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A Climate for Sufficiency

1.5-Degree Lifestyles (2025 Update)

Hot or Cool

Report

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HotorCool

Report

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Abbreviations

°C	degrees Celsius
CBDR–RC	Common but differentiated responsibilities and respective capabilities
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
ETS	EU Emissions Trading System
EU	European Union
EUR	Euro
GDP	gross domestic product
GMT	Global Minerals Trust
GNI	gross national income
I–O	input-output (models or tables)
IDDRI	Institute for Sustainable Development and International Relations
IHDI	Inequality-Adjusted Human Development Index
IPCC	Intergovernmental Panel on Climate Change
ITF	International Transport Forum
$kgCO_2e$	kilograms of carbon dioxide equivalent
kWh	kilowatt-hour
LCA	life-cycle assessment
LCF	lifestyle carbon footprint
m^2	square metre
NOx	nitrogen oxide
p-km	passenger-kilometre
PM	particulate matter
ppp	purchasing power parity
REDuse	Refuse, Effuse and Diffuse
tCO_2e	tonnes of carbon dioxide equivalent
UN	United Nations
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States dollar

Preface

Crossing Red Lines: 1.5-Degree Lifestyles

It's become somewhat of a tradition – an unfortunate one, I may add – since the first report in the 1.5-Degree Lifestyles series was produced. At the beginning of each report, our team of scientists and researchers asks questions about how climate change and our ways of living affect each other; how we are using the remaining carbon budget to prioritise our wellbeing needs within the Earth's regenerative capacity; and what observable data patterns may point towards possibilities of a healthy future.

What follows has happened each time, with little variation, from the first report to the current one. The team starts the painstaking process of gathering and crunching the data needed to understand and answer the questions in a scientific manner. When we get the initial results, we stare at our screens in consternation, our hearts telling our heads there must be some mistake. That the graphs, charts and numbers we're seeing cannot be accurate stories of the state of our biophysical environment and society: concentrations of climate-warming gases breaking through healthy planetary guardrails, tense levels of inequality threatening to snap healthy socio-political guardrails – both of them reinforced by public institutions, needed to hold it all together, fast abandoning their mandates!

We have a basic ethos at Hot or Cool Institute: if you can't see the faces of real people in your data, your science has lost its humanity.

With each edition of the report, we then test our methodology again, validate the data once more and re-run the calculations. We consult external researchers and scientists and invite political economists, leaders, and practitioners to review what we've done, hoping the review process will reveal that we've missed something significant and that the revised picture will tell a better story – that our prospects on Earth are more hopeful. At times, the reviews lead us to better data, revised estimates or even clarifications in the analysis. Yet the big picture hardly budges.

For this 2025 edition, we updated the greenhouse gas emissions budget and decarbonisation pathways based on the most recent scientific estimates. We then compared those numbers with the current requirements to meet our wellbeing needs. The central question for us was this: How close are we from what, in the scientific community, are generally agreed-upon red lines of climate change? And, is there still a way to ensure dignified standards of living for everyone while remaining within the 1.5°C limit.

Unfortunately, this report follows the same sobering tradition: we arrived at the consternation we'd hoped to avoid – the results of the analysis had our hearts hoping our heads were wrong. At current rates of emissions, we are on an express track to exhaust the greenhouse gas budget that would allow us to stay within the reliability and flourishing of healthy planetary boundaries; we are at a point where fundamental societal needs are beginning to compete with each other for the remaining carbon budget. This raises massive challenges that are ecological as much as economic, environmental as much as social, and political as much as cultural.

What follows from here is a test of how we organise ourselves as a society to ensure dignified living standards for everyone. As budgets and resources shrink, while (unfair) competition grows, hopefully we do not succumb to the social tensions that trend towards breaking point.

Science has no feelings, and data can be stubborn! But our shared humanity rests in the values we apply to our knowledge. I hope this report contributes to shaping a future that is not yet – and still can be – of sustained care, dignity and prosperous living for all.

Lewis Akenji
Executive Director, Hot or Cool Institute

Executive Summary

Fast approaching the 1.5°C guardrails

Recent temperature observations show that global warming is already rapidly approaching the critical 1.5 degrees Celsius (°C) guardrail, and the remaining carbon budget is now so limited that – if current emission levels persist – it could be exhausted by around 2028. This makes a near-term breach of 1.5°C very likely (Forster et al. 2025).

But 1.5°C is not just an abstract number. It represents lived realities: rising seas displacing communities, farmers losing crops to drought and floods, climate refugees straining political systems, and critical infrastructure designed for a cooler past buckling under new extremes. The inconvenience of today's heatwaves can rapidly turn into tomorrow's health crises; thawing glaciers may release long-dormant pathogens; and, as temperatures rise, so too do social frictions and political instability. The difference between 1.5°C and 1.7°C is not just a fraction of a degree. It marks the line between manageable disruption and irreversible, catastrophic breakdowns of ecosystems and livelihoods.

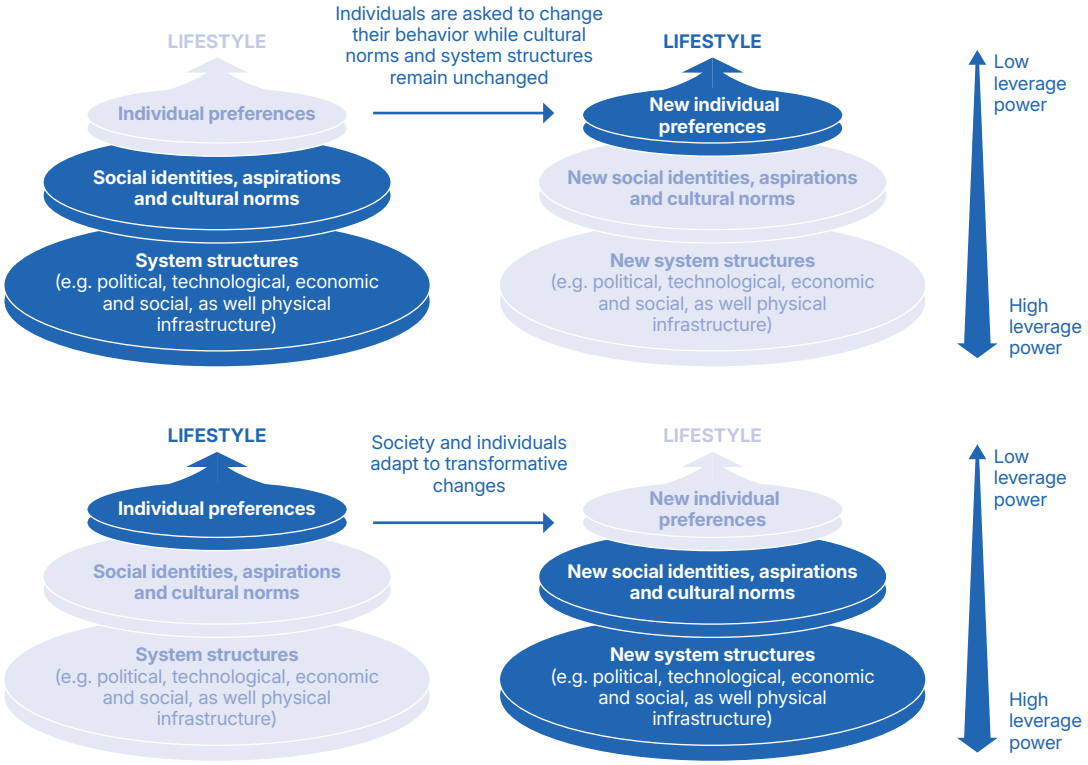
This report focuses on how *lifestyles* drives these crisis. Lifestyles are patterns of behaviour shaped by systemic factors, such as infrastructure and public policies, as well as by social norms and cultural identities (Figure ES1). Lifestyles are not just about individual choices; they are embedded in infrastructures, provisioning systems* and institutions that lock societies into consumerist aspirations and high-emission pathways. What societies consume reflects what they prioritise – and whose needs and aspirations carry weight.

