The Cost of Inaction

Die ökonomischen, sozialen und gesundheitlichen Kosten unzureichenden Klimaschutzes in der EU



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DIE GRÜNEN/EFA im Europäischen Parlament

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Vorwort

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Wir reden in Europa viel darüber, was Klimaschutz kostet: über Investitionen, über Förderungen, über Belastungen für Unternehmen und Haushalte. Was wir viel zu selten diskutieren, sind die Kosten des Nichtstuns.
Die Wahrheit ist unbequem, aber eindeutig: Untätigkeit ist teurer als jeder wirksame Klimaschutz. Die Klimakrise ist kein abstraktes Zukunftsrisiko – sie trifft Europa bereits heute. Sie kostet Menschenleben, zerstört Existenzen, gefährdet Arbeitsplätze und untergräbt die wirtschaftliche Stabilität ganzer Regionen.

Diese Studie setzt genau hier an. Sie stellt nicht die Frage, ob die Klimakrise ökonomische Kosten verursacht, sondern wie hoch diese sind, wen sie besonders treffen und wo politisches Zögern die größten Schäden verursacht. Gesundheit, Arbeit, öffentliche Haushalte, Finanzmärkte und soziale Sicherheit werden dabei gemeinsam betrachtet – denn genau so wirkt die Klimakrise in der Realität.

Europa steht an einem Scheideweg. Während der Green Deal als zentrales Zukunftsprojekt immer weiter verwässert wird, steigen die Kosten der Verzögerung Jahr für Jahr. Jeder Euro, den wir heute nicht investieren, vervielfacht sich morgen als Schaden.

Diese Studie liefert die ökonomische Grundlage für eine ehrliche politische Debatte. Sie zeigt: Klimaschutz ist keine ideologische Frage – er ist eine Frage von Verantwortung, Wohlstandssicherung und sozialer Stabilität in Europa.

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The Economic Case for Climate Action: Assessing the Costs of Inaction in the European Union

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Abstract

This report provides a quantitative assessment of the economic, fiscal and public health risks posed by anthropogenic climate change to the European Union. Rather than viewing climate inaction as a residual environmental externality, this study conceptualises it as a systemic market failure that generates persistent macroeconomic losses, fiscal instability, and rising health burdens. The analysis uses historical evidence to show that weather- and climate-related extremes caused economic losses of over €560 billion in the EU-27 between 1980 and 2021. Of these losses, only 25–33% were insured, which implies substantial exposure for households, firms, and public budgets (European Environment Agency, 2025).

The study employs an integrated analytical framework that combines subnational macroeconomic modelling, sectoral impact analysis, and climate event attribution. By explicitly accounting for regional heterogeneity, temperature variability and extremes, and the persistence of climate impacts, the analysis departs from conventional smooth-damage approaches and produces higher, policy-relevant estimates of the costs of climate inaction. At the global level, benefits of strong mitigation outweigh costs over time, especially when including avoided damages (IPCC, 2022). 1 °C of global warming reduces world GDP by over 20 % in the long run and business-as-usual warming implies substantial welfare losses (Bilal & Känzig, 2024). Under a high-emissions trajectory consistent with approximately 3 °C of warming, cumulative global GDP losses are estimated to range between 11% and 27% by 2100 (Benayad et al., 2025).

For the European Union, the results suggest that, if action is not taken, average annual welfare losses will amount to around 2% of GDP, with losses in highly exposed regions, particularly in Southern Europe, exceeding 4% of GDP (JRC, 2014). The analysis identifies productivity losses, rather than direct capital destruction, as the main way in which economic damage is transmitted. Occupational heat stress alone is projected to cost the EU around €670 million per year by 2080 (Szewczyk et al., 2025). These economic effects are closely linked to significant public health consequences, such as heat-related mortality. It is estimated that around 62,000 people died from heat-related causes in Europe in 2022, and this figure is projected to increase by a factor of 4.7 by mid-century under current emissions trajectories (Ballester et al., 2023).

Climate-related fiscal and financial risks are an emerging source of macroeconomic instability. Under high-emissions scenarios, up to 81 countries could face climate-induced sovereign credit downgrades by 2100. This could potentially increase global annual interest expenditure by up to US$2 trillion compared to 2010 levels (Klusak et al., 2023).

Conversely, the analysis demonstrates that immediate and coordinated mitigation and adaptation measures would yield significant net economic benefits. Limiting global warming to 1.5 °C could avert cumulative global losses of US$264–610 trillion (Wei et al., 2020), with an equivalent investment cost of 1–2% of cumulative global output (Benayad et al., 2025). This implies benefit–cost ratios of between 5 and 14 (Benayad et al., 2025). Although the transition would entail significant structural changes and labour reallocation, particularly in carbon-intensive sectors, it

is projected to result in positive net aggregate employment effects, including the creation of up to two million additional jobs in the EU by 2050 (European Commission, 2019).

Overall, the findings show that climate inaction is already imposing escalating and persistent costs on EU economies, public finances and human health, and that these costs far exceed the investments required to rapidly transition to a climate-neutral European economy.

Keywords: climate inaction; EU; costs of inaction; adaptation; mitigation; GDP; employment; health; fiscal risk; just transition

1. Introduction

The economic case for ambitious climate mitigation is well established at a global level. A substantial body of scientific and economic literature demonstrates that unmitigated climate change would incur extremely high costs due to rising physical damage, mounting adaptation expenses, and escalating risks of irreversible and catastrophic outcomes. From a systemic perspective, it is clear that delaying mitigation substantially increases long-term welfare losses and undermines the stability of economic and social systems.

However, translating this conclusion into concrete policy decisions, particularly at the level of individual jurisdictions such as the European Union, remains contentious. A recurring argument is that, while the costs of climate inaction are large on a global scale, they are no longer policy-relevant for today's EU decision-makers. This view is based on three related arguments: firstly, that a significant proportion of the impacts of climate change are already 'locked in' due to past greenhouse gas emissions; secondly, that the impact of the EU's marginal mitigation efforts on global temperature outcomes is limited; and thirdly, that the benefits of climate action are distributed unevenly across regions, time horizons and stakeholders, while the costs of mitigation are incurred immediately and locally.

This report challenges that interpretation. It argues that the costs of climate inaction remain highly relevant for EU policymakers — not despite, but precisely because of the geographical, temporal and institutional mismatches between action and impact. The key is to move beyond framing climate policy narrowly as a contribution to stabilising the global temperature and to assess the risks of inaction in terms of concrete economic, fiscal and strategic consequences for the European Union itself.

From global welfare losses to EU-relevant costs

Much of the debate on climate inaction has focused on cost estimates for the long term, expressed in terms of GDP losses or reductions in global welfare. While these are analytically important, they are poorly aligned with the mandates and decision-making timeframes of policymakers. EU decision-makers, for example, are accountable for fiscal stability, macroeconomic performance, financial system resilience, social cohesion and strategic autonomy within a medium-term policy horizon. Therefore, the central question is not whether climate

inaction is costly in a global or intergenerational sense, but whether it generates risks and expenditures that fall within EU jurisdictions, budgets, and policy responsibilities.

The answer is increasingly yes. Climate-related damage already incurs direct and indirect costs for EU economies through extreme weather events, heat stress, flooding, droughts and ecosystem degradation. These impacts result in higher public spending on disaster relief, infrastructure repair, agricultural compensation and healthcare, as well as rising insurance losses and mounting pressure on public reinsurance mechanisms. What were once considered future or external damages are progressively being internalised on public balance sheets.

