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UNDERSTANDING THE CLIMATE DEBT OF EXTREME WEALTH

EXECUTIVE SUMMARY WITH POLICY IMPLICATIONS

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Research conducted by Forum Ökologisch-Soziale Marktwirtschaft (FÖS)
Commissioned by Greenpeace Africa

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SUMMARY

Climate change is generating escalating economic losses and social damage across the world. These damages reflect decades of highly unequal emissions associated with wealth concentration and fossil-fuel-intensive economic growth and are cumulative. Yet responsibility for this damage is distributed extremely unequally. A small group of very wealthy individuals accounts for a disproportionate share of global emissions, not only through carbon-intensive consumption, but also through ownership of capital assets and investments linked to high-emitting economic activities. **The findings of the report show that the climate crisis is increasingly also a crisis of wealth concentration, where highly unequal ownership of carbon-intensive capital and investment structures drive highly unequal climate impacts and responsibilities.**

The report extends the concept of "climate debt" to high-net-worth individuals (HNWIs). Building on the polluter-pays principle, the principle of common but differentiated responsibilities and respective capabilities (CBDR-RC) under the United Nations Framework Convention on Climate Change (UNFCCC), and existing research on carbon inequality, the report estimates the monetised climate damages associated with emissions that exceed an equitable per capita share of the remaining carbon budget consistent with a 1.5°C pathway ("climate debt"). See Box 2 for more details on how we estimated the climate debt.

Historically, climate debt and differentiated climate responsibility have primarily been addressed at the level of states, particularly through international climate finance obligations and the CBDR-RC principle under the UNFCCC. However, there is growing evidence on the role of capital ownership associated with fossil fuels, and carbon-intensive industries as well as carbon-intensive consumption (e.g. using private yachts and jets) in driving emissions among HNWIs.

The report's results (see Box 1 and Main Takeaways below) show that:

- **climate debt is highly concentrated at the very top of the global wealth distribution. As wealth concentration increases, so too does the scale of associated climate debt.**
- **ownership-based emissions — those linked to investment portfolios and capital holdings — are considerably more concentrated among the wealthiest groups than consumption-based emissions, highlighting the growing role of capital ownership and investment structures in driving highly unequal climate responsibility.**
- **ownership-based climate responsibility and extreme wealth concentration are heavily concentrated among wealthy groups and some jurisdictions, while the countries facing the greatest climate vulnerability, climate damage, or climate finance needs are often located elsewhere.**

These findings suggest **existing climate and fiscal policy frameworks need to engage more directly with the role of extreme wealth concentration and the impacts this wealth has through ownership structures and carbon-intensive investments in driving climate breakdown.** While the polluter-pays principle has historically been applied primarily to production-based emissions or to consumption-emissions (e.g. via CO2 trading or taxes), where those least responsible for the climate crisis often continue to bear a disproportionate share of the financial burden, the report shows that **a significant share of emissions stem from ownership-structures and investment decisions of HNWIs.**

The findings therefore raise questions about appropriate policy responses to extreme wealth concentration, about responsibility at the individual level and the extent to which current climate and fiscal policy frameworks adequately address these dynamics (e.g. wealth taxes or other approaches) and whether current climate and fiscal frameworks sufficiently apply the polluter-pays principle to ownership-related emissions and carbon-intensive investment activities linked to HNWIs. This is particularly relevant in the context of globally integrated financial markets, cross-border asset ownership, and the growing role of investment portfolios and capital ownership in driving emissions associated with fossil fuels, heavy industry, aviation, and other carbon-intensive sectors.

The report highlights the importance of climate and fiscal policy frameworks to:

- **more strongly embed the principles of polluter-pays and of progressivity,** reflecting both the disproportionate climate impacts caused by extreme wealth concentration and the significantly greater ability of HNWIs to contribute to climate action and redistribution efforts.
- **consider how revenues generated through progressive climate-related fiscal instruments could be internationally distributed to contribute fairly and transparently to international climate action and climate finance**, reflecting the mismatch between where climate debt of HNWIs resides and where the greatest climate vulnerability and finance needs are located.