Consumerist lifestyles, long established in the Global North, are spreading rapidly, especially across middle-income countries, while also setting future aspirations across lower-income groups. Meanwhile, consumption by the world's wealthy – in both North and South – is pushing humanity beyond ecological safety limits, while billions remain below the minimum standards for a decent life.

This creates a dual crisis of inequality and ecological overshoot.

* Provisioning systems can be defined as the entire set of societal arrangements through which people's needs (or wants) are met. This is not limited to supply chain and business processes, but includes economic, political, cultural and institutional structures.

Figure ES1. Building blocks of lifestyles



Lifestyles are co-shaped by systems, social identities and choices. Aligning lifestyles with planetary limits requires transformations at all three levels, with priority given to the systemic levels.

The fair consumption space and targets for sufficiency living

This report underscores an urgent inter-linked challenge in our path to meeting the Paris Agreement targets: cutting excess consumption while improving the livelihoods of under-consuming groups to levels of consumption that ensure dignified living, and within the remaining carbon budget. The report elaborates on the concept of the *fair consumption space* – the safe and just zone between an environmental ceiling and a social floor (Figure ES2) – and demonstrates how "sufficiency living" can support human flourishing while achieving climate stability.

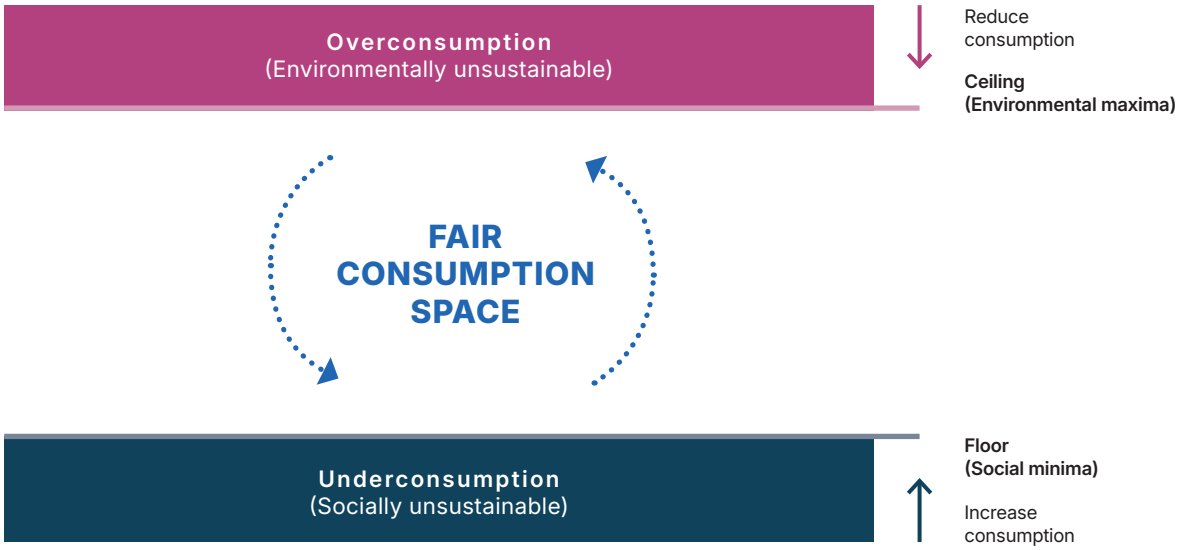
- The ceiling represents the maximum lifestyle-related emissions compatible with limiting warming to 1.5°C.
- The floor represents the minimum material conditions required for dignity, health and social participation.

Both extremes are unsustainable: consumption above the ceiling drives ecological breakdown, while levels below the floor deny people a decent life. Crucially, these are inter-linked: the more some consume beyond their fair share, the harder it becomes to lift others to the floor level while keeping within a shrinking global carbon budget.

Sufficiency is radically different from efficiency. Efficiency seeks to do more with less, but rebound effects often undermine its impact – leading to more consumption rather than less. Sufficiency requires us to ask: how much is enough to ensure wellbeing within the regenerative limits of the Earth? It shifts attention away from endless accumulation and towards cultivating wellbeing, care and shared prosperity. This report outlines key elements of a sufficiency approach to the climate crisis.

Sufficiency living is defined by the material requirements needed to secure wellbeing without material excess. Building on previous research on decent living standards, this report goes beyond basic

Figure ES2. A fair consumption space for sustainable lifestyles, defining limits for over- and underconsumption



Adapted from Akenji et al. 2021.

necessities to include wider needs for dignified living and social participation, exploring how those could be provisioned in equitable and ecologically responsible ways. It finds that meeting sufficiency living standards globally with today's technologies and practices would generate around 3.9 tonnes of carbon dioxide equivalent (tCO_2e) per person per year. This is far below the current averages in many wealthy countries (amounting to 8-10 tCO_2e per person per year, or more) but still well above the 1.5°C-aligned ceiling by 2035 (corresponding to 1.1 tCO_2e per person).