From a policy perspective, these developments mean that climate inaction is fiscally relevant. Rising climate-related expenditure competes with other public priorities, increases budgetary volatility and undermines long-term fiscal planning. Inaction today increases the likelihood that future governments will be subject to sudden expenditure shocks in a constrained fiscal environment.

Spillovers and systemic exposure

Even when the most severe physical impacts occur outside Europe, the EU is inevitably exposed to the consequences of inaction on a global scale. Climate damage propagates through trade, finance, migration and geopolitics. Disruptions to agricultural production, energy systems and critical raw material supply chains affect prices, inflation and industrial competitiveness within the EU. Climate-driven instability in neighbouring regions puts pressure on migration systems and external border management, with direct fiscal and political implications.

These spillovers undermine the argument that EU mitigation efforts are irrelevant due to their limited impact on global emissions. From an EU perspective, the relevant counterfactual is not a climate-stable world achieved unilaterally, but rather a world of escalating global climate impacts to which the EU is exposed, both economically and politically, regardless of its own share of emissions. In this context, climate action becomes a rational response to systemic risk rather than a purely altruistic contribution to global public goods.

Path dependence, lock-in, and rising future costs

A central reason why the costs of climate inaction are relevant to decisions today is the path-dependent nature of economic systems. Continued investment in carbon-intensive infrastructure, buildings, transport systems and industrial assets locks the EU into emissions-intensive trajectories that are costly to reverse. Delaying mitigation does not avoid costs; it merely shifts and amplifies them.

Late and disorderly transitions increase the likelihood of stranded assets, abrupt regulatory changes, financial instability and social conflict. Conversely, taking action early and in a predictable manner preserves flexibility, lowers adjustment costs, and reduces the risk of sudden shocks. From this perspective, climate policy is essentially a matter of managing intergenerational

risk: decisions made today determine the scale, distribution and manageability of the costs that will be incurred in the future.

This is directly relevant for EU policymakers. Inaction restricts future policy options, necessitates more disruptive interventions at a later stage, and increases the likelihood of climate policy coinciding with economic downturns or social crises. The cost of inaction is therefore not only higher future damages, but also the loss of orderly transition pathways.

Competitiveness, innovation, and strategic autonomy

Climate inaction also carries significant opportunity costs. The global transition towards low-carbon technologies is reshaping industrial structures, trade patterns and technological leadership. Delayed mitigation could result in the EU becoming dependent on external suppliers for essential clean technologies, which would undermine its industrial competitiveness and strategic autonomy.

Early and credible climate action supports innovation, learning effects and standard-setting power. This allows firms to capture emerging markets and reduce long-term production costs. Therefore, the costs of climate inaction include foregone productivity gains, weaker industrial positioning and increased vulnerability in important value chains. These outcomes fall squarely within the remit of EU economic and industrial policy.

Distributional impacts and political salience

Although the benefits of climate mitigation may seem diffuse, the costs of inaction are unevenly distributed across the EU. Farmers, coastal regions, cities, low-income households and insurers are already experiencing disproportionate effects. These distributional impacts generate political pressure, legal claims and demands for compensation, creating immediate policy challenges.

It is not necessary for all benefits to accrue locally and simultaneously for decision relevance to be established. It is sufficient for inaction to generate concentrated losses, fiscal liabilities and political instability within the EU. On this basis alone, climate inaction constitutes a material policy risk.

This study addresses the following research questions in particular: (1) What are the expected aggregate economic costs of climate inaction within the EU over the next 10–15 years? (2) Which EU regions are expected to face the highest economic and social impacts from climate inaction, and which sectors will be most affected? (3) How many jobs are at direct risk from ecosystem degradation, extreme weather events and loss of economic competitiveness due to climate inaction, under different global warming scenarios (1.5°C, 2°C, 3°C and 4°C)? (4) What are the projected health-related productivity losses among the EU workforce due to increasing climate risks (e.g. heat stress, reduced productivity)? (4) To what extent will mortality and morbidity rates within the EU workforce rise in the absence of significant climate policy action? (5) How much

could economic costs and employment losses be reduced if the EU were to implement enhanced climate mitigation and adaptation measures immediately?

2. Defining the Cost of Inaction and the Policy Baseline

The Cost of Inaction (COI) represents the total damage incurred by economic, social and environmental systems as a result of delayed or inadequate climate policies (European Environment Agency et al., 2022; OECD, 2008). Essentially, the COI captures the full estimated consequences of allowing climate change to continue unabated. Recognised globally as the world's 'greatest market failure', analysing the COI is paramount for risk management, prioritising necessary interventions and informing the efficacy of proposed policies (Krupnick & Cropper, 2020; OECD, 2008; Steininger et al., 2015a).

Methodologically, the COI is based on establishing a consistent counterfactual baseline. This baseline is defined by the assumption that no new policies will be introduced beyond those currently in place, a scenario often referred to as 'business as usual' (BAU). The BAU scenario is the critical reference point against which the potential costs of inaction (damages) and the benefits of policy intervention (avoided damages) are quantified (European Environment Agency et al., 2022; OECD, 2015).

- Baseline options: The Organisation for Economic Co-operation and Development (OECD) defines the baseline for inaction as one of the following three scenarios: a hypothetical no-adaptation scenario; a current policy baseline; or a more stringent, credible future baseline based on commitments. Pragmatically, the current policy baseline is considered the simplest and most straightforward to implement.
- Scenario alignment: Modern high-level assessments align the business-as-usual (BAU) trajectory with specific warming paths, such as the SSP2–4.5 pathway or the "Current Policies" scenario of the Network for Greening the Financial System (NGFS), which typically project warming of around 3°C by the end of the century if currently implemented policies persist.

The COI inherently encompasses all burdens borne by society, including financial, environmental, and social factors.

- Market costs: These are direct and indirect financial losses that affect market transactions and output directly, including costs for reconstruction, increased healthcare services and reduced labour productivity. For instance, the failure to implement existing EU environmental legislation incurs estimated annual costs of between €154 billion and €208 billion (EC, 2025).
- Non-market and intangible costs: These impacts include loss of human life, psychological costs, biodiversity loss, degradation of ecosystem services and increased geopolitical instability. Excluding these non-market costs deliberately leads to a conservative and potentially misleading estimate of the COI.

The assessment of COI is marked by significant uncertainty regarding future impacts and their valuation.

- Conceptual ambiguity: A major challenge lies in the persistent ambiguity and imprecise distinction between "adaptation costs" (the investment required) and "inaction costs" (the damage incurred by failing to adapt) (European Environment Agency et al., 2022).
- Valuation and discounting: COI estimates depend critically on the choice of discount rate, as this determines the relative valuation of future costs versus present mitigation expenditure. This makes the choice an unavoidable ethical judgement rather than a purely scientific one (Bureau et al., 2021; Economist Intelligence Unit, 2015). The complexity of intertemporal valuation has led many modellers to exclude discount rates in order to provide a neutral framework for interpretation (Benayad et al., 2025).
- Underestimation bias: traditional economic models, such as integrated assessment models (IAMs), tend to focus on average outcomes and often grossly underestimate extreme risks (e.g. systemic financial failure or climate tipping points), which could impose costs an order of magnitude higher. Furthermore, contemporary research shows that omitting key indicators such as daily temperature variability and extreme precipitation underestimates global damage by almost two percentage points at 3°C of warming (Waidelich et al., 2024).

