

GREENPEACE

**UNDER THE SURFACE:
THE HIDDEN CLIMATE DEBT OF EXTREME
WEALTH IN THE EUROPEAN UNION**



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PART I – CLIMATE DEBT ACROSS EU COUNTRIES

As the European Union (EU) debates new sources of revenue (known as own resources) to finance common priorities within the new Multiannual Financial Framework (MFF) 2028-2034 (European Commission, 2025a; European Council, 2026a, 2026b; European Parliament, 2026), **one dimension remains largely overlooked in the discussions and policy proposals: the climate responsibility of high-net-worth individuals (HNWIs) – including their capital investments and assets that generate emissions.** This report addresses that gap by examining the climate debt associated with individual extreme wealth concentration across EU Member States.

The first of its kind, this paper applies the climate debt methodology traditionally used for countries, to individuals in the EU, with a special focus on the 1% richest in the EU Member States. The report explores both the climate emissions linked to the lifestyles of these individuals, as well as those of their ownership, including investments and productive assets that generate emissions. The report is divided into two parts: Part I presents climate debt estimates across EU Member States and discusses their policy implications, while Part II explores the findings in greater detail through case studies of Spain, Hungary, France, Belgium, and Italy.

Climate debt = we define climate debt as the estimated monetary value of climate damages associated with emissions above an equitable share of the remaining carbon budget consistent with a 1.5°C pathway. It is a measure of climate responsibility.

This report comes at a time when demands on European and national budgets are growing. Europe needs to finance the climate transition and build resilience to worsening climate impacts, while protecting households and communities from rising costs. At the same time, governments face increasing pressure on public finances, including the repayment of EU recovery debt, and financing new political priorities, including energy security. Enhancing sufficient and fair sources of revenue is therefore vital for a more resilient Europe. The question is not only how Europe finances its future, but who should contribute, and more importantly, who perhaps has not been contributing as much as they can and should.

Despite the need to **improve data transparency and access to ownership information**, needed to fully assess how strongly emissions are concentrated among the wealthiest individuals, the report provides a good picture about the much greater climate responsibility of the individuals at the top of the wealth pyramid in the EU.

The findings reveal that a large share of climate debt is concentrated among the wealthiest groups, highlighting the importance of addressing the climate impact of extreme wealth rather than broader high-income groups alone.

In 2022, the top 1% wealth groups in the covered EU Member States were associated with an estimated €301 billion in climate debt.

In addition, the methodology used reveals the significant magnitude of carbon-intensive ownership and investments of these individuals, especially compared with the climate emissions of their lifestyles. The analysis shows the climate responsibility and capacity to contribute of the wealthiest 1% are currently insufficiently reflected in existing fiscal policies.

The findings of this report contribute to the wider debate on how those who contribute the most to the climate crisis pay for the damage they cause and finance the rapid and swift deployment of the just and fair transition.

1. MFF FINANCING CHALLENGE – WHO SHOULD CONTRIBUTE?

This report contributes to the ongoing negotiations on new EU own resources. EU leaders are currently deciding how to finance Europe's next long-term budget, the 2028–2034 Multiannual Financial Framework (MFF), and new own resources have become a central part of that negotiation. In September 2026, European Council President António Costa emphasised the need for a 'balanced and ambitious' package of own resources that guarantees the financing of the Union's priorities (European Council, 2026a). Costa pointed out that the October European Council is expected 'to provide clarity on an updated and revised basket of new own resources' (European Council, 2026a) following the leaders' decision in June to ask the Irish Presidency to accelerate work on that issue (European Council, 2026b). The European Commission states that new own resources should help finance common priorities and the repayment of NextGenerationEU (NGEU) debt while limiting pressure on national public finances (European Commission, 2025a).

The financing pressures are substantial. The Commission's proposal for the 2028–2034 MFF, presented on 16 July 2025, provides for around €1.8 trillion in 2025 prices (European Commission, 2025a). As per the European Commission, the budget is expected to respond to growing security needs, intensifying climate impacts, competitiveness challenges, demographic pressures, and the prospective enlargement of the Union, while also financing the repayment of NGEU debt (European Commission, 2025a). In February 2026, the European Parliament's MFF co-rapporteurs argued that the proposal lacked ambition and warned that NGEU repayment should not crowd out funding for new priorities (European Parliament, 2026).

Without additional revenues, Member States face a choice between higher national

contributions and a less ambitious European budget, highlighting the role of new own resources in enabling an agreement on the 2028–2034 MFF in December. The debate builds on the 2020 Interinstitutional Agreement, which established a roadmap towards introducing new own resources (European Parliament et al., 2020). The Commission subsequently proposed revenues linked to the Emissions Trading System, the Carbon Border Adjustment Mechanism, and a share of residual profits reallocated under the OECD/G20 Pillar One agreement (European Commission, 2023). Its proposal for the 2028–2034 MFF added a charge on non-collected e-waste, a tobacco excise resource, and an annual contribution from companies operating and selling in the EU with turnover above €100 million (European Commission, 2025a). Additionally, the Commission explicitly left room for other revenue sources to finance the EU budget.

These financing pressures come at a time when the costs of climate change and fossil fuel dependency are already being felt across Europe. More frequent and severe extreme weather events are causing growing economic losses and increasing demands on public budgets (see e.g. Strauss, Johnston, and Borrett, 2026; Krichene et al., 2026; Triodos Bank, 2026), while recent energy shocks and the cost-of-living crisis have shown how drastically rising energy costs can place pressure on households (see e.g. European Parliament, 2024; European Economic and Social Committee, 2025; Cipollone, 2026). Europe therefore faces a dual challenge: mobilising more resources for climate action and resilience, while ensuring that the costs of closing the transition investment gap and of climate impacts do not fall on those with the least capacity to bear them.

As a result, the main question becomes not only who should contribute, but who has so far been asked to contribute too little – and who remains largely overlooked in the debate. This report on the climate debt associated with large wealth shows that the current debate pays insufficient attention to those with the greatest capacity to contribute and the highest climate responsibility: the wealthiest 1%. Discussions about climate-related revenue instruments

often focus on production and consumption, while owners of carbon-intensive assets and their investment decisions remain largely outside the fiscal debate. By shifting attention to wealth concentration and related climate damages, our analysis shows that the climate responsibility and capacity to contribute of the wealthiest 1% are currently insufficiently reflected in that debate both domestically and at the EU level.

2. THE CONCEPT OF CLIMATE DEBT

The term ‘climate debt’ is commonly used to describe the unequal contribution of countries to climate change and the resulting responsibilities for addressing its impacts (Pelz et al., 2025; Hickel, 2020). Building on this concept, a report by Green Budget Germany (Forum Ökologisch-Soziale Marktwirtschaft e.V., FÖS), commissioned by Greenpeace Africa in June 2026, **Understanding the Climate Debt of Extreme Wealth, extends the climate debt concept from states to high-net-worth individuals (HNWIs)**, focusing on the disproportionate emissions responsibility of high-income and high-wealth groups (Green Budget Germany/FÖS, 2026). Drawing on the polluter-pays principle and the principle of common but differentiated responsibilities and respective capabilities (CBDR-RC), climate debt is used to assess the scale of climate damages associated with excess emissions by the wealthy.

Climate debt is defined and used here as an analytical measure that puts a monetary value on the climate damages associated with disproportionate emissions by different income and wealth groups. It is an indicative estimate to make the scale of climate responsibility visible, but does not represent a direct tax bill or prescribe a specific fiscal instrument. The report discusses possible progressive fiscal responses, recommending that policymakers ensure that those with disproportionate climate responsibility contribute their fair share, rather than leaving the costs of climate damage to society at large.

We define climate debt for HNWIs as the monetised climate damages associated with emissions exceeding an equitable per capita share. Climate debt is calculated by identifying emissions that exceed an equitable per capita share of the remaining carbon budget and multiplying these excess emissions by a social cost of carbon (SCC), which estimates the economic damage caused by an additional tonne of CO₂ (Green Budget Germany/FÖS 2026).

Climate debt can be estimated using either a consumption-based approach or an ownership-based approach.¹ In the first case, emissions are attributed to final consumers; in the second, they are attributed to investors and owners of productive assets that generate those emissions. In the Chancel and Rehm (2026a) dataset used here, individuals are allocated companies’ Scope 1 emissions² in proportion to their ownership shares, including emissions from firms owned abroad; e.g. an individual holding 50% of a company’s equity would be attributed 50% of that company’s direct emissions. Financial assets that do not confer ownership rights, such as corporate or government bonds or bank deposits, do not contribute to an individual’s emission footprint (Chancel and Rehm, 2026a).

It should be noted that the two approaches cannot be summed, as they allocate responsibility for emissions differently, offering different perspectives on the same problem.

1 While considering both approaches can provide useful insights, it should be noted that they are not directly comparable. Their attribution methods differ in several aspects: consumption-based emissions are assigned to income groups and link emissions to lifestyles and purchasing power, while ownership-based emissions are assigned to wealth groups and link emissions to the ownership of productive assets and investment portfolios. In addition, the consumption-based data are reported in CO₂, whereas the ownership-based data are reported in CO₂ equivalents (CO₂e); the ownership-based approach also allocates only companies’ Scope 1 emissions to company owners. For more details, see Green Budget Germany/FÖS (2026).

2 According to the Greenhouse Gas Protocol, Scope 1 covers direct emissions from sources owned or controlled by a company (e.g. burning fuel, company vehicles). Scope 2 covers indirect emissions from the generation of purchased or acquired electricity, steam, heating, and cooling consumed by the reporting company. Scope 3 covers all other indirect emissions in a company’s value chain, including both upstream and downstream emissions.

In simplified terms:

- **Consumption-based emissions accounting:** captures the full carbon footprint of consumer lifestyles, including emissions embedded in international trade. Emissions generated in one country to meet consumption in another are attributed to the final consumer.
- **Ownership-based emissions accounting:** highlights the responsibility of capital holders in driving emissions and locking in high-carbon infrastructure through investment decisions. It reflects the principle that those who own and profit from polluting industries should be held accountable for the resulting emissions.

In the following analysis, we place particular emphasis on the ownership-based approach because existing climate policy frameworks and fiscal instruments predominantly target consumers, while owners of carbon-intensive wealth receive comparatively little attention (Chancel and Rehm, 2026a; Gössling and Humpe, 2024). This matters from both a climate and distributional perspective: excise and consumption-based carbon taxes place costs on households regardless of their ability to pay and regardless of whether a viable substitute is available (Phylipsen, Anger-Kraavi, and Mukonza, 2020), while owners and investors can influence where capital is allocated and which productive assets they finance. In addition, not all consumption is equally discretionary: emissions associated with basic needs, such as heating and mobility, are fundamentally different from those associated with luxury consumption. Fiscal measures targeting consumption without accounting for these differences can disproportionately burden lower-income households (Brand et al., 2023). The focus of fiscal instruments on consumers thus highlights an important gap in current climate policy debates.

At the same time, the relationship between consumption-based and ownership-based emissions requires further research. Production and emissions result from interactions between consumers, producers,

and investors, suggesting that climate responsibility cannot necessarily be attributed exclusively to either consumers or owners of capital. Rather than competing, the two approaches should be understood as two lenses that illuminate different dimensions of climate responsibility and help inform more comprehensive and equitable climate policies. Also, consumption-based and ownership-based climate debt estimates are not directly comparable or additive, as the former are based on income groups while the latter are based on wealth groups and they differ in the scope of underlying emissions.³ Where both approaches are presented side by side, the aim is to illustrate differences in the relative scale and distribution of climate responsibility under each accounting framework, rather than to imply direct comparability.

Applying the concept of climate debt to individuals offers three key advantages:

- It captures inequalities within countries, recognising that emissions responsibility and capacity to contribute are highly concentrated.
- It links responsibility for emissions with HNWIs' ability to contribute to mitigation, adaptation, and loss-and-damage financing.
- It provides a basis for shifting discussions towards progressive fiscal instruments, such as wealth taxes or progressive climate levies, that can address the accumulation of climate debt among the wealthiest groups while supporting EU Member States in meeting their climate finance commitments. On top, this would strengthen the polluter-pays principle.

The concept of ownership-based climate debt at the individual level highlights a gap in climate policymaking. Current policy still largely focuses on steering consumption behaviour towards low-carbon products and affects low-income households more than high-income households, while carbon-intensive ownership and investments remain undertaxed (Chancel and Rehm, 2025; Brand et al., 2023). As a result, fiscal systems may

3 See [footnote 1](#).

miss opportunities to mobilise additional funds for climate finance and to incentivise shifts towards low-carbon portfolios.

The need to devote greater attention to HNWIs becomes even more pressing in light of a growing body of evidence showing that effective tax rates are often lower at the very top of the income and wealth distribution than for middle-income groups. Several studies find that effective tax rates decline at the top of the distribution due to loopholes,

exemptions, and tax privileges (Bach et al., 2025; Bruil et al., 2022; Guzzardi et al., 2024; Saez and Zucman, 2019). Fiscal instruments specifically targeting HNWIs could therefore help address two interconnected challenges: wealth inequality, which is partly reinforced by relatively low effective tax rates at the very top, and climate inequality, given that the wealthiest individuals contribute disproportionately to climate damages.

3. CLIMATE DEBT ESTIMATES

This chapter presents the main climate debt estimates for 2022, the most recent year for which data are available:

- for the top 10%, the top 1%, and the top 0.1% income groups in all EU Member States, using the consumption-based approach.
- for the top 10% and the top 1% wealth groups in all EU Member States, except Cyprus, Luxembourg, and the Netherlands,

using the ownership-based approach. These countries are excluded because per capita data are not available, which appears to be due to limited transparency regarding ownership structures.⁴ The top 0.1% could not be included in the ownership-based approach either, as country-specific emissions data for this wealth group were not available as of September 2026.

Methodological note: The climate debt estimates for high-income and high-wealth groups in EU Member States follow the methodology developed in the 2026 report on global climate debt estimates commissioned by Greenpeace Africa. While it builds on established emissions data and climate-damage valuation methods, their application to estimate climate debt for high-income and high-wealth groups is new (Green Budget Germany/FÖS, 2026).

The methodology:

- a) draws on ownership-based emissions data from Chancel and Rehm (2026a) and consumption-based emissions data from Ghosh et al. (2021) for EU Member States,
- b) defines excess emissions as emissions above an equitable annual per capita share compatible with the 1.5°C pathway as defined in Green Budget Germany/FÖS (2026); and
- c) applies a social cost of carbon (SCC) of US\$283 per tCO₂ (in 2020 prices) as used in Green Budget Germany/FÖS (2026). As the EU estimates refer to 2022, we update the SCC to 2022 prices and convert it into euros, resulting in an SCC of €310.77 per tCO₂.⁵

We do not subtract CO₂ prices already paid through carbon taxes, emissions trading systems, or similar instruments, nor do we add fossil fuel subsidies, because it is difficult to allocate both CO₂ price payments and subsidy benefits across different income and wealth groups robustly and transparently.

Importantly, the results should be interpreted as indicative estimates that illustrate patterns of climate responsibility across income and wealth groups, including the role of concentrated wealth in driving

emissions. **Climate debt provides a measure of the scale of climate damages associated with excess emissions, rather than prescribing a specific tax rate or fiscal contribution. The findings broaden the**

⁴ Per capita data for Cyprus, Luxembourg, and the Netherlands are not available in the dataset. According to Chancel and Rehm (2026a), this likely reflects challenges in identifying ultimate beneficial owners. In Luxembourg and the Netherlands, complex ownership structures and the countries' roles as major holding and investment hubs can make it difficult to attribute emissions to specific wealth groups. In Cyprus, offshore ownership arrangements may similarly obscure asset ownership, limiting the accurate attribution of emissions.

⁵ The SCC is updated from 2020 to 2022 prices using the consumer price index (CPI), following the approach applied by Gössling and Humpe (2024). The resulting amount is then converted from US dollars into euros using the European Central Bank's 2022 annual average exchange rate (European Central Bank, 2026).

rationale for fair contributions from extreme wealth: the case is not only one of ability to pay and economic inequality, but also of disproportionate climate responsibility. This additional dimension can inform discussions on how progressive taxation can help mobilise resources for climate action and a just transition, domestically and internationally.

The ownership- and consumption-based climate debt estimates are presented:

a) **as the sum of country-level group estimates for the top 1% under each approach**, to show the overall scale of

estimated climate debt and indicate where total responsibility is greatest; and

b) **as per capita data** for the top 1% under each approach, to show the concentration of climate debt across income and wealth groups and allow comparisons across EU Member States. For the consumption-based approach, the per capita data also include the top 0.1% income group; the respective top 10% groups are included for illustrative purposes, to show the disproportionate rise in per capita climate debt at the top of the distribution.