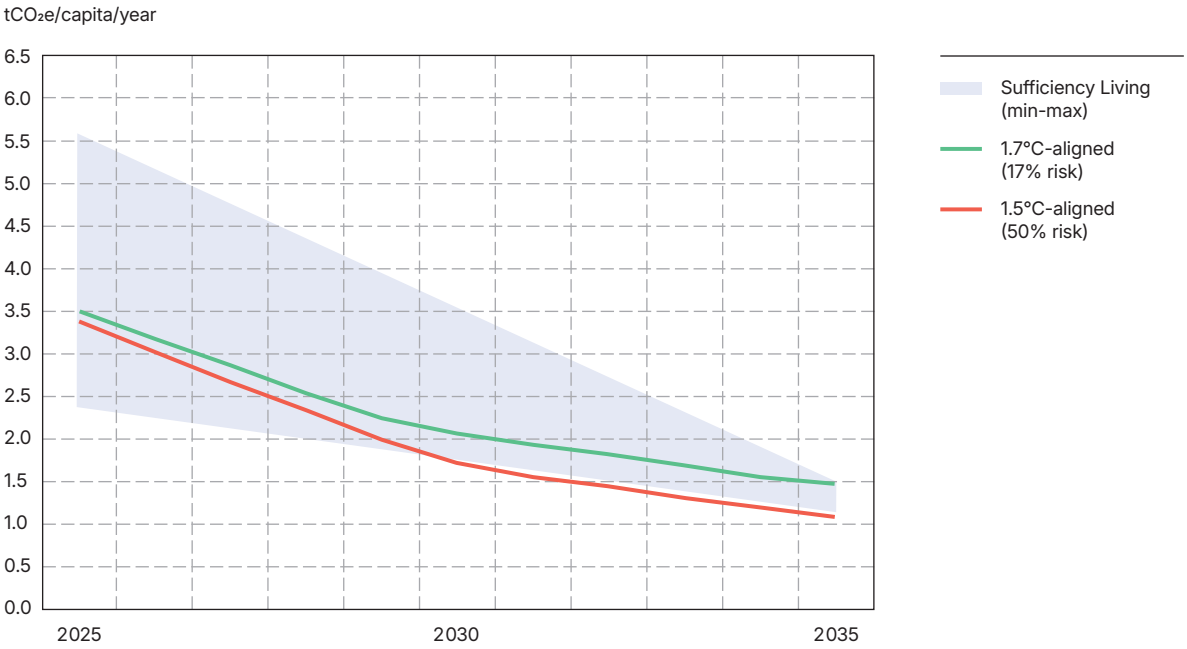
Under a low-carbon scenario – drawing on existing and quantifiable innovations (including social innovations) and easily foreseeable advancements in renewable energy, electrified transport, reduced commuting, efficient building standards, sustainable food systems and shared consumption – the emissions associated with sufficiency living standards could decline to around 1.3 tCO_2e per person per year by 2035. This is consistent with the higher-end target (2°C) of the Paris Agreement, and below the 1.7°C target (1.4 tCO_2e). However, it remains above the 1.5°C-aligned ceiling of 1.1 tCO_2e per person by 2035, identified by the Intergovernmental Panel on Climate Change (IPCC) as critical to avoiding potentially irreversible climate risks*.

The 2024 United Nations *Emissions Gap Report* warns that delayed action and weak decarbonisation efforts risk locking the world into a trajectory of 2.6-3.1°C of warming (UNEP 2024a). The present report underscores that concern, while also showing that an alternative compatible with the Paris Agreement remains within reach through a sufficiency living pathway (Figure ES3). Further ambition is both needed and achievable, particularly in the nutrition sector – through deeper decarbonisation of agricultural practices – and in personal transport, where investment in infrastructure and space reallocation could shift the focus from mobility to accessibility. Such changes would enable people to meet their needs and maintain social connections with much less travel, and therefore far fewer emissions.

Achieving this pathway will require more than rapid technological deployment. It demands deep reforms in provisioning systems, alongside shifts in cultural and social values that place equity and ecological responsibility at the center of development. It also calls for mainstreaming sufficiency within climate, economic, and social agendas, and for bringing in new actors that have not yet been part of the conversation.

* This benchmark has been calculated through the Carbon Budget Explorer (Dekker et al. 2024), based on a 50% probability of exceeding the temperature limit, moderate reductions in non-CO_2 emissions, and only minimal reliance on carbon dioxide removal.

Figure ES3. Lifestyle carbon footprint targets aligned with 1.5°C and 1.7°C pathways, and emissions associated with sufficiency living



5.6	5.2	4.8	4.4	3.9	3.5	3.1	2.7	2.3	1.9	1.5	Sufficiency Living (max)
3.9	**3.6**	**3.4**	**3.1**	**2.9**	**2.6**	**2.3**	**2.1**	**1.8**	**1.6**	**1.3**	Sufficiency Living (average)
2.4	2.2	2.1	2.0	1.9	1.7	1.6	1.5	1.4	1.3	1.1	Sufficiency Living (min)
3.5	3.2	2.8	2.5	2.2	2.0	1.9	1.8	1.7	1.6	1.4	1.7°C-aligned (17% risk)
3.4	3.0	2.6	2.3	2.0	1.7	1.5	1.4	1.3	1.2	1.1	1.5°C-aligned (50% risk)

Note: The sufficiency threshold and ecological ceiling are based on different accounting approaches. LCA-based estimates may overestimate household emissions by including structural and collective inputs, while IO-based ceilings may underestimate the full carbon cost by excluding essential societal infrastructure. The gap reflects a potential boundary mismatch rather than an exact measure of overshoot, which could be resolved through future research.

Lifestyle carbon footprints

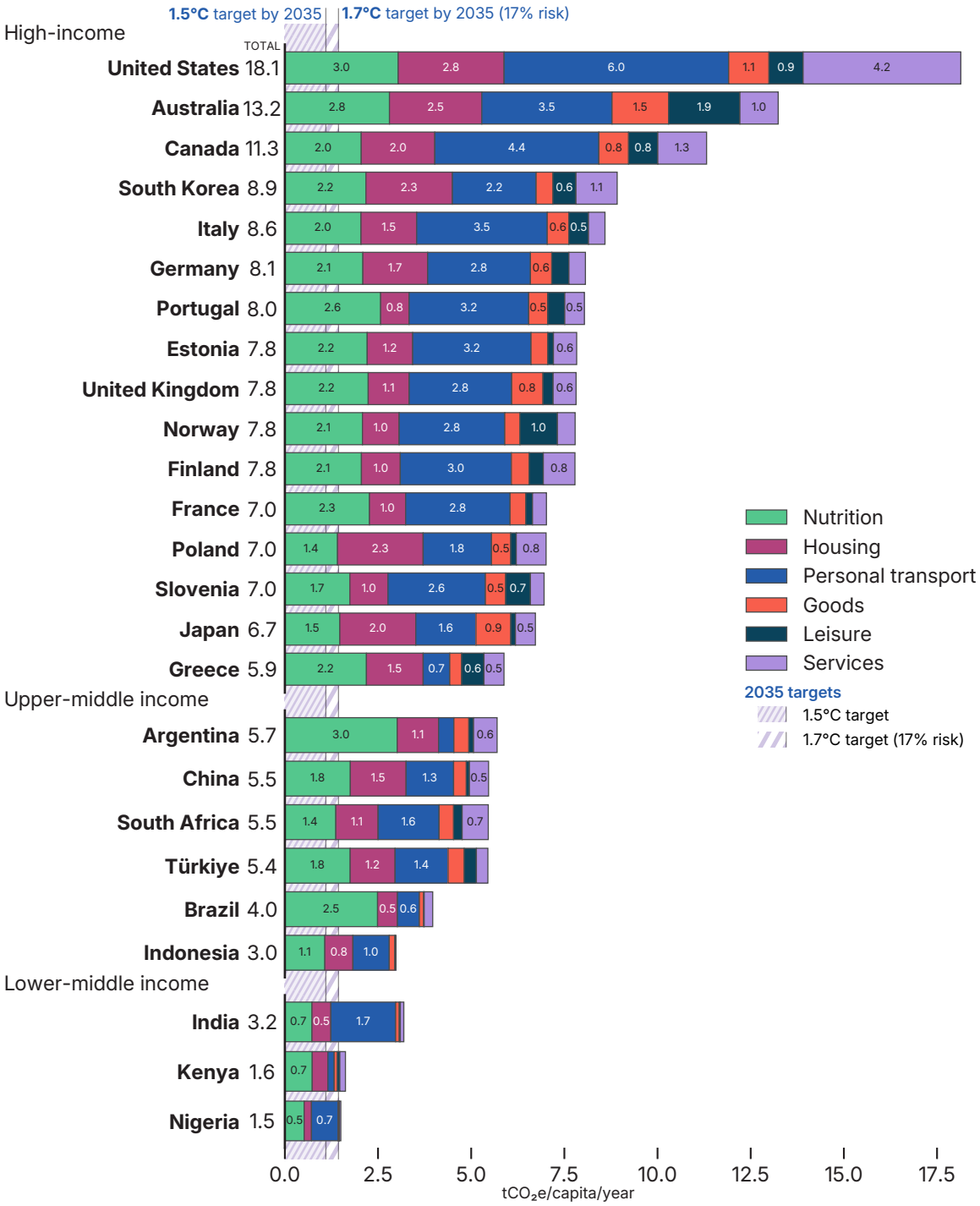
The report presents new quantitative analyses of lifestyle carbon footprints* for 25 countries, spanning high, upper-middle and lower-middle income contexts. This is the broadest assessment of its kind and, by drawing directly on official national statistics, provides rare and robust insights that are often missing in international analyses (Figure ES4). The calculations include only emissions related to lifestyles, excluding emissions from public spending and investments**.