MAIN TAKEAWAYS

BOX 1: CLIMATE DEBT IN NUMBERS

Based on the methodological approach used, the report estimates the following:

- **The annual ownership-based climate debt of the global top 0.01% (those with US$38 million or more, aka ultra-HNWIs) reached approximately US$992 billion in 2022.**
- While this cannot be directly translated into a possible tax base, it is worth illustrating the magnitude of this value, which is:
    - a rough equivalent to **public climate finance needs in developing countries** for mitigation, adaptation, and loss and damage which are estimated to be at least $1 trillion annually[1].
    - more than twice as large as current lower-bound estimates of annual loss-and-damage finance needs in developing countries, estimated to be at least US$400 billion annually.

Looking into overall patterns shown by the report's estimates we see:

- **Per capita ownership-based climate debt of the global top 0.01% wealth group is more than 130 times higher than that of the global top 10% wealth group.**
- **Ownership-based emissions are substantially more concentrated than consumption-based emissions:** the top 1% wealth group accounted for approximately 41% of ownership-based emissions in 2022, compared to 16.5% of consumption-based emissions for the top 1% income group, **meaning that climate responsibility at the very top is driven primarily by capital allocation and asset ownership.**

Looking at historical estimates and future projections we see:

- While the annual ownership-based climate debt of the global top 0.1% reached approximately US$1.82 trillion in 2022 **the accumulated (historical) ownership-based climate debt of the global top 0.1% reached approximately US$27.2 trillion over the period 1990–2022.**
- **Even under a low-emission scenario (RCP1.9 combined with SSP1[2]) assuming ambitious global mitigation efforts —the ownership-based climate debt of the global top 0.1% is projected to exceed US$81 trillion over the period 2023–2050.**

1 Climate Action Network (CAN, 2024) estimate that climate finance needs in developing countries are at least US$1 trillion in public finance annually for mitigation, adaptation, and loss and damage. If the revenues equivalent to the annual ownership-based climate debt associated with the top 0.01% wealth group, estimated at about US$992 billion, were available, they could contribute significantly to meeting this goal.

2 RCPs (Representative Concentration Pathways) describe different greenhouse gas concentration and warming pathways, while SSPs (Shared Socioeconomic Pathways) describe different socioeconomic development trajectories. RCP1.9 combined with SSP1 refers to a 1.5°C-compatible mitigation pathway combined with a sustainability-oriented socioeconomic development scenario.

Looking at existing tax proposals we see:

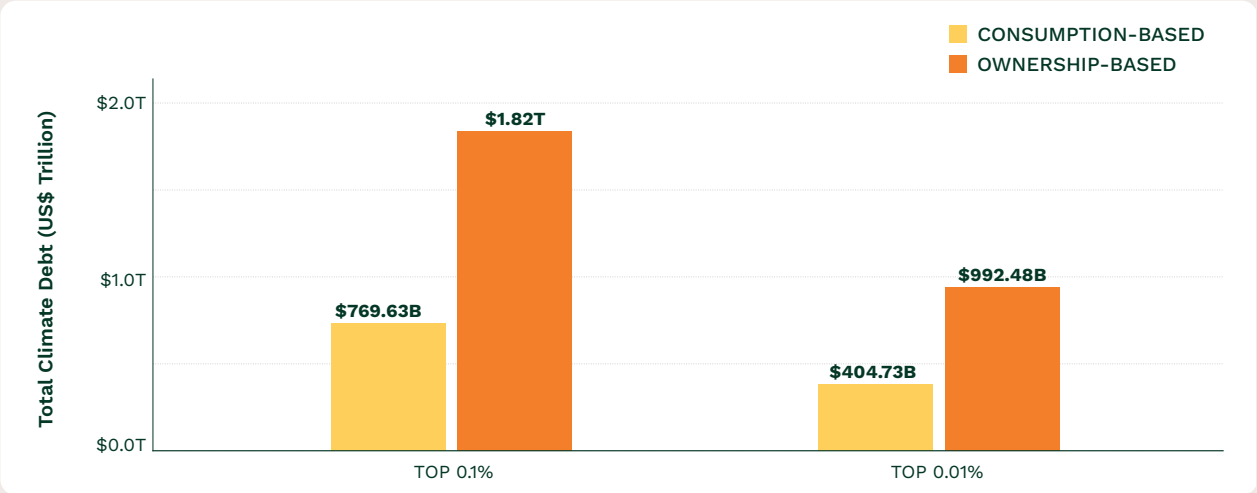
- Even ambitious combinations of luxury-consumption and wealth-related taxes would cover just under a quarter (23%) of the estimates of annual consumption-based climate debt and less than half (42%) of the annual ownership-based climate debt of the global top 0.01%.
- This indicates a gap between current levels of political ambition in developing appropriate policy solutions and the scale of climate debt associated with extreme wealth concentration.