3. Modeling Systemic Risk and Incomplete Accounting

3.1 Theoretical Foundations of Systemic Climate Risk

The way in which climate change is assessed within economic theory has evolved from viewing it as a distinct environmental externality to recognising it as the most significant systemic market failure in human history. Methodologically, this requires a shift from marginal analysis to frameworks that can account for failures in all areas of the economy and society. A central conceptual challenge is the absence of a complete set of Arrow–Debreu markets to price risk and coordinate long-term investments. This results in a lack of price signals to guide the necessary structural transformations. Consequently, standard market-based interventions are often insufficient and larger, non-marginal interventions are required to reorient economic systems towards a sustainable equilibrium. This systemic perspective also necessitates the acknowledgement that underlying economic structures may be locked into carbon-intensive, path-dependent trajectories, wherein specialised 'dirty' innovations impede the adoption of cleaner alternatives (Acemoglu et al., 2016; Aghion et al., 2016).

3.2 Critical Appraisal of Traditional Integrated Assessment and General Equilibrium Models

Integrated Assessment Models (IAMs) have traditionally been the main quantitative tool used to estimate the social cost of carbon (SCC) and inform global policy targets . These frameworks typically link socio-economic projections, climate modules and damage functions in order to

derive a welfare-optimal path for reducing emissions (Pindyck, 2013; Stern, Stiglitz Charlotte Taylor, et al., 2022). However, high-level scientific critiques emphasise that IAMs often rely on rigid, non-empirical foundations, such as the assumption of a representative agent operating under perfect foresight and market clearing. Computable general equilibrium (CGE) models offer a more granular sectoral and regional representation, focusing on market-based trade-offs and the propagation of shocks through trade and productive activities. Despite this level of detail, CGE models are structurally limited by their inability to easily incorporate non-market impacts, and by their reliance on marginal responses to shocks (OECD, 2015; Steininger et al., 2015b). This may not adequately capture the state of an economy facing large, discontinuous climatic disruptions. Both IAMs and CGE models frequently operate under a 'first-best' paradigm that assumes other market failures have been corrected. This can lead to biased results and an underestimation of the benefits of comprehensive climate policy packages (Lipsey & Lancaster, 1956; Stern, Stiglitz, et al., 2022).

3.3 The Paradigm Shift Toward Non-Equilibrium and Agent-Based Frameworks

The inherent limitations of equilibrium-based models have led to the creation of a 'third wave' of climate-economic methodologies (Köberle et al., 2021; Monasterolo et al., 2019; Stern, 2016). Agent-based models (ABMs) depart from the representative agent fiction by simulating the interactions of a multitude of heterogeneous agents, notably firms, households and banks, under conditions of bounded rationality and imperfect information. This approach enables the endogenous emergence of system-wide crises to be studied, as well as the complex feedback loops between the real economy and the financial sector. Alongside this, Stock-Flow Consistent (SFC) models provide an integrated assessment of macro-financial stability by explicitly linking real-sector production to financial-sector accounting. These evolutionary frameworks are better equipped to handle nonlinearities, policy path dependency and the radical uncertainty that characterises the transition to a low-carbon economy. By shifting the focus away from marginal perturbations, these models can examine the structural shifts and dislocations in labour and capital markets that are often overlooked in more traditional aggregative models.

3.4 Methodological Divergence in Damage Function Specification: Level versus Growth Effects

A critical factor in determining projected economic impacts is the mathematical formulation of the climate-damage function (Burke et al., 2015). The debate centres on whether climatic shocks predominantly affect the 'level' of economic output in a single period, or whether they persistently alter the long-term 'growth rate' of the economy. Assuming that damages impact growth rates through mechanisms such as reduced capital accumulation or degraded total factor productivity leads to substantially higher, compounding cost estimates over time. Methodologically, many contemporary empirical studies adopt the conservative assumption of 'pure level effects', whereby permanent climate changes only have an instantaneous impact on the growth rate, and then use distributed lag models to test for persistence. This approach aims

to provide a robust lower bound on persistence, while avoiding the infinite growth effects assumed by some more pessimistic models.

3.5 Accounting for Discontinuity: Tipping Points and Fat-Tail Risks

There is a significant risk of crossing irreversible thresholds associated with climate change, known as Earth System Tipping Points. However, traditional economic models typically represent climate damage using continuous, often quadratic, functions that fail to account for the potentially catastrophic, discontinuous nature of these large-scale events. These 'fat-tail' risks present a methodological difficulty in that they involve low-probability, high-impact outcomes where the potential damage is effectively unlimited. This makes standard cost-benefit analyses based on expected utility potentially meaningless. In order to integrate these risks, we must shift our focus from optimising average outcomes to a risk-centric approach that prioritises avoiding catastrophic tail events. Newer methodologies use stochastic integrated assessment and 'storylines' to better capture the cross-sectoral and cascading consequences of crossing multiple interconnected tipping elements (Lenton et al., 2008; Stern, Stiglitz, et al., 2022; Weitzman, 2009).

3.6 The Ethical and Analytical Complexity of Intertemporal Discounting

The choice of discount rate remains one of the most controversial and influential parameters in the field of climate change economics. Most models use the Ramsey rule, which breaks the discount rate down into two components: the pure rate of time preference (ρ), reflecting the importance placed on future generations; and the elasticity of the marginal utility of consumption (η), multiplied by the economic growth rate. High discount rates effectively suggest that the welfare of distant generations is of negligible value today, resulting in weak climate action being endorsed. Conversely, using low or zero pure rates of time preference is increasingly regarded as the only ethically defensible position in the context of irreversible, long-term, planetary-scale impacts. Furthermore, risk and time discounting must be treated as conceptually distinct; confounding them can lead to flawed heuristics that pay less attention to future costs precisely when those costs are most uncertain. As it is not possible to derive a single rate scientifically, presenting results across a range of rates or excluding them altogether is essential for transparency in policy appraisal (Stern, 2008; Stern, 2007).

4. Sectoral evaluation: Direct Impact Chains and Monetisation

4.1 Primary Resource Sectors and Ecosystem Services

The primary resource sectors, including agriculture and forestry, are particularly vulnerable to climate change as their production processes are largely determined by biological and environmental factors. The economic costs of inaction in these sectors are evident through complex impact chains involving direct biophysical shifts and the systemic degradation of the natural capital on which they depend.

4.1.1 Agriculture and food security: Productivity Gains versus Systemic Stress

The relationship between climate change and agricultural productivity is characterised by stark differences between the potential for short-term gains in temperate regions and the accelerating losses in tropical zones. Mid- and high-latitude regions may initially experience productivity gains due to prolonged growing seasons and the stimulatory effects of CO_2 fertilisation on C_3 crops such as wheat and soybeans (Ackerman & Stanton, 2006; Richardson, 2009). In Austria, for example, a moderate warming scenario is expected to boost the annual value of the sector by around €110-120 million by mid-century (Steininger et al., 2015b).