The global average lifestyle carbon footprint across these 25 countries is 7.1 tCO_2e per person per year – more than six times the 1.5°C-aligned target of 1.1 tCO_2e for 2035. At the extremes, the United States (18.1 tCO_2e) has an average lifestyle carbon footprint more than 10 times that in Nigeria (1.5 tCO_2e). Despite regional and cultural differences, three domains – nutrition, housing and transport – consistently emerge as the primary drivers of lifestyle-related emissions. Together, these domains account for 66% to 95% of the total lifestyle carbon footprint across income groups, with their relative share increasing as income decreases.

* Lifestyle carbon footprint refers to the total greenhouse gas emissions, expressed in carbon dioxide equivalents (CO_2e), that are directly and indirectly caused by an individual's or household's everyday activities – such as nutrition, housing, personal transport, goods and services – throughout the full life cycle of the products and services consumed.

** Earlier modelling studies indicate that lifestyles account for around 72% of society's emissions (Hertwich and Peters 2009). This difference between lifestyle carbon footprints and total emissions was considered when calculating future emission targets aligned with decarbonisation pathways.

Figure ES4. Lifestyle carbon footprints by country and across six major consumption domains



To align with the 1.5°C target by 2035, average lifestyle emissions must fall by:

- 82% to 94% in high income countries,
- 64% to 81% in upper-middle income countries, and
- 29% to 67% in lower-middle income countries.

No country, however, is currently on track to achieve these reductions. Without systemic change, climate goals will remain out of reach.

Importantly, comparing emission levels with income offers valuable insights. Countries with similar human development – as measured by the Inequality-adjusted Human Development Index from the United Nations Development Programme – show very different carbon intensities (Figure ES5). This reveals that development pathways are not fixed: some countries achieve higher wellbeing with lower emissions, offering opportunities for policy learning and exchange.

Inequalities also exist within countries. In high-income contexts, many people overshoot sufficiency levels while marginalised groups remain below them. In lower-income countries, elites consume far above sufficiency while large populations still lack access to basic needs. Overconsumption and underconsumption are therefore two sides of the same crisis.

Domains and options for change

As the window for limiting heating to 1.5°C shrinks and becomes increasingly difficult to keep open, meaningful and timely action is more urgent than ever. Every fraction of a degree matters. Arguing that "it's too late" is misleading and only serves those who seek to maintain the polluting status quo.

Lifestyle changes that directly address overconsumption can reduce per capita lifestyle carbon footprints considerably (Figure ES6). The greatest impacts are found in:

- **Nutrition:** adopting plant-based, vegetarian or planetary health diets can cut 1,000–2,500 kilograms of CO_2e per person annually, depending on the country context.

- **Transport:** avoiding private car use in urban areas, shifting to public and active transport, and reshaping urban planning so people live closer to work or study can each save over 1,000 kilograms of CO_2e per person per year, especially in car-dependent countries.

- **Housing:** retrofitting buildings, applying passive standards, using low-carbon materials, and switching to clean heating and cooling systems reduce energy demand and emissions at scale.

Figure ES5. Comparing Inequality-adjusted Human Development Index (IHDI) and lifestyle carbon footprint (tCO_2e/capita/year)