EXTREME WEALTH CONCENTRATION GENERATES HIGHLY CONCENTRATED CLIMATE DEBT

Based on the methodological approach used in the report, the estimated annual ownership-based climate debt of the global top 0.01% wealth group (so-called ultra-high-net-worth individuals or UHNWIs, also defined as individuals with US$38 million or more) amounted to approximately US$992 billion in 2022. For the global top 0.1%, the estimated annual ownership-based climate debt reached approximately US$1.82 trillion in 2022 (see Figure 1).

Ownership-based emissions are substantially more concentrated than consumption-based emissions: in 2022, the top 1% wealth group accounted for approximately 41% of ownership-based emissions, compared to 16.5% of consumption-based emissions for the top 1% income group. **This implies that climate responsibility at the very top is not only linked to high-carbon lifestyles, but driven primarily by decisions of capital allocation and asset ownership.**

FIGURE 1. TOTAL ESTIMATED CLIMATE DEBT BY ECONOMIC GROUP, 2022 (US$)

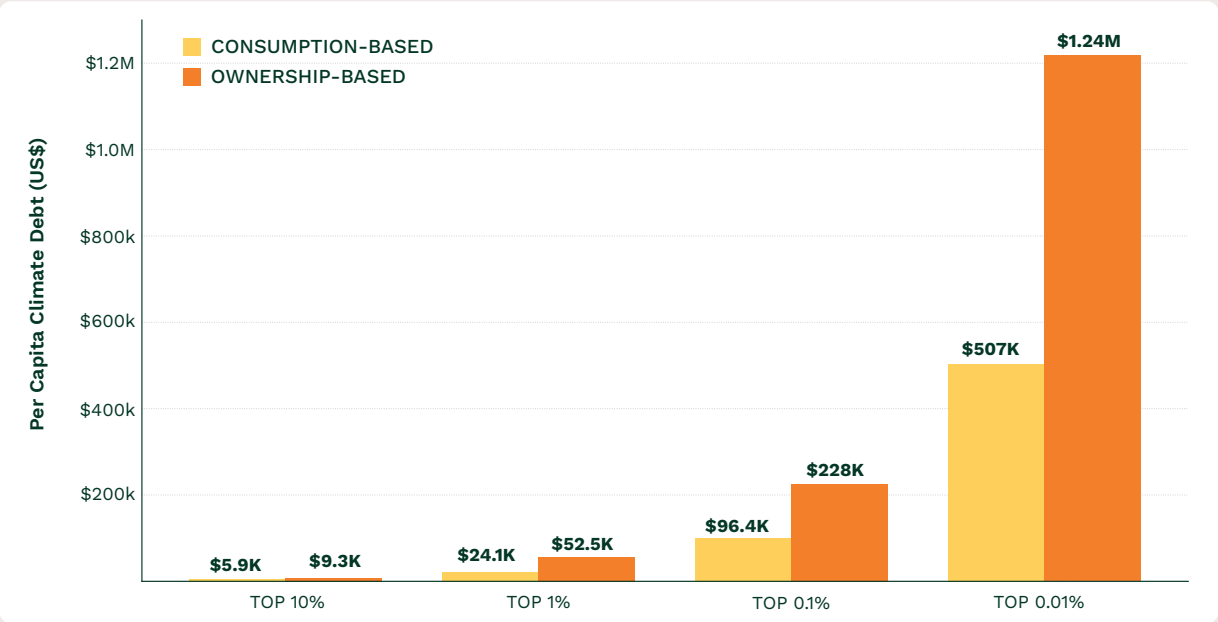


Source: Green Budget Germany (Forum Ökologisch-Soziale Marktwirtschaft e.V., FÖS), own illustration. Based on climate debt calculation results shown in Table 15 in Annex VII (Estimated climate debt under consumption-based accounting) and Table 18 in Annex VIII (Estimated climate debt under ownership-based accounting).

As Figure 2 shows, per capita climate debt rises steeply and non-linearly towards the top of the global wealth distribution. The average per capita ownership-based climate debt of the top 0.01% wealth group is more than 130 times higher than that of the global top 10% wealth group.