3.1. Climate debt estimates are substantially higher under the ownership-based approach than under the consumption-based approach

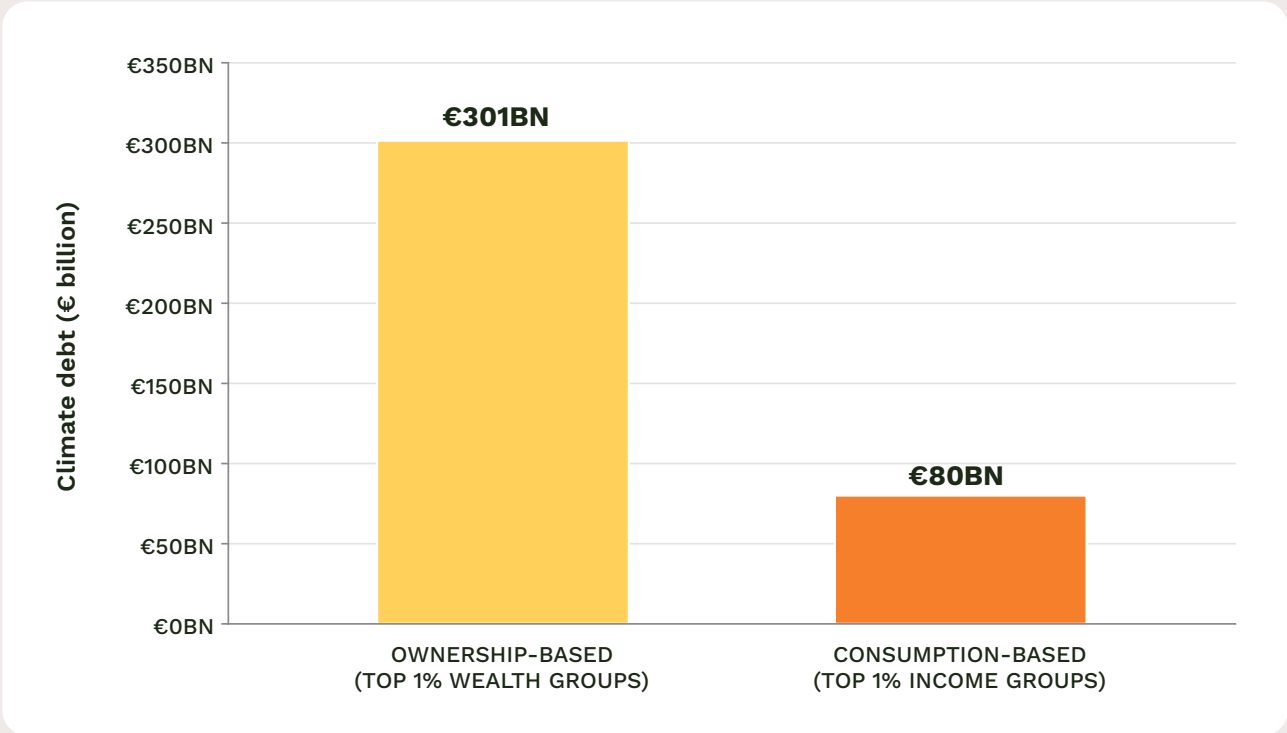
Figure 1 shows the sum of the country-level climate debt estimates for the top 1% wealth groups in the 24 covered EU Member States under the ownership-based approach and for the top 1% income groups in the same Member States under the consumption-based approach. Taken together, the country-level top 1% groups across the 24 covered Member States comprise approximately 4.3 million people in each approach. Our calculations show that, in 2022, the combined country-level ownership-based climate debt of the top 1% wealth groups across 24 EU Member States amounted to approximately €301 billion, compared with approximately €80 billion for the top 1% income groups under the consumption-based approach.⁶ **This result shows that ownership-based emissions are**

much more concentrated at the very top of the wealth distribution than consumption-based emissions. This finding is consistent with growing wealth concentration across EU Member States (European Commission, 2026b) and a growing number of centi-millionaires and billionaires in the region (Oxfam, 2025b).

It should be noted that Figure 1 does not include Cyprus, Luxembourg, or the Netherlands, as ownership-based data are not available for these countries due to limited transparency regarding ownership structures (Chancel and Rehm, 2026a). This data gap means that the aggregate ownership-based climate debt estimate is likely conservative.

⁶ These two figures are not additive, as the consumption-based and ownership-based approaches partly refer to the same underlying emissions and should instead be understood as two different perspectives on how to attribute emissions to economic groups.

Figure 1: Sum of estimated climate debt for country-level top 1% wealth groups under the ownership-based approach and country-level top 1% income groups under the consumption-based approach across the 24 covered EU Member States, 2022 (€ billion)



Source: Own calculations based on Ghosh et al. (2021) and Rehm and Chancel (2026)

Notes: As the ownership-based emissions data are reported only on a ‘per capita’ basis, we calculated group-level emissions following Chancel and Rehm (2026b), using total population figures from the World Inequality Database (WID.world, 2025).

The country level estimates for the top 0.1%, the top 1%, and top 10% economic groups are shown in table 1 in the Annex.

The ownership-based approach reveals an additional, substantially more concentrated layer of inequality that cannot be clearly observed through consumption-based analyses alone. It highlights a gap in current EU climate-related fiscal policy, which tends to treat individual responsibility primarily as a matter of consumption. A substantial part of the economic incidence of the EU Emissions Trading System (EU ETS) is ultimately passed on to consumers, particularly through electricity prices (European Commission, 2025b), thereby creating incentives for consumers to choose lower-carbon alternatives. However, the EU and its Member States currently lack a fiscal instrument explicitly designed to incentivise wealthy individuals to shift investment patterns towards low-carbon portfolios.

To put the aggregate ownership-based climate debt estimates into perspective, the following section looks at two sides of the same question: 1) the scale of the climate damage and disproportionate responsibility it reveals – including how this compares with the resources Europe needs for climate action and a just transition – and 2) the scale of potential fiscal responses.

Climate debt is not a tax bill, nor money that governments could automatically collect. Rather, by putting a monetary value on the damages associated with emissions above an equitable share, it makes the scale of climate damage tangible and comparable to other economic costs and funding needs. It is up to policymakers to develop appropriate fiscal responses that make those responsible

contribute their fair share towards addressing the costs society at large is already bearing. Climate debt shows the responsibility and gives an estimate of the costs society is bearing; progressive fiscal instruments should address the problem. The following comparisons show just how significant the costs associated with disproportionate emissions are at a time when governments are searching for resources to finance Europe's future.

1) Scale of damages

The following comparison provides an order-of-magnitude illustration of the climate damages associated with excess emissions by the wealthiest groups, showing the scale of the damages associated with excess emissions by the wealthiest groups, relative to economic losses and major EU funding commitments. These commitments provide an indication of the scale of costs and financial resources involved in addressing Europe's climate, social and budgetary needs.

Climate-related economic losses:

- More than four years of climate-related economic losses across the EU: In a single year, the ownership-based climate debt associated with the wealthiest 1% across the 24 covered EU Member States reached approximately €301 billion. This exceeds the €208 billion in direct economic losses caused by weather- and climate-related extremes across the entire EU over four years between 2021 and 2024 (2024 prices) (European Environment Agency, 2025)
- Larger than the economic impact of Europe's extreme heat and drought in 2026: The extreme heat and drought that swept Europe in 2026 could reduce EU GDP by around €180 billion, according to estimates by Triodos Bank (2026) – enough to wipe out almost all of the EU's expected economic growth that year and equivalent to around 60% of the annual ownership-based climate debt associated with the wealthiest 1% for 2022. In other words, the estimated climate debt associated with the richest 1% is substantially larger than

the economic losses from one devastating summer across Europe. Making the wealthiest 1% pay their fair share through progressive taxation could help mobilise resources to address such climate impacts.

Major EU funding commitments:

- Around 3.5 times the Social Climate Fund: The Social Climate Fund is expected to mobilise at least €86.7 billion over 2026–2032, including mandatory national co-financing, to support vulnerable households, vulnerable micro-enterprises, and vulnerable transport users (European Commission, n.d.a). At approximately €301 billion, the annual ownership-based climate debt estimate associated with the top 1% wealth groups across the 24 covered Member States is around 3.5 times this entire seven-year amount.
- More than five times the Just Transition Mechanism: The EU's Just Transition Mechanism is designed to ensure that the transition towards climate neutrality happens in a fair way, supporting the regions, industries and workers facing the greatest socio-economic challenges. Across its three pillars, the mechanism aims to mobilise around €55 billion over 2021–2027 (European Commission, n.d.b). The €301 billion ownership-based climate debt estimate is equivalent to more than five times the amount the EU aims to mobilise through the Just Transition Mechanism over seven years.
- Almost twice the proposed seven-year NextGenerationEU (NGEU) debt repayments: Under the European Commission's proposal for the next EU budget, €168 billion is foreseen over 2028–2034 for repayment of the interest and principal of the non-repayable support financed through NGEU borrowing (€24 billion per year) (European Parliament, 2026). At approximately €301 billion, the annual ownership-based climate debt estimate associated with the top 1% wealth groups across the 24 covered Member States is around 1.8 times this seven-year amount.

2) Potential fiscal responses

Building on these comparisons, the question is how governments can make those with the greatest climate responsibility and the greatest ability to pay contribute their fair share towards addressing these costs. There is no single way to address climate debt: different progressive fiscal measures can help translate this responsibility into concrete financial contributions towards climate action, adaptation and a just transition. Taxation of extreme wealth and carbon-intensive ownership offers a way to start correcting this imbalance, while raising substantial resources for public priorities (see chapter 4).

One concrete example is a minimum effective tax rate on extreme wealth. Parrinello, Varaschin and Zucman (2025) estimate that a **2% minimum effective tax rate on EU residents with net wealth above €100 million could raise approximately €67 billion annually.**⁷ To put that figure into perspective, we compare the estimated revenue from the tax with yearly finance needs of the central policy mechanisms in the EU budget introduced above.

One year of this estimated revenue would be equivalent to:

- **77% of the €86.7 billion the Social Climate Fund is expected to mobilise over 2026–2032**, including mandatory national co-financing. This is a yearly average of €12.4 billion.

- **More than the entire €55 billion the Just Transition Mechanism aims to mobilise over 2021–2027.** This is a yearly average of €7.9 billion.
- Around 40% of the €168 billion foreseen for **NextGenerationEU (NGEU) debt repayments over seven years (2028–2034) under the Commission’s proposal for the next EU budget.** This is a yearly average of €24 billion.

Taken together, the annualised amounts for these three mechanisms total approximately €44.3 billion, meaning the estimated €67 billion in annual revenue expected from a 2% minimum effective tax rate on EU residents with net wealth above €100 million would be equivalent to around 1.5 times their combined annual amounts.

At the same time, this potential annual tax revenue is equivalent to more than a fifth of the €301 billion in annual ownership-based climate debt associated with Europe’s wealthiest 1%. While a wealth tax would not aim to directly recover this climate debt, the comparison illustrates how progressive fiscal measures could begin translating disproportionate climate responsibility into substantial financial contributions. In addition, more progressive fiscal measures are needed that address disproportionate climate responsibility.

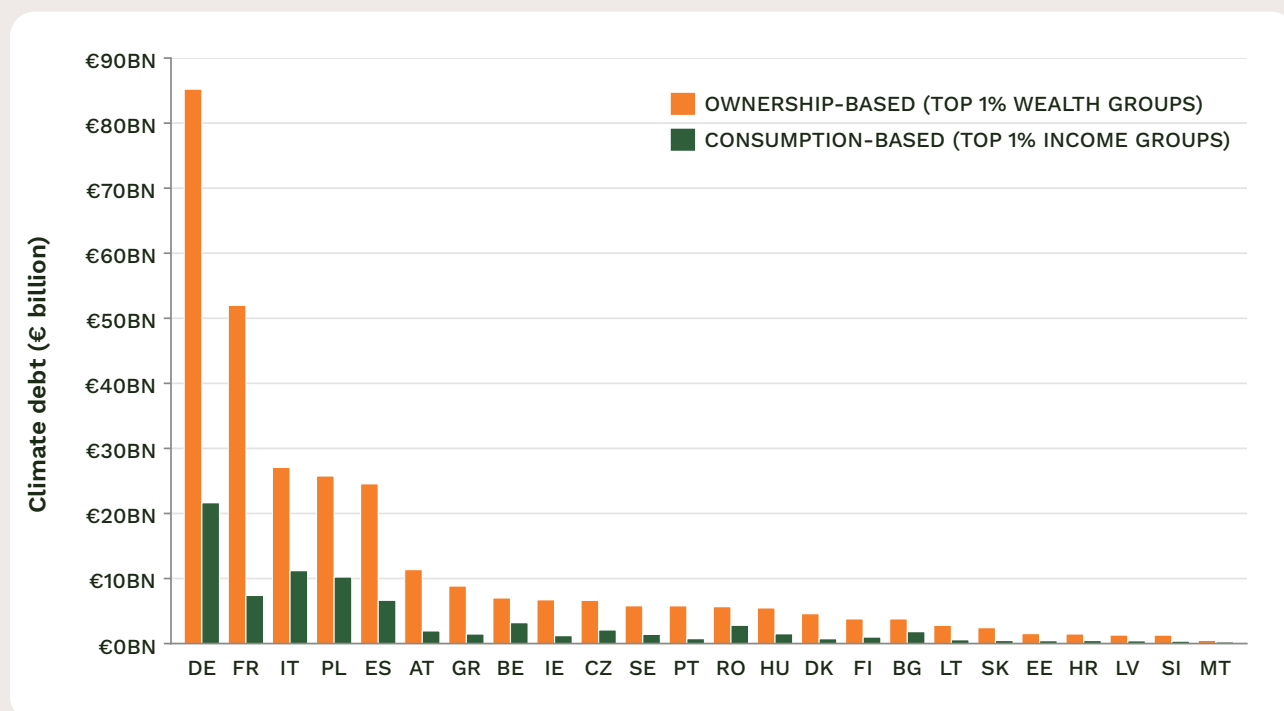
3.2. Climate debt in EU Member States is concentrated at the very top of the income and wealth distributions and varies across countries

When looking at the country-level group estimates for the top 1%, as shown in Figure 2, Germany and France account for the largest ownership-based climate-debt estimates among the covered EU Member States,

while Germany and Italy have the largest consumption-based climate-debt estimates.

⁷ This revenue estimate is based on a separate methodology from the climate debt analysis: it applies an absolute wealth threshold of €100 million to EU residents, rather than the statistical top 1% wealth groups used in the ownership-based climate debt estimates. The two figures should therefore not be interpreted as directly corresponding to the same population or tax base.

Figure 2: Estimated climate debt for country-level top 1% wealth groups under the ownership-based approach and country-level top 1% income groups under the consumption-based approach across the 24 covered EU Member States, 2022 (€ billion)



Source: Own calculations based on Ghosh et al. (2021) and Rehm and Chancel (2026)

Notes: As the ownership-based emissions data are reported only on a 'per capita' basis, we calculated group-level emissions following Chancel and Rehm (2026b), using total population figures from the World Inequality Database (WID, world, 2025).

The country-level estimates for the top 10% and top 0.1% groups are shown in Table 1 in the Annex.

Looking at climate debt per capita (i.e. average climate debt per person within an income or wealth group) rather than at aggregate estimates shows where climate responsibility is most concentrated among HNWIs. Figures 3 and 4 display the average per capita climate debt within the top 1% income and wealth groups, respectively, allowing comparisons across Member States regardless of population size:

- Under the consumption-based approach, **Malta, Luxembourg, Estonia, Poland, and Bulgaria** show the highest average per capita climate debt estimates for the top 1% income groups, suggesting that lifestyles and luxury consumption may play an important role for high-income groups in these countries.
- Under the ownership-based approach, **Ireland, Austria, Estonia, Germany, and Lithuania** show the highest average per capita climate debt estimates for the

top 1% wealth groups, suggesting that ownership structures and investment portfolios may be of particular importance in these countries.

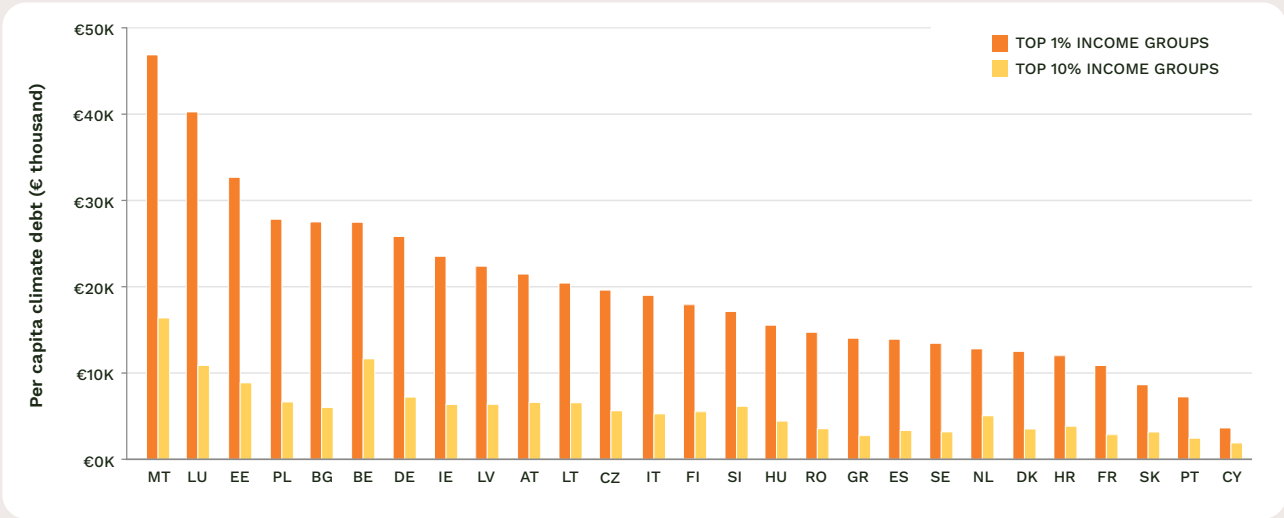
The per capita estimates increase sharply with income and wealth in all countries. Based on the underlying data, the difference between the top 1% and the top 10% income groups under the consumption-based approach ranges from around twofold to approximately fivefold, while the difference between the top 1% and the top 10% wealth groups under the ownership-based approach ranges from fourfold to more than eightfold. **Members of the top 1% income and wealth groups have substantially higher per capita climate debt estimates than members of the respective 10% groups. The difference is more pronounced under the ownership-based approach, highlighting how strongly emissions attributed to corporate asset ownership are concentrated among the wealthiest groups.**

The same pattern is observed on a global scale, and existing studies suggest that the **divergence may become even more pronounced among members of the top 0.1% and top 0.01%, showing a highly non-**

linear increase towards the top of the wealth distribution (Green Budget Germany, 2026). **Evidence for billionaires likewise points to exceptionally high emissions at the very top** (Oxfam, 2024, 2025a).