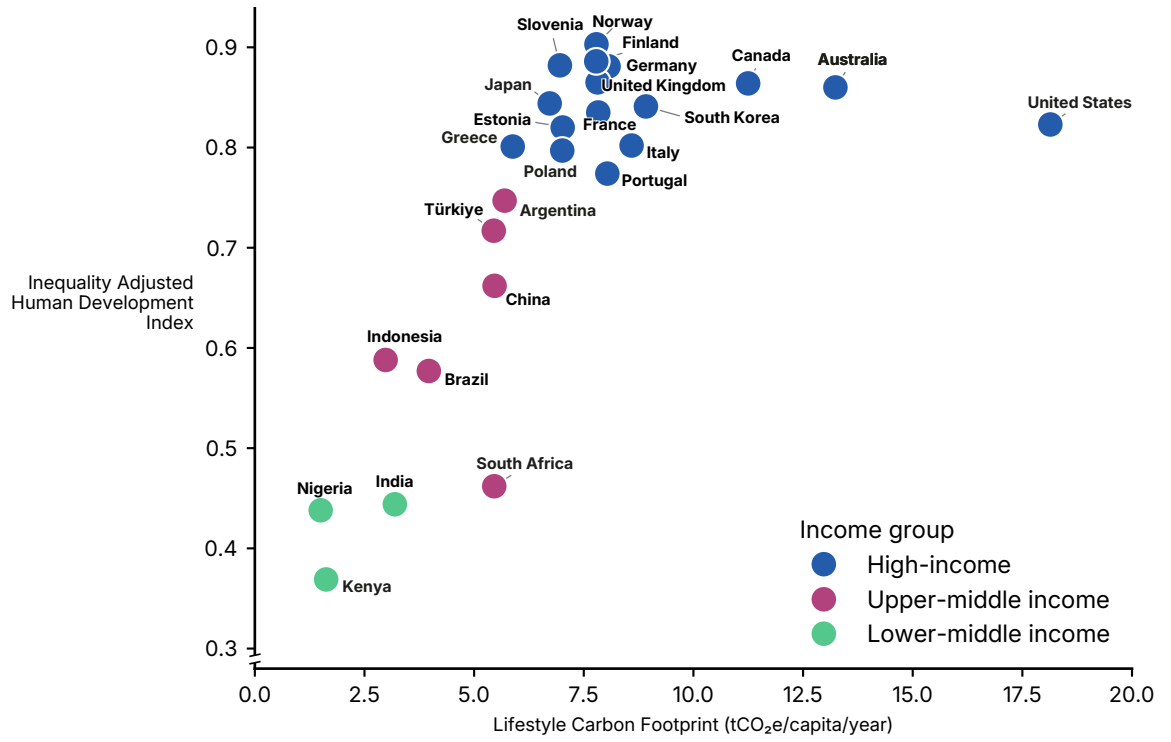
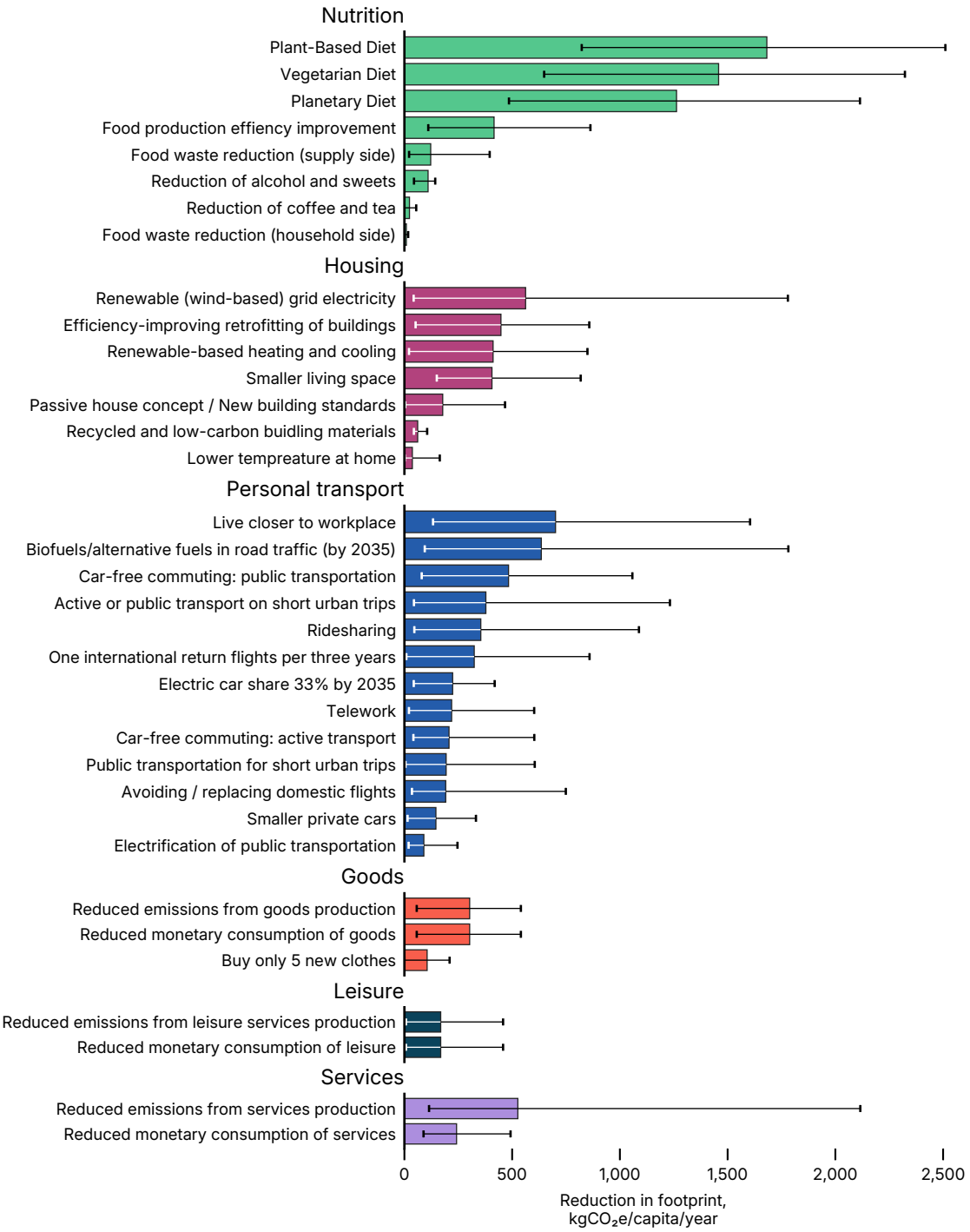


Figure ES6. Average per capita footprint reductions ($kgCO_2e$/capita/year) for low-carbon lifestyle options



Note: Error bars indicate minimum and maximum reduction potential ($kgCO_2e$/capita/year) across selected case countries: Argentina, Brazil, Canada, Finland, France, Japan, South Africa, the United Kingdom and the United States.

By focusing on nutrition, personal transport, and housing, sufficiency becomes both a guiding principle and a practical pathway for aligning lifestyles with climate targets. These domains are universal priorities for reducing emissions, but the most impactful actions differ across countries – underscoring the need for tailored, context-specific pathways to low-carbon futures.

Recommendations

Overall, the findings of this report make clear that incremental efficiency improvements are insufficient. Fundamental societal transformations are needed to enable climate-compatible, socially just lifestyles. The recommendations include six critical actions at the collective and individual levels, to avoid crossing socio-ecological red lines.

Bend back the emissions curve: recommit to 1.5°C

The climate ambition remains the same, keeping temperature rise as low as possible above pre-industrial levels. In the context of overshoot, this requires keeping the level and duration of average global temperatures above 1.5°C as short as possible. This makes 1.5°C still the target, only now more urgent. The longer we stay at such levels of overshoot – and, even worse, for every additional unit of increase in average global temperatures above 1.5°C – the more impactful it would be, and difficult to reverse to comfortable pre-overshoot levels.

Governments must urgently recommit to 1.5°C, and adopt concrete, verifiable, and time-bound plans, preferably legally binding, with compulsory reductions for business and strong international co-ordination. "Too late" narratives only serve the status quo. The curve can still be bent back – if rapid, co-ordinated action is taken.

Implement globally co-ordinated taxes and wealth caps

The wealthiest top 10% of the global population is responsible for nearly half of all emissions, while the bottom 50% accounts for less than a third (Chancel 2022). And the trend is worsening. Some estimates show that the top 1% global wealth share could rise from around 38.5% today to 46% in 2050 if the wealthiest individuals own all the new low-carbon infrastructure. Tackling overconsumption and inequality is therefore central to climate stability.

Globally co-ordinated fiscal tools can curb harmful excess and redistribute opportunities fairly. These include progressive income, wealth and inheritance taxes; comprehensive capital gains taxation; maximum income–minimum income ratios; and absolute wealth ceilings. Revenues should be redirected to fund universal basic services and sufficiency-oriented infrastructure.

Such policies are not unprecedented. In the 1940s, the top marginal tax rate in the United States reached 94%, greatly reducing inequality. Today, globally co-ordinated action on wealth and taxation could both fund sufficiency for all and reduce social tensions that undermine climate co-operation.

Change aspirations and catalyse large-scale social innovation

Shifting towards sufficiency requires redefining what societies aspire to. Current aspirations, shaped by consumerism and advertising, drive overconsumption and ecological overshoot. New collective visions are needed that are built on more positive values such as care and collaboration, and that emphasise wellbeing and shared prosperity within planetary limits.

An understanding of social tipping dynamics – how small interventions can trigger large, systemic changes in society – can be used to trigger rapid change. For example, removing fossil fuel subsidies and exposing the moral implications of fossil fuel use, strengthening climate education and engagement, and restricting excessive wealth accumulation could have a cascade of positive systemic implications. Active choice editing would further catalyse innovation, such as through phasing out private consumption options that may be harmful and have distributive burdens (e.g. private jets, loyalty programmes for non-essential consumer goods), while expanding access to sustainable alternatives such as affordable public transport and healthy diets. Changing societal aspirations would also require new business models. A business licence to operate would be linked to measures that demonstrate value to society and contributions to ecological health. Public policy is needed to encourage alternative models such as circular businesses, non-profit businesses, worker-owned corporations and co-operatives.