Climate debt associated with the world's wealthiest individuals on a per-capita basis reaches extraordinary levels. In 2022, average annual climate debt estimates for the 0.01% following the set approach, amounted to approximately US$506,783 per person using consumption-based emissions and **approximately US$1.24 million per person using ownership-based emissions.**

FIGURE 2. ESTIMATED PER CAPITA CLIMATE DEBT BY ECONOMIC GROUP, 2022 (US$)



Source: Green Budget Germany (Forum Ökologisch-Soziale Marktwirtschaft e.V., FÖS), own illustration. Based on climate debt calculation results shown in Table 15 in Annex VII (Climate debt under consumption-based accounting) and Table 18 in Annex VIII (Climate debt under ownership-based accounting).

Historical estimates illustrate the full scale of climate responsibility concentrated at the top: the accumulated ownership-based climate debt of the global top 0.1% wealth group reached approximately US$27.2 trillion over the period 1990–2022. This suggests that wealth concentration and ownership-based emissions reinforce one another over time.

Even under comparatively ambitious mitigation scenarios, climate debt remains highly concentrated among the wealthiest groups. Under the low-emission SSP1 scenario, the projected per capita ownership-based climate debt of the global top 0.1% reached approximately US$8.8 million over the period 2023–2050, compared to approximately US$660,000 per capita climate debt for the average person in the global top 10%. Looking at the top 0.1% group as a whole, ownership-based climate debt is projected to exceed US$81 trillion during that same period.

This suggests that overall emissions reductions pathways alone do not automatically resolve the extreme concentration of climate responsibility associated with wealth derived from assets ownership and investment structures. Even in lower-emission futures, ownership of carbon-intensive assets and capital remains highly unequal, meaning climate debt continues to accumulate disproportionately at the top of the global wealth distribution.

OWNERSHIP-BASED EMISSIONS REPRESENT A MAJOR BLIND SPOT IN CURRENT CLIMATE POLICY

Existing climate and fiscal policy frameworks do not sufficiently address emissions linked to wealth ownership and investment activities.

Current climate policies and fiscal instruments primarily target production-based and consumption-based emissions, while ownership-based emissions linked to investment portfolios (corporate ownership, business assets and equity investments) remain comparatively undertaxed (see Chancel, 2022; Chancel and Rehm, 2025b).

While not designed specifically to address ownership-based emissions, some existing tax and levy proposals nevertheless partially engage with carbon-intensive ownership and investment structures and help illustrate the scale of ownership-related climate responsibility identified in the report. The report compares the annual ownership-based climate debt of the global top 0.01% wealth group — estimated at approximately US$992 billion in 2022 — with revenue estimates from some existing proposals such as a fossil fuel profit surtax and a green financial transaction tax (Table 7 in the report). Even under ambitious revenue assumptions, the two proposals would together generate approximately US$420 billion annually, covering only around 42% of the estimated annual ownership-based climate debt of the top 0.01% wealth group.

While these instruments target only specific sectors and financial flows, ownership-based emissions reflect a much broader set of emissions associated with capital ownership, investment portfolios, productive assets and carbon-intensive wealth structures across the economy. The comparison therefore illustrates the extent to which existing climate-related fiscal proposals are only a beginning of addressing emissions associated with carbon-intensive wealth ownership and investment activities and where much more deliberate action is needed to properly address the urgency of the ongoing climate crisis.

CLIMATE DEBT AND CLIMATE FINANCE ARE GEOGRAPHICALLY MISALIGNED

The countries in which (private household) wealth and ownership-based emissions are concentrated are often not the countries facing the greatest climate vulnerability or climate finance needs[3].

As the map (Figure 3) below illustrates, a relatively small number of jurisdictions hosting large concentrations of private wealth account for a disproportionate share of ownership-based climate responsibility and climate debt. These jurisdictions would likely be central to the implementation of fiscal instruments targeting carbon-intensive wealth and investment activities.

