

The hidden costs of inaction

Why a failed climate transition will prove costly



This paper is part of a series of research outputs that supports the Council’s assessments of the long-term sustainability of the public finances.

The series is specifically intended to provide analysis and research that feeds into the Council’s Long-term Sustainability Reports.

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1. Overview of findings

This report assesses the long-term fiscal impacts of climate policy. It focuses on three distinct scenarios:

- **coordinated action** where Ireland and the rest of the world successfully transition to net zero
- **inaction** where Ireland misses its targets, other countries stick to current policies, and temperatures rise more than they otherwise would; and
- **uncoordinated action** where Ireland takes action to meet its net-zero targets, but the rest of the world fails to act.

When comparing these scenarios, several key insights emerge.

First, the State faces a direct choice between investing in the domestic economy or risking paying substantial amounts for missing its targets. If Ireland takes action, the Exchequer will incur costs to electrify transport, upgrade buildings, and decarbonise. If Ireland chooses inaction, these upfront transition costs would be lower. But the State risks facing massive costs for missing legally binding EU targets. Instead of paying to make up for falling behind, that same money could fund measures that support the transition and bring broader benefits to Irish society. The €5 billion spent in recent years on temporary fuel and energy supports also puts the trade-off in perspective. These amounts could have instead funded more lasting alternatives, like deep retrofits for over 110,000 homes or enhanced €10,000 subsidies for half a million electric vehicles.

Second, domestic climate action is an insurance policy with benefits, even if the rest of the world fails to act. In an uncoordinated scenario, where Ireland acts but global temperatures still rise, the State could face severe economic damages alongside high costs to fund its own transition. However, acting alone guarantees tangible local benefits and limits potential costs. It would shield the State from escalating, open-ended costs of missing EU targets. It would reduce public healthcare costs associated with air pollution. It would lower the running costs of homes and vehicles for citizens, helping alleviate burdens associated with a higher cost of living whilst improving Ireland's energy security. And it would help position Ireland at the frontier of tomorrow's technology.

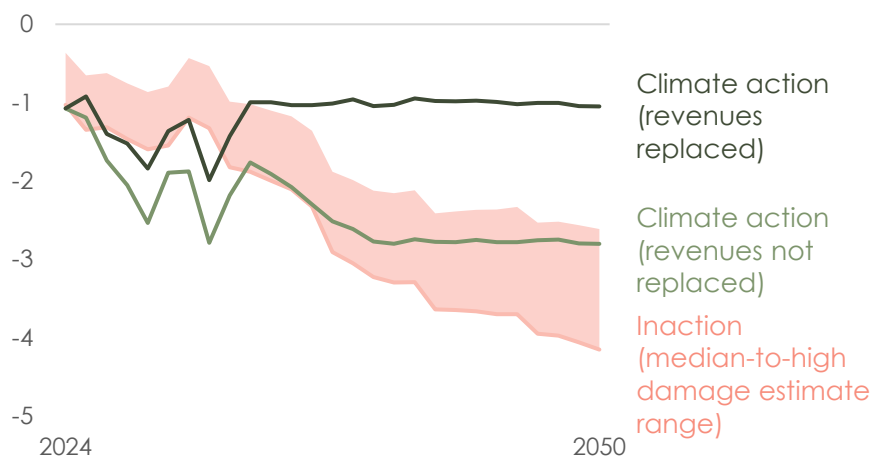
Third, regardless of the path chosen, Ireland will eventually have to replace lost fossil fuel revenues. The ongoing shift towards electric vehicles and electrification means tax revenues tied to fossil fuels will fall significantly. Even if the State takes no further climate action, these revenues will still decline. The Government must devise a strategy to replace this lost revenue, potentially through measures like distance-based road charges.

Replacing taxes would not necessarily mean having to increase the overall tax burdens on average taxpayers. The overall tax take would, in effect, remain unchanged relative to today, though who exactly pays those taxes may change. The Commission on Taxation and Welfare (2022) suggested measures such as congestion charges and road-use charges based on distance, location, and time to fill the gap. These measures have been introduced elsewhere and should be considered. However, policy should be mindful not to introduce them too fast or in ways that could derail transition efforts such as people’s switch to electric vehicles.

A credible strategy could reduce the overall impact of climate action on Ireland’s annual budget balance substantially to just 1% of GNI* (Figure N° 1). By contrast, wider inaction, coupled with no credible plan to replace revenues could double annual impacts out to 2050 on average (2% of GNI*), even rising to as much as four times the cost in time (4% of GNI* by 2050).

N° 1 Successful policy action would help cap potential fiscal costs

Impact on budget balance, % GNI*



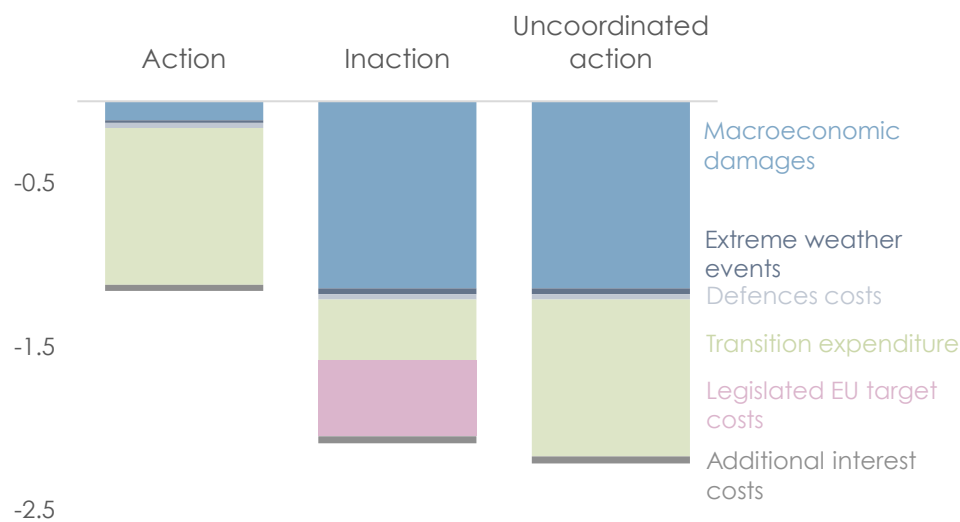
Source: Own estimates.

Notes: The inaction scenarios assume global inaction, with higher levels of warming as a result (+2.5°C by 2100). By contrast, the action scenarios assume lower levels of warming (+1.6°C by 2100).

Finally, action remains fiscally prudent. The least cost outcome is a situation in which Ireland’s action domestically were matched by international efforts. This would see the economic and budgetary impacts of climate drastically curbed. Failing that, even a situation in which Ireland takes action and others do not has similar costs to wider inaction. That is, the average budgetary impact would end up broadly similar at close to 2% of GNI* on average (Figure N° 2) — almost double the costs of action.

N° 2 It is prudent to act

Annual average impact on budget balance where revenues are replaced, % GNI* 2026-2050



Source: Own estimates.

Notes: These average annual budget balance impacts assume that revenue losses are ultimately replaced, keeping taxes unchanged as a % of GNI*. The inaction and uncoordinated action scenarios both assume higher levels of warming (+2.5°C by 2100) than the action scenario (+1.6°C by 2100).

This all suggests that, from a sustainability of the public finances perspective, action is the more sensible approach. If Ireland takes climate action, in a way that successfully contributes to more coordinated action, the Exchequer costs will be far lower.

Thinking of policy, four design principles stand out. First, emphasising fairness and tangible local benefits when communicating the case for policy action. Second, using fiscally sustainable incentives like “feebates” that pair higher taxes on high-emission products with rebates on cleaner alternatives. Third, reframing choices to account for behavioural biases such as loss aversion and status quo bias. Fourth, phasing in alternative taxes gradually to avoid derailing the take-up of cleaner technologies.

2. Introduction

This paper assesses the long-run macroeconomic and fiscal implications of climate change, and the transition to net zero.

The paper updates previous analysis by the Irish Fiscal Advisory Council on the implications of climate change for Ireland’s public finances. It builds on earlier work by extending both the scope of scenarios considered and the range of fiscal channels assessed.

There are two main differences relative to previous analysis.

Stylised scenarios

First, we focus on three stylised climate scenarios. These are designed to cover a wide range of potential outcomes and clarify the choices facing policymakers:

- A **“Policy Action”** scenario assumes stronger mitigation efforts consistent with achieving net zero emissions by 2050. This would be in line with Ireland’s domestic targets and the international commitments like the Paris Agreement. This scenario assumes that the policy response is universal. That is, other countries are also assumed to achieve their agreed reductions in emissions. This pathway limits long-term climate damages. However, it still entails fiscal costs related to transitioning to a greener economy. This is one way to assess the wide range of potential outcomes.
- An **“Inaction”** or “Business-as-usual” scenario. This reflects a continuation of existing policies (“with existing measures” in some modelling frameworks)— those policies that are already in place but nothing beyond that. This scenario implies that emissions reductions will be insufficient to meet Ireland’s agreed targets and, because we assume inaction is universal, higher global warming over time.¹
- **“Uncoordinated Action”**: This assumes Ireland successfully transitions to net zero by 2050, but the rest of the world does not. Ireland faces domestic transition costs and global macroeconomic damages. However, it avoids EU

¹ Understanding the potential scale of damages under a higher warming pathway is necessary to inform adaptation planning and fiscal exposure in the long run (ESABCC , 2026).

compliance fines, protects public health from air pollution, reduces vehicle and heating costs, and reduces exposure to volatile fossil fuel markets. To establish the outer bounds of what could happen, the main body of this report compares the extremes of global action against global inaction. The uncoordinated scenario, which tests the practical case for Ireland acting alone, is detailed in Appendix A.

These three scenarios provide a clear contrast between an active policy response to climate-related challenges and the implications of doing nothing.

Of course, there are risks that Ireland’s action is not matched by efforts elsewhere. The results will vary depending on the extent of efforts made by different countries to limit climate damages and the associated increases in extreme weather events and associated health costs. Appendix A shows a scenario where there is uncoordinated policy action — domestic policy action coupled with global inaction.

The two key scenarios we focus on — effective policy action and policy inaction — have very different implications. As the table below shows (Nº 3), large costs are likely in an inaction scenario when all channels are considered. Taxes would be expected to fall more than in a policy action scenario where fossil fuel revenues are replaced. Moreover, the lack of action, when considered at the national and global level, would be expected to lead to more severe economic impacts, more extreme weather, worse health outcomes, more urgent needs for flood and other defences, and costs arising as a result of missing EU targets.

Nº 3 How certain policy scenarios compare

Illustrative impacts expected for an “inaction” and “policy action” scenario

	Inaction		Policy action	
Fossil fuel taxes	↓↓↓	Gradually decline	–	Actively replaced
Transition spending	–	Unchanged	↑	Additional supports
Climate macro impacts	↓↓↓	More severe	↓	Less severe
Damage costs	↑↑↑	More severe	↑	Less severe
Defences costs	↑↑↑	More severe	↑	Less severe
Health-related costs	↑↑↑	More severe	↑	Less severe
Legislated EU target costs	↑↑↑	Legal costs faced	–	Costs avoided

More comprehensive analysis of trade-offs

A second difference with the Council's previous work on fiscal risks associated with climate (Fiscal Council and CCAC, 2025; Casey & Carroll, 2023) is that we broaden the analysis. We extend our analysis to capture more ways in which climate change is likely to affect the public finances.

Earlier work focused primarily on the direct fiscal costs of the transition — reduced taxes from lower fuel use, and government supports or subsidies to encourage the transition.

This paper is more comprehensive. It includes the economy-wide macroeconomic effects expected to result from long-run changes in climate. It looks at the potential costs of missing legally agreed international climate targets. It assesses the pressures that are likely to arise in public healthcare settings related to a hotter climate and higher levels of air pollution. Finally, it also updates the estimates of the transition-related spending and revenue impacts.