Such changes require participation of citizens to strengthen legitimacy. Through citizen assemblies, citizens, communities and non-market actors must be empowered to co-create alternatives that align lifestyles with ecological realities.

Prioritise the carbon budget: provisioning systems for fundamental needs

With a shrinking carbon budget, priority must go to meeting fundamental needs: nutrition, housing, health and transport. These sectors not only drive the majority of lifestyle emissions but are also where inequalities are most visible and where social tensions most often erupt.

A provisioning systems approach shifts the focus from consumer products to how societies organise the delivery of needs. Governments should direct remaining emissions space and investment into universal access to nutritious food, affordable housing, quality health care and low-carbon mobility. This requires universal basic provisioning, the protection of essential services from speculation, and the expansion of affordable public options such as free, frequent public transport.

Such an approach offers a double dividend: lowering emissions while reducing inequality and strengthening social stability. It ensures that carbon is spent where it matters most – on dignified lives within ecological limits.

Take personal responsibility: apply REDuse to sufficiency living

While systems and policies set the conditions, individuals and households undeniably also play a role. Adapting a simple framework REDuse (Refuse, Effuse and Diffuse) can empower individuals and households in their daily lives to understand areas where action can have high impact. Refuse discourages harmful practices (e.g. cut back on flights and fast fashion). Effuse promotes or advocates for low-carbon alternatives (e.g. vote for climate action and push for 1.5°C-aligned strategies). Diffuse encourages collaboration and actions that spread sufficiency (e.g. shared living). These shifts can cut 1–2.5 tonnes of CO_2e per person annually for an average person in the countries studied, while also delivering health, financial and social benefits.

Applying REDuse to sufficiency living directs individuals and households to where strategic individual intervention can have multiplier effects in the community and broader system. It encourages them to take action in three key areas of life: everyday living choices, work and political participation.

Establish a Council on Global Ecological Stability and Justice

The current confluence of crises calls for a new governance architecture that addresses the problems from a global perspective, that ensures a collaborative approach rather than destabilising competitiveness, and that ensures there is justice and needs-based prioritisation of the remaining carbon budget and resources. Global commons require global governance. This report calls for the creation of a Council on Global Ecological Stability and Justice.

The Council would:

- Monitor the fair consumption space and ensure transparent reporting on global resource use;
- Co-ordinate contraction and convergence* pathways to bring countries and groups into alignment with planetary limits;
- Provide a platform for addressing global inequalities in consumption and emissions;
- Align international finance with sufficiency living and safeguard access to essential services worldwide.

Such a body could complement existing United Nations institutions by anchoring ecological stability and justice as inseparable goals, ensuring that planetary limits and human dignity are jointly respected.

Looking forward

This report demonstrates that the challenge of 1.5°C is inseparable from the challenge of lifestyles. Current levels of consumption are driving ecological overshoot while leaving billions without the means for a decent life. The concept of the fair consumption space highlights a dual imperative: cut overconsumption while raising underconsumption to sufficiency levels.

The analysis shows that lifestyle carbon footprints must decline by 80–90% in high-income countries, and substantially in all others, if global warming is to be limited in line with the Paris Agreement goals. Sufficiency living offers a pathway to achieve this, combining well-being with ecological responsibility. While the remaining carbon budget is rapidly shrinking, it is still possible to reduce overshoot and avoid the most dangerous consequences.

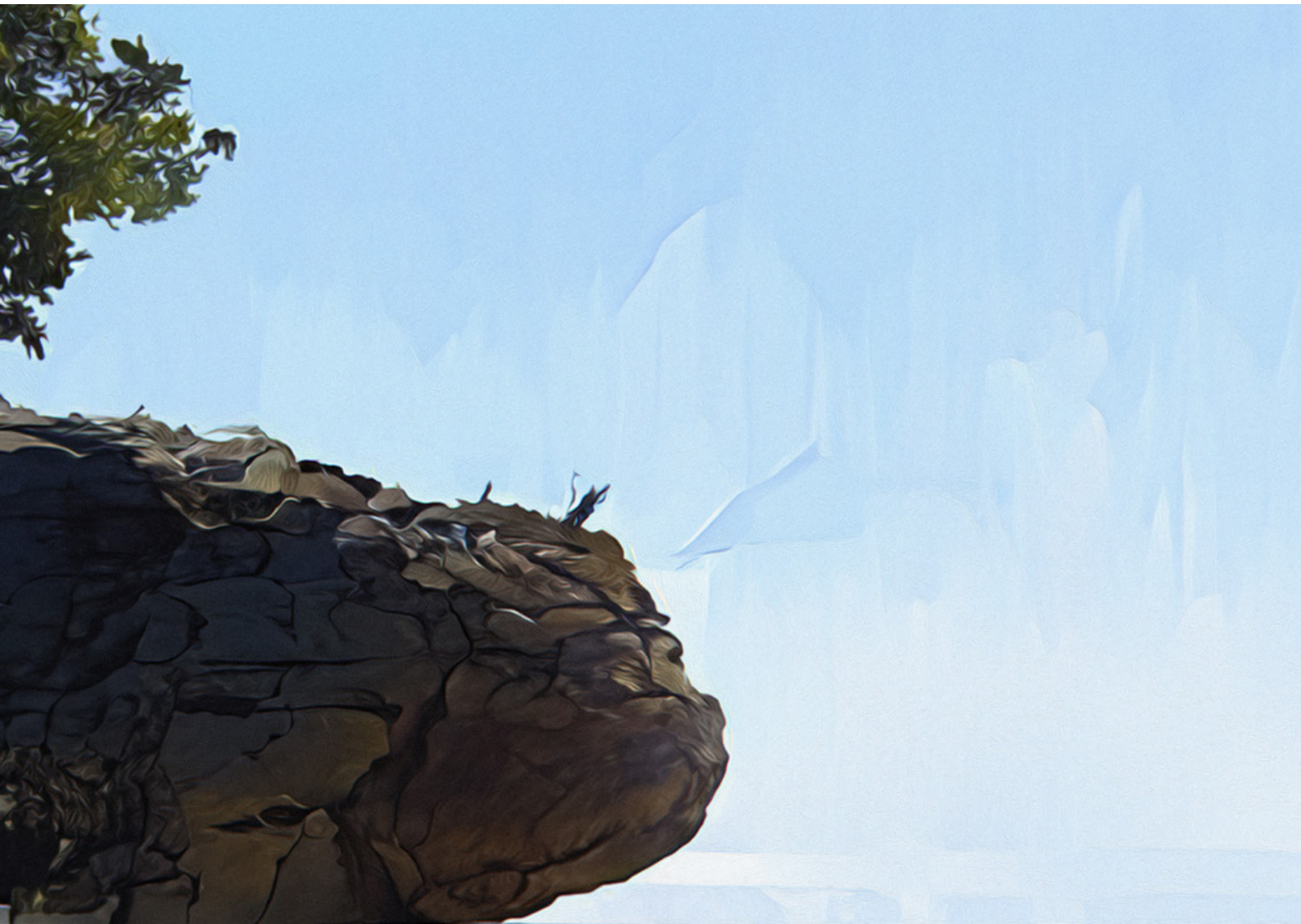
Solutions are available – what is needed is courage and leadership to act. Reductions in food, transport, and housing emissions can each save more than 1 tonne of CO_2e per person annually, while also delivering co-benefits for health, affordability and quality of life. Progressive taxation and wealth caps, alongside global governance mechanisms, are essential to ensure fairness and enable systemic transformation. Individuals and households also play a role by refusing harmful consumption, supporting sustainable alternatives and spreading sufficiency practices.