At the same time, indicators of climate vulnerability point in the opposite geographical direction. Many countries holding only a very small share of global private wealth – particularly in Africa, South Asia, and other highly climate-vulnerable regions – face comparatively high levels of climate vulnerability and possess more limited capacity to adapt to climate-related impacts. By contrast, countries in Europe and North America account for a disproportionately large share of global private wealth while generally exhibiting lower vulnerability and greater adaptive

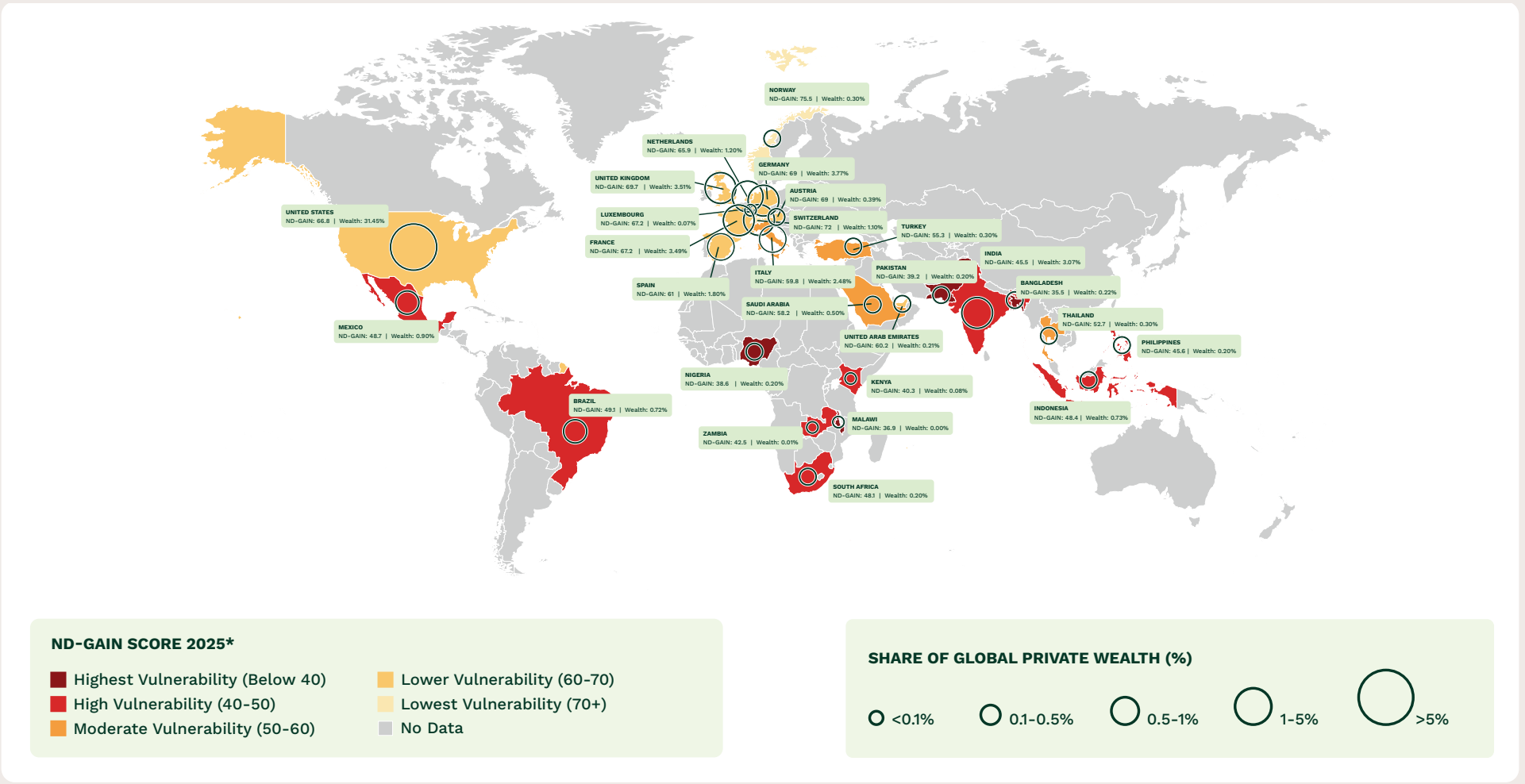
3 As available data do not allow direct allocation of ownership-based climate debt estimates to individual jurisdictions, country-level household wealth data were used here only as an indicative proxy for the geographical concentration of private wealth and associated ownership-based climate responsibility. This should not be interpreted as equating private wealth with state wealth, nor as implying that ownership-based emissions are territorially located where wealth holders reside.

capacity.