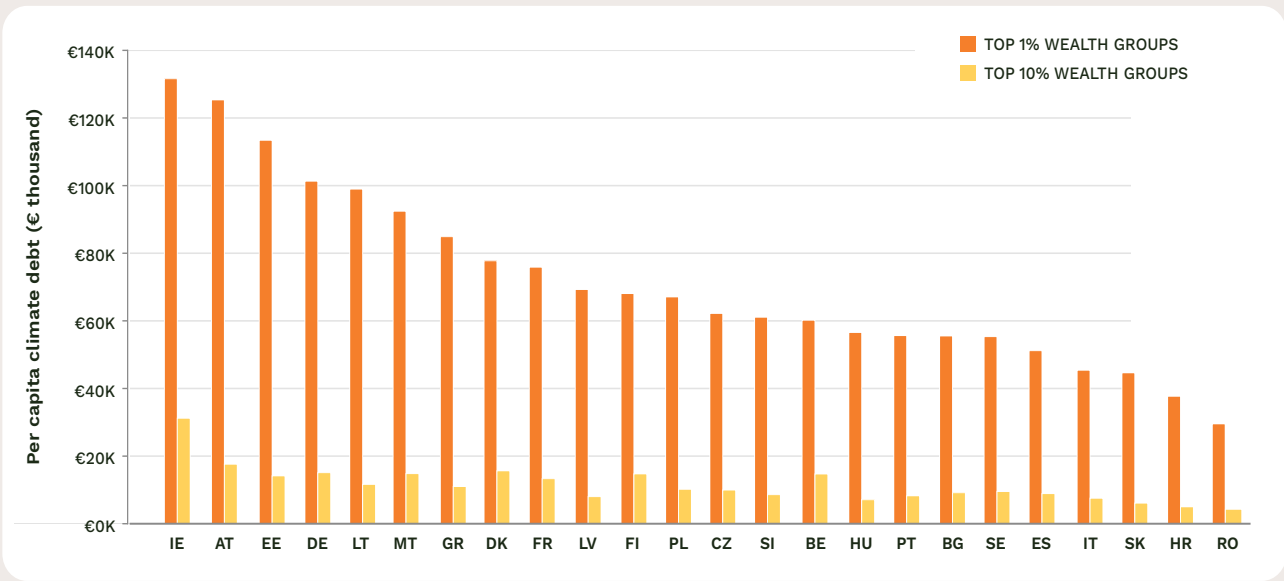
These data show that treating the top 10% as a homogeneous group significantly understates the role of high-net-worth individuals (HNWIs) in driving emissions. This large increase in per capita climate debt estimates at the very top of the distribution underscores the need for strongly progressive policy responses to climate debt, targeting top income and wealth groups.

Figure 3: Estimated per capita climate debt for country-level top 1% and top 10% income groups under the consumption-based approach, 2022 (€ thousand)



Source: Own calculations based on Ghosh et al. (2021)

Figure 4: Estimated per capita climate debt for country-level top 1% and top 10% wealth groups under the ownership-based approach, 2022 (€ thousand)



Source: Own calculations based on Rehm and Chancel (2026)

Note: Due to missing ownership-based data, Cyprus, Luxembourg, and the Netherlands are not shown.

Figures 3 and 4 also show that the top 1% is not a homogeneous European group. Under the consumption-based approach, average per capita climate debt estimates for country-level top 1% income groups range from around €47,000 in Malta to roughly €4,000 in Cyprus

– a difference of almost twelvefold. Under the ownership-based approach, average per capita climate debt estimates for country-level top 1% wealth groups range from around €132,000 in Ireland to roughly €30,000 in Romania – a difference of more than fourfold.

The wider variation in consumption-based climate debt between countries suggests that, alongside differences in income and wealth levels, the lifestyles of the top 1% income groups differ substantially across EU Member States, whereas ownership-based climate debt points to consistently high levels of climate responsibility associated with asset ownership and investment portfolios among the top 1% wealth groups across the EU, although the magnitude differs between countries.

3.3. The top 0.1% and above – what we don't see

Figure 5 illustrates that the disproportionate rise in per capita climate debt becomes even more pronounced for country-level top 0.1% income groups compared with the corresponding top 1% and top 10% income groups. While the consumption-based approach includes estimates for country-level top 0.1% income groups in the EU Member States covered (Ghosh et al., 2021), corresponding data for country-level top 0.1% wealth groups under the ownership-based approach were not available as of September 2026 (Rehm and Chancel, 2026). Country-specific data for groups above the top 0.1% (focusing on centi-millionaires and billionaires) are not available for either the consumption-based or the ownership-based approach.

Further, the ownership-based dataset does not include per capita estimates for Cyprus, Luxembourg, and the Netherlands.

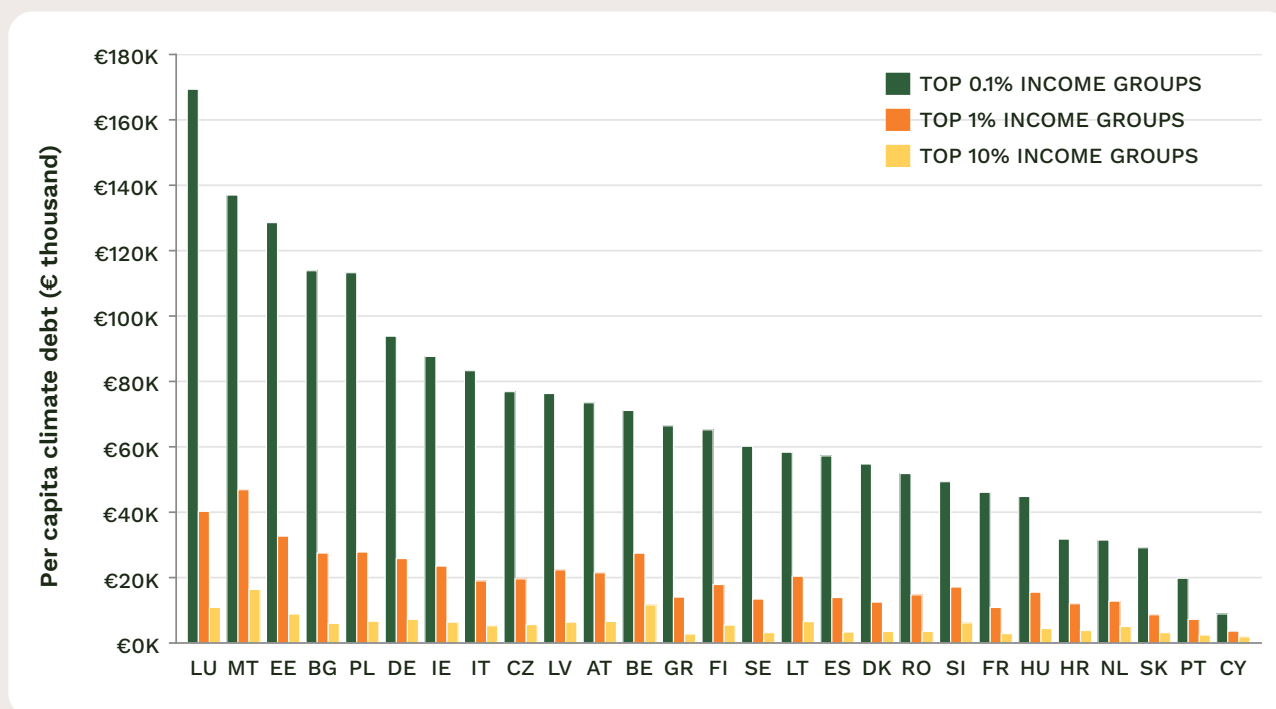
This appears to be due to limitations in identifying ultimate beneficial owners. In Luxembourg and the Netherlands, the role of these countries as hubs for holding foreign

firms on behalf of investors based elsewhere can complicate the attribution of emissions to specific groups. For Cyprus, the authors Chancel and Rehm (2026a) note that some Russian emissions recorded as foreign-owned and attributed to owners based in Cyprus may in fact be owned by Russian residents or expatriates registered there. Taken together, these attribution challenges limit the reliable allocation of per capita ownership-based emissions to the corresponding wealth groups (Chancel and Rehm, 2026a).

These data gaps limit our ability to capture the full extent of emissions concentration among the wealthiest individuals within the top 1%. Existing research suggests that climate-related responsibilities further concentrate at the very top of the wealth and income distribution (Green Budget Germany/FÖS, 2026; Oxfam, 2024, 2025a). Treating the top 10% or the top 1% as homogeneous groups therefore risks overlooking substantial differences within these groups, particularly the disproportionate role of centi-millionaires and billionaires.

Improved data on asset ownership by the wealthiest individuals and the emissions associated with those assets would be essential to better understand how climate debt is concentrated at the very top of the wealth distribution.

Figure 5: Estimated per capita climate debt for country-level top 0.1%, top 1%, and top 10% income groups under the consumption-based approach, 2022 (€ thousand)



Source: Own calculations based on Ghosh et al. (2021)

3.4. The gap between consumption- and ownership-based climate debt estimates varies widely between EU Member States

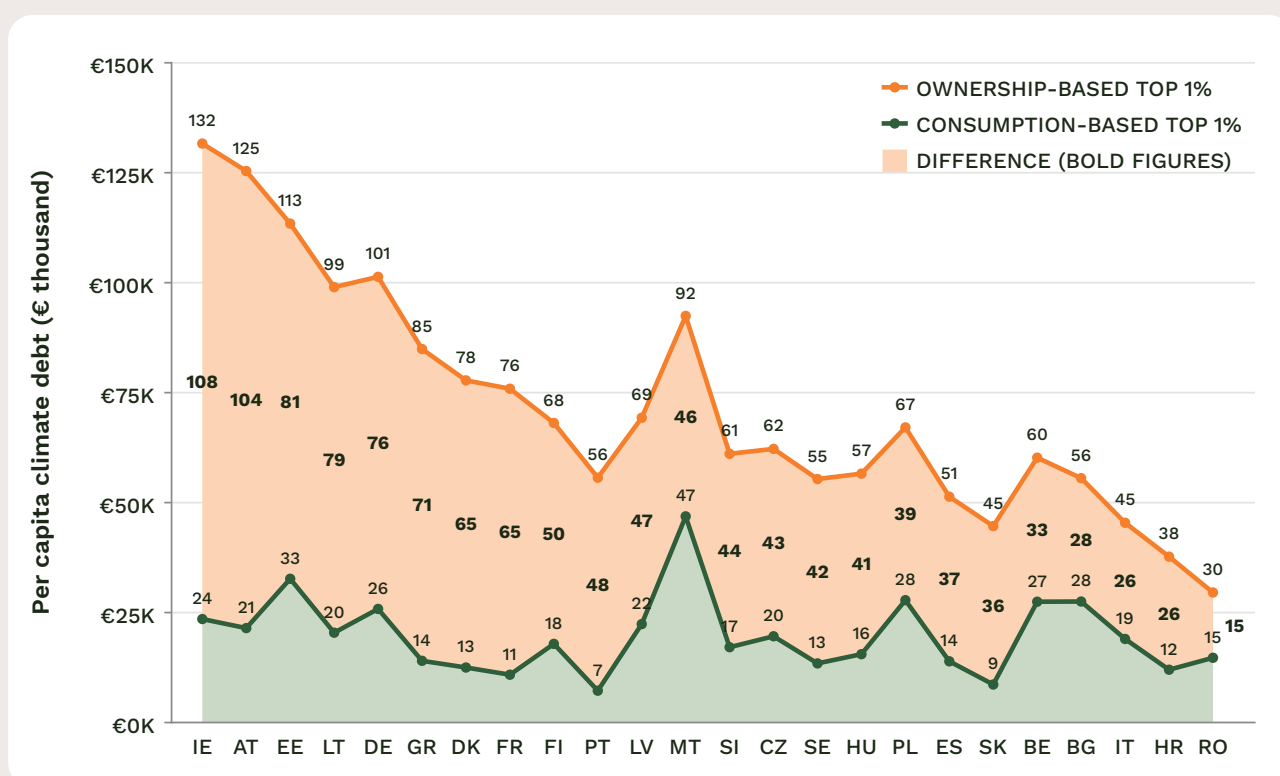
Figure 6 shows the absolute difference between estimated per capita climate debt for country-level top 1% wealth groups under the ownership-based approach and country-level top 1% income groups under the consumption-based approach across the 24 covered EU Member States. The gap is calculated as the ownership-based estimate minus the consumption-based estimate, with positive values indicating that the ownership-based approach assigns greater climate responsibility than the consumption-based approach.

While Figure 6 illustrates the absolute gap between ownership- and consumption-based climate debt estimates, Figure 7 shows the ratio between the two estimates. The former identifies where the absolute difference

between the estimates is largest, whereas the latter reveals where the ownership-based estimate is largest relative to the consumption-based estimate. As shown in Figure 6, the largest absolute difference is observed in Ireland, where the gap reaches approximately €108,000 (with the ownership-based estimate reaching approximately 5.5 times the consumption-based estimate), closely followed by Austria. In contrast, the smallest gap is found in Romania, where the ownership-based estimate is approximately twice the consumption-based estimate. In relative terms, Figure 7 shows that Portugal has the highest ratio of ownership-based to consumption-based climate debt estimates, followed by France and Denmark.

Large absolute differences highlight where the gap between the two estimates is greatest in per capita monetary terms, providing a sense of scale in relation to, e.g., climate finance needs. High ownership-to-consumption ratios indicate where the ownership-based approach attributes substantially greater climate responsibility to the top 1% than the consumption-based approach, highlighting a dimension of climate inequality that consumption-based estimates alone do not capture.

Figure 6: Absolute difference between estimated per capita climate debt for country-level top 1% wealth groups under the ownership-based approach and country-level top 1% income groups under the consumption-based approach across the 24 covered EU Member States, 2022 (€ thousand)

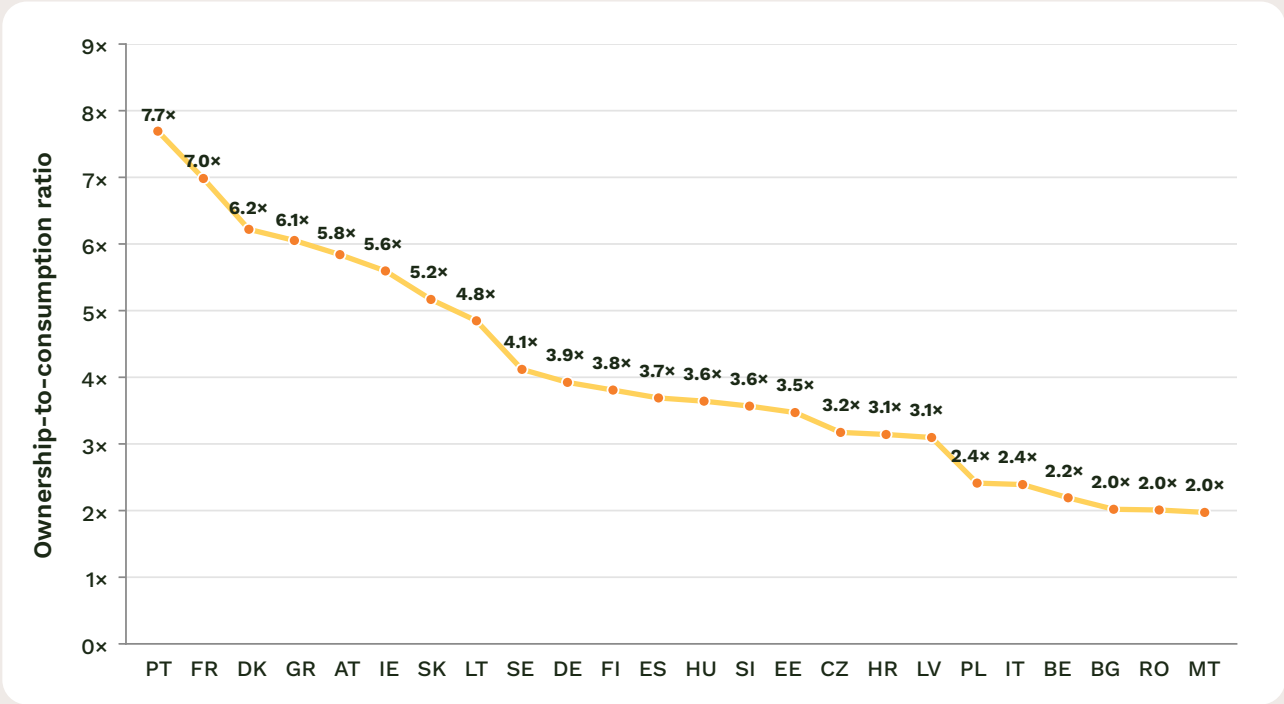


Source: Own calculations based on Ghosh et al. (2021) and Rehm and Chancel (2026)

Notes: Due to missing ownership-based data, Cyprus, Luxembourg and the Netherlands are not shown.

The ownership-based and consumption-based estimates are based on different methodologies and are therefore not directly comparable (see [footnote 1](#)). The figure should therefore be interpreted as an illustration of the gap between the estimates.

Figure 7: Ratio of estimated per capita climate debt for country-level top 1% wealth groups under the ownership-based approach to that for country-level top 1% income groups under the consumption-based approach across the 24 covered EU Member States, 2022



Source: Own calculations based on Ghosh et al. (2021) and Rehm and Chancel (2026)

Notes: The ownership-to-consumption ratio is calculated by dividing the ownership-based per capita climate debt estimate by the consumption-based per capita climate debt estimate. E.g., in the case of Portugal (PT), the ownership-based estimate is 7.7 times the consumption-based estimate.

