement of the National Climate Objective so that SOLAS, other state education agencies and employers can make strategic training investments. The assessment can inform the development of a Just Transition Plan. Evidence exists that highlights that an increase in skills will be required across industry. The Skills for Zero Carbon report, published in 2021, highlights that 75% of Irish companies need new skills to meet climate goals.^[47] Another report identified the specific skills and talent needed to meet the demands of the growing offshore wind industry in Ireland, highlighting strong opportunities in project development, operation and management and proposing a series of short-, medium- and long-term recommendations for addressing skills shortages and increasing levels of local content in Irish projects.^[48] Separately, a report commissioned by SOLAS and published in 2023 estimated that 22,779 new entrants will be required between 2023 and 2030 to support the Government's target of retrofitting 446,300 homes by 2030.^[49] Furthermore, a study identified capacity constraints in the labour market for delivering the National Development Plan.^[50] The lack of capacity with respect to human resources and relevant skills was identified as the largest barrier to environmental policy implementation, at both policymaking and policy delivery levels, by Government and semi-state bodies.^[51] Further evidence is necessary to identify the skills required across all sectors that will be impacted. A centralised open access database of the current and future skills required to support the transition to a climate-neutral economy would be a good step.

5.6. Corporate sustainability reporting

The EU Corporate Sustainability Reporting Directive (CSRD) of 2022^[52] will be an important tool for businesses in Ireland to identify and disclose the risks they face from a changing climate, as well as the impacts they may have on climate, society and other environmental parameters, including biodiversity. The CSRD requires reporting against a set of European Sustainability Reporting Standards,^d which were adopted by the European Commission in July 2023.^[53] The public consultation on transposing the CSRD into Irish law was held in 2023. It is effective from 1 January 2024 for public interest entities with more than 500 employees (reporting in 2025), from 2025 for companies and public interest entities with 250–500 employees (reporting in 2026) and from 2026 for listed SMEs (reporting in 2027) with an 'opt-out' possible until 2028.^[54]

CSRD reporting will provide useful annual information from 2025 on climate risks and opportunity assessments undertaken by businesses, as well as data on their efforts to reduce greenhouse gas emissions and to improve overall sustainability. To facilitate transparency, the Council recommends that the Government should immediately set up an easily accessible public database of businesses' annual CSRD digitalised reports and ensure that the information therein is kept up to date to help users of annual reports evaluate the sustainability performance of companies in Ireland. This would ensure that better data are available on private sector action on climate as well as other environmental and social standards. It would also allow for tenable learning and knowledge sharing opportunities between different businesses. The Council recommends that DETE should convene an outreach and awareness programme for businesses on their CSRD disclosure requirements relating to climate change.

d There are 12 European Sustainability Reporting Standards on general requirements, general disclosures, climate (including adaptation, mitigation and energy), pollution, water and marine resources, biodiversity and ecosystems, resource use and circular economy, own workforce, workers in the value chain, affected communities, consumers and end users, and business conduct.



The Council welcomes existing climate supports from Government to businesses to help them reduce emissions, transition to low-carbon economy and achieve increased energy efficiency in their operations. Examples of these supports are, among others, the Climate Toolkit 4 Business and Green Transition Fund.^[55] The Council recommends that DETE puts in place systems and processes to ensure that all businesses are informed about and actively encouraged to avail themselves of the Climate Toolkit 4 Business and the Green Transition Fund.

5.7. Climate resilience

The private sector has played a limited role in the implementation of adaptation strategies in Ireland to date. A report commissioned by the EPA found that awareness of climate change adaptation was limited among businesses in Ireland with the exception of large companies and the Financial Services sector.^[56] The report also found that SMEs tend to be focused on climate actions that result in efficiencies and cost savings and that most are unaware of the risks and opportunities that climate change will present in the future.

Business and industry are not included as a specific sector in Ireland's draft updated National Adaptation Framework. In terms of climate change resilience, the CSRD offers new opportunities and places obligations on Irish businesses to plan for and manage climate change risks, including transboundary climate risks and the potential impact of these on their supply chains and operations. Improved information on physical climate risks projected to affect Ireland, as well as the expected timeframe for impacts, is now available, including the EPA's Climate Ireland,^[57] Met Éireann's National Framework for Climate Services,^[58] Ireland's Climate Change Assessment^[59] and other sources. The European Climate Risk Assessment^[60] highlights the need for businesses to better integrate physical climate risks and adaptation needs into existing disclosure and due diligence frameworks and for stress tests to better account for cascading, compounding and tail risks from climate change. The assessment also notes the need for more action to facilitate access to and increase the purchase of weather-related insurance for businesses.

Existing climate supports from Government to businesses have focused mainly on climate mitigation and initiatives to reduce the carbon footprint of business operations.^[55] Government supports relating to adaptation, such as Emergency Business Flooding Schemes, have been more reactive and focused on supporting businesses damaged by flooding events. Businesses have not been supported or incentivised with a targeted programme to develop innovative new products and services for the 'adaptation economy' and to capitalise on opportunities for adaptation to climate change. Several opportunities exist to stimulate Irish business in this area, including technologies for more climate-resilient agriculture, deployment of nature-based solutions to protect biodiversity, and digital-based services such as early warning systems for hazards and systems for monitoring environmental conditions. Climate change adaptation should also be increasingly integrated into the operations of businesses. The Council recommends that DETE ensures that sufficient supports are available for businesses to integrate adaptation into their operations and to develop products, innovations and services that enhance adaptation and resilience to climate change.



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