This mismatch highlights the importance of international coordination on climate-related fiscal policy, including ongoing discussions under the United Nations Framework Convention on International Tax Cooperation (UN Tax Convention) as well as international climate finance negotiations under the UNFCCC.

It also speaks to the fact that any approach to addressing the climate debt of HNWI through fiscal measures should consider how revenues can be mobilised and allocated effectively, fairly, and transparently. This involves determining how revenues contribute to existing national and global climate and ecological transition and restoration commitments at a scale commensurate with needs. Central to the legitimacy of any policy is the international distribution of these funds, given that wealth is heavily concentrated in a small number of countries, while the climate impacts of that wealth are widely shared and predominantly felt by the most vulnerable communities in the Global South.

FIGURE 3. GEOGRAPHICAL MISMATCH BETWEEN GLOBAL PRIVATE WEALTH AND CLIMATE VULNERABILITY AND ADAPTIVE CAPACITY



* Categories shown in the figure are author-defined groupings of ND-GAIN scores for visualisation purposes and do not represent official ND-GAIN classifications.

Sources: Shorrocks et al. (2022), Global Wealth Databook 2022; University of Notre Dame Global Adaptation Initiative (2025), Country Index 2025.

IMPLICATIONS FOR CLIMATE AND FISCAL POLICY

FOLLOWING THESE FINDINGS, THE REPORT IDENTIFIES THREE MAJOR IMPLICATIONS FOR CLIMATE AND FISCAL POLICY:

BEYOND SOCIAL AND TAX EQUITY:

The analysis shows that extreme wealth concentration is not only linked to rising socio-economic inequality, but also to extreme carbon inequality, with the highest wealth groups associated with disproportionately larger shares of emissions. ***The findings therefore suggest that discussions around policy responses to counter extreme wealth concentration and the climate and ecological impact caused by this wealth, may need to strengthen progressivity, as well as, alongside broader redistributive and social equity objectives apply the polluters-pay principle to wealth derived from carbon-intensive assets and investments.***

BEYOND CONSUMPTION AND PRODUCTION:

Emissions from capital ownership (ownership-based emissions) represent one of the most undertaxed and insufficiently addressed dimensions of carbon inequality. Existing climate policy frameworks and fiscal instruments continue to focus primarily on production-based and consumption-based emissions, while ownership-based emissions linked to asset ownership and carbon-intensive investment activities remain comparatively undertaxed, raising questions about the effectiveness of current policy frameworks in incentivising green transition pathways and the extent to which the polluter-pays principle is applied to ownership-related emissions and investment structures. This imbalance contributes to the perception that climate policy places disproportionate burdens on middle- and lower-income households while leaving emissions associated with concentrated wealth insufficiently addressed. ***The findings therefore suggest a need for climate and fiscal policy frameworks to, besides consumption and production-based approaches, also address the ownership-related emissions, including differentiated treatment of carbon-intensive assets, and other fiscal and regulatory measures addressing ownership structures and capital allocation.*** Such approaches could also include tools such as climate malus/bonus systems and other differentiated fiscal mechanisms aimed at discouraging carbon-intensive investment behaviour and incentivising lower-carbon capital allocation.

BEYOND NATIONAL SOLIDARITY:

Climate debt raises questions of international redistribution and contribution to climate finance, since wealth concentration and climate vulnerability are geographically misaligned. The countries where the greatest concentration of private wealth (as a proxy for where the HNWIs

with the greatest estimates of ownership- based climate responsibility could be potentially taxed) are often not the countries facing the greatest climate impacts and climate finance needs. At the same time, this mismatch underscores the need for substantially increased and more predictable international climate finance. Revenues generated through progressive climate-related fiscal instruments should support a just transition, accelerate investment in renewable energy and low-carbon infrastructure, and strengthen adaptation, loss-and-damage responses, and direct support for the countries and communities most affected by climate change. ***Future policy design should therefore also consider how parts of the resulting revenues could be redistributed and thus contribute to international climate action and climate finance.*** *Policy frameworks, both at national and international level, should better recognise that HNWIs have disproportionately high climate and ecological footprints, while their wealth is highly mobile and accumulated across different jurisdictions.*