The ownership-based and consumption-based estimates are based on different methodologies and are therefore not directly comparable (see [footnote 1](#)). The figure should therefore be interpreted as an illustration of the ratio between the estimates.

4. CONCLUSIONS

As this paper shows, there is a striking imbalance at the heart of the EU's current fiscal system: those with the greatest climate responsibility are also those with the greatest ability to pay. Yet when the bill for climate damage arrives, it is largely paid by low- and middle-income households (Chancel and Mohren, 2025). This increases the pressure on public budgets as well as low- and middle-income households, and climate-related damages are borne by climate-affected communities which are often those with lower capacity to pay (Chancel and Mohren, 2025). Meanwhile, potential contributions from the wealthiest 1% remain largely outside fiscal debates, even though they can be attributed high climate responsibility via their ownership of corporate assets and investment decisions. This is particularly striking given evidence that effective tax rates often decline at the top of the wealth distribution (Oxfam, 2025b; Bach et al., 2025; Bruil et al., 2022; Guzzardi et al., 2024; Saez and Zucman, 2019).

Private jets, luxury travel and high-carbon lifestyles are the visible tip of the iceberg and fiscal policy needs to find appropriate responses to reduce their negative impacts. But this analysis shows why Europe also needs to look beneath the surface, at high wealth and the **ownership and control over productive assets**. Across the 24 EU Member States covered, the wealthiest 1% were associated with approximately €301 billion in ownership-based Climate Debt in 2022, compared with around €80 billion under the separate consumption-based approach for the top 1% income groups. The two figures show why looking at consumption alone leaves an important part of the picture unseen.

Debates about limited public budgets for climate action and social policy should also be viewed in the context of growing wealth concentration and the increasing number of centi-millionaires and billionaires and lower tax contributions. Growing evidence shows

that HNWIs often face lower effective tax rates than middle-income groups and are growing in numbers across the EU (Bach et al., 2025; Bruil et al., 2022; Guzzardi et al., 2024; Saez and Zucman, 2019). While climate damages are becoming manifest in droughts, wildfires, and heat waves across Europe, the EU **is overlooking a significant potential source of public revenue. How Europe responds to growing climate and social pressures is also a political choice about who is asked to contribute. Bringing progressive wealth taxation into the picture could expand fiscal space for addressing climate finance needs while helping to reduce existing wealth and climate inequality.**

The EU should apply **the polluter-pays principle consistently in its fiscal policy, so that those with the greatest climate responsibility and the greatest ability to pay contribute more.**

Taxing extreme wealth across the EU is a way to apply the polluter-pays principle consistently in EU fiscal policy. New own resources (e.g. wealth taxes, potentially differentiating between low-carbon and high-carbon wealth assets) could generate additional public revenue for climate mitigation, climate adaptation, and social policy priorities, while also creating incentives to shift investment portfolios towards lower-carbon activities. This would broaden the fiscal debate beyond individual consumption and bring control over productive assets into the fiscal debate.

Recent proposals for additional fiscal flexibility during energy crises or for new funds to respond to climate impacts (e.g. European Commission, 2026a; Ministry for the Ecological Transition and the Demographic Challenge, Spain, 2026) address genuine and urgent financing needs. However, a policy response that focuses only on compensating for damages after they occur remains incomplete. It places the costs of climate change on society at

large without adequately addressing the highly concentrated emissions that come along with ownership patterns of the wealthiest 1%. Progressive taxes on extreme wealth and carbon-intensive ownership can simultaneously mobilise resources for public action and strengthen incentives to reduce investment in carbon-intensive activities that lock in emissions.

Yet before governments can tax extreme wealth fairly, they need to be able to see it. **This report reveals significant holes in the picture.** Per capita ownership-based estimates could not be produced for **Cyprus, Luxembourg and the Netherlands**, apparently because of limitations in tracing ultimate ownership. Even more strikingly, the analysis cannot provide ownership-based estimates for the **top 0.1% – the centi-millionaires and billionaires at the very top of the wealth distribution – because sufficiently granular data are unavailable.** Precisely where wealth becomes most concentrated, the picture becomes more opaque.

Closing this transparency gap requires action at home and cooperation across borders. EU governments should improve data on ultimate beneficial ownership, asset composition and investment portfolios, and strengthen the automatic exchange of information. Also, wealth crosses borders, and fair taxation cannot depend on individual countries choosing to act alone. **The EU and its Member States should therefore pair stronger European rules with ambitious international cooperation, supporting binding minimum standards that prevent extreme wealth from disappearing behind borders and complex ownership structures.**

The UN Framework Convention on International Tax Cooperation can strengthen those common rules, improve transparency and enable more effective taxation of highly mobile wealth (see Greenpeace, 2026). **Europe should play an active role in securing an ambitious and binding agreement.** If EU governments want those with the greatest climate responsibility and greatest ability to pay to contribute their fair share, they need to **look beneath the tip of the iceberg.**

BIBLIOGRAPHY – PART I

- Bach, L., Bozio, A., Guillouzouic, A., and Malgouyres, C. (2025): Do Billionaires Pay Taxes? CEPR Discussion Paper No. 20660. CEPR Press, Paris and London. Available at: <https://cepr.org/publications/dp20660> (accessed 28 September 2026).
- Brand, C., Coenen, G., Hutchinson, J., and Saint Guilhem, A. (2023): The macroeconomic implications of the transition to a low-carbon economy. Available at: https://www.ecb.europa.eu/press/economic-bulletin/articles/2023/html/ecb.ebart202305_01~a6ff071a65.en.html (accessed 9 October 2026).
- Bruil, A., van Essen, C., Leenders, W., Lejour, A., Möhlmann, J., and Rabaté, S. (2022): Inequality and Redistribution in the Netherlands. CPB Discussion Paper No. 436. CPB Netherlands Bureau for Economic Policy Analysis, The Hague. Available at: <https://www.cpb.nl/system/files/cpbmedia/omnidownload/CPB-Discussion-Paper-436-Inequality-and-Redistribution-in-the-Netherlands.pdf> (accessed 28 September 2026).
- Chancel, L., and Mohren, C. (2025): Climate Inequality Report 2025. Climate Change: A Capital Challenge. Why Climate Policy Must Tackle Ownership. World Inequality Lab Key Report.
- Chancel, L., and Rehm, Y. (2025): Accounting for the carbon footprint of capital ownership advances the understanding of emission inequality: Available at: https://prod.wid.world/www-site/uploads/2023/12/WorldInequalityLab_WP2023_26_Accounting-for-the-carbon-footprint-of-capital-ownership-advances-the-understanding-of-emission-inequality_Final.pdf (accessed 9 October 2026).
- Chancel, L., and Rehm, Y. (2026a): Global inequalities in ownership-based carbon footprints. *Nature Climate Change*, 16(7), 781–789. Available at: <https://www.nature.com/articles/s41558-026-02662-5> (accessed 28 September 2026).
- Chancel, L., and Rehm, Y. (2026b): Supplementary Information to Global inequalities in ownership-based carbon footprints. Supplementary material to *Nature Climate Change*, 16(7), 781–789. Available at: <https://www.nature.com/articles/s41558-026-02662-5> (accessed 28 September 2026).
- Cipollone, P. (2026): The new energy shock: economic scenarios and policy implications. Available at: <https://www.ecb.europa.eu/press/key/date/2026/html/ecb.sp260506~1bbd4ed780.en.html> (accessed 9 October 2026).
- European Central Bank (2026): Euro foreign exchange reference rates – US dollar (USD). Available at: https://www.ecb.europa.eu/stats/policy_and_exchange_rates/euro_reference_exchange_rates/html/eurofxref-graph-usd.en.html (accessed 28 September 2026).
- European Commission (2023): An adjusted package for the next generation of own resources. COM(2023) 330 final. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52023DC0330> (accessed 28 September 2026).
- European Commission (2025a): A dynamic EU Budget for the priorities of the future – The Multiannual Financial Framework 2028–2034. COM(2025) 570 final/2. Available at: [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52025DC0570R\(01\)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52025DC0570R(01)) (accessed 2 October 2026).

- European Commission (2025b): Trends in carbon intensity and the macroeconomic role of the EU Emissions Trading System. European Economic Forecast, Autumn 2025. Available at: https://economy-finance.ec.europa.eu/trends-carbon-intensity-and-macroeconomic-role-eu-emissions-trading-system_en (accessed 2 October 2026).
- European Commission (2026a): EC Midday press briefing of 1 October 2026: Budget/Energy – Italy / Flexibility / Inflation / National escape clause / Fiscal rules: Q&A. Available at: <https://audiovisual.ec.europa.eu/en/media/video/I-295485> (accessed 5 October 2026).
- European Commission (2026b): Wealth Taxation, Including Net Wealth, Capital and Exit Taxes. Final Report. Volume 1. Publications Office of the European Union, Luxembourg. DOI: 10.2778/0817231. Available at: <https://op.europa.eu/en/publication-detail/-/publication/b3294f0c-386f-11f1-be39-01aa75ed71a1/language-en> (accessed 28 September 2026).
- European Commission (n.d.a): Social Climate Fund. Available at: https://commission.europa.eu/strategy-and-policy/eu-budget/performance-and-reporting/programme-performance-statements/social-climate-fund_en (accessed 1 October 2026).
- European Commission (n.d.b): The Just Transition Mechanism: making sure no one is left behind. Available at: https://commission.europa.eu/topics/regional-and-urban-policy/just-transition-mechanism_en (accessed 1 October 2026).
- European Council (2026a): Press statement by President Costa following the meeting with Ireland’s Taoiseach, Micheál Martin. Available at: <https://www.consilium.europa.eu/en/press/press-releases/2026/09/17/press-statement-by-president-costa-following-the-meeting-with-ireland-s-taoiseach-micheal-martin/> (accessed 2 October 2026).
- European Council (2026b): European Council, 18–19 June 2026. Available at: <https://www.consilium.europa.eu/en/meetings/european-council/2026/06/18-19/> (accessed 5 October 2026).
- European Economic and Social Committee (2025): EESC calls for bold new strategy to tackle cost-of-living crisis and build lasting resilience. Available at: <https://www.eesc.europa.eu/en/news-media/news/eesc-calls-bold-new-strategy-tackle-cost-living-crisis-and-build-lasting-resilience> (accessed 9 October 2026).
- European Environment Agency (2025): Economic losses from weather- and climate-related extremes in Europe. Available at: <https://www.eea.europa.eu/en/analysis/indicators/economic-losses-from-climate-related> (accessed 5 October 2026).
- European Parliament, Council of the European Union, and European Commission (2020): Interinstitutional agreement between the European Parliament, the Council of the European Union and the European Commission on budgetary discipline, on cooperation in budgetary matters and on sound financial management, as well as on new own resources, including a roadmap towards the introduction of new own resources. OJ L 433I, 22 December 2020, pp. 28–46. Available at: https://eur-lex.europa.eu/eli/agree_interinstit/2020/1222/oj/eng (accessed 28 September 2026).
- European Parliament (2024): Housing crisis: why prices are rising and what the EU is doing about it. Available at: <https://www.europarl.europa.eu/topics/en/article/20241014STO24542/housing-crisis-why-prices-are-rising-and-what-the-eu-is-doing-about-it> (accessed 9 October 2026).
- European Parliament (2026): Next long-term EU budget: 2028–2034 multiannual financial framework. Available at: [https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI\(2026\)782646](https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2026)782646) (accessed 25 September 2026).

- Ghosh, E., Nazareth, A., Wang, G., Kartha, S., and Kemp-Benedict, E. (2021): Emissions Inequality Dashboard. Stockholm Environment Institute (SEI). Available at: <https://emissions-inequality.org/> (accessed 21 September 2026).
- Gössling, S., and Humpe, A. (2024): The social cost of carbon falling on the wealthy. *Cleaner Production Letters*, 7, 100068. Available at: <https://www.sciencedirect.com/science/article/pii/S2666791624000149> (accessed 28 September 2026).
- Green Budget Germany/FÖS (2026): Understanding the Climate Debt of Extreme Wealth. Available at: <https://www.greenpeace.org/africa/en/publications/60882/understanding-the-climate-debt-of-extreme-wealth/> (accessed 28 September 2026).
- Greenpeace (2026). Global Tax Treaty Negotiators Meet as Record Heat Intensifies Worldwide. Available at: <https://www.greenpeace.org/static/planet4-international-stateless/2026/07/46df2ac1-media-brief-inc5-untc.pdf> (accessed 7 October 2026).
- Guzzardi, D., Palagi, E., Roventini, A., and Santoro, A. (2024): Reconstructing income inequality in Italy: New evidence and tax system implications from distributional national accounts. *Journal of the European Economic Association*, 22(5), 2180–2224. Available at: <https://doi.org/10.1093/jeea/jvad073> (accessed 28 September 2026).
- Hickel, J. (2020): Quantifying National Responsibility for Climate Breakdown: An Equality-Based Attribution Approach for Carbon Dioxide Emissions in Excess of the Planetary Boundary. *The Lancet Planetary Health*, 4(9), e399–e404. Available at: [https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196\(20\)30196-0/fulltext](https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(20)30196-0/fulltext)
- Krichene, H., Griesbach, B., Gröschl, J., Utermoehl, K., and Elisabeth, J. (2026): Too hot to grow. The economic costs of extreme heat. Available at: https://www.allianz-trade.de/content/dam/onemarketing/aztrade/allianz-trade_de/dokumente/2026-05-28-allianz-trade-studie-the-economic-costs-of-extreme-heat.pdf (accessed 9 October 2026).
- Ministry for the Ecological Transition and the Demographic Challenge, Spain (2026): Spain's non-paper for a stronger European Climate Resilience Framework. Available at: https://www.miteco.gob.es/content/dam/miteco/es/prensa/Spain_Non-paper_Climate_Resilience_Framework.pdf (accessed 1 October 2026).
- Oxfam (2024): Carbon Inequality Kills: Why curbing the excessive emissions of an elite few can create a sustainable planet for all. Available at: <https://policy-practice.oxfam.org/resources/carbon-inequality-kills-why-curbing-the-excessive-emissions-of-an-elite-few-can-621656/> (accessed 28 September 2026).
- Oxfam (2025a): Climate Plunder: How a Powerful Few Europeans Are Locking the World into a Climate Disaster. Available at: <https://www.oxfam.org/en/research/climate-plunder-how-powerful-few-europeans-are-locking-world-climate-disaster> (accessed 28 September 2026).
- Oxfam (2025b): A European agenda to tax the super-rich: A solution to inequality in the European Union. Available at: <https://policy-practice.oxfam.org/resources/a-european-agenda-to-tax-the-super-rich-a-solution-to-inequality-in-the-europea-621736/> (accessed 28 September 2026).
- Pelz, S., Ganti, G., Lamboll, R., Grant, L., Smith, C., Pachauri, S., Rogelj, J., Riahi, K., Thiery, W., and Gidden, M. J. (2025): Using Net-Zero Carbon Debt to Track Climate Overshoot Responsibility. *Proceedings of the National Academy of Sciences*, 122(13), e2409316122. Available at: <https://www.pnas.org/doi/10.1073/pnas.2409316122>

- Phylipsen, D., Anger-Kraavi, A., and Mukonza, C. (2020): Distributional impacts of carbon pricing on households. Available at: <https://documents1.worldbank.org/curated/en/817211588598030616/pdf/Distributional-Impacts-of-Carbon-Pricing-on-Households.pdf> (accessed 9 October 2026).
- Rehm, Y., and Chancel, L. (2026): Code package and data: Global inequalities in ownership-based carbon footprints. Zenodo. Available at: <https://doi.org/10.5281/zenodo.19366484> (accessed 28 September 2026).
- Saez, E., and Zucman, G. (2019): *The Triumph of Injustice: How the Rich Dodge Taxes and How to Make Them Pay*. W. W. Norton & Company, New York and London. Available at: <https://www.norton.com/books/9781324002727> (accessed 28 September 2026).
- Strauss, D., Johnston, I., and Borrett, A. (2026): European wildfire costs this year have already surpassed €3bn. Available at: <https://www.ft.com/content/ef7f88ca-3dc0-49c7-b995-05b1de69cc74?syn-25a6b1a6=1> (accessed 9 October 2026).
- Triodos Bank (2026): Hot Summer Economics. Economic effects of the hot European summer of 2026. Available at: <https://www.triodos.com/en/articles/2026/hot-summer-economics> (accessed 8 October 2026).
- WID.world (2025): World Inequality Database. Available at: <https://wid.world/data/> (accessed 1 October 2026).