The task ahead is urgent but achievable. If governments, businesses, and citizens act together to re-align lifestyles with planetary limits, we can bend the emissions curve back towards 1.5°C and create the conditions for equitable and sustainable human flourishing.

* Contraction and convergence calls for global emissions to decline while national per capita emissions equalise, with high emitters cutting faster to enable a fairer share of the remaining carbon budget. It is grounded in the Common but Differentiated Responsibilities and Respective Capabilities (CBDR-RC) principle of the United Nations Framework Convention on Climate Change (UNFCCC), which recognises that all nations share the duty to protect the climate but that high-income countries bear greater responsibility and capacity.

PART I

Introduction



1

Living on the Edge of 1.5

Scientists have long warned of the risks of global heating, with the science getting more refined, more precise and more urgent each year. Even without the science, events and patterns on the ground bear witness to increasingly desperate manifestations of a rapidly changing climate. Yet year after year, these warnings have gone largely ignored – diluted by political compromise, buried by business interests or presumed economic necessities, or deferred with blind faith in future technologies.

Where leaders have made any efforts, they have placed disproportionate faith in market-based solutions and technological fixes, while underplaying the need for deep structural, social and cultural transformations. Above all, we have collectively downplayed the power of mutuality, care and justice. We have largely chosen not to trust in the public's ability to accept radical but necessary and fair decisions. The result? Global average temperatures continue to climb, now reaching thresholds that threaten to unleash accelerating heating and climate impacts.

Scientists now warn that the world is on the verge of passing the 1.5-degree Celsius (°C) warming limit. Recent observations show that warming is already approaching this threshold, and the remaining carbon budget is now so limited that, if current emission levels persist, it could be exhausted by around 2028 – making it almost certain that the 1.5°C target will be breached in the near future (Forster et al. 2025).

1.5°C is not an abstract number. It represents lived experiences in a hugely unequal world: jet-setters hopping across continents for fun while subsistence farmers lose their annual harvests to floods; well-off consumers enjoying shopping sprees in glitzy air-conditioned malls while slum-dwellers in megacities are exposed to intensifying lethal heatwaves. Behind that number are diverse stories of fear, displacement and attempts to adapt.

The deepening climate crisis is causing knock-on effects, disrupting societies in a multitude of ways. Soon, growing numbers of climate refugees will fuel political and cultural tensions. The inconvenience of heat will turn to pandemics as old glaciers thaw, unleashing long-dormant microbes for which we have not had time to build immunity. Infrastructure – from hospital equipment to transport systems – built for the "normal" temperatures of the past, is already straining in today's extreme heat. And as the mercury rises, so do our tempers.

Our focus in this report is on *lifestyles*[1] – a deceptively simple concept that captures complex patterns of behaviour shaped by infrastructure, policy, social norms and culture. Lifestyles are not just about personal choices and behaviours but are embedded in provisioning systems, economic models and political institutions. They are reflections of what societies prioritise – and whose needs, desires and opinions they prioritise. That is why examining how lifestyles are driving the climate crisis, as we do in this report, is not mainly about blaming individuals for behaving irresponsibly, but more importantly about uncovering the deeper, systemic structures that lock us into high-emission pathways.

It also involves clarifying how human consumption should change: to fall within a ceiling of maximum consumption (defined by safe ecological boundaries) and a floor of minimum consumption (defined by the material standards needed to secure human needs, wellbeing and fairness) – what we call the *fair consumption space*.

1 This report adopts the definition of sustainable lifestyles used by the United Nations (UN) Environment Programme: "a cluster of habits and patterns of behaviour embedded in a society and facilitated by institutions, norms and infrastructures that frame individual choice, in order to minimize the use of natural resources and generation of wastes, while supporting fairness and prosperity for all" (Akenji and Chen 2016).

This space is hair-raisingly small and shrinking. If everyone were to enjoy even a basic dignified standard of living – defined by access to clean energy, housing, healthy food, education and health care – the associated emissions would push us near or beyond the 1.5°C limit. This assumes that these needs are met with technologies that are commonly used currently, and that high-end consumers do not make rapid and drastic cuts in carbon-intensive consumption. Over- and underconsumption are interlinked and must be tackled simultaneously, in ways that reflect these linkages.

The most recent decarbonisation pathways indicate that emissions from the average lifestyle must fall from the current 7.1[2] tonnes of CO_2 equivalent (tCO_2e) per capita down to around 1.1–1.4 tCO_2e per capita by 2035, and as low as 0.3–0.7 tCO_2e by 2050, with these ranges reflecting the pathways to remain within warming of 1.5°C and 1.7°C. For many high-income countries, this implies emission cuts of over 80%. Reductions of this magnitude, and within such a limited time frame, cannot be achieved only through changes in individual behaviour or the deployment of cleaner technologies. They require a fundamental transformation in society.

1.1. In this report

This report is a major update to the 2021 edition *1.5-Degree Lifestyles: Towards A Fair Consumption Space for All* and builds on a series of related publications (Box 1.1). It is updated to reflect the most recent scientific assessments of the remaining carbon budget to stay within the 1.5°C limit, and related decarbonisation pathways.

Part II of the report presents quantitative analyses of lifestyle-related greenhouse gas emissions for 25 countries, representing some of the highest-consuming countries as well as middle-income countries and countries where many people struggle to meet even basic needs. This is a much larger and more diverse set of countries than was analysed for the previous editions of the 1.5-Degree Lifestyles report, providing a stronger basis for conclusions.

For each country, section 3 identifies emission hotspots of consumption and estimates the *lifestyle carbon footprints* of the population in comparison to target levels for keeping within warming limits. Reduction pathways for nine selected case countries are explored through a range of options that, if prioritised for climate and social impact, would contribute to bringing lifestyles within a fair consumption space for all.

For this 2025 edition of the 1.5-Degree Lifestyles report, we have taken the difficult – and profoundly sobering – step of analysing not just the pathways to remain within 1.5°C, but extending this to 1.7°C. This is not a concession; it is an act of honesty. The remaining carbon budget consistent with a two-thirds chance of limiting warming to 1.5°C has shrunk considerably to just around two years of emissions at current rates (Forster et al. 2025). Scenarios that reach 1.7°C are associated not only with increasing expected impacts but also with higher uncertainties and hard-to-assess risks, especially regarding feedback loops – potential self-reinforcing negative impacts that could be triggered at temperature increases exceeding 1.5°C. Getting close to 1.5°C is already triggering dangerous reactions from the Earth system, and we are still far from understanding the full consequences of going up to 1.7°C.

Acknowledging and analysing 1.7°C pathways carries its own dangers. It risks contributing to a shifting of the goal posts – endorsing, even if unintentionally, the delay tactics and inaction of governments, businesses and high-consuming elites. But ignoring this reality would be worse. Analysing the 1.7°C scenarios also means recognising that we will face greater dangers than what we are already experiencing – and, again, that the worst impacts will fall hardest on the world's poorest populations, who have contributed little to this problem in the first place.