The analysis draws on the OECD-EDISON framework (OECD, 2025a). This provides a consistent, scenario-based approach to assessing the long-run economic and fiscal implications of climate change. The tool combines global macroeconomic scenarios, country-level damage functions and sectoral pathways to trace how climate change and climate policy affect public finances over time. The methodology and data sources are set out in detail in the accompanying OECD technical guidance (OECD, 2025a).

3. Macroeconomic impacts

Assessing the long-run macroeconomic implications of climate change is critical to understanding its fiscal impact. Climate risks can manifest through various avenues, such as the destruction of capital or in terms of the availability of labour. However, long-run models predominantly capture these impacts through the climate's impact on productivity. That is, rising global temperatures and extreme weather events act as a drag on productivity, permanently reducing the efficiency with which economies can produce goods and services.

This section draws on estimates of the macroeconomic impacts of climate change used by the OECD (2025b) for its long-run scenarios (see Box A). The estimates show how higher global temperatures are expected to affect economy-wide activity over time. These scenarios are expressed as lower levels of GDP relative to a world without climate change.² For Ireland, subsequent sections discuss the implications in terms of GNI*.

The macroeconomic impacts we consider are modelled as translating into more adverse fiscal outcomes. As economic output falls relative to baseline levels, government revenues are assumed to decline proportionately. That is, we assume a “one-for-one” fall in revenues in line with reduced economic activity (a revenue elasticity of 1). This aligns with past estimates developed by the Council (Casey & Carroll, 2023).

For public spending, we follow the approach adopted by the Office for Budget Responsibility (2024). Spending is assumed to respond with an elasticity of 0.5 to changes in the size of the economy. This roughly implies that governments seek to maintain public expenditure to some extent in cash terms.³ For instance, it could be taken to entail governments maintaining public services and investment at baseline nominal levels, while reducing other areas of non-interest spending, such as welfare and pensions. As a result, the mismatch between shrinking cash receipts and less

² The macroeconomic projections capture the long-run indirect effects of climate change on potential output. Additional costs from extreme events and adaptation measures are considered separately as direct public expenditure. Further detail is provided in Section 4.

³ There is international evidence that nominal expenditure tends not to adjust down fully in line with lower economic activity. For instance, past episodes of debt reduction underscore the rarity of outright spending cuts, and the reliance on spending restraint (Hitschfeld, Pina, & Miyahara, 2025).

responsive public expenditure means that climate-induced output losses ultimately translate into larger budget deficits.

Box A. Long-run damage estimates

In the OECD global long-run economic scenarios, potential output is determined by productive inputs (labour and capital) and the efficiency with which these inputs are combined. Long-run growth is projected to moderate over time, for example due to demographic trends or weaker productivity growth. Climate change is treated as an additional factor that can reduce long-run output relative to baseline projections.

The OECD framework incorporates climate change in three layers: the energy transition pathway, the mitigation costs and the physical damages.

Energy transition pathways

The energy transition pathway determines the emissions trajectory and the associated increase in global temperatures over time.

In a Business-as-Usual, policy settings remain broadly unchanged from those currently in place. Emissions reductions are insufficient to meet international climate targets, leading to a rise in global temperatures of 2.5°C by the end of the century.

In an Accelerated energy transition, additional policies are introduced to reduce emissions more rapidly. This is consistent with achieving net zero targets by 2050. As emissions decline quickly, this limits warming to around 1.6°C.

Mitigation costs

Mitigation costs reflect the reallocation of economic resources required to reduce emissions. They arise only when the energy transition takes place.

These costs are derived from a carbon abatement cost curve. Its magnitude depends on the speed and efficiency of the transition, reflecting factors such as capital reallocation frictions, technological progress, and changes in preferences. Based on the pace of cost decline, it considers two alternatives: slow and fast reduction in carbon mitigation costs.

Climate damages

The damage curve determines how strongly output responds to increases in global temperatures. It is often defined in terms of the GDP as a function of temperature anomalies. The idea is to capture the compounding nature of climatic impacts, where economic losses rise more than proportionally as global temperatures increase. In practical terms, damages grow faster as temperatures rise. For example, climate damages are estimated at approximately 2.6% of global GDP for 1.6°C of warming and 6.3% for 2.5°C of warming.

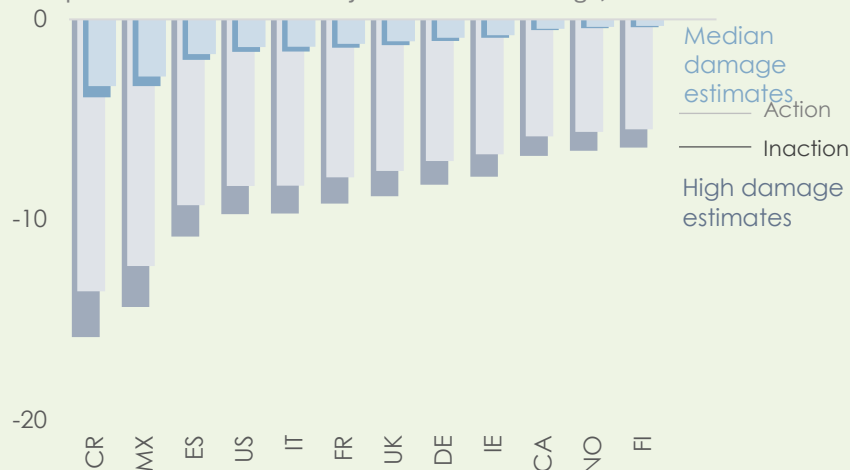
Under high-damage assumptions, climate-related damages increase substantially over time and account for the largest share of long-run economic losses. The economic losses approximately double between 2025 and 2050, and double again by 2100. This “high damage” function, calibrated to recent empirical work by Bilal and Känzig (2024), suggests that the productivity impact of temperature volatility is far more severe than previously understood. This approach involves a structural neoclassical growth model linked to global temperatures. Higher temperatures lead to a persistent drop in total factor

productivity that lowers expected returns, hence lowering investment and the capital stock over time.

Alternatively, under median damage assumptions, estimated output losses are considerably smaller. This is based on the meta-analysis by Howard and Sterner (2017). While these estimates ultimately translate into a quadratic damage function relating temperature and economic activity, the underlying meta-analysis controls for methodological differences across studies, such as the inclusion of catastrophic or non-market impacts. It also corrects for duplication bias in the literature.

Nº 4 Severity of economic impacts depends on temperature

% impact on economic activity from climate change, 2050



Source: OECD (2025b) global long-run economic scenarios.

Note: The estimates of damages to economic activity are relative to a “no-climate baseline” — one in which climate is not assumed to have any impact on economic activity. Lighter bars represent scenarios where policy action is taken to achieve net zero targets. Darker bars indicate estimates consistent with policy inaction. The costs of mitigation fall rapidly under Climate Action with median damages. In the high-damage scenario, mitigation costs decline more slowly.

While the scale of benefits varies by country, the economic case for early action is generally clear. Many countries face the same trade-off: act now, or delay and face potentially much greater losses later.

Given the two key scenarios this report considers, there are two distinct futures relevant to consider in terms of macroeconomic impacts.⁴ These illustrate the range of the potential productivity impacts Ireland could face related to climate change.

Policy Action

The “Policy Action” scenario corresponds to a transition, low warming scenario. It represents an optimistic outcome where the world successfully coordinates to meet the Paris Agreement goals.

⁴ Namely, we consider the OECD-ET2 1.6°C Median Damage scenario and the OECD-BAU2 2.5°C High Damage scenario. For more details see (OECD, 2025b).

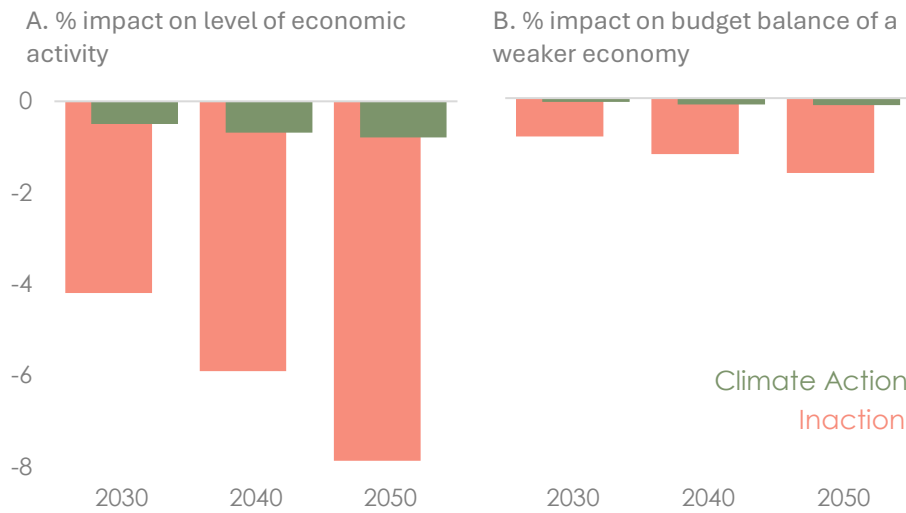
This entails global temperature increases being limited to around 1.6°C by 2100, compared to pre-industrial levels, and it means a rise of approximately 1.5°C by 2050. The scenario models a rapid acceleration in green technology, where the cost of decarbonisation falls significantly faster than historical trends. The model projects that the transition eventually becomes net positive for growth. On the physical risk side, it assumes a “median” damage function. This results in moderate productivity losses that are outweighed by the benefits of the low-carbon transition as the century progresses.

Inaction scenario

Conversely, the “Inaction” scenario, based on a business as usual, higher warming scenario, illustrates a “climate breakdown” future. It reflects a more adverse alternative. This is characterised by policy inertia and higher risks to economic activity from warming. This scenario assumes that decarbonisation proceeds only at the pace of current policies, leading to 2.5°C of warming by 2100 and 1.8°C by 2050.⁵ It adopts the high damage function in line with recent empirical evidence suggesting stronger productivity impacts from temperatures increase. Under these conditions, the absence of transition costs offers little relief, as the physical damages from climate change drive a massive reduction in global potential output of approximately 36% by the end of the century.

⁵ This warming pathway is broadly consistent with the UNEP global warming projections (UNEP, 2025), which projects global warming of 2.8°C under current policies, and aligns with the higher-warming scenarios recommended by the European Scientific Advisory Board on Climate Change (see above) for adaptation planning (ESABCC, 2026).

Nº 5 Climate action would be estimated to drastically reduce the long-term fiscal and economic impacts for Ireland



Sources: OECD global long-run economic scenarios and own estimates.
 Notes: The macro impact shows projected output losses relative to a no-climate-change baseline. The fiscal impacts translate these losses into the effect on the budget balance, accounting for different elasticities for revenue and public spending.

Under the Inaction scenario, Ireland’s output in 2050 is projected to be almost 8% below its no-climate change baseline (Figure Nº 5A). Under climate action, consistent with achieving net zero, output losses in 2050 are ten times smaller, at around 0.8% relative to the same baseline. In terms of the size of national income, the difference by 2050 is equivalent to around €4,500 per person in today’s money.

These indirect impacts on economic activity from climate are translated into fiscal terms. Revenue is assumed to fall one-for-one in line with economic activity. Expenditure is assumed to have an elasticity of 0.5 with respect to the level of economic activity. As such, the effect on the budget balance is a deterioration of 1.6 percentage points of GNI* by 2050 in the inaction scenario as compared to 0.15 percentage points in the action scenario (Figure Nº 5B).

4. Costs of extreme weather events

Ireland's economy is likely to be affected by "chronic" or "ongoing" effects related to climate change. These could reduce economic activity, and lead to lower government revenues.