ANNEX

Table 1: Estimated climate debt for the country-level top 0.1%, the top 1%, and the top 10% economic groups under the ownership-based and consumption-based approach, 2022 (€ billion)

	TOP 0.1%		TOP 1%		TOP 10%	
COUNTRY	OWNERSHIP	CONSUMPTION	OWNERSHIP	CONSUMPTION	OWNERSHIP	CONSUMPTION
DE	n.d.	7.86	85.21	21.64	127.14	60.37
FR	n.d.	3.14	51.98	7.40	91.38	19.35
IT	n.d.	4.91	27.08	11.20	45.04	31.01
PL	n.d.	4.17	25.76	10.22	39.14	24.26
ES	n.d.	2.73	24.55	6.65	43.35	15.93
AT	n.d.	0.66	11.36	1.94	15.97	5.96
GR	n.d.	0.69	8.84	1.46	11.47	2.87
BE	n.d.	0.83	7.01	3.21	17.15	13.61
IE	n.d.	0.45	6.73	1.22	15.95	3.29
CZ	n.d.	0.82	6.64	2.09	10.65	6.00
SE	n.d.	0.63	5.81	1.41	10.01	3.34
PT	n.d.	0.21	5.80	0.75	8.62	2.55
RO	n.d.	0.99	5.67	2.80	8.47	6.73
HU	n.d.	0.43	5.48	1.50	6.89	4.27
DK	n.d.	0.32	4.59	0.74	9.25	2.08
FI	n.d.	0.36	3.79	0.99	8.22	3.04
BG	n.d.	0.76	3.79	1.83	6.27	3.97

	TOP 0.1%		TOP 1%		TOP 10%	
COUNTRY	OWNERSHIP	CONSUMPTION	OWNERSHIP	CONSUMPTION	OWNERSHIP	CONSUMPTION
LT	n.d.	0.17	2.79	0.58	3.28	1.86
SK	n.d.	0.16	2.44	0.47	3.35	1.71
EE	n.d.	0.17	1.53	0.44	1.91	1.20
HR	n.d.	0.12	1.47	0.46	1.96	1.47
LV	n.d.	0.14	1.30	0.42	1.51	1.20
SI	n.d.	0.11	1.29	0.36	1.82	1.30
MT	n.d.	0.07	0.49	0.25	0.78	0.87
SUM I	n.d.	30.92	301.40	80.04	489.59	218.23
LU	n.d.	0.11	n.d.	0.26	n.d.	0.71
CY	n.d.	0.01	n.d.	0.05	n.d.	0.25
NL	n.d.	0.56	n.d.	2.26	n.d.	8.91
SUM II	n.d.	31.60	301.40	82.61	489.59	228.11

Source: Own calculations based on Ghosh et al. (2021) and Rehm and Chancel (2026)

Notes: As the ownership-based emissions data are reported only on a ‘per capita’ basis, we calculated group-level emissions following Chancel and Rehm (2026b), using total population figures from the World Inequality Database (WID world, 2025).

Due to missing per capita emissions data for Cyprus, Luxembourg, and the Netherlands (shown as n.d. – no data), we could not calculate ownership-based group-level emissions for those countries. For the comparison between the two approaches in the main text, we therefore use Sum I, which covers only the 24 Member States for which data are available under both approaches.

PART II – COUNTRY ANALYSES: SELECTED EU MEMBER STATES

The following section focuses on the ownership-based approach to examine the climate responsibility associated with the ownership patterns and investment decisions of very wealthy individuals, an area that receives comparatively little attention in current climate policy debates.

The country analyses first look at emission inequality across the bottom 50%, middle 40%, top 10%, and top 1% income and wealth groups and, for ownership-based emissions, the concentration trend between 2010 and

2022. They then present per capita and aggregate climate debt estimates to show the scale and concentration of climate responsibility across high-income and high-wealth groups. Finally, the estimates are contextualised through a comparison with other EU Member States and with the potential revenue from Zucman's proposed 2% minimum effective tax rate for individuals with net wealth above €100 million in each of the countries analysed.

CLIMATE DEBT OF EXTREME WEALTH – SPAIN

SPAIN AT A GLANCE

- Spain's wealthiest 1% are associated with an estimated ownership-based climate debt of around €24.6 billion in 2022, while the top 1% income group under the consumption-based approach are associated with €6.6 billion estimated climate debt in the same year⁸ – at the same time Spain's climate-related economic losses amounted to around €2.5 billion⁹ in 2022.
- Climate debt rises with increasing wealth: the estimated per capita climate debt for the top 1% wealth group is approximately €51,300, around 5.7 times as high as for the top 10% wealth group.
- The emissions underlying the ownership-based climate debt estimates are extremely concentrated at the top of the wealth distribution. Average per capita ownership-based emissions for the top 1% were around 5, 58, and 770 times as high as those for the top 10%, middle 40%, and bottom 50%, respectively.

⁸ See [Chapter 2 \(The Concept of Climate Debt\)](#) for an explanation of the concept of climate debt and [Chapter 3 \(Climate Debt Estimates\)](#) for the underlying methodology.

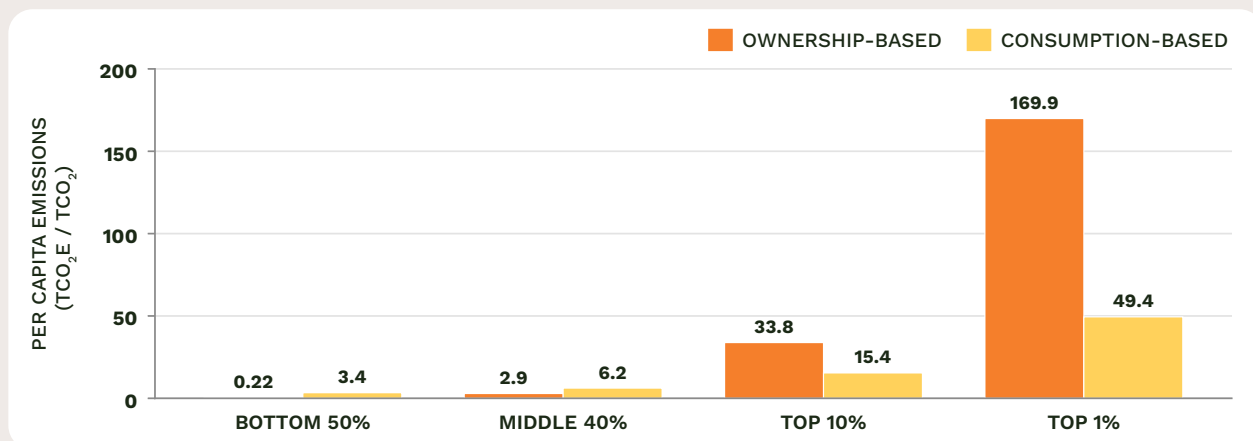
⁹ The per capita climate-related economic loss figure (€51.7 per capita in 2022) is taken from the European Environment Agency (2025) and has been multiplied by Spain's 2022 population (approximately 47.8 million) provided by the World Inequality Database (WID.world, 2025), resulting in approximately €2.5 billion. Due to interannual variability, the EEA figure is based on a 30-year moving average and should therefore not be interpreted as the actual economic losses incurred in 2022. Annual climate-related economic losses have increased considerably in recent years. From 2018 to 2021, annual losses varied between €2.2 billion and €2.9 billion, but the figure rose to €11.2 billion in 2022 before declining to €7.1 billion in 2023 (European Commission, 2025). A separate modelling study estimates that extreme weather events in the summer of 2025 could reduce gross value added in affected regions of Spain by approximately €12.2 billion in 2025 (University of Mannheim and European Central Bank, 2025). The 30-year moving average therefore smooths these interannual fluctuations, but the underlying trend suggests an increase in climate-related economic losses.

DEVELOPMENTS IN EMISSION INEQUALITY

Per capita emissions in Spain are distributed unevenly across the bottom 50%, middle 40%, top 10%, and top 1% income groups under the consumption-based approach and the corresponding wealth groups under the ownership-based approach. However, **per capita emissions associated with the ownership of productive assets rise more sharply towards the top of the distribution.** Figure 1 and Table 1 show that estimated per capita ownership-based emissions rise disproportionately, with average emissions for the top 1% around five times as high as for the top 10%, around 58 times as high as for the middle 40%, and around 770 times as high as for the bottom 50%.

Looking at changes in ownership-based emissions over time, the distribution of emissions in Spain became more concentrated at the top of the wealth distribution (Table 1). While per capita ownership-based emissions declined across all wealth groups, they declined at different rates. The bottom 50% experienced the largest relative decrease, with emissions falling by almost half, whereas the top 1% saw a decline of only 13%. As a result, ownership-based emissions became even more concentrated at the top between 2010 and 2022, with the share of the top 1% increasing from 34% to 37%, while that of the bottom 50% fell from 4% to 2%.

Figure 1: Estimated per capita emissions for wealth groups (tCO₂e) under the ownership-based approach and income groups (tCO₂) under the consumption-based approach in Spain, 2022



Source: Ghosh et al. (2021) and Rehm and Chancel (2026)

Table 1: Ownership-based per capita emissions, changes, and emission shares in Spain, 2010 and 2022

Wealth Groups	Per capita emissions (tCO ₂ e)		Change (%)	Emission share (%)	
	2010	2022		2010	2022
Bottom 50%	0.43	0.22	-48.8	4	2
Middle 40%	3.32	2.91	-12.3	23	25
Top 10%	42.12	33.84	-19.7	73	73
Top 1%	195.39	169.87	-13.1	34	37
Total	5.75	4.65	-19.1	100	100

Source: Rehm and Chancel (2026); own calculations for the percentage changes

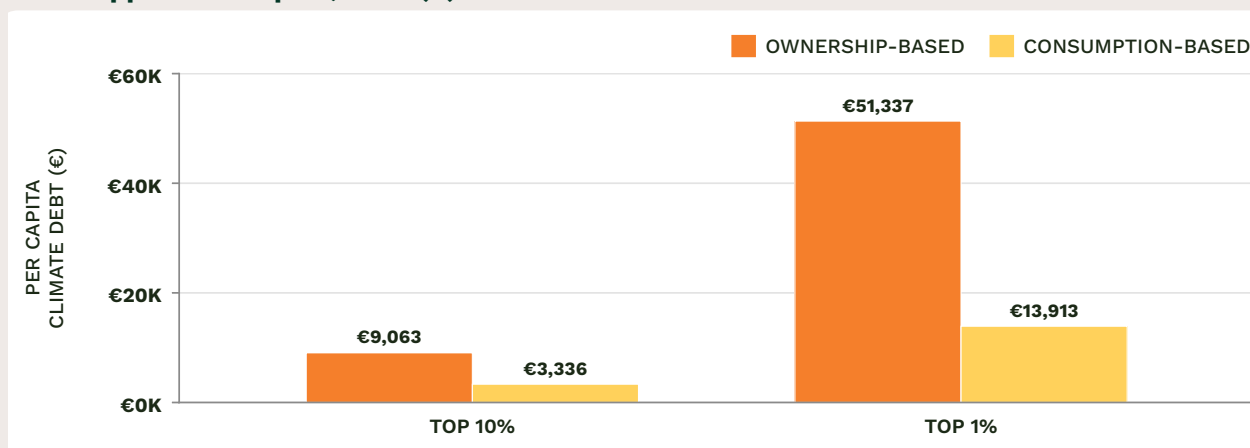
Note: The top 1% is a subset of the top 10%; the four wealth-group rows therefore do not represent mutually exclusive groups and cannot be summed to obtain the total population.

CLIMATE DEBT

In line with the emissions data, per capita climate debt estimates increase sharply towards the top of the income and wealth distributions (Figure 2), with a steeper increase under the ownership-based approach. The difference between the top 10% (approximately 4.8 million individuals) and the top 1% (approximately 478,000 individuals) is substantial: per capita climate debt for the top 1% is around 5.7 times as high as for the top 10% wealth group under the ownership-based approach and around 4.2 times as high as for the top 10% income group under the consumption-based approach.

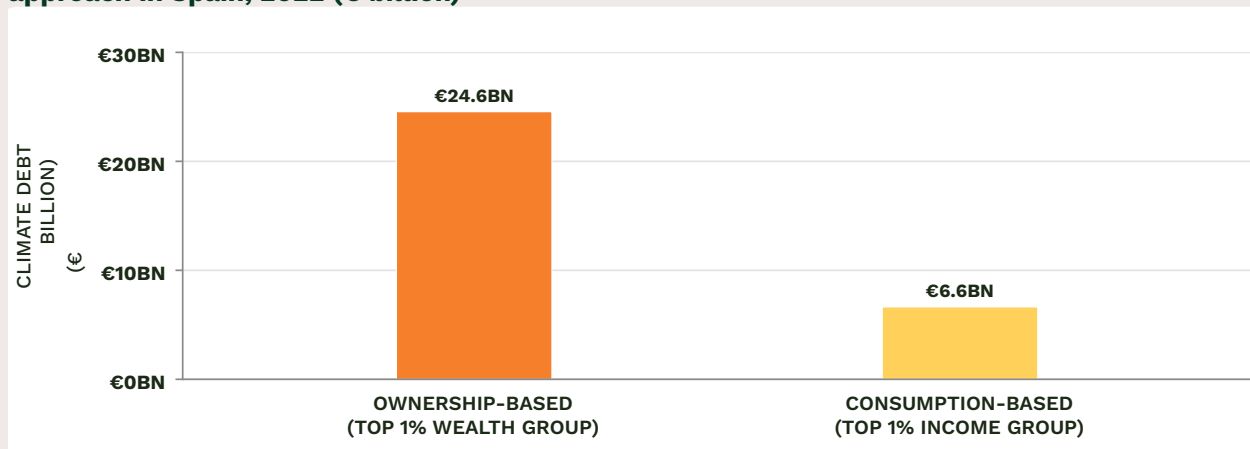
While per capita estimates highlight differences in climate responsibility across income and wealth groups, aggregate estimates (Figure 3) show the scale of climate responsibility associated with the top of the distribution. In 2022, the estimated climate debt associated with the top 1% wealth group reached approximately €24.6 billion under the ownership-based approach, whereas the corresponding estimate for the top 1% income group amounted to approximately €6.6 billion under the consumption-based approach.

Figure 2: Estimated per capita climate debt for the top 10% and top 1% wealth groups under the ownership-based approach and the corresponding income groups under the consumption-based approach in Spain, 2022 (€)



Source: Own calculations based on Ghosh et al. (2021) and Rehm and Chancel (2026)

Figure 3: Estimated aggregate climate debt for the top 1% wealth group under the ownership-based approach and the corresponding top 1% income group under the consumption-based approach in Spain, 2022 (€ billion)



Source: Own calculations based on Ghosh et al. (2021) and Rehm and Chancel (2026)

Note: The group population figures stated in the text are rounded, whereas the aggregate climate debt estimates shown here are based on exact WID population data.

These findings suggest that a narrow focus on consumption when designing fiscal instruments (e.g. carbon taxes) may overlook an important dimension of climate responsibility associated with the ownership of companies, assets, and investment decisions of the wealthiest 1%. **In Spain, the strong concentration of ownership-based climate debt at the top of the wealth distribution, together with the increase in the concentration of the underlying ownership-based emissions between 2010 and 2022, highlights the role that capital owners can play in decarbonisation efforts and supports the need for progressive fiscal instruments** (e.g. wealth taxes potentially differentiating between low-carbon and high-carbon assets) **to help finance a just transition.**

CONTEXTUALISING CLIMATE DEBT

To put these estimates into perspective, Spain's aggregate climate debt estimates for the top 1% wealth group are compared with corresponding estimates in other EU Member States. In addition, **estimated revenue from a proposed wealth tax** illustrates the potential of such a tax to cover the estimated insurance compensation costs for the flooding in Spain associated with the October 2024 DANA event¹⁰.

Comparison with other EU Member States: While the aggregate climate debt estimate for Spain's top 1% wealth group is relatively high (Spain ranks fifth among the EU Member States covered in the report; [see Figure 2, Chapter 3.2](#)), the estimated per capita ownership-based climate debt of the top 1% wealth group is relatively modest compared with that in other EU Member States. In 2022, Spain ranked among the five countries with the lowest per capita ownership-based climate debt estimates for the top 1% wealth group, while the five countries with the

highest estimates had values approximately 1.9 to 2.6 times as high as Spain's ([see Figure 4, Chapter 3.2](#)).

Climate-related insurance compensation: Parrinello, Varaschin, and Zucman (2025) estimate that a 2% minimum effective tax rate on the wealth of individuals in Spain with net wealth above €100 million could raise approximately €5.2 billion annually. At the same time, the Spanish Consorcio de Compensación de Seguros estimates that total insurance compensation costs associated with the October 2024 DANA floods will amount to around €4.8 billion (Seguros News, 2025). Potential annual revenue from the proposed 2% minimum effective tax rate on net wealth above €100 million would therefore be sufficient to cover the estimated total insurance compensation costs linked to a major climate-related disaster in Spain.

¹⁰ DANA is the Spanish acronym for 'Depresión Aislada en Niveles Altos'. It refers to a meteorological phenomenon in which a pocket of cold air becomes detached from the main atmospheric circulation at high altitude, creating highly unstable weather conditions. In Spain, this phenomenon can cause heavy rainfall and flooding under certain conditions, especially along the Mediterranean coast (AEMET, n.d.). The October 2024 DANA event was one of the most severe weather events in Spain in recent decades, causing widespread flooding, particularly in the Valencia region (AEMET, 2025).

CLIMATE DEBT OF EXTREME WEALTH – HUNGARY

HUNGARY AT A GLANCE

- Hungary's wealthiest 1% are associated with an estimated ownership-based climate debt of around €5.5 billion in 2022¹¹ – while the country's average annual climate-related economic losses over a 30-year period amounted to approximately €0.26 billion¹².
- Climate debt rises sharply with increasing wealth: the estimated per capita climate debt for the top 1% wealth group is approximately €56,600, almost eight times as high as for the top 10% wealth group.
- The emissions underlying the ownership-based climate debt estimates became drastically more concentrated at the top of the wealth distribution between 2010 and 2022, with the share of the top 1% increasing from 46% to 63%, while that of the middle 40% fell from 17% to 7%. In absolute terms, the per capita emissions of the wealthiest 1% were around 6,200 times as high as for the bottom 50% in 2022.

DEVELOPMENTS IN EMISSION INEQUALITY

Hungary exhibits a highly unequal distribution of per capita emissions under both the consumption-based and ownership-based approaches. However, **per capita emissions associated with the ownership of productive assets rise much more sharply towards the top of the distribution.** Figure 1 and Table 1 show that estimated per capita ownership-based emissions rise disproportionately, with average emissions for the top 1% around 6.8 times as high as for the top 10%, around 350 times as high as for the middle 40%, and around 6,200 times as high as for the bottom 50%.