However, these gains are increasingly considered a 'temporary windfall' likely to be offset or reversed as warming exceeds critical thresholds (Steininger et al., 2015b). Agricultural systems are highly vulnerable to heat stress and water limitations. While corn yields may rise at temperatures up to 29 °C, a single day at 32 °C can result in a 1% yield loss (Schlenker & Roberts, 2009). Furthermore, increased inter-annual variability and extreme events such as droughts and flash floods disrupt production planning and can reduce national harvests by 10% or more (Lesk et al., 2016; McSweeney, 2016). This contributes to global food price volatility and inflation (Tigchelaar et al., 2018). In low-income regions, these biophysical shocks are exacerbated by reduced labour productivity in outdoor environments. It is estimated that effective labour supply in Asia would decrease by 18 percentage points under a 3.0°C warming scenario. Consequently, while northern regions may temporarily increase their share of global food production, the overall trend indicates a future of reduced prosperity and heightened food insecurity (Dasgupta et al., 2021).

4.1.2 Forestry and carbon sinks: Disturbance Regimes and Adaptive Management

The long rotation periods of trees present forestry with unique challenges, limiting its capacity for rapid genetic or structural adaptation. While a warming climate initially extends the vegetation period, this potential increase in biomass is often offset by an intensified disturbance regime. The European spruce bark beetle (Ips typographus) is one of the most significant biotic threats: rising temperatures enable faster population growth and allow infestations to spread to previously unaffected mountain forests. In Austria, annual financial losses from bark beetle outbreaks in production forests are estimated to reach €141 million by 2100 (Steininger et al., 2015b).

Abiotic disturbances, particularly storm damage and drought stress, further endanger the economic stability of the sector. In some regions, peak wind speeds during gales can already cause damage equivalent to 4–50% of annual timber production. Beyond timber losses, forest degradation undermines their critical role as carbon sinks and protective barriers against natural hazards such as rockfalls and avalanches. Restoring the protective function of damaged mountain forests would incur significant costs, estimated at €220,000 per hectare (Steininger et al., 2015b). To mitigate these risks, assisted migration (the selection and transfer of seed provenances adapted to future climates) has emerged as a vital adaptation strategy. Modelling suggests that relying on local seeds could result in a 41% decline in the European forest carbon sink, whereas

implementing assisted migration could maintain or even increase CO_2 sequestration levels to 48–60 TgC per year (Chakraborty et al., 2024).

4.1.3 Non-market intangibles: Valuing biodiversity and ecosystem resilience

A significant proportion of the cost of inaction stems from the erosion of ecosystem services that are not traded in conventional markets and are therefore systematically excluded from standard GDP metrics. These services represent the natural capital on which the global economy is built and provide essential functions ranging from food security to climate regulation.

The Economic Anchor of Agricultural Stability

Pollination and natural pest control are fundamental to agricultural productivity. Globally, more than 75% of food crops rely on pollinators, contributing between US$235 billion and US$577 billion to global agricultural output annually (Gallai et al., 2009; IPBES, 2019; World Health Organization, 2024). In Austria, these services were valued at around €298 million for pollination and €255 million for natural pest control per year in 2008 (Steininger et al., 2015b). The total global economic impact of biodiversity loss is estimated at a staggering US$10 trillion per year (IPBES, 2019; World Health Organization, 2024). This figure includes healthcare costs resulting from increased transmission of zoonotic diseases and agricultural losses due to declining pollinator populations (Mora et al., 2022).

Natural defences and hazard mitigation

Biodiversity provides critical protection against extreme weather events. Coastal ecosystems, such as mangroves, salt marshes and wetlands, act as natural shock absorbers, preventing up to US$65 billion worth of property damage from storm surges worldwide each year (Spalding et al., 2014). Coral reefs, which provide a habitat for a third of all marine species, also function as vital breakwaters (Beck et al., 2018). However, projections indicate that a 1.5°C rise in temperature would result in the loss of 70–90% of the world's coral reefs, and a 2°C increase would lead to almost total loss of coverage (Armstrong McKay et al., 2022). Without the flood protection provided by these reefs, the annual global cost of coastal flooding would double.

Irreversibility, tipping points and systematic underestimation

The loss of biodiversity causes irreversible damage, triggering cascading consequences throughout the Earth system. Anthropogenic climate change is rapidly increasing the attributable risk fraction (FAR) for ecosystem collapse (Lenton et al., 2008). Current economic models typically grossly underestimate true systemic risk because they fail to account for tipping points — thresholds at which small disturbances can cause a system to transition to a qualitatively new and often degraded state (Weitzman, 2009). The potential collapse of certain ecosystem services, such as pollination, fisheries and timber production, for example, could result in a 2.3% annual decline in global real GDP by 2030 (Johnson et al., 2021). Furthermore, unmitigated warming could trigger biodiversity loss on a scale comparable to the Permian extinction, which wiped out 90% of species (Benayad et al., 2025).

Social, cultural and psychological burdens

Inaction results in profound non-economic losses and damages that extend beyond material assets. This includes the loss of cultural heritage, territorial identity and indigenous knowledge. This is particularly pertinent for communities such as the Inuit, whose way of life is under threat due to the decline in polar ice. At an individual level, awareness of mounting climate threats and perceived governmental betrayal can generate widespread psychological distress, often referred to as 'eco-anxiety' (Hickman et al., 2021; Kumar et al., 2023). The annual cost of mental health conditions resulting from climate-related hazards is projected to reach nearly US$47 billion by 2030 (World Health Organization, 2024). As these intangible and subjective costs, including 'pain and suffering', are rarely monetised, the actual economic imperative for action is far more urgent than traditional, GDP-centric analyses suggest.

4.2 Built environment and infrastructure resilience

The resilience of the built environment is critical to determining the total cost of inaction (COI), as infrastructure is long-lasting capital which is often designed based on historical climate data. Climate change disrupts this sector by shifting thermal energy demands, physically destroying transport networks and mechanically and qualitatively degrading water systems.

4.2.1 Energy and buildings: Thermal Demand Trade-offs and Systemic Risks

The primary economic impact on the construction industry is a structural shift in energy demand: rising temperatures reduce the need for winter heating while increasing the need for summer cooling.

EU-27 expenditure dynamics: Broadly speaking across Europe, heating demand is expected to fall by around 28 Mtoe by 2050 and 65 Mtoe by 2100. This would result in annual cost savings of €34 billion and €121 billion respectively. However, these savings are offset by an increase in cooling demand, which is projected to rise by 16 Mtoe and 53 Mtoe respectively. This will incur additional electricity and investment costs of €30 billion and €109 billion per year, respectively (Mima et al., 2011).

Peak load and investment requirements: While temperate regions such as Austria could initially save €235 million per year on net energy expenditure by mid-century, the electricity sector would incur a substantial 'investment penalty' to manage peak summer demand. To cover the surge in demand during heatwaves, an additional investment of between €230 million and €390 million per year in new power plant capacity will be required by 2050 (Steininger et al., 2015b).

Systemic reliability and blackout risks: Failure to implement adaptive grid measures increases the risk of costly power outages. A total blackout in Austria lasting just 24 hours is estimated to result in losses of between €750 million and €1.1 billion (Reichl et al., 2013). Furthermore, the EU is at a competitive disadvantage, with gas prices currently three to five times higher than in the US, and industrial electricity prices two to three times higher than in the US and China (Draghi, 2024).

4.2.2 Transport and mobility: Infrastructure damage and service disruption

The transport sector is highly vulnerable to hazards triggered by precipitation, which account for 80–90% of road damage in Europe.