However, future governments are also likely to face increased costs related to more frequent extreme weather events. These "direct" or "acute" costs typically involve repairing of roads, rail networks, or pressures to compensate households and businesses for losses related to flooding or other severe weather events.

Extreme weather events like floods, storms, and other climate hazards increase public spending needs. They cause immediate damage to public infrastructure, disrupt economic activity, and increase demand for emergency response and recovery supports.

Climate hazards can act as a risk multiplier. They can compound existing economic vulnerabilities and amplify fiscal pressures beyond the initial damage through what are called "cascading effects" (EEA, 2024). Examples include severe droughts that lead to widespread food and water shortages or severe storms damaging critical energy infrastructure. All these costs can affect multiple sectors, are highly uncertain, and can lead to large year-to-year fluctuations in spending, depending on how severe and frequent they are.

Floods and storms

In Ireland, floods and storms account for the largest share of climate-related disaster impacts.

The Emergency Events Database "EM-DAT" contains international records for extreme weather events and associated damages. The data suggest that large-scale floods and storms occur once every 25 years in Ireland. If annualised, to give a smoothed out average cost per year, it implies costs for Ireland of around 0.3% of GNI* for floods and 0.1% for storms. Including more frequent, lower severity floods and storms would likely increase the scale of these estimates (see Box B).

Box B. A decade of extreme storms in Ireland

This box examines specific extreme weather events over the period 2015–2025. The fiscal impact of extreme weather events in Ireland is distinct from broader economic losses. The State may effectively have to act as an “insurer of last resort” for public infrastructure and uninsurable private risks.

Analysis of major storm events from 2015 to 2025 reveals that the Exchequer bill is highly sensitive to the nature of the extreme weather event.

Flooding can accentuate the damage

The fiscal impact of storms depends on their nature, particularly whether they result in wind, flooding, or snow. For example, Storm Ophelia (2017) and Storm Éowyn (2025) were both severe wind events that resulted in large headline economic losses due to business interruption and damage to private assets (roofs, power grids). However, because they did not coincide with major structural flooding, the direct cost to the State was comparatively low. These losses were largely absorbed by private insurance and the commercial semi-state sector, including ESB Networks.

Nº 6 State Financing vs. Total Economic Impact of Selected Storms

€ million unless stated, estimated

Storm Event	Total impact	% GNI*	Of which, State funded	% GNI*	State as % total impact
Storm Éowyn, Jan 2025	370	0.11%	69	0.02%	19%
Storm Babet, Oct 2023	289	0.10%	89	0.03%	31%
Storm Emma, Mar 2018	97	0.05%	58	0.03%	60%
Storm Ophelia, Oct 2017	56	0.03%	7	0.00%	13%
Storm Desmond, 2015/16	177	0.10%	131	0.08%	74%

Sources: Various sources were used as data are not systematically reported. It includes private insurer reporting, answers to parliamentary questions, government statements, and media reports. State costs include exceptional cleanup, maintenance and care costs.

By contrast, snow and ice events like Storm Emma and flood events like Storm Desmond (2015) and Storm Babet (2023) placed heavier burdens on the Exchequer (up to three-quarters of the total bill). This reflects a greater need for State intervention responding to damage and disruptions to roads and bridges, to stresses on health services, and for “Humanitarian Assistance” and business support schemes that cover damage in areas where private flood insurance is unavailable or prohibitively expensive.

Comparison with Global Databases

It is important to note that the analysis produced here for these events suggests costs that are broadly in line with international estimates of historical damage costs. This includes those from the Emergency Events Database (EM-DAT) used for our modelling, but also CATDAT data (European Environment Agency, 2025), both of which indicate typical overall economic costs of 0.1% of GNI* for each of Ireland’s extreme weather events.

A broader takeaway is that the Government should systematically track and report these costs for Ireland.⁶ Extreme weather events can be significant, particularly when “silent” infrastructure repair costs are fully accounted for. The Government should aim to publish these costs fully on a general government basis, reflecting both direct and indirect costs.

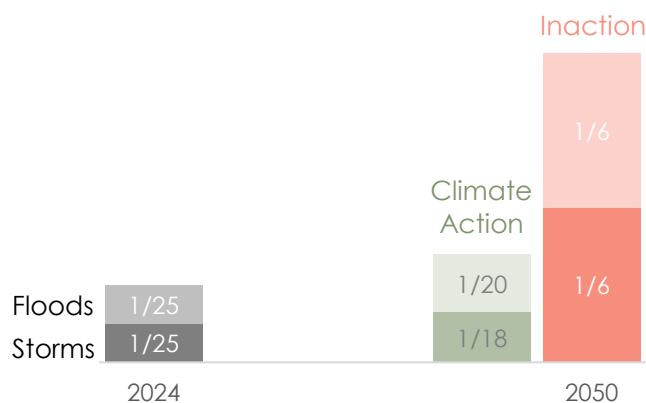
⁶ This is echoed by the Climate Change Advisory Council and Central Bank of Ireland (2025).

As global temperatures rise, the probability of some types of extreme events increases. This raises the likelihood of large, unanticipated expenditures. These pressures can be amplified by cascading effects, where disruption in one area spreads to others.

Future impacts are projected by combining historical disaster experience with the probability of certain events happening under different warming levels (IPCC, 2023). For example, heavy precipitation events are estimated to become around 20% more likely at 1.5°C of warming and around 50% more likely at 2°C. Similarly, extreme floods could become about 30% more likely under 1.5°C warming and up to four times more likely under 3°C warming (Seneviratne, 2023). Applying these probability increases, events that historically occurred roughly once every 25 years could, by mid-century, occur at around once every six years (Figure N° 7).

N° 7 Extreme events could become far more common

Estimated number of events in every year, in Ireland



Source: Own estimates based on EM-DAT and IPCC (Seneviratne, 2023).

Notes: Figure reports annual major event probabilities (e.g. 1/25 denotes one event every 25 years; 1/6 denotes one event every six years).

For the projections, we assume that extreme weather events become more severe as well as more frequent. The increase in frequency is calibrated based on estimates from the sixth IPCC report (Seneviratne, 2023). The increase in severity is uncertain. As a basic assumption, we assume that events become twice as severe by 2050 (rising in a linear way between now and then).

The results for the two scenarios is extreme weather events costs are around three times higher under the inaction scenario by 2050. The costs are estimated to rise to an annual average of 0.06% of

GNI* as compared to 0.02% of GNI* per annum in an “action” scenario. However, these costs remain small compared to other channels.

5. Adaptation costs

Adaptation includes investment in measures that increase resilience to climate risks, such as flood defence, coastal retreat or hazard-proofing infrastructure.

Investing in adaptation measures or “defences” can reduce climate-related losses. They can also generate additional economic, social, and environmental benefits. There are estimates of large returns to investing in adaptation spending, which range from at least double to more than twelve times the amount invested (CBI and CCAC, 2025). Recent research by Rising, et al. (2026), based on 300 studies, found that the median benefit-cost ratio for adaptation investments were around 4:1, and for certain investment, benefits can exceed costs after three years.

One form of adaptation, coastal management, may involve substantial long-term public expenditure for Ireland. This reflects the potential for catastrophic impacts on buildings in the absence of such interventions (EPA, 2025).

Adaptation needs also extend beyond infrastructure. Climate change poses material risks to agriculture, for example, through greater exposure to pests and diseases, but also having wider impacts on food supply.

There are concerns that current adaptation efforts are insufficient to address the projected increase in climate risks. Sectoral Adaptation Plans have lacked ambition and the actions covered in the plans have been noted for being vague or immeasurable (CCAC, 2025).

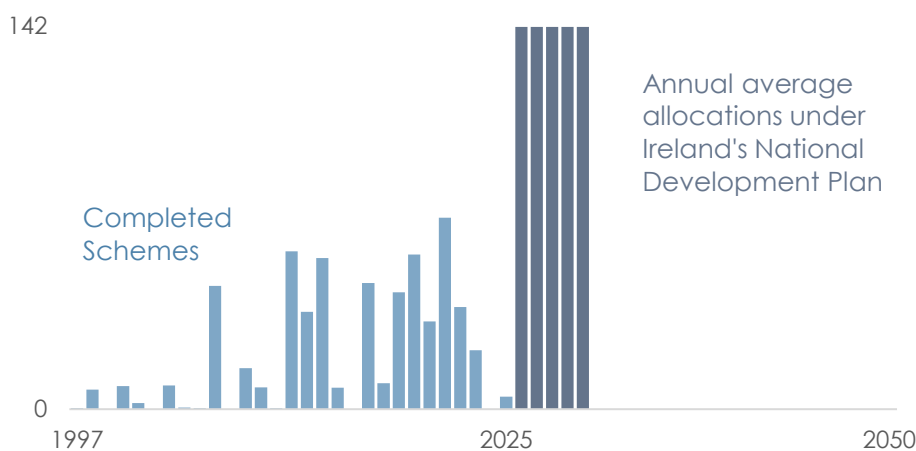
To date, 56 flood relief schemes under the Office of Public Works (OPW) have been completed in Ireland, with a total cost of approximately €581 million. Another 94 projects are ongoing and 54 future schemes are planned. Under the National Development Plan (NDP), for the period 2026-2030, €0.7 billion has been allocated to flood defences. This is equivalent to around €142 million per year (or 0.04% of GNI*⁷).

⁷ This is relative to the estimated annual cost of flooding of €101 million (Central Bank of Ireland, 2024).

The official plans for spending on flood projects under the NDP allocations look to be sufficient when compared to historical estimates (Figure N° 8). However, there appears to have been a gap between what was committed and what was delivered historically. Moreover, only about half of large NDP projects were completed by 2025 on schedule (Fiscal Council, 2025). Hence, the future allocations may be insufficient to meet needs. This is especially relevant given the scale of recent flooding events.

N° 8 Flood defence expenditure is set to rise

€ million



Source: OPW (floodinfo.ie), National Development Plan and OPW Sectoral investment plan.

For the purposes of modelling the costs of action and inaction, this report does not differentiate between the two scenarios in terms of the costs of adaptation. Doing so would require a clear sense of how adaptation costs scale up with higher levels of warming and with more frequent extreme weather events. This is not something we are currently able to estimate. Annual cost estimates beyond the NDP figures are assumed to increase in line with inflation.

6. Health impacts

Climate change has the potential to add costs to public healthcare systems. High heat, greater temperature variability, poorer air quality and extreme weather events can all place a burden on healthcare services. Such changes are expected to mean higher healthcare spending due to additional hospital visits, more pressure on resources, and risks of damages to health infrastructure.

This section examines some of the potential fiscal costs associated with these impacts in Ireland. We focus on morbidity-related outcomes. That is, the number of people requiring medical attention. This helps highlight the direct fiscal costs to the healthcare system.

Temperature-related health impacts

Both high and low temperatures increase health risk and raise demand for healthcare services. This includes heat stress and illnesses, such as heatstroke, dehydration, and cardiovascular complications. Similarly, low temperatures can aggravate health conditions such as pneumonia.

International evidence shows a non-linear relationship between temperature and health outcomes (see Box C). Risks increase at both temperature extremes, with particular strong effects among older age groups (Carleton et al. (2022)). They estimate that moving from a high-emissions pathway (around 4.5°C warming) to a moderate one (around 2.4°C) reduces projected climate-related mortality by around 84% by the end of the century.

Among EU countries, higher temperatures tend to mean higher health costs too. It has been found that a 1°C increase in temperature is associated with a 0.10 percentage point rise in public health spending as a share of total general government expenditure (Socol, Iuga, Socol, & Iuga, 2023). This is based on data for 27 EU countries over the period 2000 to 2020. Given current public healthcare expenditure, this would entail an additional €125 million per year in Ireland for each 1°C increase in annual average temperatures.