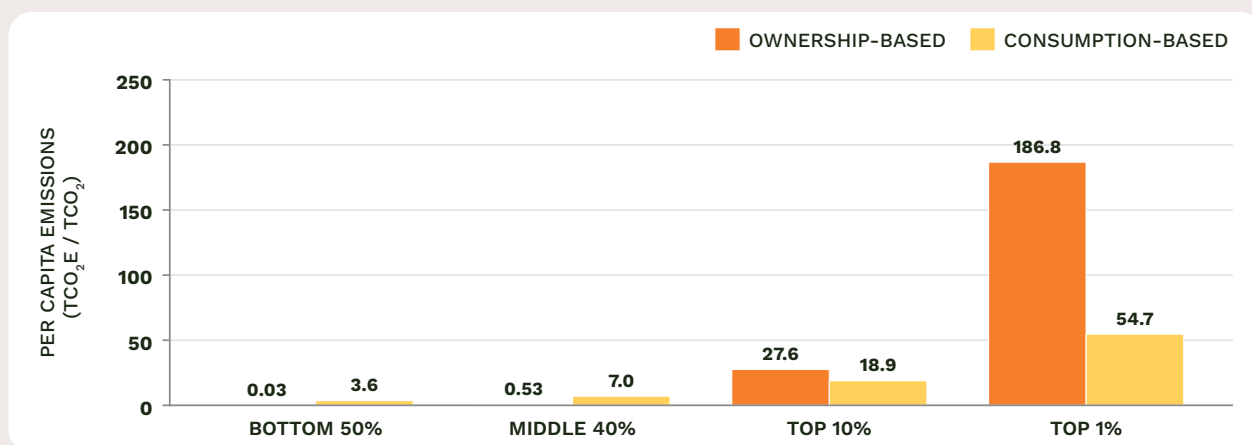
Between 2010 and 2022, the distribution of ownership-based emissions in Hungary became substantially more concentrated at the very top of the wealth distribution (Table 1).

While per capita ownership-based emissions declined across all wealth groups, they declined at markedly different rates. The bottom 50% experienced the largest relative decrease, with emissions falling by almost three-quarters, whereas the top 1% saw a decline of only 2%. As a result, ownership-based emissions became even more concentrated at the very top between 2010 and 2022, with the share of the top 1% increasing from 46% to 63%, while that of the middle 40% fell from 17% to 7%.

¹¹ See [Chapter 2 \(The Concept of Climate Debt\)](#) for an explanation of the concept of climate debt and [Chapter 3 \(Climate Debt Estimates\)](#) for the underlying methodology.

¹² The per capita climate-related economic loss figure (€27.3 per capita in 2022) is taken from the European Environment Agency (2025) and has been multiplied by Hungary's 2022 population (approximately 9.7 million) provided by the World Inequality Database (WID.world, 2025), resulting in approximately €0.26 billion. Due to interannual variability, the EEA figure is based on a 30-year moving average and should therefore not be interpreted as the actual economic losses incurred in 2022. Annual climate-related economic losses have fluctuated considerably in recent years. From 2018 to 2021, annual losses ranged between €8 million and €34 million, but the figure rose sharply to €2.43 billion in 2022 before declining to €30 million in 2023 (European Commission, 2025). The 30-year moving average therefore smooths these interannual fluctuations while retaining the country-specific information on climate-related economic losses.

Figure 1: Estimated per capita emissions for wealth groups (tCO₂e) under the ownership-based approach and income groups (tCO₂) under the consumption-based approach in Hungary, 2022



Source: Ghosh et al. (2021) and Rehm and Chancel (2026)

Table 1: Ownership-based per capita emissions, changes, and emission shares in Hungary, 2010 and 2022

Wealth Groups	Per capita emissions (tCO ₂ e)		Change (%)	Emission share (%)	
	2010	2022		2010	2022
Bottom 50%	0.11	0.03	-73	1	0
Middle 40%	1.74	0.53	-70	17	7
Top 10%	34.15	27.57	-19	82	92
Top 1%	190.74	186.75	-2	46	63
Total	4.17	2.98	-29	100	100

Source: Rehm and Chancel (2026); own calculations for the percentage changes

Note: The 1% is a subset of the top 10%; the four wealth-group rows therefore do not represent mutually exclusive groups and cannot be summed to obtain the total population.

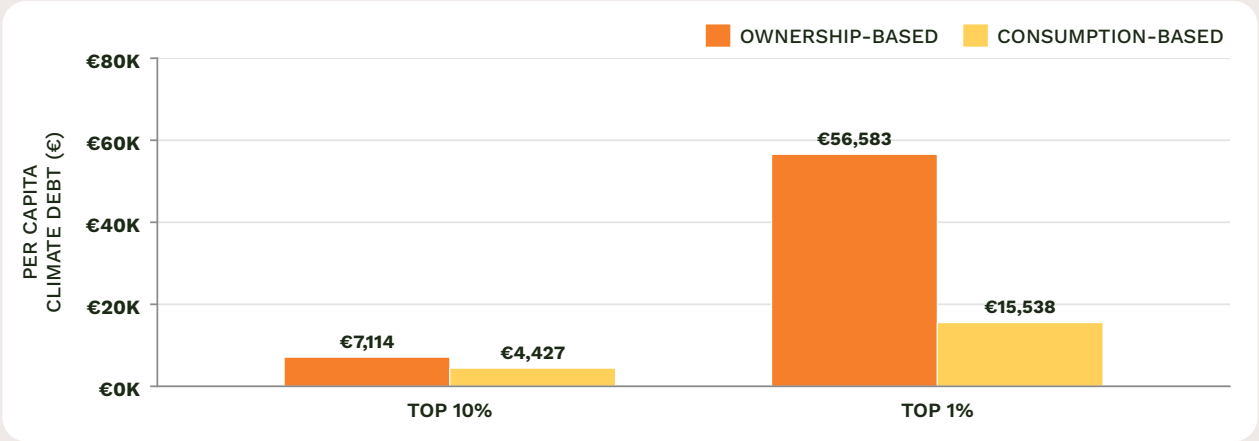
CLIMATE DEBT

Reflecting the pattern observed in the emissions data, per capita climate debt estimates increase sharply towards the top of the income and wealth distributions (Figure 2), with a particularly steep increase under the ownership-based approach.

The difference between the top 10% (approximately 968,000 individuals) and the top 1% (approximately 97,000 individuals) is substantial: per capita climate debt for the top 1% is almost eight times as high as for the top 10% wealth group under the ownership-based approach, whereas it is around 3.5 times as high as for the top 10% income group under the consumption-based approach.

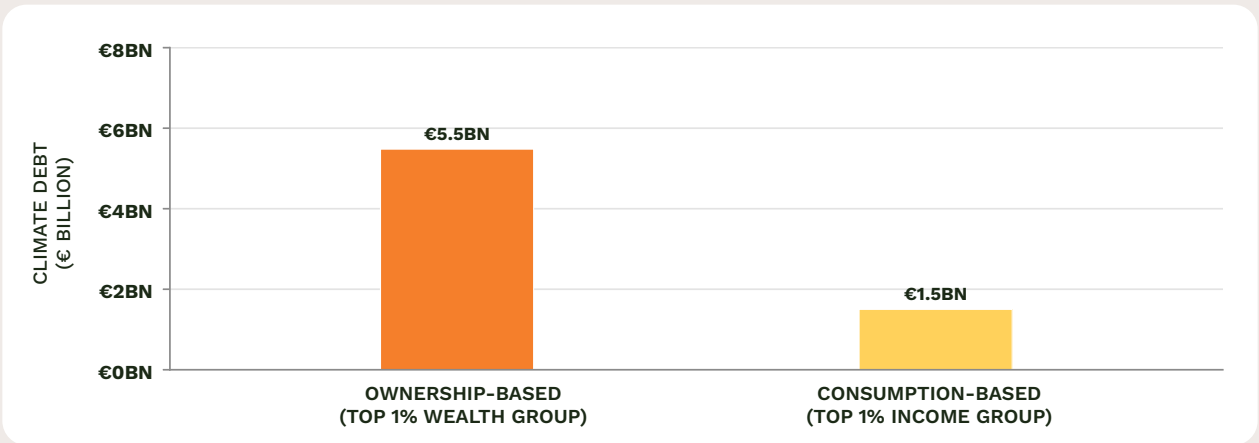
Per capita estimates reveal disparities in climate responsibility across income and wealth groups, while aggregate estimates (Figure 3) illustrate the scale of climate responsibility concentrated at the top of the distribution. In 2022, the estimated climate debt associated with the top 1% wealth group reached approximately €5.5 billion under the ownership-based approach, whereas the corresponding estimate for the top 1% income group amounted to approximately €1.5 billion under the consumption-based approach.

Figure 2: Estimated per capita climate debt for the top 10% and top 1% wealth groups under the ownership-based approach and the corresponding income groups under the consumption-based approach in Hungary, 2022 (€)



Source: Own calculations based on Ghosh et al. (2021) and Rehm and Chancel (2026)

Figure 3: Estimated aggregate climate debt for the top 1% wealth group under the ownership-based approach and the corresponding top 1% income group under the consumption-based approach in Hungary, 2022 (€ billion)



Source: Own calculations based on Ghosh et al. (2021) and Rehm and Chancel (2026)

Note: The group population figures stated in the text are rounded, whereas the aggregate climate debt estimates shown here are based on exact WID population data.

The strong concentration of climate debt estimates associated with the ownership of productive assets highlights an important dimension of climate responsibility linked to the investment patterns of the wealthiest 1%, which may not be fully captured through a consumption lens. **In Hungary, the very strong concentration of ownership-based climate debt at the very top of the wealth distribution, together with the substantial increase in the concentration of the underlying ownership-based emissions between 2010 and 2022, highlights the role that capital owners can play in decarbonisation efforts and supports the need for progressive fiscal instruments (e.g. wealth taxes potentially differentiating between low-carbon and high-carbon assets) to help finance a just transition.**

CONTEXTUALISING CLIMATE DEBT

To place Hungary's results in a wider context, the country's aggregate climate debt estimates for the top 1% wealth group are compared with corresponding estimates in other EU Member States. The analysis also considers the extent to which estimated revenue from a proposed wealth tax could cover Hungary's climate-related economic losses.

Comparison with other EU Member States: Hungary ranks 14th among the 24 EU Member States covered in the report for aggregate ownership-based climate debt of the top 1% wealth group, with an estimated €5.5 billion in 2022 (see Figure 2, Chapter 3.2). The estimated per capita ownership-based climate debt of Hungary's top 1% wealth group was approximately €56,600, placing Hungary 16th among the 24 covered Member

States (see Figure 4, Chapter 3.2).

Climate-related economic losses: Parrinello, Varaschin, and Zucman (2025) estimate that a 2% minimum effective tax rate on the wealth of individuals in Hungary with net wealth above €100 million could raise approximately €200 million annually. Meanwhile, the European Environment Agency (2025) reports a 30-year moving average of climate-related economic losses of €27.3 per capita for Hungary in 2022¹³ – multiplied by Hungary's population, this corresponds to approximately €0.26 billion. Potential annual revenue from the proposed 2% minimum effective tax rate on net wealth above €100 million would therefore cover around 76% of this estimated annual loss figure.

CLIMATE DEBT OF EXTREME WEALTH – FRANCE

FRANCE AT A GLANCE

- France's wealthiest 1% are associated with an estimated ownership-based climate debt of around €52 billion in 2022¹⁴ – while France's climate-related economic losses amounted to around €4.3 billion¹⁵ in the same year.
- Climate debt rises with increasing wealth: the estimated per capita climate debt for the top 1% wealth group is approximately €76,000, around 5.7 times as high as for the top 10% wealth group.
- The emissions underlying the ownership-based climate debt estimates became slightly more concentrated at the top of the wealth distribution between 2010 and 2022, with the share of the top 1% increasing from 42% to 45% between 2010 and 2022. In absolute terms, the per capita emissions of the wealthiest 1% were around 1,900 times as high as for the bottom 50% in 2022.

¹³ See [footnote 12](#).

¹⁴ See [Chapter 2 \(The Concept of Climate Debt\)](#) for an explanation of the concept of climate debt and [Chapter 3 \(Climate Debt Estimates\)](#) for the underlying methodology.

¹⁵ The per capita climate-related economic loss figure (€62.8 per capita in 2022) is taken from the European Environment Agency (2025) and has been multiplied by France's 2022 population (approximately 68.5 million) provided by the World Inequality Database (WID.world, 2025), resulting in approximately €4.3 billion. Due to interannual variability, the EEA figure is based on a 30-year moving average and should therefore not be interpreted as the actual economic losses incurred in 2022. Annual climate-related economic losses have fluctuated considerably in recent years. From 2018 to 2021, annual losses varied between €3.4 billion and €6.1 billion, but the figure rose to €8.8 billion in 2022 before declining to €3.1 billion in 2023 (European Commission, 2025). The 30-year moving average therefore smooths these interannual fluctuations while retaining the country-specific information on climate-related economic losses.

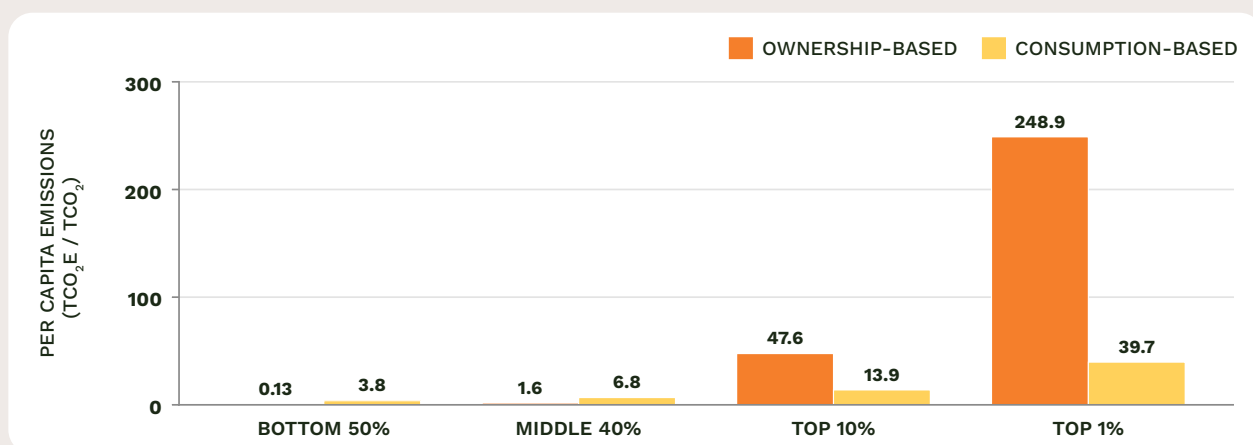
DEVELOPMENTS IN EMISSION INEQUALITY

Per capita emissions in France are distributed markedly unevenly under both the consumption-based and ownership-based approaches. However, **per capita emissions associated with the ownership of productive assets rise considerably more sharply towards the top of the distribution.** Figure 1 and Table 1 show that estimated per capita ownership-based emissions rise disproportionately, with average emissions for the top 1% around 5.2 times as high as for the top 10%, around 153 times as high as for the middle 40%, and around 1,900 times as high as for the bottom 50%.

Over the period examined, the distribution of ownership-based emissions in France

became more concentrated at the top of the wealth distribution (Table 1). While per capita ownership-based emissions declined across all wealth groups, they declined at different rates. The middle 40% experienced the largest relative decrease, with emissions falling by 18%, whereas the top 1% saw a decline of only 9%. As a result, ownership-based emissions became slightly more concentrated at the top between 2010 and 2022, with the share of the top 1% increasing from 42% to 45%, while the shares of the bottom 50%, middle 40%, and top 10% remained stable at the rounded values shown in Table 1.

Figure 1: Estimated per capita emissions for wealth groups (tCO₂e) under the ownership-based approach and income groups (tCO₂) under the consumption-based approach in France, 2022



Source: Ghosh et al. (2021) and Rehm and Chancel (2026)

Table 1: Ownership-based per capita emissions, changes, and emission shares in France, 2010 and 2022

Wealth Groups	Per capita emissions (tCO ₂ e)		Change (%)	Emission share (%)	
	2010	2022		2010	2022
Bottom 50%	0.14	0.13	−7	1	1
Middle 40%	1.99	1.63	−18	12	12
Top 10%	55.53	47.61	−14	87	87
Top 1%	272.51	248.89	−9	42	45
Total	6.42	5.48	−15	100	100

Source: Rehm and Chancel (2026); own calculations for the percentage changes

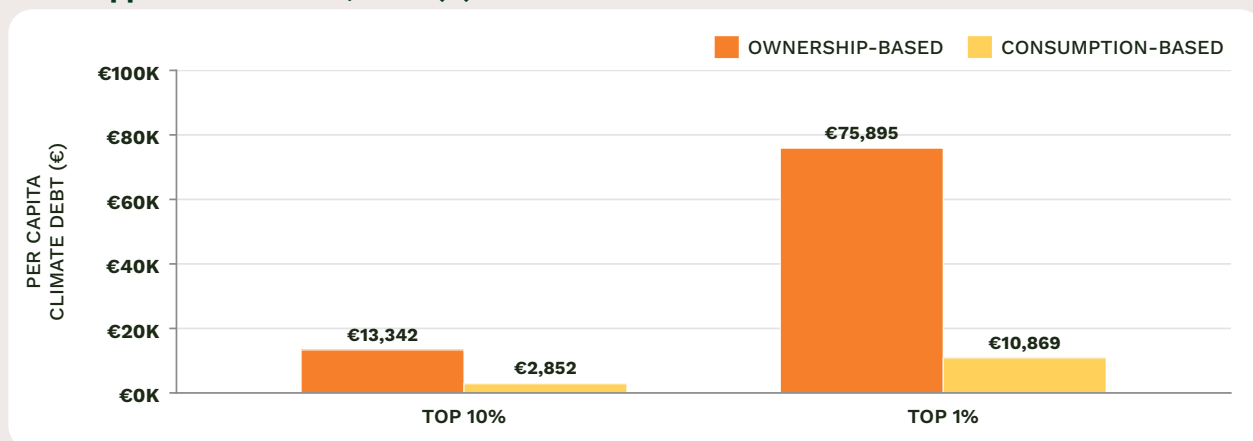
Note: The top 1% is a subset of the top 10%; the four wealth-group rows therefore do not represent mutually exclusive groups and cannot be summed to obtain the total population.