Maintenance and repair costs are escalating: Currently, 30–50% of European road maintenance expenditure is weather-related, equating to around €8–13 billion per year (Nemry & Demirel, 2012). In 2024 alone, climate-related losses in the EU amounted to €18.2 billion, primarily due to storms and flooding. The total economic cost of extreme weather events in Europe between 1980 and 2023 was an astonishing €738 billion (Copernicus & World Meteorological Organization (WMO), 2025).

The modal distribution of losses shows that extreme weather damage in Europe is concentrated, with approximately 80% affecting roads, 16% affecting air travel, and 3% affecting rail. In the Alpine region, the costs of increased extreme precipitation outweigh any savings from reduced frost weathering of roads and bridges (Nemry & Demirel, 2012).

Indirect disruption and inefficiency: The indirect costs of service interruptions often far exceed direct repair costs. For example, the lack of integration in European airspace management results in inefficient flight routes, incurring an annual cost of €6 billion. Furthermore, weather-related road closures exacerbate congestion, costing the EU an estimated €230 billion annually (Draghi, 2024; Steininger et al., 2015b).

4.2.3 Water supply and sanitation: Resource Degradation and Fiscal Liabilities

Failure to address climate change in the water sector poses a dual threat: a quantitative challenge to resources and a qualitative risk to public health.

The costs of non-implementation are significant. Failing to achieve 'good status' for all EU water bodies, as required by the Water Framework Directive (WFD) and the Marine Strategy Framework Directive (MSFD), would cost an estimated €63.7 billion per year (European Commission et al., 2025).

Groundwater and surface water stress: Non-compliance with groundwater chemical status standards alone costs the 19 EU states investigated €636 million per year. The expiration of time-limited WFD Article 4(4) exemptions in 2027 represents a critical fiscal threshold; achieving 'good status' for bodies currently under exemption could generate annual benefits of €38.6 billion (European Commission et al., 2025).

Infrastructural and health impacts: In Austria, the additional accumulated costs of water supply and sanitation are projected to reach at least €170 million by 2050 (Steininger et al., 2015b). Heavy rainfall events overload combined sewer systems, causing mechanical damage and increasing the turbidity of spring water, which necessitates expensive treatment upgrades. Globally, the lack of climate-resilient water and sanitation systems contributes to the 1.7 million annual deaths caused by unsafe water (Prüss-Üstün et al., 2004).

4.3 Service economies and urban systems

4.3.1 Tourism Dynamics: Regional Shifts and Macroeconomic Amplification

The tourism sector is highly sensitive to climate change because many of its activities are closely linked to environmental conditions and natural resources. Projections indicate a significant structural shift in demand across Europe. While rising temperatures and reduced precipitation could lead to gains in northern and high-latitude regions, these would be offset by accelerating losses in destinations that rely on snow and high temperatures (Agrawala, 2007; Amelung & Moreno, 2012).

A key outcome of the evaluation of inaction is the magnification effect on the wider economy, whereby total damage is much greater than direct losses to the tourism sector. For example, studies within the EU framework show that the overall economic impact (as measured by Gross National Product, which takes into account welfare spillovers) is 60% higher than the direct losses reported by the tourism sector itself. In mountain regions, the projected reduction in winter overnight stays (estimated at 1.5 million visits per year by mid-century) is not offset by marginal increases in summer demand. These losses cascade through input-output linkages, primarily affecting intermediate suppliers in the food production, beverage, and agricultural sectors (Steininger et al., 2015b).

4.3.2 Urban Heat Islands: The fiscal burden of thermal resilience

The Urban Heat Island effect causes urban environments to retain more heat than their rural surroundings, thereby exacerbating the health and economic risks associated with global warming. To determine the cost of inaction, scientists use the preventative cost approach, which quantifies the public investment required to maintain current levels of thermal comfort through green and blue infrastructure.

Infrastructure requirements: Maintaining thermal comfort in major urban centres requires an 11% expansion of urban green spaces. For a representative sample of large cities, this equates to an additional 195 hectares of green space and the planting of 4,300 street trees in the short term (2011–2030), followed by a further 143 hectares and 4,500 trees by 2050 (Steininger et al., 2015b).

Fiscal liabilities: The financial burden of these measures is substantial and geographically concentrated. For instance, the capital expenditure required for Vienna alone is expected to total around €4 billion by 2050 due to high property prices and demand for cooling (Steininger et al., 2015b).

Operational escalation: Beyond the initial investment, the annual maintenance costs of these expanded green spaces are projected to almost double, rising from €7.8 million to €13.4 million by the middle of the century. Failure to implement these preventative measures will result in an 'emergency' cost of inaction characterised by escalating heat-related mortality and substantial labour productivity losses within the urban workforce (Szewczyk et al., 2025).

5. Macroeconomic and fiscal consequences

5.1 Committed economic damage and redistribution

1 °C of global warming reduces world GDP by over 20 % in the long run and business-as-usual warming implies substantial welfare losses (Bilal & Känzig, 2024). Regions in the bottom income decile are projected to experience annual losses of 8% of GDP per capita, while the wealthiest decile faces a comparatively lower burden of 3.5% (Callahan & Mankin, 2022). This dynamic has already been observed historically: global warming is estimated to have increased between-country inequality by around 25% over the past 50 years (Diffenbaugh & Burke, 2019). Crucially, the committed damages outweigh the mitigation costs required to limit global warming to 2°C, demonstrating that inaction would incur significantly higher costs than aggressive abatement (IPCC, 2023).

These shocks do not remain within national borders, but spread through the highly integrated global value chains that currently account for 70% of international trade (OECD, 2015). Around 29% of global manufacturing hubs and many of the top 30 ports are directly exposed to physical climate hazards, creating systemic risks to the supply chain (Benayad et al., 2025; Hanson et al., 2011). Consequently, the European economy faces significant indirect damage via cross-border spillovers: climate-induced production outages in major trading partners such as China and the United States disrupt upstream supplies and downstream markets, amplifying economic losses to welfare beyond the initial physical events (Zappala, 2024). These ripple effects are further exacerbated by 'climateflation', whereby natural disasters and severe weather events cause persistent inflationary pressures (Beirne et al., 2024; Schnabel, 2022).

5.2 Fiscal space and financial stability

The cost of inaction is rapidly turning into tangible fiscal liabilities due to the systematic decline in sovereign creditworthiness. Projections for 109 countries suggest that 59 nations could face an average downgrade of 0.68 notches by 2030 under high-emissions scenarios, and 81 sovereigns could face an average downgrade of 2.18 notches by 2100. These rating changes are expected to increase annual interest payments on sovereign debt worldwide by US$203 billion. Within the EU, these downgrades would significantly increase the cost of capital (Klusak et al., 2023). Austria, for example, is projected to face a downgrade of 1.16 notches even under a scenario that limits warming to 2°C. This would result in an additional annual interest expenditure of US$320 million. The fiscal burden is expected to be more severe under unmitigated warming (Köppl & Schratzenstaller, 2024). Some projections suggest that climate damage could account for an additional 2.0% of GDP in annual primary borrowing, and increase national debt-to-GDP ratios by up to 74 percentage points by the 2070s (UK Office for Budget Responsibility, 2025).