Box C. Evidence on climate healthcare impacts

International evidence shows that temperature extremes place sustained pressure on healthcare systems, increasing service demand, straining capacity, and raising public health expenditure. Studies across different countries illustrate how these pressures emerge.

Higher service demand and system congestion

Emergency department visits increase following both cold and hot temperatures. In California, White (2017) finds an 11% total net increase in emergency department visits in the 30 days that follow a day under 4°C, relative to a 16–18°C day. For a day over 27°C, the relative increase in visits is 5.1%. In terms of costs, they estimate that for every 100,000 persons exposed to a day under 4°C or a day over 27°C, the cost of providing hospital services increases by 5.3% (\$12,176) or 3.5% (\$7,994), respectively, compared to a mean daily cost per 100,000 people of \$230,846.

Evidence from the UK shows that extreme temperatures place significant pressure on hospital capacity. On days of extreme heat, excess admissions account for around 6% of hospital capacity on average. On days of extreme cold, they account for around 3%. Over the study period, these excess admissions cost approximately £17.3 million per year (Rizmie et al., 2022).

Similarly, in Mexico, on very hot days emergency department visits rise by about 7% and hospitalizations by 4% (Aguilar-Gomez, Graff Zivin, & Neidell, 2025). Hospitals become overcrowded, and even patients already admitted before the heatwave face higher risks.

The role of adaptation

Adaptation can mitigate, but not fully offset, the impact of extreme heat on public health spending. For the United States, Barrage (2023) estimates that an additional “very hot day” can increase annual public medical expenditures by up to 0.45%, with effects that vary across regions. Southern states already well-adapted to hot weather show smaller predicted impacts on spending compared to northern regions less well-adapted.

High temperature risks for Irish healthcare

Even with its mild climate, Ireland faces risks. Irish hospital admissions are found to increase noticeably when temperatures exceed 16°C. In a week where daily temperatures reach 22°C to 25°C, emergency admissions are found to rise by around 8.5% compared to cooler days (10–13°C)⁸ (Duffy, et al., 2024). These additional heat-related hospitalizations in Ireland could cost between €156,000 and €364,000 annually per 100,000 people, depending on the severity of illness treated (de Bruin, Kweku Kyei, & Henry, 2024). Scaling these results to Ireland’s overall population, this implies roughly €8–19 million per year. Yet the estimate only captures hospital treatment costs. It does not reflect additional

⁸ Among children, the increase is even higher — over 12%.

health service use such as GP visits, medication, well-being or lost productivity⁹.

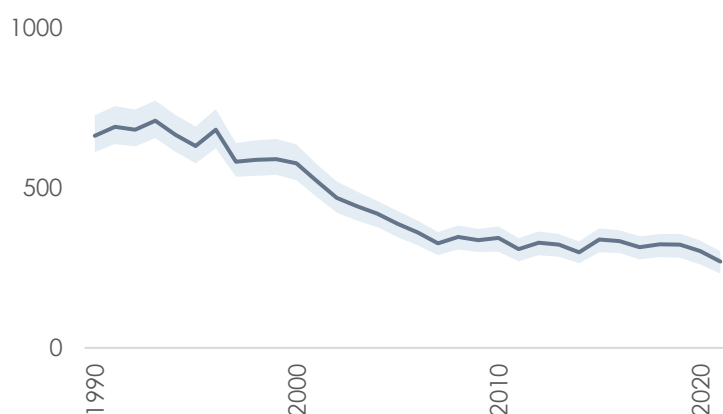
As warm weeks become more frequent, healthcare costs are expected to rise further. Without climate action, emergency admissions in spring and summer in Ireland are projected to rise by 13% annually by 2050 and 18.3% per year by the end of the century (Duffy, et al., 2024). This could add an additional €15 to €35 million per year by 2050, depending on the illness treated and assuming a moderate population growth path.

Cold-related risks for Irish healthcare

For now, heat-related health risks in Ireland remain relatively low. Cold weather accounts for the vast majority of temperature-related health impacts. Sudden cold snaps tend to trigger hospital visits for conditions such as hypothermia and respiratory infections, particularly among older and vulnerable populations.

Nº 9 Cold remains a dominant driver of temperature-related health loss

DALYs attributable to cold temperatures (per 100,000 population)



Source: Global Burden of Disease (GBD).

Disability-adjusted life years (DALYs) measure the overall burden of disease, combining years of life lost due to premature mortality and years lived with disability.¹⁰ For instance, in 2021, cold temperatures caused an estimated loss of 270 healthy life years per 100,000 population (Figure Nº 9). Those attributable to high temperatures have been minimal. Over the same period, DALYs

⁹ For instance, labour productivity alone is estimated to drop by 1.6% for each 1°C increase in outdoor temperature (de Bruin & Kweku Kyei, 2024).

¹⁰ One DALY represents one year of full health lost.

attributable to high temperatures remained typically below 1 per 100,000, and virtually zero in most years. Also, in terms of mortality, cold spells were associated with between 90 and 118 excess deaths per 100,000 people each year (Masselot, et al., 2023), while heat contributed to just one excess death per 100,000 annually.

The health impact of cold temperatures has decreased in recent years. This is not only due to gradually milder winters. It also reflects structural factors, like improvements in housing insulation.

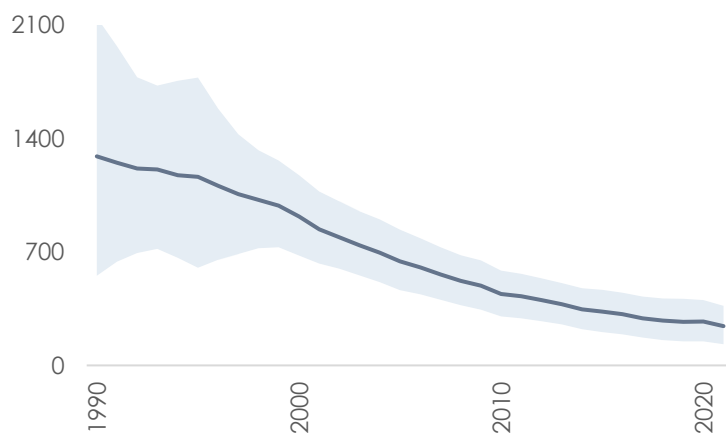
Looking ahead, warmer winters may reduce cold-related illness and mortality. But risks are unlikely to disappear entirely. This is particularly relevant given greater climate variability and more intense cold snaps, which may still generate acute shocks to the health system.

Air pollution healthcare impacts for Ireland

The use of fossil fuels — while also driving climate change — produces air pollution. This worsens air quality and increases health risks. Higher concentrations of pollutants aggravate respiratory and cardiovascular conditions. This can lead to additional hospitalisations. Among the pollutants, fine particulate matter (PM_{2.5}) is most closely associated with hospitalisations and premature deaths.

Nº 10 Declining health burden from air pollution in Ireland

Healthy life years lost (DALYs, age-standardized, per 100,000 population)



Source: Global Burden of Disease (GBD).

Notes: The 97% of the air pollution DALYs correspond to particulate matter pollution. Others include ambient ozone pollution and nitrogen dioxide pollution.

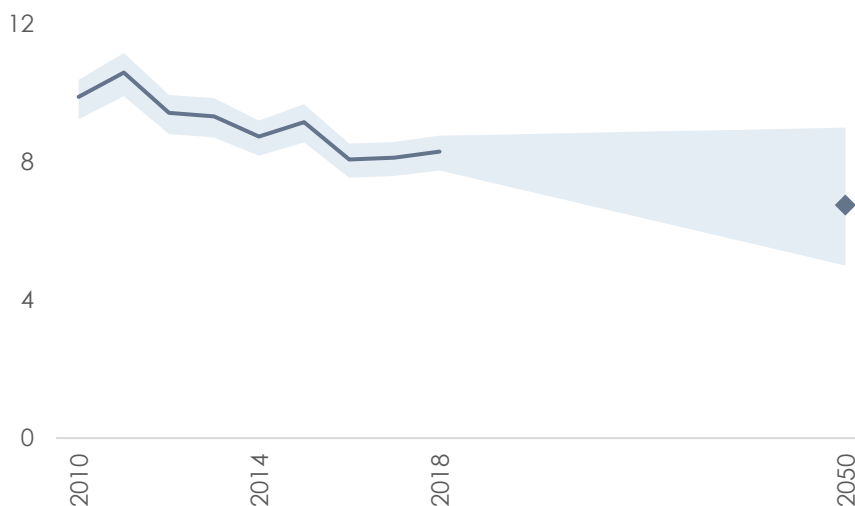
Over the past decade, Ireland has seen modest but consistent improvements in air quality. The extent to which the Irish population is exposed to pollution has declined steadily since 2010. While the associated costs on healthcare have also fallen (Figure N° 10), these remain higher than they would be in a scenario where Ireland fully transitions to net zero.

Hospital admissions linked to ambient air pollution account for over 15,000 bed-days per year on average. Treating these patients cost from €3.8 to €26.5 million annually in acute care hospital spending. Additional costs from other pollutants could add another €1.4 to €4.8 million per year (Nolan, 2023).

Pollution-related hospital admissions can also surge during short-term declines in air quality. Over a five-year period in Dublin, air quality was classified as “good” on 96% of days. However, when it fell to “fair” or “poor,” daily inpatient admissions for respiratory and cardiovascular diseases rose. For instance, hospitalisations due to asthma increased by 70%, and those due to heart failure more than doubled (Quintyne, Sheridan, Kenny, & O’Dwyer, 2020).

N° 11 The expected decline in air pollution where there is climate action

PM_{2.5} concentrations (µg/m³)



Source: WHO, Clayton, et al. (2024)

Notes: The upper bound reflects a 4% increase in PM_{2.5} relative to 2014 levels (no additional policy). The lower bound represents the WHO-recommended threshold. The dot marks projected PM_{2.5} levels under a net zero scenario.

In the absence of additional policy measures, pollution levels will remain broadly stable or rise modestly by 2050 (Clayton, et al.,

2024). A scenario aligned with strong climate action could bring pollution exposure down by roughly 23% (Figure N° 11).¹¹ This implies potential savings of up to €7 million per year in avoided hospital expenditure by mid-century.

It is worth noting that, even in a scenario where other countries do not pursue climate action, action by Ireland can have a meaningful impact on air pollution levels in Ireland.

Extreme weather events

Climate change also intensifies other extreme events. The frequency and intensity of extreme weather events — such as storms, floods, and prolonged rainfall — are expected to increase. These shocks impose acute, unplanned costs on hospitals, local authorities, and emergency services.

A example is the 2015-2016 winter floods. In the months following the floods, areas with high surface water exposure recorded increased cases of waterborne illnesses. The strongest link between infection peaks and the flood event appeared with a lag of 16-20 weeks (M. Boudou, 2021).

Forecasting and managing the health burden of extreme events remains particularly challenging, as their impacts vary regionally. Also, they can trigger cascading effects, where one extreme event sets off a chain of disruptions, with consequences that extend well beyond the initial hazard (EEA, 2024).

Despite the uncertainty in costings, the overall conclusion is clear: early action brings health benefits. At the global level, these health co-benefits are large enough to exceed a substantial share of the costs of mitigation. In the EU, avoided deaths and disease could offset between 7% and 84% of the cost of climate policy. Taking the mid-range of these estimates, close to half of the cost of climate action could be offset by improved health outcomes (Markandya, et al., 2018).

¹¹ In many European countries reductions could exceed 50%. In Ireland, reductions are limited due to the large share attributable to natural sea salt aerosols.