NEW FISCAL POLICY TOOLS NEEDED

The findings of the report highlight the urgent need for fiscal instruments that address not only tax inequality, but also the climate and ecological impacts associated with extreme wealth concentration, the ways in which wealth is generated, and the environmental consequences linked to carbon-intensive ownership and investment structures. **Consistent implementation and integration of "polluter pays principle" at all levels is paramount to building more just and fair national and international fiscal systems, aligned with sustainable development goals and other global commitments.**

Different instruments could address different dimensions of climate debt: some mechanisms may, for example, focus primarily on mobilising resources linked to accumulated historical responsibility in one-off contributions to cover immediate national and international climate mitigation and adaptation needs, while others may aim to reduce future emissions through designing higher tax rates for individuals owning assets with disproportionately high ecological and climate footprint.This distinction is also relevant in the context of fairness and proportionality in climate policy design, given that ownership- and investment-based emissions associated with concentrated wealth may require different policy approaches than emissions linked primarily to household consumption. Different types of emissions and economic actors should therefore be addressed according to their respective levels of responsibility and capacity to influence emissions. The aim would be to discourage carbon-intensive investment and ownership structures through designing fiscal incentives leading to behavioural and investment changes.

Finally, the effective implementation of fiscal policies targeting the climate debt of HNWIs depends on a set of enabling conditions, particularly with regard to transparency, data availability, and international cooperation. The identification and valuation of wealth, especially across borders, require strengthened systems for asset registration, beneficial ownership transparency, country-by-country reporting, and international exchange of information. Without such systems, the ability of governments to design and implement effective fiscal instruments will remain limited.

This highlights the importance of stronger international coordination on setting global tax rules and allocation of taxing rights, defining minimum global tax standards, combating tax abuse and illicit financial flows, financial transparency, cross-border asset registration and equitable international revenue distribution, all of which could be properly addressed under processes such as the UN Framework Convention on International Tax Cooperation (UNFCITC).

BOX 2: HOW THE REPORT ESTIMATES CLIMATE DEBT

The report estimates climate debt as the monetised damage associated with emissions that exceed an equitable per capita share of a 1.5°C-compatible carbon budget. The calculation follows five steps, it:

1. **DEFINES THE GROUPS ANALYSED.**
   The report looks at the global top 10%, top 1%, top 0.1%, and top 0.01% income and wealth groups.
2. **ATTRIBUTES EMISSIONS TO THESE GROUPS.**
   For the consumption-based approach, the report uses emissions inequality datasets developed by the Stockholm Environment Institute (SEI) and the World Inequality Lab, which attribute global emissions to income groups based on observed consumption patterns, including emissions embedded in traded goods and services. For ownership-based emissions, the report builds on the framework developed by Lucas Chancel and Yannic Rehm (2025b), which attributes emissions associated with firms and productive capital to wealth groups according to patterns of equity ownership, private firm ownership, pension assets, portfolio composition, and international ownership structures.
3. **ESTIMATES MISSING VALUES WHERE NEEDED.**
   Where direct statistical data are not available for the very top groups, the report imputes values using available distributional emissions data and observed concentration patterns across income and wealth groups. These estimates are therefore group-based and indicative, not individual-level emissions accounts.
4. **DEFINES AN EQUITABLE EMISSIONS BENCHMARK.**
   The report calculates an equal per capita share of emissions consistent with a 1.5°C pathway. Emissions above this benchmark are treated as 'excess emissions'.
5. **MONETISES EXCESS EMISSIONS.**
   Excess emissions are multiplied by a social cost of carbon (SCC) of US$283 per tCO_2 in 2020 prices, based on Moore et al. (2024). For historical estimates, the SCC is adjusted over time; for projections, the same logic is applied to future emissions pathways.

The report presents three types of climate debt estimates: **annual climate debt** for 2022, **accumulated climate debt** for 1990–2022, and **projected climate debt** for 2023–2050 under different emissions and inequality scenarios.

The consumption-based and ownership-based estimates are **non-additive: they represent two alternative attribution lenses for assessing the full estimated climate damages associated with emissions.** The results should therefore not be combined, and any future policy instruments drawing on these approaches would therefore need to carefully consider overlaps between different emissions accounting frameworks and existing climate-related fiscal measures. **The results should be understood as indicative estimates illustrating relative orders of magnitude and patterns of climate responsibility associated with different income and wealth groups, rather than as direct tax calculations or precise policy prescriptions.**

For the full methodology, **see chapters 1+2 and annexes of the main report.**

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