Public budgets are under further strain due to a significant 'climate protection gap', forcing governments to act as insurers of last resort (Kuik et al., 2023). Between 1980 and 2021, weather- and climate-related extremes in the EU-27 caused economic losses totalling over €560 billion, yet just 25–33% of these were insured (European Environment Agency et al., 2022). Local and national

governments bear the brunt of this uninsured majority through disaster relief, reconstruction of public infrastructure and compensation for vulnerable households. In certain Central and Eastern European Member States, insurance coverage remains below 10%, leaving national budgets highly exposed to catastrophic volatility (European Environment Agency et al., 2022). Failure to act on a large enough scale is already resulting in tangible recovery costs: in the US and EU combined, cumulative disaster-related recovery spending has exceeded US$2 trillion since 2010 (Mbuk & Pacquement, 2025). Furthermore, unmitigated climate change threatens the 'safety net' provided by private insurance markets, as rising premiums and pricing difficulties could lead to a collapse in the market or necessitate costly government bailouts for financial institutions.

6. Labour market dynamics and social protection

6.1 Structural Reallocation and Skill Gaps

The transition towards a climate-neutral economy is an industrial revolution of unprecedented speed (Erbach & Hofmayr, 2022). It requires a total overhaul of the EU's production and consumption systems. Although the projected impact on employment in the EU is modest, ranging from a 0.3% contraction to a 0.5% expansion by 2030 (Vandeplas et al., 2022), this masks a profound process of 'creative destruction'. This is characterised by the creation of around 200 million new jobs and the loss of 185 million existing jobs worldwide by 2050 (McKinsey, 2022). The economic damage caused by inaction on climate change is primarily driven by a systemic loss in labour productivity, rather than merely capital destruction (Benayad et al., 2025). Unmitigated heat exposure resulted in the loss of 512 billion potential labour hours in 2023, which is a 49% increase on the average for the 1990s (Romanello et al., 2024). In the US, productivity losses between 2000 and 2023 were almost six times higher than direct property damage, at $4 trillion (Mohaddes & Raissi, 2025).

Jobs at risk are primarily concentrated in 'brown' sectors, which are defined as high-pollution activities and currently account for around 5% of total EU employment (Caseloads, 2022; Vandeplas et al., 2022). Coal and lignite mining, which represent 0.1% of EU jobs, are projected to see a 50% decline in employment by 2030 under ambitious mitigation scenarios. The risk of stranded human capital is acutely localised, given that these industries are geographically clustered. For instance, 'brown' sectors represent 11.3% of jobs in north-eastern Scotland and 5.3% in Silesia, Poland. Failure to manage these transitions could lead to structural unemployment, since extraction workers' skills are often highly specialised and less transferable than those in other industrial sectors (Vona et al., 2018). In contrast, the renewable energy sector generates significantly more jobs per megawatt of power installed and per dollar of investment than the fossil fuel industry does. EU renewable energy employment exceeded 1.5 million jobs by 2018 (Chateau & Saint-Martin, 2013).

Transforming the skills required for a net-zero, circular economy involves creating new 'green' roles and 'greening' existing occupations. It is projected that high-skilled occupations will grow by 12 million, whereas low-skilled manual roles may decrease by 3.5 million. This shift is particularly

evident in the automotive sector, where 90% of the expected job growth between 2020 and 2030 will be in engineering and ICT roles (Draghi, 2024). In addition to specialised STEM expertise, the transition requires 'transversal' or generic skills, such as critical thinking and adaptability, to navigate increasingly automated and machine-intensive environments. The fiscal burden of this upskilling is significant; for example, the one-off cost of retraining the labour force in Member States such as Romania and Bulgaria is estimated to be between 1.3% and 1.7% of GDP (Vandeplas et al., 2022).

6.2 Equity and vulnerable populations

Climate change acts as a 'risk multiplier', disproportionately affecting those who have the fewest resources with which to adapt. This exacerbates existing structural injustices. This inequality is evident in the global distribution of labour capacity losses (World Health Organization, 2024). In 2023, potential income losses from heat exposure amounted to 7.6% of GDP in countries with a low Human Development Index (HDI), compared to a much lower burden in high-income regions (Romanello et al., 2024). Within the EU, the aggregate welfare loss is estimated at 2% of GDP; however, southern European countries are expected to incur losses exceeding 4% of GDP in high-warming scenarios, primarily due to their heightened susceptibility to heat stress and coastal flooding (European Commission, 2018).

Gender disparities are exacerbated by climate shocks due to biological sensitivity and socio-economic roles. For example, exposure to extreme heat can directly impact maternal and neonatal health, increasing the risk of preterm birth and gestational diabetes (Nyadanu et al., 2024). In the labour market, women often have less time due to unpaid care responsibilities, which increase during climate disasters. In certain contexts, a single standard deviation increase in temperature has been found to reduce women's labour supply by 7.86 hours per week, whereas the effect on men was statistically insignificant. Furthermore, women remain underrepresented in the 'sunrise' industries of the green transition, such as transport and energy, where they account for just 22% of the workforce (ILO, 2024a; Ngepah & Conselho Mwiinga, 2022).

Universal social protection (USP) is a vital policy instrument for mitigating 'loss and damage' and ensuring a fair transition. However, a 'protection gap' currently means that 3.8 billion people globally, including 2.1 billion in nations that are most vulnerable to climate change, have no access to any form of social safety net. In the EU, robust USP systems — where public social expenditure (excluding health) averages at 19.2% of GDP — serve as vital automatic stabilisers. These systems mitigate the adverse effects of climate policies such as carbon pricing, which disproportionately impact lower-income households that allocate a larger proportion of their income to energy expenses (ILO, 2024b). One example of strategic revenue recycling is using carbon tax proceeds to reduce labour taxes for low-to-middle income workers. This could create up to 412,000 additional EU jobs by 2030, turning a potential output drag into an employment dividend (Weitzel et al., 2023).

7. Human capital, health and well-being

7.1 The Quantified Health Burden and Labour Capacity

The erosion of human capital through health shocks induced by climate change is one of the most severe consequences of inaction within the European Union, where temperatures have risen by 2.2°C above pre-industrial levels — twice the global average (Romanello et al., 2023). An estimated 62,000 heat-related deaths were recorded across Europe in 2022 alone, highlighting the region's vulnerability, which is exacerbated by an ageing population and high rates of underlying chronic disease (Ballester et al., 2023). Global projections indicate that heat-related mortality among adults over 65 has already surged by a record-breaking 167% compared to the 1990s average (Romanello et al., 2023). Without accelerated mitigation, heat-related deaths in Europe are projected to reach 30,000 annually at 1.5°C of warming. Meanwhile, mid-century projections for countries such as Austria suggest a tenfold increase in heat-related deaths compared to the average between 2003 and 2012 (Steininger et al., 2015b). Beyond direct heat-related mortality, climate change is radically altering the environments in which infectious diseases can be transmitted. In Europe, for instance, the environmental suitability for the transmission of dengue and chikungunya has grown by almost 60% since the 1950s, while the area of coastline suitable for Vibrio pathogens is expanding by 142 km each year (Romanello et al., 2023).