How health-related costs are incorporated

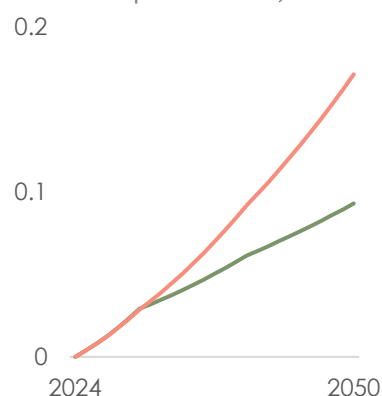
Given the uncertainty surrounding the magnitude of climate-related health impacts, we focus on two channels for our modelling. First, we focus on the pressures on public healthcare spending arising from increases in average temperatures. Second, we focus on the estimated changes in health expenditure associated with levels of air pollution.

For temperature-related costs, we assume public health expenditure responds to temperature changes using the elasticity in Socol et al. (2023).¹² By mid-century, spending pressures from higher temperatures could be around twice as large under the inaction scenario (Figure N° 12A).

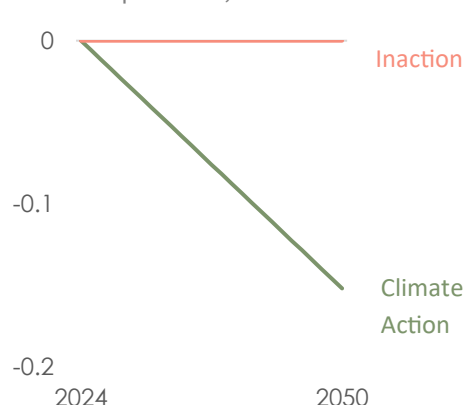
For air pollution, we assume that current pollution levels are already reflected in baseline healthcare spending and therefore do not give rise to additional costs relative to today. The “Climate Action” scenario implies lower future concentrations of PM_{2.5} (Clayton, et al., 2024). Improved air quality in turn reduces the burden of pollution-related illness, lowering demand for treatment and associated public health expenditure. Cutting PM_{2.5} pollution — rather than keeping it at today’s levels — could save healthcare costs equal to about 0.15% of GNI* per year by mid-century (Figure N° 12B).

N° 12 Higher health costs are expected with higher temperatures and more air pollution

A. Additional health-related costs due to temperature rise, % GNI*



B. Additional health-related costs/benefits due to air pollution, % GNI*



Sources: Own calculations based on Socol, Iuga, Socol, & Iuga (2023) and Clayton, et al. (2024).

¹² The temperature paths are based on our scenarios (1.6°C under the “action” scenario and 2.5°C for “inaction” by 2100). By 2050, the increases are smaller, at around 1.5°C and 1.8°C, respectively. When applying the elasticity, temperature anomalies are translated relative to 2024 levels.

7. Cost of missing targets

A key channel when looking at trade-offs on climate action is Ireland’s internationally agreed targets. These apply at EU level. But they are also mirrored in domestic legislation. The potential cost of missing these may be enormous.

The estimates presented in this section are consistent with those produced in earlier work by the Fiscal Council and the Climate Change Advisory Council (2025). That analysis looked at the potential costs Ireland faces if it fails to meet its agreed EU climate commitments up to 2030.

In Ireland’s case, missing the European Union climate targets it has agreed to could trigger large fiscal costs. These targets seek to achieve carbon neutrality by 2050. They have four underlying aims: reducing emissions, increasing renewable energy, improving energy efficiency, and improving land use.

Under the “Climate Action” scenario we consider, Ireland achieves net zero and meets its legislated targets. In this case, no further compliance costs are assumed to arise both up to 2030 and afterwards.¹³ In other words, the additional actions to meet agreed climate requirements avoids the need to purchase credits from other countries and prevents Ireland having to pay penalties.

By contrast, the “current policies” or “inaction” scenario implies that Ireland misses its targets. With current policies remaining in place, this means Ireland falls short of its legislated climate commitments both up to 2030 and in the post-2030 period. Such a scenario implies that Ireland would face potential costs, including being required to purchase compliance credits from other Member States to offset the shortfall.¹⁴

Estimated costs up to 2030

Previous work by the Fiscal Council and CCAC (2025) provided detailed estimates covering emissions reductions, renewable

¹³ We exclude historical payments previously made in this analysis. Foregone revenues from ETS flexibility have already occurred and will continue unless significant policy changes are implemented.

¹⁴ Note that this assumes, even with current policies, some other EU countries achieve their required emissions reductions such that it is possible to purchase transfers.

energy, and land-use. The figures presented here build directly on that analysis, by extending the analysis beyond 2030.

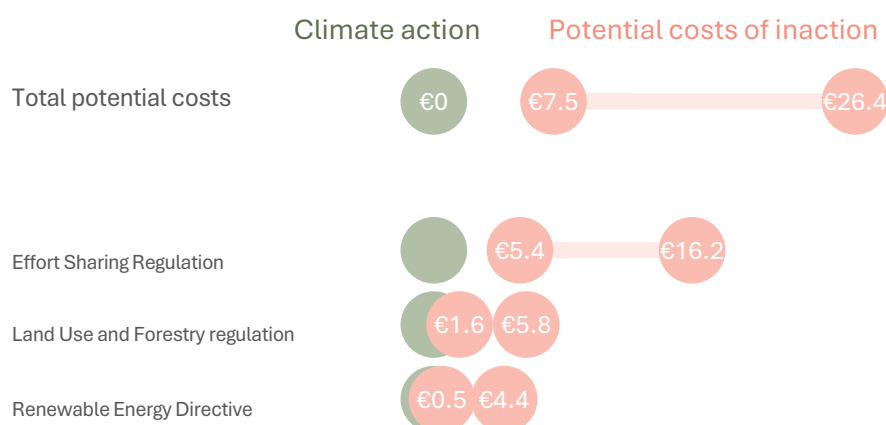
In essence, the EU climate framework is designed to achieve emissions targets collectively across Member States. Under a continuation of the current framework, countries that miss their emissions allocations would purchase compliance allowances from those that outperform against their targets. The estimated fiscal costs therefore reflect both the size of projected emissions shortfall and the assumed market price of these allowances.

The total costs for the period out to 2030 could range from €8 to €26 billion if Ireland fails to step up action. If the Government were to fully implement the additional measures in its own Climate Action Plan by 2030, this cost could fall to between €3 and €12 billion (Figure N° 13). And if Ireland were to reach its targets in full, no costs would be expected, other than those already incurred.¹⁵

Missing targets wouldn't just mean large payments — it would also be a colossal missed opportunity. Instead of paying to make up for falling behind, that same money could go toward investments that support the transition, lower living costs, cut pollution, improve health, and bring broader benefits to Irish society.

N° 13 The costs of missing targets are potentially enormous

€ billions, estimated cost range



Source: Own calculation based on Fiscal Council and CCAC (2025).

Notes: The range of potential costs of our “inaction” scenario corresponds to the With Existing Measures (WEM). If there is highly ambitious climate action, no additional costs would emerge.

¹⁵ Ireland has opted to use its ETS flexibility under the Effort Sharing Regulation. This means Ireland is currently forgoing revenue by not auctioning off a portion of its ETS allowances.

These potential costs apply across different sectors like transport, energy, agriculture and land-use, and different pieces of legislation.

The most significant cost comes from the Effort Sharing Regulation (ESR), which covers emissions from sectors such as transport, buildings, agriculture, and waste — 71% of Ireland’s total emissions.

Ireland faces the largest per capita gap in the EU under the Effort Sharing Regulation. Failure to meet these targets could cost between €5 and €16 billion by 2030, depending on allowance prices. Additional costs could arise from other legislation, such as the Land-Use Regulation (LULUCF) and the Renewable Energy Directive (Figure N° 13). These figures are based on current measures and reflect upper- and lower-bound scenarios (see Fiscal Council and CCAC, 2025, for full assumptions and methods). For the purposes of the analysis, we use projected Emissions Trading System (ETS) prices, representing a relatively conservative lower-bound assumption.

These costs are not guaranteed but represent plausible fiscal risks. The final figure will depend on the size of Ireland’s compliance gap and the market price of compliance. Carbon allowance prices are uncertain and could rise if many countries miss their targets or delay purchases. Overperforming Member States may also influence prices in bilateral negotiations. While some flexibility mechanisms may ease the pressure, one thing is certain: without action to reduce emissions, Ireland will face substantial costs.

Targets beyond 2030 are more uncertain

Beyond 2030, there is more uncertainty around the costs of missing targets. Ireland has broadly committed to reducing emissions after 2030. This includes commitments to targets for both 2040 and 2050. However, it is not yet clear how these will work.

This analysis takes a conservative approach. It focuses on one arm of the EU requirements and assumes the existing regime, currently operating, is more or less unchanged.

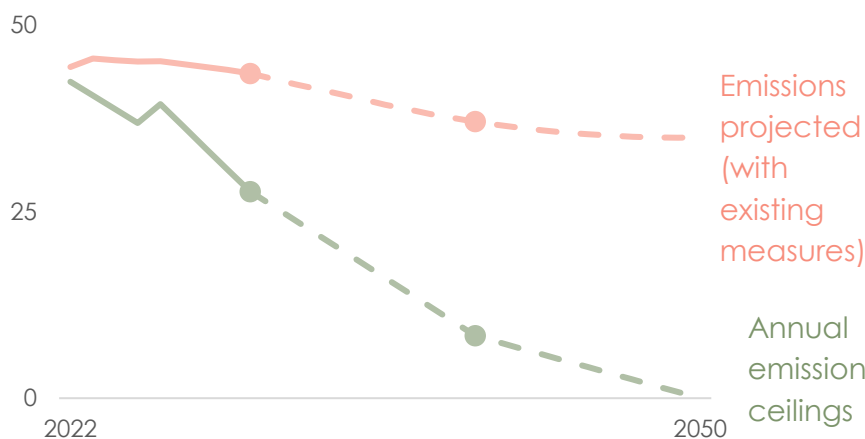
It is a clear that costs associated with Ireland missing its targets will persist—should Ireland not take action. Indeed, these could potentially grow further.

The overarching requirement for EU Member States is net zero emissions or climate neutrality by 2050. Currently, the EU legislation sets a target of at least a 55% reduction in greenhouse gas emissions relative to 1990 levels by 2030. Looking ahead, the European Commission has proposed a 90% reduction in emissions by 2040. Of this, 85% comes from domestic reductions and up to 5% of reductions are allowed to be achieved through international credits. The details of how the 2040 target will be implemented are not yet fully specified.

Meeting the net zero target by 2050 would require countries to continue cutting emissions at a similar pace. After 2040, the focus would increasingly shift toward carbon removals, particularly in harder-to-abate sectors (European Commission, 2024).

Nº 14 Widening emissions gap

Annual emissions, Mt CO₂ equivalent



Source: EPA and author's workings.

Note: Emissions ceilings are assumed to follow a linear path between the current 2030 target and the 2040 target of a 85% domestic reduction in emissions relative to 1990 levels. A linear path is then assumed between 2040 and net zero by 2050.

Climate action can avoid significant penalties by 2030, but maintaining momentum will be essential to prevent even higher long-term costs as targets tighten toward 2050.

Ireland will have to continue steadily reducing its emissions to net-zero by 2050. To model these costs, we assume a similar regime to the current Effort Sharing Regulation. The annual emission ceilings under the current Effort Sharing Regulation are assumed to follow the overall reduction targets, with emissions having to decline

linearly between 2030 and 2040 — reaching a 85% reduction from 1990 levels by 2040 and achieving full net-zero by 2050 (Figure N° 14). As there is no regime currently in place for renewable energy post 2030, similar to the renewable energy directive, we do not estimate additional costs post-2030 from this. Similarly, we do not estimate additional costs post-2030 for missing targets in the Land-Use, Land-Use change and forestry sector post 2030.