CLIMATE DEBT

Following a similar pattern to per capita emissions, per capita climate debt estimates increase sharply towards the top of the income and wealth distributions (Figure 2), with a steeper increase under the ownership-based approach. The difference between the top 10% (approximately 6.8 million individuals) and the top 1% (around 685,000 individuals) is substantial: per capita climate debt for the top 1% is around 5.7 times as high as for the top 10% wealth group under the ownership-based approach and almost four times as high as for the top 10% income group under the consumption-based approach.

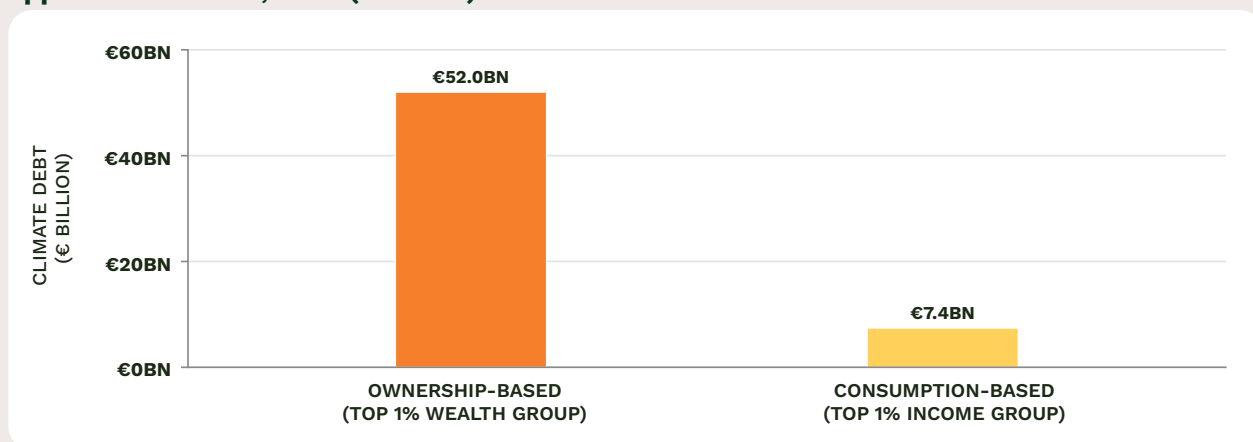
Per capita estimates show how climate responsibility differs across income and wealth groups; aggregate estimates (Figure 3), in turn, indicate the scale of climate responsibility associated with the top of the distribution. In 2022, the estimated climate debt associated with the top 1% wealth group reached approximately €52 billion under the ownership-based approach, whereas the corresponding estimate for the top 1% income group amounted to approximately €7.4 billion under the consumption-based approach.

Figure 2: Estimated per capita climate debt for the top 10% and top 1% wealth groups under the ownership-based approach and the corresponding income groups under the consumption-based approach in France, 2022 (€)



Source: Own calculations based on Ghosh et al. (2021) and Rehm and Chancel (2026)

Figure 3: Estimated aggregate climate debt for the top 1% wealth group under the ownership-based approach and the corresponding top 1% income group under the consumption-based approach in France, 2022 (€ billion)



Source: Own calculations based on Ghosh et al. (2021) and Rehm and Chancel (2026)

Note: The group population figures stated in the text are rounded, whereas the aggregate climate debt estimates shown here are based on exact WID population data.

These findings suggest that a narrow focus on consumption when designing fiscal instruments (e.g. carbon taxes) may overlook an important dimension of climate responsibility associated with the ownership of companies, assets, and investment decisions of the wealthiest 1%. **In France, the pronounced concentration of ownership-based climate debt at the top of the wealth distribution, together with the increase in the concentration of the underlying ownership-based emissions between 2010 and 2022, underscores the contribution that capital owners could make to the low-carbon transition and the importance of progressive fiscal instruments** (e.g. wealth taxes that could differentiate between low-carbon and high-carbon assets) **in financing a just transition.**

CONTEXTUALISING CLIMATE DEBT

To provide a broader perspective, France's aggregate climate debt estimates for the top 1% wealth group are compared with corresponding estimates in other EU Member States. The analysis also examines how far **estimated revenue from a proposed wealth tax** could go towards covering climate-related economic losses in France.

Comparison with other EU Member States:

France ranks second among the 24 EU Member States covered in the report for aggregate ownership-based climate debt of the top 1% wealth group, with an estimated €52 billion in 2022, after Germany ([see Figure 2, Chapter 3.2](#)). The estimated per capita ownership-based climate debt of France's top 1% wealth group was approximately €76,000, placing France in the upper half of the 24 covered Member States ([see Figure 4, Chapter 3.2](#)).

Climate-related economic losses: According to Parrinello, Varaschin, and Zucman (2025), a 2% minimum effective tax rate on the wealth of individuals in France with net wealth above €100 million could raise approximately €19.4 billion annually. At the same time, the European Environment Agency (2025) reports a 30-year moving average of climate-related economic losses of €62.8 per capita for France in 2022¹⁶ – multiplied by France's population, this corresponds to approximately €4.3 billion. Potential annual revenue from the proposed 2% minimum effective tax rate on net wealth above €100 million would therefore be sufficient to cover this estimated annual loss figure around 4.5 times over.

¹⁶ See [footnote 15](#).

CLIMATE DEBT OF EXTREME WEALTH – BELGIUM

BELGIUM AT A GLANCE

- Belgium's wealthiest 1% are associated with an estimated ownership-based climate debt of around €7 billion in 2022¹⁷ – while Belgium's climate-related economic losses amounted to around €1.4 billion¹⁸ in the same year.
- Climate debt rises with increasing wealth: the estimated per capita climate debt for the top 1% wealth group is approximately €60,200, around 4.1 times as high as for the top 10% wealth group.
- The emissions underlying the ownership-based climate debt estimates became less concentrated at the top of the wealth distribution between 2010 and 2022, with the share of the top 1% decreasing from 30% to 27%, while the bottom 50% accounted for only 3% of ownership-based emissions in 2022. In absolute terms, the per capita emissions of the wealthiest 1% were around 450 times as high as for the bottom 50% in 2022.

DEVELOPMENTS IN EMISSION INEQUALITY

Per capita emissions in Belgium are distributed notably unevenly under both the consumption-based and ownership-based approaches, with inequality more pronounced under the ownership-based approach. Figure 1 and Table 1 show that estimated per capita ownership-based emissions rise disproportionately, with average emissions for the top 1% around 3.8 times as high as for the top 10%, around 40 times as high as for the middle 40%, and around 450 times as high as for the bottom 50%.

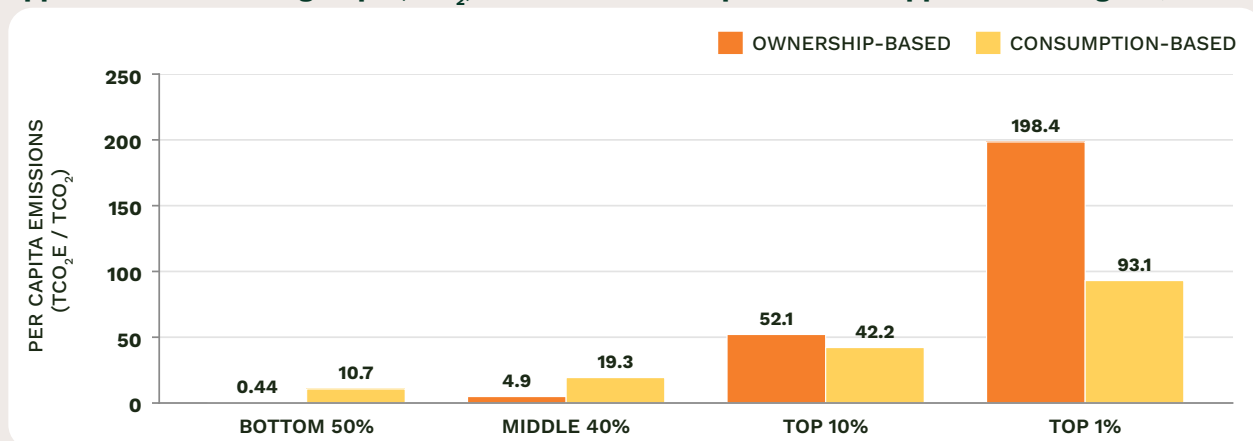
The data for Belgium show a slight decrease in the concentration of ownership-based emissions at the top of the wealth distribution between 2010 and 2022 (Table 1). In contrast to France, Hungary,

and Spain, where the emission share of the top 1% wealth group increased, the corresponding share in Belgium decreased from 30% in 2010 to 27% in 2022. While this decrease in concentration is a positive development, the top 1% (approximately 116,000 individuals) still accounted for the same share of ownership-based emissions as the middle 40% (approximately 4.7 million individuals). This highlights the remaining emission inequality across wealth groups, despite a reduction in the concentration of emissions at the very top of the wealth distribution.

¹⁷ See [Chapter 2 \(The Concept of Climate Debt\)](#) for an explanation of the concept of climate debt and [Chapter 3 \(Climate Debt Estimates\)](#) for the underlying methodology.

¹⁸ The per capita climate-related economic loss figure (€119.5 per capita in 2022) is taken from the European Environment Agency (2025) and has been multiplied by Belgium's 2022 population (approximately 11.6 million) provided by the World Inequality Database (WID.world, 2025), resulting in approximately €1.4 billion. Due to interannual variability, the EEA figure is based on a 30-year moving average and should therefore not be interpreted as the actual economic losses incurred in 2022. Annual climate-related economic losses have fluctuated considerably in recent years. From 2018 to 2021, annual losses varied between €212 million and €11.1 billion, but the figure fell to €840 million in 2022 and further to €99 million in 2023 (European Commission, 2025). The 30-year moving average therefore smooths these interannual fluctuations while retaining the country-specific information on climate-related economic losses.

Figure 1: Estimated per capita emissions for wealth groups (tCO₂e) under the ownership-based approach and income groups (tCO₂) under the consumption-based approach in Belgium, 2022



Source: Ghosh et al. (2021) and Rehm and Chancel (2026)

Table 1: Ownership-based per capita emissions, changes, and emission shares in Belgium, 2010 and 2022

Wealth Groups	Per capita emissions (tCO ₂ e)		Change (%)	Emission share (%)	
	2010	2022		2010	2022
Bottom 50%	0.74	0.44	-41	4	3
Middle 40%	6.29	4.91	-22	26	27
Top 10%	66.54	52.08	-22	70	70
Top 1%	285.50	198.43	-30	30	27
Total	9.54	7.39	-23	100	100

Source: Rehm and Chancel (2026); own calculations for the percentage changes

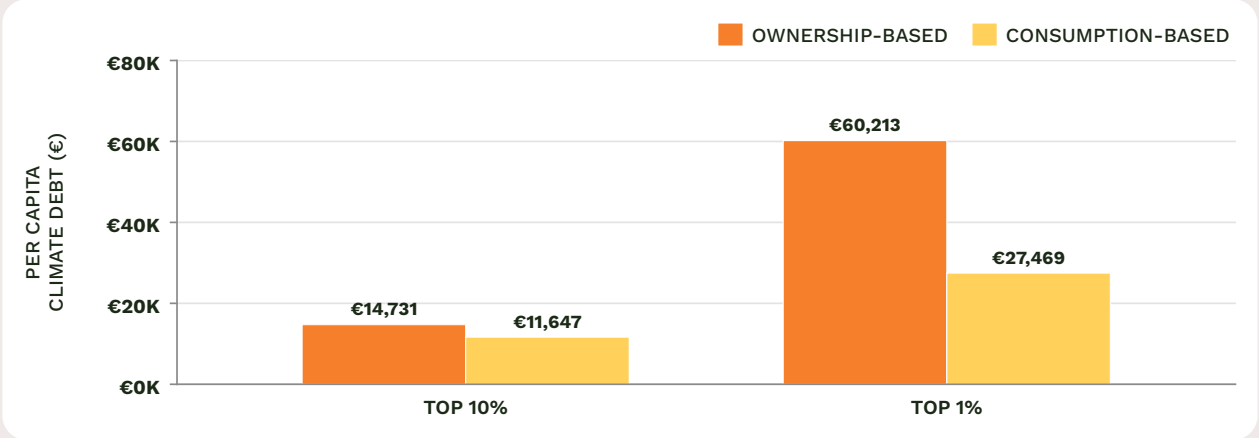
Note: The top 1% is a subset of the top 10%; the four wealth-group rows therefore do not represent mutually exclusive groups and cannot be summed to obtain the total population.

CLIMATE DEBT

As with per capita emissions, per capita climate debt estimates increase markedly towards the top of the income and wealth distributions (Figure 2), with a steeper increase under the ownership-based approach. However, the gap between the top 10% (approximately 1.2 million individuals) and top 1% (approximately 116,000 individuals) wealth groups is a bit less pronounced in Belgium than in the other country cases, with per capita climate debt for the top 1% around 4.1 times as high as for the top 10%. Under the consumption-based approach, the corresponding gap is smaller, at around 2.4 times.

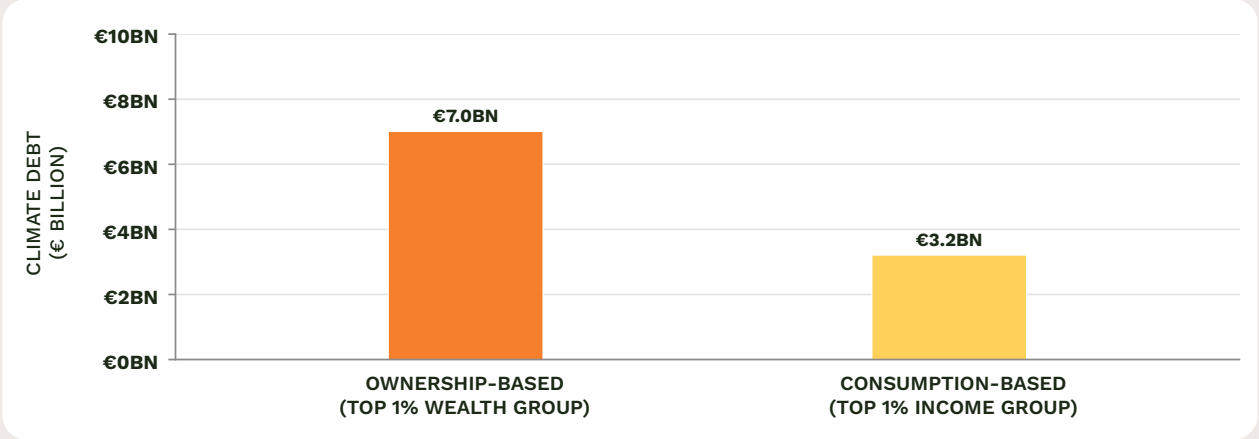
Whereas per capita estimates highlight differences in climate responsibility across income and wealth groups, aggregate estimates (Figure 3) illustrate the scale of climate responsibility associated with the top of the distribution. In 2022, the estimated climate debt associated with the top 1% wealth group reached approximately €7 billion under the ownership-based approach, whereas the corresponding estimate for the top 1% income group amounted to approximately €3.2 billion under the consumption-based approach.

Figure 2: Estimated per capita climate debt for the top 10% and top 1% wealth groups under the ownership-based approach and the corresponding income groups under the consumption-based approach in Belgium 2022 (€)



Source: Own calculations based on Ghosh et al. (2021) and Rehm and Chancel (2026)

Figure 3: Estimated aggregate climate debt for the top 1% wealth group under the ownership-based approach and the corresponding top 1% income group under the consumption-based approach in Belgium, 2022 (€ billion)



Source: Own calculations based on Ghosh et al. (2021) and Rehm and Chancel (2026)

Note: The group population figures stated in the text are rounded, whereas the aggregate climate debt estimates shown here are based on exact WID population data.

While ownership-based emissions became less concentrated at the top of the wealth distribution in Belgium between 2010 and 2022, the gap in per capita climate debt between the top 1% and the top 10% is still considerable and was larger under the ownership-based approach than under the consumption-based approach in 2022. This highlights the role that capital owners can play in supporting the low-carbon transition and points to the relevance of progressive fiscal instruments (e.g. wealth taxes potentially differentiating between low-carbon and high-carbon assets) to help finance a just transition.

CONTEXTUALISING CLIMATE DEBT

To show how Belgium compares to other EU Member States, the country’s aggregate climate debt estimates for the top 1% wealth group are examined alongside those of the other countries covered. The analysis also

considers how much of Belgium’s climate-related economic losses could be covered by estimated revenue from a proposed wealth tax.