The economic valuation of these health impacts reveals a staggering loss of welfare. The monetised value of European heat-related mortality was estimated to be 1.2% of regional gross national income (GNI) in 2018 (Romanello et al., 2023). The choice of methodology — the Value of a Statistical Life (VSL), which measures willingness to pay for risk reduction, or the Value of a Life Year (VOLY), which considers remaining life expectancy — significantly impacts these estimations (OECD, 2006; Steininger et al., 2015b; World Health Organization, 2024). For instance, the cost of air pollution in the EU ranges from €276 billion (VOLY) to €427 billion (VSL) (AEA Technology Environment, 2005). Meanwhile, rising temperatures have a nonlinear effect on labour capacity, particularly in sectors with high exposure, such as construction and agriculture, where workers lose 50% of their capacity once temperatures exceed 33–34 °C (Kjellstrom et al., 2019). In 2023, global heat exposure resulted in the loss of 512 billion potential labour hours, equating to US$835 billion in potential income losses. Within the European context, these productivity deficits are projected to reach €670 million per year by 2080 (Kovats et al., 2011). This figure excludes the hidden costs of increased occupational injuries, which rise by around 1% for every degree above 21 °C (Fatima et al., 2021).

7.2 Psychological impacts and the systemic burden on healthcare

The 'slow violence' of climate change significantly impacts mental health and intangible well-being, although this impact is often difficult to quantify (Gifford, 2011; Nixon, 2011; Slovic et al., 2011). This impact is characterised by psychological distance and psychic numbing. Sentiment analysis of over eight billion social media posts indicates that extreme heat events in 2023

worsened human sentiment by 53% compared to historical levels, suggesting an unprecedented emotional burden. This distress is increasingly being measured using the Hogg Eco-Anxiety Scale, with 66.4% of urban leaders now categorising climate-related mental health issues as a 'high concern'. Empirical evidence suggests that the risk of suicide increases linearly with rising temperatures, with a projected 1% increase in incidence for every 1°C rise above local thresholds. The most vulnerable groups, including children and indigenous communities such as the Inuit, experience 'eco-anxiety' and solastalgia due to the loss of cultural heritage and perceived governance failure. This has caused almost 40% of young people to reconsider having children in the future (Albrecht et al., 2007; Hickman et al., 2021).

The fiscal pressure on healthcare systems is expected to be immense, with climate change projected to cause 4.1–5.2 billion cases of illness in low- and middle-income countries (LMICs) between 2026 and 2050. By mid-century, the annual death toll from climate-sensitive diseases, including dengue, malaria, and extreme heat, could reach 15.6 million in these regions alone. This is the 'price of inaction', but limiting warming to below 2°C could provide a 'massive opportunity' for humanity: the resulting economic savings could triple global healthcare spending by 2100, which currently averages at 10.3% of global GDP (Benayad et al., 2025; World Health Organization, 2024).

Taking decisive action in specific areas, such as phasing out fossil fuel subsidies and introducing corrective pricing for polluting energy sources, is expected to prevent 1.2 million premature deaths each year by 2034. This would contribute to a total of 1.9 million lives potentially saved annually through climate-health initiatives. However, failure to fund these preventive measures (despite the World Bank's strategic goal of providing quality health services to 1.5 billion people) forces public budgets to act as the 'insurer of last resort', bearing a fiscal burden far higher than the cost of immediate low-carbon adaptation for health systems. Ultimately, as international assessments warn, further delays in addressing these issues constitute an 'act of negligence' that threatens the future stability and viability of entire societies.

8. The Political Economy of (In)action

8.1 The language and frames of delay

The persistence of climate inaction, despite overwhelming scientific consensus, is fundamentally an issue of ideational framing. The way in which decision-makers perceive and represent reality determines the scope of subsequent policy action. Framing operates through simultaneous processes of sense-making, whereby problematic situations are transformed into specific policy problems, and naming and categorising, which amplifies certain aspects of the crisis while obscuring others. A critical shift has been observed in government rhetoric, moving from a diagnostic framing centred on an 'urgent threat' to a prescriptive framing focused on 'economic opportunity'. In developed contexts such as the European Union, earlier 'emergency and humanitarian' frames, which emphasise the moral duty to protect future generations and vulnerable ecosystems, are increasingly being replaced by 'green growth' and 'energy politics'

frames. While this shift aims to present the transition as a driver of competitiveness and job creation, it often results in the political agenda becoming more limited. For example, in certain EU member states, the exclusion of 'emergency' terminology has led to a documented reduction in proposed measures for biodiversity and marine preservation, as climate change is almost exclusively reframed as a technical issue of emissions and fossil fuel replacement.

Furthermore, political discourse is often characterised by 'discourses of delay' that justify inadequate mitigation efforts without denying the science itself. A prevalent narrative in this area is the overconfidence in 'small actions', a psychosocial phenomenon whereby focusing on individual, low-impact behaviours such as recycling or changing light bulbs provides 'misplaced reassurance' that sufficient action is being taken. This 'licensing behaviour' enables both the public and policymakers to justify continuing high-carbon lifestyles or delaying radical structural shifts. Combined with 'whataboutism' — the redirection of responsibility to other major emitters such as China or the United States — these narratives foster a sense of 'causal inefficacy', where the scale of the global crisis makes national or personal effort seem insignificant. This is reinforced by the 'tragedy of the horizons', whereby the short-term nature of financial and political decision-making (e.g. election cycles and quarterly reports) remains fundamentally misaligned with the long-term, cumulative nature of climate impacts. Consequently, even when 80% of citizens acknowledge the reality of climate change, the belief that radical change is impossible due to ingrained habits or human nature acts as a 'safety blanket' against anxiety, entrenching inertia and the 'governance trap' between states and citizens.

8.2 Building public and stakeholder support

To overcome these barriers, public discourse needs to shift from viewing climate action as an 'economic burden' to recognising the 'triple dividend' of resilience. This framework broadens the definition of benefits to encompass not only the avoidance of physical losses, but also the realisation of economic potential (e.g. innovation and productivity), as well as the delivery of social and environmental co-benefits, such as enhanced public health through reduced air pollution. Empirical research in Europe shows that public support for climate policies is more closely linked to beliefs about benefits than concerns about costs. While people are sensitive to cost-of-living increases, they react positively to communication that emphasises co-benefits such as cleaner air, healthier diets and urban green spaces. In fact, individuals who perceive both high costs and high benefits are significantly more supportive of policy shifts than those who perceive even minimal costs with only moderate benefits. The benefit-to-cost ratio of investing in adaptation can be as high as 1:10, where an investment of 0.6% of GDP could prevent losses amounting to 6%. This makes the economic case for action not just an environmental necessity, but also a fiscal imperative.

Institutionalising this response requires moving away from ad hoc disaster relief towards a system of shock-responsive and anticipatory governance. Currently, a significant 'climate protection gap' exists within the EU. Between 1980 and 2021, economic losses from weather extremes amounted to €560 billion, yet only one quarter to one third of this was insured. This forces public budgets to

act as the 'insurer of last resort', bearing remedial costs that are 50% higher than the cost of preventative compliance with environmental legislation. A successful transition requires public institutions to strengthen their capacity to integrate climate risk assessments, such as Amsterdam's 3D flood-risk mapping, directly into standard institutional planning and urban design. This institutionalisation must be underpinned by a 'reinvigorated social contract' that ensures a Just Transition. The EU's Social Climate Fund, for example, and the strategic recycling of carbon revenues, using taxes on fossil fuels to fund labour tax cuts or direct 'carbon dividends' to households can transform a regressive output drag into an employment dividend. This would secure the political legitimacy needed for radical decarbonisation. Ultimately, by aligning financial systems with a 'well-being economy', governments can foster a virtuous circle in which climate action enhances societal trust and collective agency, making the sustainable choice the default option for all stakeholders.