Under current policies, Ireland’s inaction is likely to mean a substantial emissions gap, which entail significant and escalating potential costs. Based on projected Emissions Trading System (ETS) prices, the annual cost of covering Ireland’s emissions gap will rise from approximately €1.4 billion in the early 2030s to approximately €6.6 billion by 2050.¹⁶

These are stylised estimates and should be interpreted with caution. Actual costs would depend not only on Ireland’s emissions gap and the price paid to close it, but also on how future EU legislation is designed. The current calculation assumes the compliance framework remains similar to today’s — including the same approach to purchasing credits and accounting for shortfalls — yet this may change after 2030.

¹⁶ Cumulative costs of €7.2 billion and €32.8 billion, respectively are annualised to provide ease of interpretation. As things currently stand in the EU climate architecture, costs will materialise in lump sums in specific years. This is based on the WEM emissions projection under the ESR. ETS future prices are taken up to 2030. From there, the 2030 price is assumed to grow in line with inflation (2%) out to 2050.

8. Fiscal costs of the transition

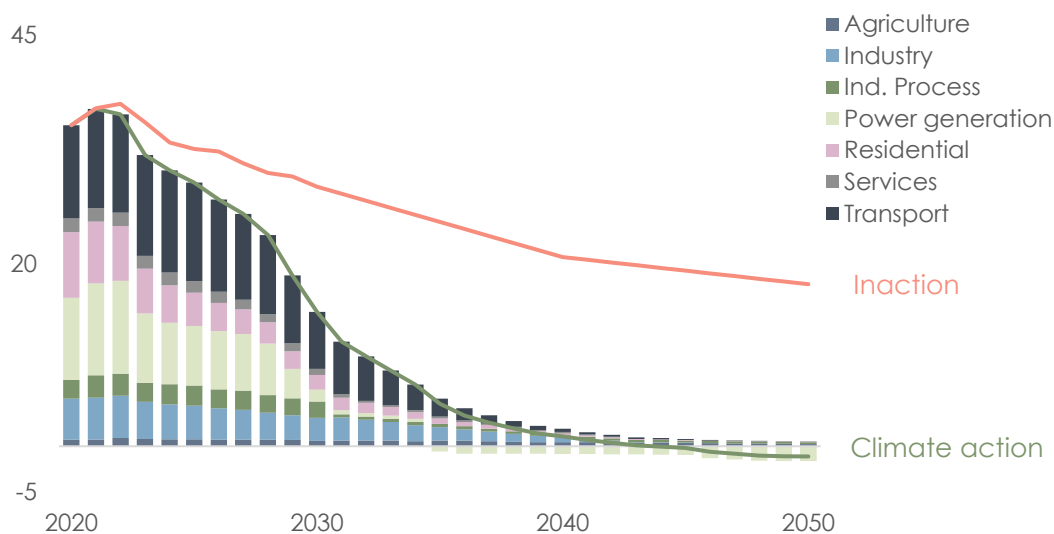
This section updates the assessment of the fiscal costs of the transition set out in Casey and Carroll (2023). It uses the same broad approach but draws on more recent modelling work and data. It examines how climate change reshapes the structure of public finances, as the State faces both higher spending to support decarbonisation and a gradual erosion of some tax bases.

The transition risks to the public finances are modelled using projections from the TIMES–Ireland Model, developed by the MaREI Energy Policy and Modelling Group at University College Cork (Balyk, et al., 2022). The model traces out internally consistent pathways for energy supply, energy demand and associated emissions in Ireland.

Again, we focus on two key scenarios. The inaction scenario uses modelling estimates based on a business-as-usual with existing measures to 2050. The climate action scenario is based on the weighted-average scenario. This represents a pathway that is consistent with the Climate Change Advisory Council’s proposed carbon budgets out to 2040. In effect, this should steer Ireland broadly towards achieving net zero by 2050 (Figure N° 15). Even in the inaction scenario, there is still an expectation of some shift towards greater electricity use. Hence Ireland’s emission there too, but to a lesser extent.

N° 15 Domestic CO₂ emissions from energy use projected to decline

ktCO₂e (kilotonnes of carbon dioxide equivalent)



Source: MaREI EMPG.

Revenue: energy and transport-related taxes

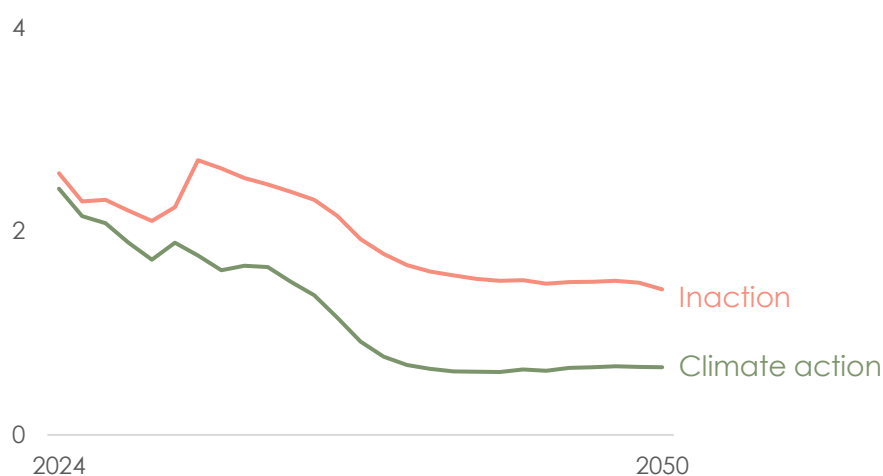
On the revenue side, the climate transition mainly affects tax bases associated with fossil fuel use and vehicle emissions.

Under the “Policy Action” scenario, without revenue replacement, tax revenue is estimated to decline substantially by 2050. It falls by the equivalent of 1.5 percentage points of GNI* between 2025 and 2050 (Figure N° 16). This would have a marked impact on the budget balance, in the absence of any offsetting efforts to reduce spending or raise taxes elsewhere.

Even in the “Inaction Scenario”, where there is an absence of additional climate policies to meet commitments, revenues would still be projected to fall markedly, declining by around 1.1 percentage points of GNI*. This is as a result of a continued — although less pronounced — shift towards electric vehicles and electrification more generally.

N° 16 Revenues are likely to fall, but faster with a transition

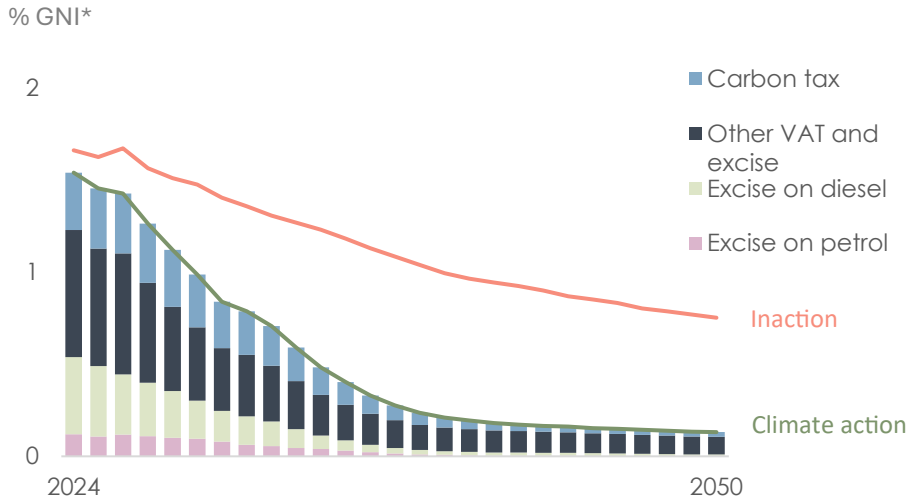
% GNI*



Source: Own calculations based on OECD-EDISON tool and MaREI EMPG.

Demand for fossil fuels declines as the energy system transitions towards electricity and other low-carbon sources. Because electricity and some low-carbon fuels are typically subject to lower effective tax rates than petrol and diesel, this shift reduces the revenue collected from energy-related taxes. By 2050, total revenue from carbon, excise, and VAT on fuels and electricity is projected to fall from 1.5% to 0.1% of GNI* under the transition (Figure N° 17).

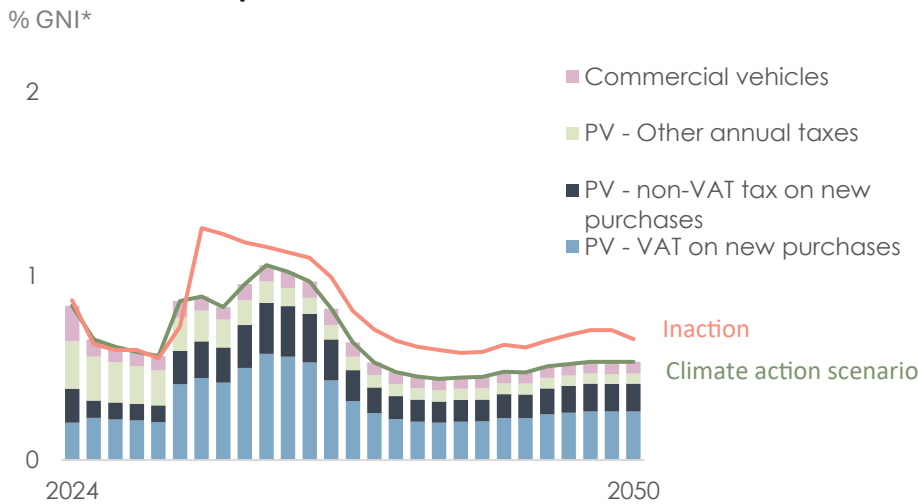
Nº 17 Emissions-based revenue is set to fall under both scenarios



Source: Own calculations based on OECD-EDISON tool and MaREI EMPG.

As the share of battery electric and other zero-emission vehicles increases, average tax liabilities (like the Vehicle Registration Tax) fall. This process is already underway. The market share of electric vehicles is rising regardless of whether Ireland ultimately reaches its net-zero targets.

Nº 18 Taxes on vehicle purchases are set to fall under both scenarios



Source: Own calculations based on OECD-EDISON tool and MaREI EMPG.

Notes: PV stands for Personal Vehicles.

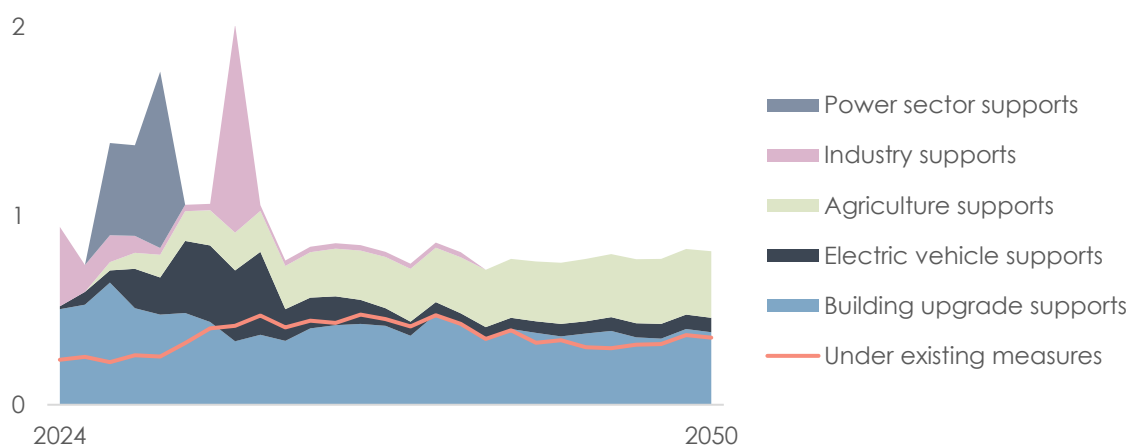
The transition, therefore, accelerates and deepens a revenue trend that would, to some extent, occur anyway.