Comparison with other EU Member States:

With an estimated aggregate ownership-based climate debt of approximately €7 billion in 2022, Belgium ranks eighth among the 24 EU Member States covered in the report ([see Figure 2, Chapter 3.2](#)). By contrast, the estimated per capita ownership-based climate debt of Belgium's top 1% wealth group was approximately €60,200, placing Belgium 15th among the 24 covered Member States ([see Figure 4, Chapter 3.2](#)).

Climate-related economic losses: Parrinello, Varaschin, and Zucman (2025) estimate that a 2% minimum effective tax rate on

the wealth of individuals in Belgium with net wealth above €100 million could raise approximately €1 billion annually. At the same time, the European Environment Agency (2025) reports a 30-year moving average of climate-related economic losses of €119.5 per capita for Belgium in 2022¹⁹ – equivalent to approximately €1.4 billion when multiplied by Belgium's population. Potential annual revenue from the proposed 2% minimum effective tax rate on net wealth above €100 million would therefore cover almost 72% of this estimated annual loss figure.

CLIMATE DEBT OF EXTREME WEALTH – ITALY

ITALY AT A GLANCE

- Italy's wealthiest 1% are associated with an estimated ownership-based climate debt of around €27 billion in 2022²⁰ – while Italy's climate-related economic losses amounted to around €5.4 billion²¹ in the same year.
- Climate debt rises with increasing wealth: the estimated per capita climate debt for the top 1% wealth group is approximately €45,400, around six times as high as for the top 10% wealth group.
- The top 1% wealth group's share of ownership-based emissions remained stable at 27% between 2010 and 2022, while the share of the bottom 50% fell from 11% to 8% over the same period. In absolute terms, the per capita emissions of the wealthiest 1% were around 160 times as high as for the bottom 50% in 2022.

DEVELOPMENTS IN EMISSION INEQUALITY

Per capita emissions in Italy are distributed unevenly across income and wealth groups under both the consumption-based and ownership-based approaches, with **per**

capita emissions rising more sharply towards the top under the ownership-based approach. Figure 1 and Table 1 show that estimated per capita ownership-based

¹⁹ See [footnote 18](#).

²⁰ See [Chapter 2 \(The Concept of Climate Debt\)](#) for an explanation of the concept of climate debt and [Chapter 3 \(Climate Debt Estimates\)](#) for the underlying methodology.

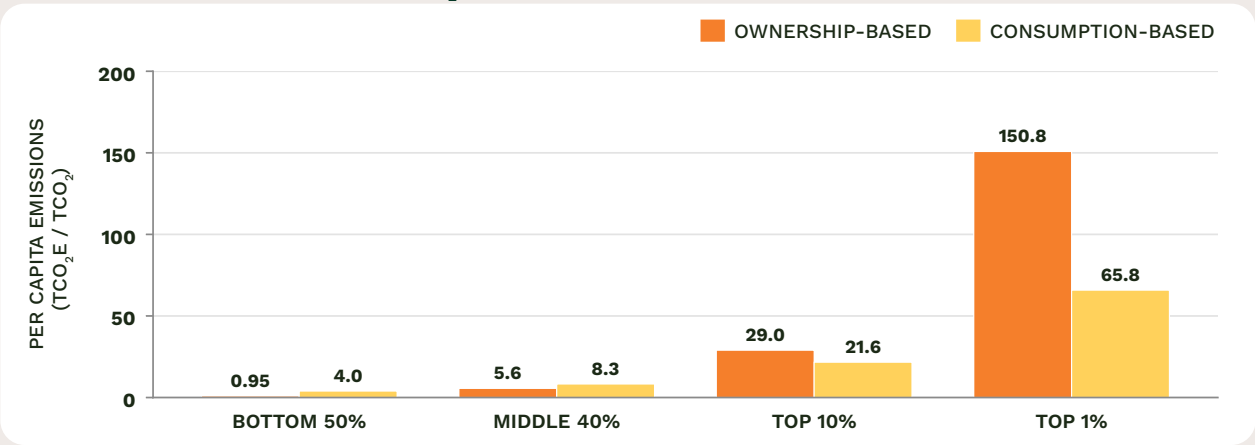
²¹ The per capita climate-related economic loss figure (€89.9 per capita in 2022) is taken from the European Environment Agency (2025) and has been multiplied by Italy's 2022 population (approximately 59.6 million) provided by the World Inequality Database (WID.world, 2025), resulting in approximately €5.4 billion. Due to interannual variability, the EEA figure is based on a 30-year moving average and should therefore not be interpreted as the actual economic losses incurred in 2022. Annual climate-related economic losses have fluctuated considerably in recent years. From 2018 to 2021, annual losses varied between €5.7 billion and €686 million, but the figure rose to €17.6 billion in 2022 before declining to €15.7 billion in 2023 (European Commission, 2025). The 30-year moving average therefore smooths these interannual fluctuations while retaining the country-specific information on climate-related economic losses.

emissions for the top 1% wealth group were around 5.2 times as high as those for the top 10%, around 27 times as high as those for the middle 40%, and around 160 times as high as those for the bottom 50%.

In Italy, the emission share of the top 10% decreased between 2010 and 2022, while that of the top 1% wealth group remained stable at 27% (Table 1). Per capita ownership-based emissions declined across all wealth groups except for the middle 40%, potentially indicating a rise in prosperity within that

group. The bottom 50% experienced the largest relative decrease, with emissions falling by almost 30%, whereas the top 1% saw a decline of 11%. As a result, the share of ownership-based emissions attributed to the top 1% wealth group remained at 27% between 2010 and 2022, while that of the bottom 50% fell from 11% to 8%.

Figure 1: Estimated per capita emissions for wealth groups (tCO₂e) under the ownership-based approach and income groups (tCO₂) under the consumption-based approach in Italy, 2022



Source: Ghosh et al. (2021) and Rehm and Chancel (2026)

Table 1: Ownership-based per capita emissions, changes, and emission shares in Italy, 2010 and 2022

Wealth Groups	Per capita emissions (tCO ₂ e)		Change (%)	Emission share (%)	
	2010	2022		2010	2022
Bottom 50%	1.33	0.95	−29	11	8
Middle 40%	5.40	5.60	+4	34	40
Top 10%	34.86	28.99	−17	55	52
Top 1%	170.00	150.82	−11	27	27
Total	6.31	5.62	−11	100	100

Source: Rehm and Chancel (2026); own calculations for the percentage changes

Note: The top 1% is a subset of the top 10%; the four wealth-group rows therefore do not represent mutually exclusive groups and cannot be summed to obtain the total population.

CLIMATE DEBT

As with the underlying emissions, per capita climate debt estimates increase sharply towards the top of the income and wealth distributions (Figure 2), with a steeper increase under the ownership-based

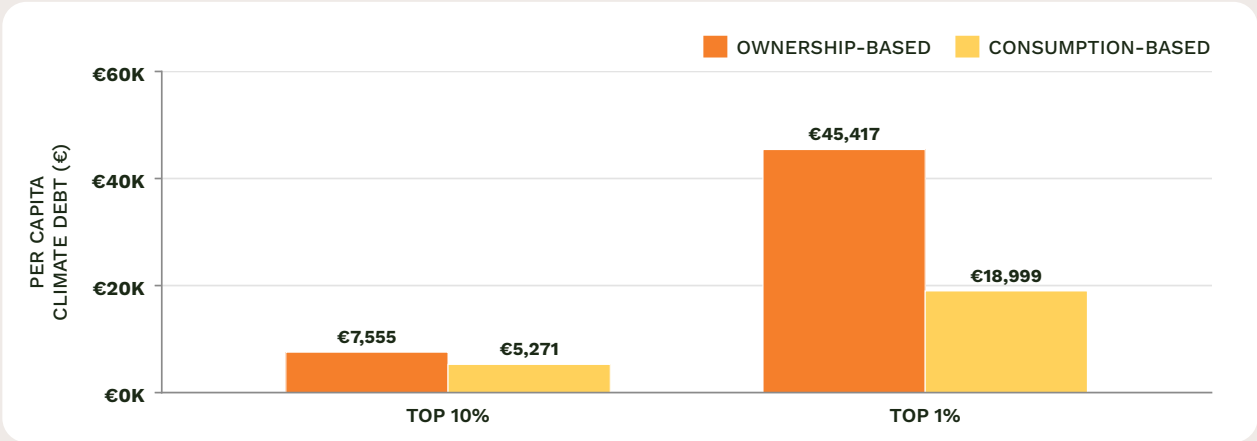
approach. The gap between the top 10% (approximately 6 million individuals) and the top 1% (approximately 596,000 individuals) is substantial in Italy: under the ownership-based approach, per capita climate debt for

the top 1% wealth group is around six times as high as for the top 10%, whereas the corresponding gap between income groups under the consumption-based approach is around 3.6 times.

Per capita estimates highlight differences in climate responsibility across income and wealth groups; aggregate estimates (Figure 3), in turn, illustrate the scale of climate responsibility associated with the top of the

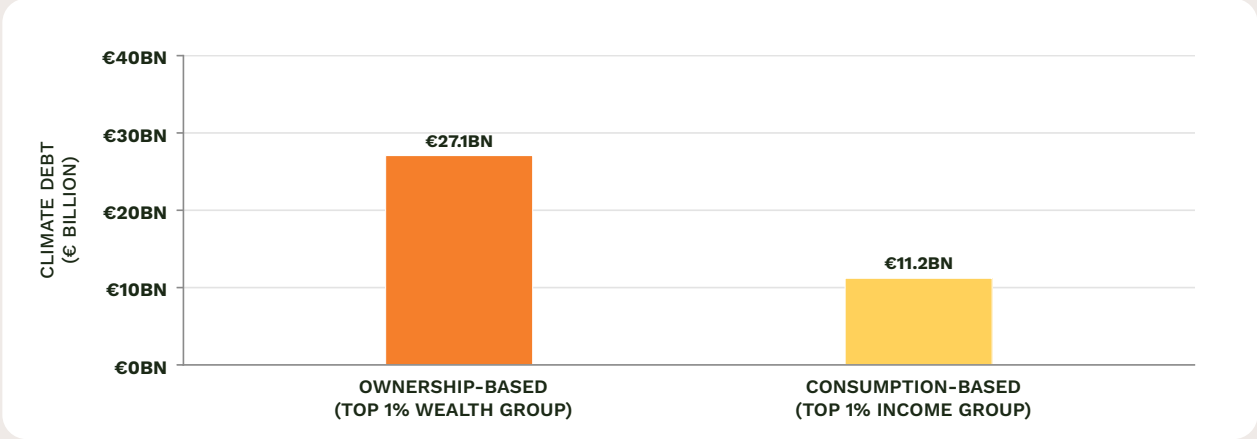
distribution. In 2022, the estimated climate debt associated with the top 1% wealth group reached approximately €27.1 billion under the ownership-based approach, whereas the corresponding estimate for the top 1% income group amounted to approximately €11.2 billion under the consumption-based approach.

Figure 2: Estimated per capita climate debt for the top 10% and top 1% wealth groups under the ownership-based approach and the corresponding income groups under the consumption-based approach in Italy, 2022 (€)



Source: Own calculations based on Ghosh et al. (2021) and Rehm and Chancel (2026)

Figure 3: Estimated aggregate climate debt for the top 1% wealth group under the ownership-based approach and the corresponding top 1% income group under the consumption-based approach in Italy, 2022 (€ billion)



Source: Own calculations based on Ghosh et al. (2021) and Rehm and Chancel (2026)

Note: The group population figures stated in the text are rounded, whereas the aggregate climate debt estimates shown here are based on exact WID population data.

The substantial ownership-based climate debt associated with Italy's top 1% wealth group highlights the importance of broadening the policy focus beyond consumer-focused measures (e.g. carbon taxes) to include owners of productive capital. **Although the share of ownership-based emissions attributed to Italy's top 1% wealth group remained stable at 27% between 2010 and 2022, its members still have considerable scope to influence emissions through their investment decisions and the financial capacity to contribute to climate investments.** Against this background, **progressive fiscal instruments**, including wealth taxes potentially differentiating between low-carbon and high-carbon assets, **could help finance a just transition.**

CONTEXTUALISING CLIMATE DEBT

To place Italy's climate debt estimates in a broader EU context, the aggregate figures for the top 1% wealth group are compared with corresponding estimates in other EU Member States. The focus then shifts to the extent to which **estimated revenue from a proposed wealth tax** could cover climate-related economic losses in Italy.

Comparison with other EU Member States: In terms of aggregate ownership-based climate debt estimates for the top 1% wealth group, Italy ranked third among the 24 Member States covered in the report, after Germany and France, with approximately €27.1 billion in 2022 ([see Figure 2, Chapter 3.2](#)). By contrast, Italy was among the five countries with the lowest estimated per capita ownership-based climate debt for the top 1% wealth group, at approximately €45,400 in 2022 ([see Figure 4, Chapter 3.2](#)).

Climate-related economic losses: Parrinello, Varaschin, and Zucman (2025) estimate that a 2% minimum effective tax rate on the wealth of individuals in Italy with net wealth above €100 million could raise approximately €8.3 billion annually. According to the European Environment Agency (2025), the 30-year moving average of climate-related economic losses in Italy was €89.9 per capita in 2022²². Multiplying this per capita figure by Italy's population gives an estimated €5.4 billion in annual climate-related economic losses. Potential annual revenue from the proposed 2% minimum effective tax rate on net wealth above €100 million would therefore be sufficient to cover this estimated annual loss figure around 1.5 times over.

²² See [footnote 21](#).

BIBLIOGRAPHY – PART II

Agencia Estatal de Meteorología (AEMET) (n.d.): Borrascas y danas con gran impacto:

Información divulgativa y de otras temporadas. Available at: <https://www.aemet.es/es/web/conocermas/borrascas> (accessed 12 October 2026).

Agencia Estatal de Meteorología (AEMET) (2025): 2024, un año marcado en España por las altas temperaturas y la riada de octubre en Valencia. Available at: https://www.aemet.es/es/noticias/2025/05/iac_2024 (accessed 12 October 2026).

European Commission (2025): 2025 Country Report – Belgium. Recommendation for a Council Recommendation on the economic, social, employment, structural and budgetary policies of Belgium. Commission Staff Working Document SWD(2025) 201 final. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52025SC0201> (accessed 7 October 2026).

European Commission (2025): 2025 Country Report – France. Recommendation for a Council Recommendation on the economic, social, employment, structural and budgetary policies of France. Commission Staff Working Document SWD(2025) 210 final. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52025SC0210> (accessed 7 October 2026).

European Commission (2025): 2025 Country Report – Hungary. Recommendation for a Council Recommendation on the economic, social, employment, structural and budgetary policies of Hungary. Commission Staff Working Document SWD(2025) 217 final. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52025SC0217> (accessed 7 October 2026).

European Commission (2025): 2025 Country Report – Italy. Recommendation for a Council Recommendation on the economic, social, employment, structural and budgetary policies of Italy. Commission Staff Working Document SWD(2025) 212 final. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52025SC0212> (accessed 7 October 2026).

European Commission (2025): 2025 Country Report – Spain. Recommendation for a Council Recommendation on the economic, social, employment, structural and budgetary policies of Spain. Commission Staff Working Document SWD(2025) 209 final. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52025SC0209> (accessed 7 October 2026).

European Environment Agency (2025): Belgium. Climate-related economic losses. Available at: <https://www.eea.europa.eu/en/europe-environment-2025/countries/belgium/climate-related-economic-losses> (accessed 7 October 2026).

European Environment Agency (2025): France. Climate-related economic losses. Available at: <https://www.eea.europa.eu/en/europe-environment-2025/countries/france/climate-related-economic-losses> (accessed 7 October 2026).

European Environment Agency (2025): Hungary. Climate-related economic losses. Available at: <https://www.eea.europa.eu/en/europe-environment-2025/countries/hungary/climate-related-economic-losses> (accessed 7 October 2026).

European Environment Agency (2025): Italy. Climate-related economic losses. Available at: <https://www.eea.europa.eu/en/europe-environment-2025/countries/italy/climate-related-economic-losses> (accessed 7 October 2026).

- European Environment Agency (2025): Spain. Climate-related economic losses. Available at: <https://www.eea.europa.eu/en/europe-environment-2025/countries/spain/climate-related-economic-losses> (accessed 7 October 2026).
- Ghosh, E., Nazareth, A., Wang, G., Kartha, S., and Kemp-Benedict, E. (2021): Emissions Inequality Dashboard. Stockholm Environment Institute (SEI). Available at: <https://emissions-inequality.org/> (accessed 7 October 2026).
- Parrinello, Q., Varaschin, G., and Zucman, G. (2025): Resources for a Safe and Resilient Europe: The Case for Minimum Taxation of Ultra-High-Net-Worth Individuals in the EU. EU Tax Observatory, Policy Note. Available at: <https://taxobservatory.world/publication/resources-for-a-safe-and-resilient-europe-the-case-for-minimum-taxation-of-ultra-high-net-worth-individuals-in-the-eu> (accessed 6 October 2026).
- Rehm, Y., and Chancel, L. (2026): Code package and data: Global inequalities in ownership-based carbon footprints. Zenodo. Available at: <https://zenodo.org/records/19366484> (accessed 28 September 2026).
- Seguros News (2025): El Consorcio eleva a 4.800 millones la estimación del coste total de la DANA. Available at: <https://segurosnews.com/news/el-consorcio-eleva-a-4-800-millones-la-estimacion-del-coste-total-de-la-dana> (accessed 12 October 2026).
- University of Mannheim and European Central Bank (2025): Dry-Roasted NUTS: Early Estimates of the Regional Impact of 2025 Extreme Weather. Working paper by Sehrish Usman, Miles Parker, and Mathilde Vallat. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=5484206 (accessed 9 October 2026).
- WID.world (2025): World Inequality Database. Available at: <https://wid.world/data/> (accessed 1 October 2026).