9. Conclusion: The transition to a well-being economy

9.1 The imperative of early action and the non-linear penalties of delay

The scientific and economic evidence synthesised in this report shows that the opportunity for cost-effective climate stabilisation is quickly disappearing, making an urgent transition to a well-being economy essential. The idea that 'a stitch in time saves nine billion' is not just a metaphor, but a quantifiable fact. For instance, taking action now to limit global temperature rise is crucial for ensuring food security for a global population expected to reach nine billion by 2050. The penalties for policy delay are profoundly non-linear and cumulative. Within the European Union, the cost of the implementation gap regarding environmental law already stands at approximately €180 billion per year. This reflects the foregone health and ecosystem service benefits that would have been secured through full compliance. Furthermore, delaying the deployment of essential carbon dioxide removal (CDR) technologies in the EU by just one decade is projected to increase total removal costs by €120–190 billion per decade of inaction.

On a global scale, the financial cost of delay is even more striking. For the 1.5°C stabilisation target, the total discounted abatement costs increased by around 100% between 1980 and 2020 due to the steeper decarbonisation pathways required to make up for lost time. By 2020, further delay to meeting the 1.5°C target was estimated to cost over $5 trillion annually, while delaying the 2°C target had increased in cost from $0.3 trillion per year in 2010 to nearly $0.6 trillion per year in 2020 (Sanderson & O'neill, 2020). These figures highlight a critical 'runaway point', beyond which management becomes unlikely as the rate of cost accumulation exceeds available societal resources (Ahmed et al., 2022). The only viable strategy for achieving environmental benefits is to take action early, as investing around 60% of the necessary funds before 2050 could prevent 95% of the costs that would otherwise be incurred in the latter half of the century (Benayad et al., 2025).

9.2 Synthesis: Climate Action as Life Insurance for the Planet

The findings of this report characterise climate action as 'life insurance for the planet', describing it as a systemic risk management strategy where the 'premiums', the costs of mitigation and adaptation, are a small fraction of the potential for catastrophic, irreversible loss. Transitioning to a well-being economy realises a 'triple dividend' by avoiding physical losses, unlocking economic potential through innovation and delivering profound social and environmental benefits. The economic returns on these proactive investments are compelling: every US$1 invested in mitigation could potentially return 5 to 14 times the original capital expenditure over the same period. To capture these returns, global investments must increase significantly by 2050 (9-fold for mitigation and 13-fold for adaptation) reaching approximately 1–2% of cumulative global economic output by 2100.

Beyond direct fiscal gains, climate action functions as a critical public health intervention: scaling up key climate-health initiatives could save almost 2 million lives each year by 2034, primarily by reducing exposure to air pollution. Ultimately, the cost of climate action should be viewed as a productive investment in the foundations of future prosperity, given that the net cost of inaction is estimated to equate to between 11% and 27% of cumulative global economic output by the end of the century. Failure to act constitutes an 'act of negligence' that ignores the risk of widespread system collapse, in which case the cost of inaction becomes effectively unlimited. By aligning economic systems with planetary boundaries, the European Union can transition from an extractive industrial model to a resilient, zero-carbon future that safeguards human survival and long-term economic stability.

10. Policy recommendations

10.1 Reframing the economic discourse and fiscal transparency

A fundamental shift towards a well-being economy requires an immediate transition from marginal environmental analysis to a systemic risk management framework that prioritises the 'triple dividend' of resilience. Policy evaluation must move beyond narrow GDP metrics and incorporate non-market values, particularly with regard to natural capital and human health. In order to address current market failures, the European Union should require all listed companies and financial institutions to disclose standardised, forward-looking climate risk information, ensuring that the 'climate value at risk' — estimated at US$2.5 trillion globally — is reflected in current asset valuations and credit ratings. Regulators must require credit rating agencies to extend their assessment horizons beyond the current three-to-five-year window in order to capture long-term fiscal vulnerabilities that could trigger sovereign downgrades. Furthermore, impact assessments should utilise low or zero social discount rates to accurately value the welfare of future generations and account for fat-tail risks associated with irreversible Earth System Tipping Points (ESTPs). This should include adopting a 'guardrail approach' that treats 1.5°C not as an aspirational target, but as a firm constraint for macroeconomic planning.

10.2 Strategic labour market transformation and social protection

A Just Transition requires proactive alignment of labour and social policies to manage the significant sectoral shifts inherent in the green revolution. Decision-makers should implement strategic revenue recycling, using proceeds from carbon pricing mechanisms such as the EU ETS to reduce labour taxes for those on low and middle incomes. Such a shift could transform a potential output drag into an employment dividend of up to 412,000 additional jobs by 2030. In order to prevent stranded human capital, particularly in 'brown' sectors which still account for 5.7% of total EU employment, governments must invest in 'skills intelligence' and targeted reskilling programmes. The automotive sector is a key priority, with 90% of job growth between 2020 and 2030 projected to be in highly skilled engineering and ICT roles. At the same time, universal social protection (USP) systems must be reinforced to act as automatic stabilisers, cushioning vulnerable households against the impact of rising energy prices. In regions with high industrial concentration, such as Silesia (where 5.3% of jobs are in 'brown' sectors), regional development policies must focus on economic diversification before displacement occurs, in order to avoid long-term structural unemployment.

10.3 Mainstreaming public health and environmental compliance

Given that unmitigated warming threatens to increase annual heat-related deaths by 4.7-fold by mid-century, climate policy must be recognised as a critical public health intervention. To reap significant co-benefits, the EU should prioritise phasing out fossil fuel subsidies, which reached record highs globally in 2022, and allocate those funds to climate-resilient, low-carbon health systems instead. Scaling up climate-health initiatives, primarily by reducing air pollution, could save almost 2 million lives each year by 2034. Furthermore, Member States must address the shortcomings in the implementation of environmental legislation, as the failure to enforce existing EU environmental law currently incurs costs of €180 billion per year for the Union. Achieving full compliance would generate net savings of €58 billion per year by avoiding remedial costs. Policies should also integrate heatwave early warning systems, which have demonstrated benefit-cost ratios as high as 3,700:1 in major European cities.

10.4 Governance, risk management and infrastructure resilience

To overcome the 'tragedy of the horizons', the EU must establish shock-responsive and anticipatory governance systems. This requires public institutions to be strengthened in order to integrate complex climate risk assessments, such as 3D flood-risk mapping, directly into urban design and national budgetary frameworks. Priority must be given to closing the 'climate protection gap', since currently only 25–33% of weather-related losses in the EU are insured, leaving national budgets highly exposed to volatility. Investment in infrastructure should focus on 'no-regrets' measures that remain viable across all global warming scenarios. Specifically, energy grids should be targeted to prevent blackout losses, which can exceed €1 billion for a single 24-hour event in some Member States. Furthermore, as a temporary temperature overshoot now appears almost certain, large-scale deployment of carbon dioxide removal (CDR) technologies is essential to meeting long-term climate targets and restoring planetary stability. Although these

technologies are currently expensive and suboptimal compared to primary mitigation measures, they are necessary to offset residual emissions and address overshot carbon budgets. Therefore, sustained research and development (R&D) must be enabled immediately to foster technological breakthroughs and drive down costs, as every year of delay in CDR deployment in the European Union substantially increases the final fiscal burden by an estimated €0.12–€0.19 trillion. Ultimately, failing to act on these issues constitutes an 'act of negligence', as the long-term costs of inaction are effectively unlimited compared to productive investment in a resilient, zero-carbon future.

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