Expenditure

On the expenditure side, the transition will require sustained State intervention in several sectors to encourage the shift to reduced emissions. This is expected to average close to 0.9% of GNI* in an “action” scenario and 0.4% of GNI* in an “inaction” scenario (Figure N° 19).

N° 19 Achieving net zero would require some additional public spending

% GNI*



Source: Own calculations based on OECD-EDISON tool and MaREI EMPG.

The actual fiscal impacts could be much less. For example, much depends on what the State decides to in relation to directly funding income losses in the agricultural sector as opposed to encouraging alternative income-generating activities.

Moreover, this analysis does not take account of a potential substitution of existing expenditure for similar areas in support of the transition. An example would be public transport switching to cheaper electric methods of transport rather than fossil fuels investments.

Another important point to note in the context of potential expenditure costs is that they are beginning to look less expensive when compared to the ongoing costs of temporary measures—due to Ireland’s significant reliance on imported fossil fuels. As Box D shows, temporary supports to offset rising fuel prices have proved to be a costly and recurring feature of policy in recent years. These costs could have gone a long way to supporting the transition and avoiding the risks of costs related to missing international targets down the line.

Box D. Temporary fuel subsidies are a costly, short-term solution

Ireland has frequently used temporary fuel tax cuts in recent years as a response to various energy crises. These help support many people who rely on fuels to heat their homes and drive vehicles. But they are short-term solutions. They offer temporary relief while leaving households exposed to future price shocks. They also divert public funds away from permanent infrastructure upgrades and undermine Ireland's efforts to transition its economy to clean alternatives that would be more stable, secure, and can help avoid massive costs of missing international commitments.

Between 2022 and 2026, temporary energy support measures are estimated to cost just over €5 billion. If this €5 billion was used for permanent alternatives, the state could potentially have funded:

- **Electric Vehicles:** A €10,000 subsidy covering the purchase of over 500,000 electric cars. This is equivalent to 22% of all passenger vehicles in Ireland. A subsidy of this size would reduce the costs of many electric vehicles substantially. In 2026, there are at least four electric vehicles on the Irish market priced under €20,000 with existing supports: the Dacia Spring, BYD Dolphin Surf, Leapmotor T03, and Hyundai Inster. A €10,000 subsidy would reduce their price to below €12,000 on average.
- **Home Retrofits:** Full funding for deep retrofits for 112,000 homes. This assumes a blended average cost of just under €45,000 based on Lynch, Tovar, and Farrell (2026). Their analysis suggests median costs for deep retrofits ranging from €22,914 for an apartment to €66,503 for a detached house. Upgrading this many properties equates to retrofitting over 5% of the national housing stock. To put this in perspective, this number of units is equivalent to the number of homes in Wicklow, Laois, and Longford combined. Both the national and county-level housing comparisons are drawn from the CSO Census 2022.

Buildings and energy efficiency

The largest single source of transition-related expenditure in the near-term arises from building energy-efficiency upgrades.

Achieving climate objectives will involve sustained retrofit activity over several decades.

Under the Climate Action Plan, the residential sector is expected to reduce greenhouse gas emissions by around 40% by 2030 relative to 2018 levels. By 2023, emissions had fallen by 23.6%, implying that meeting the remaining reduction requires a significant acceleration in retrofit activity and heating system electrification.

Retrofit costs remain significant in both scenarios because the stock of dwellings requiring upgrades is largely fixed. Given the scale and pace of the required transformation, as well as the

limited private financial incentives for many households, this means that continued State intervention is necessary.

By 2050, the annual fiscal cost of building upgrades is estimated to reach around €2.8 billion. These costs do not disappear under current policies but would be around €1 billion lower per annum.

Agriculture

Agriculture also remains a major source of transition-related costs. The sector accounts for a high share of Ireland's greenhouse gas emissions. Meeting emissions ceilings is conditional to a range of technological and management improvements. Some mitigation measures could even be beneficial to farmers, reducing emissions while generating savings for farms.¹⁷

We assume a scenario in which emissions ceilings are met primarily through reductions in livestock numbers relative to the current-policy path. This would reduce farm incomes if no policy response were put in place. The State would compensate at least part of the income losses associated with this adjustment.¹⁸ In effect, public transfers bridge the gap between farm incomes under current activity levels and incomes consistent with lower-emissions production.

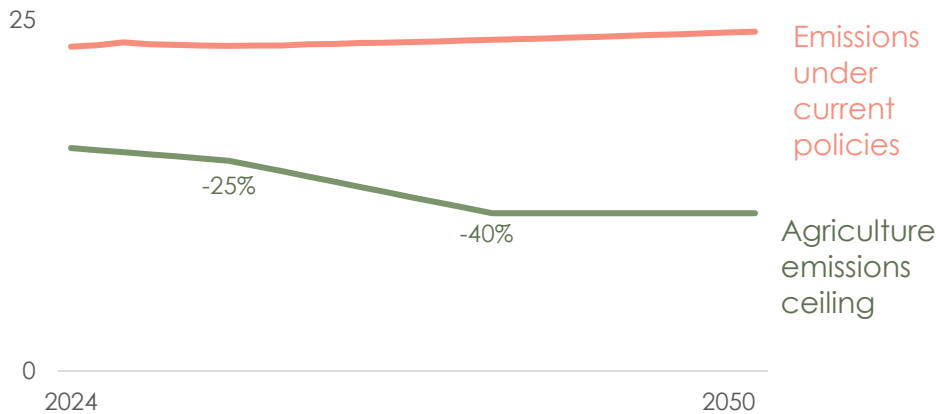
The reduction in emissions follows the indicative pathway set out in the Sectoral Emissions Ceilings, which points to an indicative reduction of around 25% in agricultural emissions by 2030 (Figure N° 20). Beyond 2030, we assume that emissions fall to around 40% below baseline levels by 2040. From 2040 onwards, emissions reductions remain at this level, and support costs are assumed to rise in line with inflation.

¹⁷ For instance, dairy EBI is one of the measures with the highest potential for cost savings, estimated at up to €450 million per year by 2030 (Teagasc, 2023).

¹⁸ The modelling approach is the same as in (Casey & Carroll, 2023), which was based on work Commissioned by the Climate Change Advisory Council and carried out by Teagasc (Climate Change Advisory Council, 2021).

Nº 20 Agricultural emissions would need to fall in the transition scenario

Annual emissions, Mt CO₂ equivalent



Source: Own calculations based on EPA.

Note: Emissions under current policies refer to the “With Existing Measures” pathway.

These supports are not one-off costs but persist for as long as emissions ceilings bind. Of course, the duration will depend on the speed of adjustment, technological progress, changes in production and other mitigation measures.

Transport

Regarding expenditure on the transport sector, the Government has already set out a Sectoral Investment Plan for Transport for 2026–2030, with a total envelope of €24.3 billion, of which €10.1 billion is earmarked for public transport. This level of investment will help address Ireland’s relatively low transport capital stock compared to other high-income EU countries. However, future investment needs to tilt more decisively towards low-carbon modes, so that the spending is reoriented towards greener projects.

The transition in transport is also supported by targeted incentives for vehicle turnover. We assume the existence of a temporary scrappage-type scheme to accelerate the replacement of older internal-combustion vehicles with cleaner alternatives. The scheme is modelled as a grant of €10,000 per eligible car over the period 2027–2032, with the total fiscal cost determined by the projected number of participating vehicles.¹⁹ This support is front-loaded and does not create a permanent spending pressure. It is calibrated based on work by Austin (2023).

¹⁹ In June 2026, a pilot scrappage scheme for private cars 13 years and older was announced offering grants of €5,000, in addition to the €3,500 grant for new electric vehicles. The cost of this pilot scheme is set to be capped at €10 million, meaning only 2,000 vehicles will be eligible.

Box E. Electric vehicle uptake

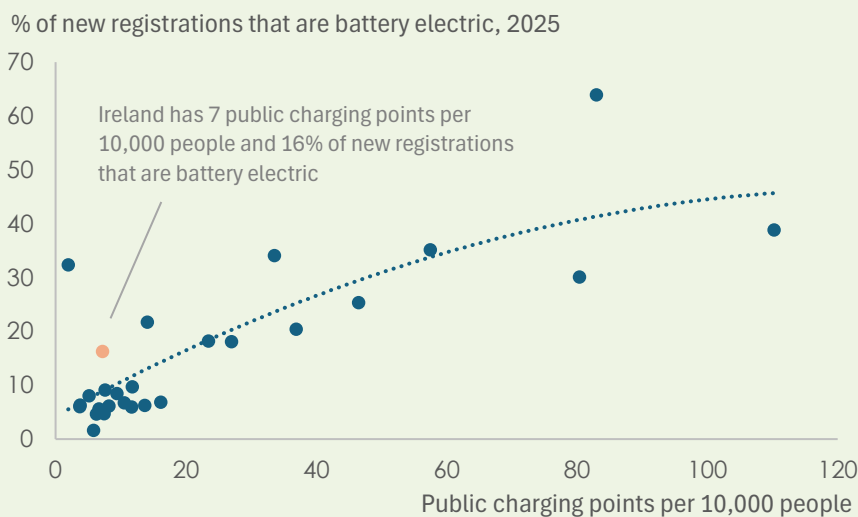
Ireland's transition to electric vehicles has seen adoption rates rise recently. While this is more than would be expected given the low numbers of public charging points in Ireland, there is a long way to go to meet the Government's targets for 2030.

Uptake rose in 2025, with new battery electric vehicle registrations capturing roughly 20% of new private cars. This brings the total annual registrations to over 23,000 units. However, with just over 200,000 EVs on the road at the end of 2025, and a national target of nearly 945,000 EVs by 2030, the current uptake is insufficient. It would take over 30 years rather than 5 years to hit the target at current rates of uptake. This puts Ireland at risk of billions in potential costs from failing to meet agreed EU commitments to reduce emissions.

The economics of ownership

The price of vehicles remains a key driver of uptake. According to the EU Consumer Monitor 2023, purchase price is the number one challenge reported across surveyed European markets; a sentiment echoed in surveys of Irish consumers. And while the long-term financial case for electric vehicles is compelling, uptake remains low. Analysis suggests that electric vehicles have running costs that are much lower. The average driver of a petrol or diesel car could be losing close to €2,000 per year in fuel and maintenance compared to an electric equivalent.²⁰ Over an eight-year ownership cycle, the total costs of an electric and petrol/diesel equivalent with a similar market price suggests the petrol/diesel costs around 40% more.²¹ Clearly, other factors are affecting buyer choices, such as the change in technology, range, battery life, and other potential sources of anxiety.

Nº 21 Ireland's uptake high despite limited charging infrastructure



Source: Alternative Fuels Observatory data for 2025.

Note: Data for 13 countries (Belgium, Czechia, Denmark, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden) are valid to Dec 2025; the rest Nov 2025.

²⁰ This analysis is based on petrol prices of €1.73 per litre, electricity at €0.20 per kWh, efficiency of 7 litres per 100km and 15kWh per 100km, with an average distance travelled of 15,000km per year. The excess maintenance and motor tax on petrol/diesel estimated at just under €700 per annum.

²¹ This extends the running cost analysis for a base price vehicle of €40,000, but it reflects lower Vehicle Registration Tax, and the SEAI grant support of €3,500 for electric vehicles.

So, what can the government do? The policy literature tends to argue for a staged transition — gradual subsidies transitioning to distance-based taxation to avoid deadweight loss. However, the scale of Ireland’s 2030 gap suggests further intervention might be needed. We calibrate our fiscal costs based on parameters in Austin (2023) and the estimated price differentials between electric and non-electric vehicles in the current Irish market. This leads to an assumed increase in the grant to €10,000, which would cost approximately €1.6 billion for 250,000 vehicles. To put this in context, €1.6 billion represents 0.5% of Ireland's projected GNI* for 2025 and roughly 1.3% of total government expenditure. It is modest compared to the potential costs of missing EU targets we report.

Crucially, this intervention is not assumed to be open-ended. It is estimated to bring registration numbers in line with the MaREI estimates of the vehicle transition required to achieve net zero emissions by 2050. By fast-tracking the market to a self-sustaining “threshold,” mirroring the Norwegian approach, we assume the State can eventually withdraw this support. In 2020, the Norwegian state enterprise Enova ceased subsidies for standard fast-charging, declaring the sector commercially viable. This decision coincided with EVs reaching approximately 15% of the total vehicle fleet and a “cars-to-charger” ratio slightly higher than Ireland’s current levels at which point high utilisation ensured private profitability. By contrast, Ireland’s EVs are about 3% of the total fleet.

Industry

Within industry, the cement sector accounts for the largest share of emissions. These emissions are difficult to abate through electrification alone.

Reducing emissions in this sector therefore requires targeted policy support to enable the deployment of low-carbon production methods, like carbon capture and storage (CCS). Given the high capital costs, the transition is unlikely to occur without public intervention. In the modelling framework, government support is assumed to facilitate the installation of abatement technologies rather than to permanently subsidise output.

Power

The shift towards renewable electricity generation is expected to be led by private investment. However, the expansion of renewable capacity creates additional infrastructure needs that fall partly on the public sector. Ensuring a stable and reliable electricity supply requires investment in grid expansion, reinforcement, storage capacity, and system balancing.

Rather than direct ownership of the State, expenditure is therefore concentrated on network infrastructure and system reliability.

9. Policy takeaways

This section considers some insights from the analysis. It brings together the various channels discussed to assess the choices facing policymakers (Figure N° 22). It also reflects on international best practices for policy design.

When all aspects are considered, the fiscal case for Ireland taking climate action domestically is clear. This is true even if global coordination fails. The State faces a distinct choice: it can either direct public funds towards domestic transition infrastructure — upgrading homes, electrifying transport, and supporting the economy — or it can direct funds towards massive, deadweight costs for missing EU targets.

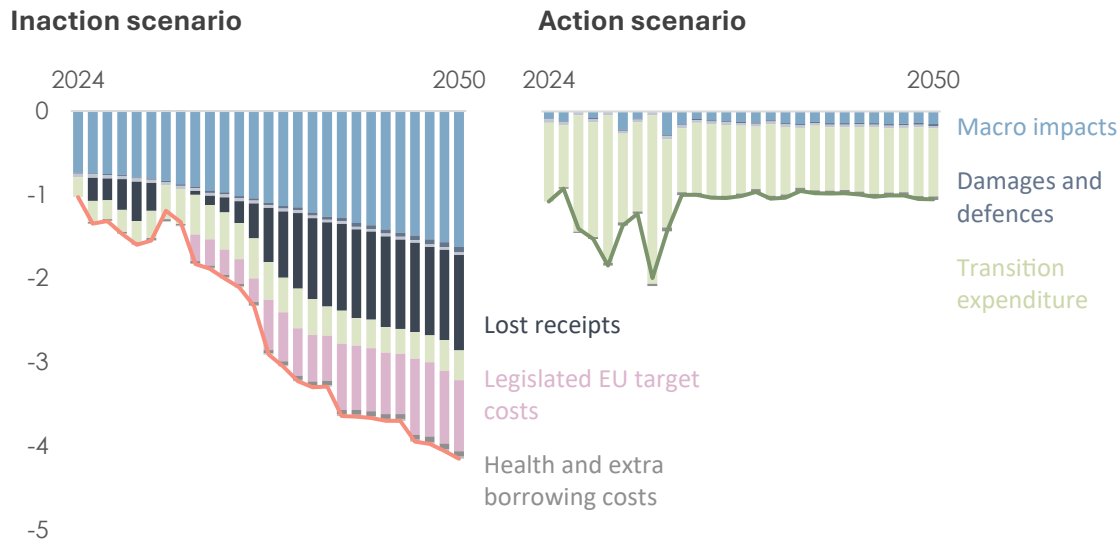
As the analysis shows, both global inaction and uncoordinated action result in severe macroeconomic damages. However, taking action domestically limits the State's exposure to open-ended penalties and secures tangible local benefits. At the same time, the transition to a low-carbon economy may also generate economic opportunities. By positioning Ireland as a country that is embracing the transition, the shift to policy action could spur growth in new technologies, new innovation, and in areas related to frontier industries.

This reality should fundamentally shape how the transition is communicated and managed. Because coordinated global action cannot be guaranteed, relying on abstract global goals to motivate the public is risky. Instead, as Box F outlines, policy narratives can focus on the immediate, guaranteed domestic benefits of the transition.

Furthermore, the fiscal impacts of climate action must be managed with a clear strategy to replace revenue losses. The falloff in fossil fuel taxes is a key driver of fiscal pressures. As Box F notes, it is crucial to phase in alternative revenue sources, such as distance-based charges, while balancing this need against the risks of derailing the transition.

Nº 22 Inaction could be far costlier for Ireland

Total estimated impact on budget balance, % GNI*



Source: Own calculations based on the OECD-EDISON tool.

Box F. Lessons from international best practice

For transition policies to succeed, they often need to consider people's behaviour and use clear communication as much as they need to consider economic efficiency. The international literature highlights four key pillars for designing robust policies around the transition.

1. Fairness and tangible benefits

Public support for transition policies often hinges on fairness and perceived effectiveness. Indeed, fairness across groups is a stronger predictor of support for such policies than individual self-interest tends to be (Bergquist, Nilsson, Harring, & Jagers, 2022). Moreover, research indicates that citizens are less motivated by abstract global climate goals than by tangible, local improvements.

To build support, policy narratives can pivot from stressing global benefits, which depend on coordinated action that cannot be guaranteed, to local benefits that are more certain. For example, policy can emphasise immediate gains such as reduced air pollution, lower heating costs and running costs for vehicles, improved energy security, and reduced congestion. In terms of fairness, additional revenues raised can be used to reduce costs related to the transition and offset regressive impacts.

2. Using fiscally sustainable incentives like "Feebates"

As the share of electric vehicles in the Irish market grows, there may be concerns that subsidies become fiscally unsustainable. So-called "feebates" are one way to address this (IMF, 2024). They involve higher taxes being placed on high-emission vehicles, with the proceeds helping to offset higher subsidies or rebates for low-emission ones. The exact fees can be proportional to how far above a certain level of emissions a vehicle is (for example, €50 off for every 1g CO₂ of emissions below 100g/km). This "linear" approach is somewhat evident in the French "malus" system. It avoids cliff edge effects and risks around strategic pricing. Governments can gradually

adjust feebates as EVs proliferate, helping protect budgets in a way that pure subsidy schemes fail to.

3. Reframing choices

Standard economic arguments around choices often fail due to behavioural factors. For instance, the “status quo bias” tends to mean that people prefer their existing situation even where it is economically less advantageous. Moreover, “loss aversion”, the tendency for individuals to be motivated to avoid a loss more than to achieve a gain of the same size, can matter hugely for consumer behaviour.

How does this apply to the transition? One example is to consider the market for EVs. Instead of marketing EVs based on potential future savings, communication can frame the internal combustion engine as an active drag on costs. For instance, highlighting that drivers “lose” significant sums annually in fuel and maintenance costs by failing to switch is likely to trigger a stronger response than promising future savings (OECD, 2025). Policymakers should also recognise that consumers are unlikely to be swayed by cost savings alone, if a transition to new technology means a big change to their status quo. This is something highly relevant for the switch to EVs, which involves a marked change in people’s experience with transport as compared to, say, a switch between a petrol or diesel vehicle.

4. Phasing in alternative taxes

Fuel tax revenues are projected to dry up as economies green. Replacing those revenues with some alternative will be a key part of maintaining fiscal sustainability. Options frequently considered internationally include taxes on distance travelled or congestion charges. However, there is trade-off to the speed at which these are introduced. Too fast, and it can scupper the transition — slowing the adoption of new technology and not having sufficient transport alternatives in place. Too slow, and the cost of the fiscal supports can become much steeper, while the political capacity to increase taxes becomes more difficult (people get used to paying lower taxes on EVs).

The literature suggests two responses. First, make a simple start early. Governments can begin with “proxy” charges based on odometer readings or vehicle weight/pollution class to establish the principle of paying for road use (Noll, Schmidt, & Egli, 2026). These could, for instance, be placed on all road users. Second, a gradual move to more precision in taxation. Once administrative capacity is built up, the tax system can transition to *real-time* distance and congestion pricing. This can actively manage traffic demand and create economic value beyond what fuel taxes can deliver by reducing congestion where and when it matters.

What about beyond 2050?

The gap between action and inaction is expected to widen beyond 2050. This reflects a number of expected developments.

- **First, temperature paths are expected to further diverge.** There is estimated to be close to a one-degree Celsius difference between action and inaction scenarios by the end of the century. Higher temperatures are associated with progressively larger economic impacts. Not only do these

accumulate, but they also create a feedback to other costs and adverse impacts.

- **Second, extreme weather events will become more frequent and severe.** This leads to additional expenditure pressures associated with repairs, infrastructure resilience, and adaptation needs, which rise over time.
- **Third, there is a growing risk of climate tipping points.** These unpredictable shifts in the Earth's systems could trigger abrupt and severe economic shocks, making the consequences of global inaction even worse.

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Appendix A:

Uncoordinated policy action

The paper focuses on two distinct policy scenarios. One in which there is no policy action to limit climate change, both domestically and globally, and another scenario in which there is domestic and global policy action to limit climate change.

This appendix presents results of a third scenario — uncoordinated action. In this scenario, Ireland takes action to limit climate change, reducing its emissions and achieving net zero by 2050. However, internationally there is not sufficient action to mitigate climate damages. Warming is consistent with a rise in global temperatures of 2.5°C by the end of the century.

Under this scenario, Ireland faces largely the same transition costs as in the policy action scenario. However, as there is no global action limit climate change, climate change continues and global temperatures rise. As a result, Ireland faces macroeconomic, physical and health costs similar to the inaction scenario.

Average annual budgetary costs, 2026-2050

% of GNI*

	Action	Inaction	Uncoordinated action
Macroeconomic damages	-0.1	-1.1	-1.1
Extreme weather events	0.0	0.0	0.0
Emission related taxes	-1.3	-0.6	-1.3
Emission related taxes (if actively replaced)	0.0	0.0	0.0
Transition expenditure	-1.0	-0.4	-1.0
Defences costs	0.0	0.0	0.0
Health-related costs	0.0	0.0	0.0
Legislated EU target costs	0.0	-0.5	0.0
Additional interest costs	0.0	0.0	-0.1
Total	-2.5	-2.8	-3.6
Total (where taxes are actively replaced)	-1.2	-2.1	-2.3

Note: Cumulative figures reflect transition costs, damages, and other impacts out to 2050. They are calculated relative to a scenario in which climate change does not happen.

The results point to a “prisoners’ dilemma” of sorts for climate action in Ireland. The best outcome, in terms of least costs to the state, is coordinated domestic and global policy action. This results

in annual average losses of just 1.2% of GNI* in the case where the government also acts to replace revenues.

In a scenario in which there is both domestic and global policy inaction, annual average losses climb to 2.1% of GNI* on average, even when revenues are replaced.

However, the worst outcome is uncoordinated action — domestic policy action, and global policy inaction. In this scenario, where Ireland acts, but others fail to adequately reduce emissions, the annual average losses climb further to 2.3% of GNI*, even when revenues are replaced.

In all of these three cases, the costs are higher if domestic policy does not respond adequately to replace revenues as they dry up. The costs of action rise to 2.5% of GNI* on average, inaction to 2.8% and uncoordinated action to 3.6%.