Part III of this report presents critical perspectives from the front line of systems thinking around societal transformation. Through six reflection pieces, experts engage with the scientific understanding that we are on the cusp of crossing a critical threshold – one that is both biophysical and social – and explore the broader implications of *sufficiency* as an approach to ensuring wellbeing for all. The pieces challenge longstanding assumptions around private property, the "carbon cost" of poverty eradication, and traditional narratives of sustainable lifestyles being about sacrifice. They present strategies for organising and movement-building and make concrete suggestions around changes needed to mainstream 1.5°C lifestyles (Box 1.2).

The report concludes with **Part IV: Recommendations**, which considers the results of the analysis and asks the question: Where do we go from here? As we look at crossing ecological thresholds, we now have no choice but to also cross social ones; we cannot keep "solving" climate change the same way we have done so far, up to this failure. Section 11 of the report recommends six ways forward, from actions by individuals all the way up to international governance levels. They are starting points that, although rather demanding, constitute only the minimum that is needed if we are to address the magnitude and urgency of ecological overshoot.

2 Unweighted average across the 25 countries assessed in the report.

Box 1.1. Heating up: some reports in the 1.5-Degree Lifestyles series

The first report *1.5-Degree Lifestyles: Targets and Options for Reducing Lifestyle Carbon Footprints* (IGES et al. 2019) was published in 2019. Consumption data for five countries combined with global emission reduction pathways from the database of the Intergovernmental Panel on Climate Change (IPCC) showed that keeping global heating below 1.5°C was challenging but still achievable. The report highlighted the stark inequality in emissions and presented a scenario for an equitable decarbonisation where countries' average per capita emissions from lifestyles would converge by 2030.

The 2021 report *1.5-Degree Lifestyles: Towards A Fair Consumption Space for All* (Akenji et al. 2021) – analysing consumption data for a diverse set of 10 countries – indicated that pathways aligned with the 1.5°C limit still existed for most countries, although for those with very high per capita lifestyle carbon footprints, no such scenarios could be identified. The study emphasised the need to accelerate emission reductions from production systems while also transforming lifestyles towards lower levels of consumption, particularly in high-income countries and among the wealthy, worldwide. The report introduced the concept of the fair consumption space, stressing the importance of eliminating excessive consumption while ensuring that basic needs are met universally.

The 2022 report *Unfit, Unfair, Unfashionable: Resizing Fashion for a Fair Consumption Space* (Cosciemeet al. 2022) applied the fair consumption space concept to the global fashion sector and explored what level of consumption might be compatible with the 1.5°C limit. The data highlighted the need for industry to drastically reduce production volumes and, from the demand side, suggested a consumption of no more than five newly produced clothing items per person per year.

Applying this further to sectors, and now to a specific country, the 2023 report *Food Production and Consumption in a 1.5°C World: Options for Germany* (Latva-Hakuni et al. 2023) analysed the climate impact of food consumption in Germany. It confirmed the need for major changes at all stages of the value chain, including a shift to plant-based diets. It also highlighted the double dividend of reduced meat consumption – how this can reduce emissions from livestock rearing and feed production, but also free up land that can become a carbon sink through rewilding or reforestation.

The 2024 report *Towards a Fair Consumption Space for All: Options for Reducing Lifestyle Emissions in Norway* (Bengtsson et al. 2024) presented pathways to 1.5-degree lifestyles in Norway, one of the wealthiest countries in the world. The study looked not only at the carbon footprint of an average person's lifestyle but also explored the role of within-country inequality. It found that a higher-consumption lifestyle that many Norwegians aspire to, without being regarded as luxurious, has almost twice the climate impact of an average lifestyle in the country.

This 2025 edition of the 1.5-Degree Lifestyles report, *A Climate for Sufficiency: 1.5-Degree Lifestyles – 2025 Update* is an extensive update of the 2021 global edition, reflecting the most recent climate science, and is based on consumption data for 25 countries across all world regions. It shows that sufficiency is imperative as we look set to transgress the 1.5°C environmental ceiling while failing to ensure decent living standards for all, as the consequences of inequality and climate warming collide. It is through a sufficiency approach that lifestyles can be realigned to support both human flourishing and planetary health, including climate stability.

Box 1.2. Expert perspectives in this report

Part III of this report presents critical perspectives from the front line of systems thinking to explore implications of sufficiency as an approach to ensuring wellbeing for all.

Triggering social tipping dynamics. This perspective explores how social change can be triggered by learning from the systems dynamics concept of ecological tipping points. Social tipping can be achieved by identifying key components, or tipping elements, of society that – when pushed – pass a critical threshold at which even small changes can quickly lead to big, self-reinforcing shifts, triggering fast and wide-reaching transformations in behaviours, norms, technologies and infrastructure.

Carbon cost of eliminating poverty. This perspective challenges the conflated argument that raising living standards for billions of people is in conflict with reducing climate-warming emissions. The misconception lies in the perverse and disproved assumption that the rich have to increase their own emissions through economic growth to create opportunities that would eliminate poverty. Such arguments usually fail to consider the need to reduce emissions of the rich in order to open up opportunities for the poor within the fair consumption space. The present report brings an optimistic lens to argue that it is still possible to achieve wellbeing for everyone within the remaining carbon budget for 1.5°C, but high inequality substantially complicates this task and must be addressed.

Accessing wellbeing co-benefits. Climate change mitigation, particularly when it involves changes in consumption or lifestyles, is typically presented as a sacrifice and threat to material comforts of modern life. A wellbeing approach, however, distinguishes between wellbeing outcomes that are valuable to us in their own right, and determinants of wellbeing – which are important but are not ends (for individuals) in themselves. Although changes in transport systems and working hours can enhance wellbeing, misinformation and the existing inertia of unsustainable modes often limit these gains.

Engaging citizen assemblies. There is surging interest in "deliberative mini-publics" – which include citizens' assemblies, citizen juries and citizen panels – that bring together small but representative samples of citizens to discuss complex issues and propose new solutions. When well-designed and well-timed, citizens' assemblies provide a counter-narrative to political polarisation and climate backlash. As well as exploring recent examples of citizen assemblies and lessons learned, this report makes recommendations on what is needed to fully realise the promise of deliberative mini-publics as catalysts for a more sustainable world.

Rethinking private property. If we are serious about confronting climate breakdown, we must confront the property regimes that lock us into destruction. Private property is often celebrated as the cornerstone of prosperity – praised for fuelling innovation, protecting individual freedom and anchoring civilization itself. But in reality, the modern institution of private property frequently works in reverse: producing instability, deepening inequality, and concentrating control over land, labour and life in the hands of a few. What is framed as a vehicle for liberty and abundance often functions as a mechanism of exclusion, hoarding and environmental degradation. Rethinking private property is a necessary condition for any just and liveable future.

Escaping climate tunnel vision. The ongoing crisis is more profound and multi-faceted than seen through the "carbon tunnel vision" of mainstream sustainability policy. A deeper reason for our ecological and social failures may be that modern societies have tended to value scientific knowledge and technology over other ways in which people understand and relate to nature. Indigenous and local knowledge systems, built over generations of living in close connection with ecosystems, contain valuable wisdom about how to live sustainably. More than technical optimisation, what is needed is a cultural renaissance and a chance for societal renewal. In an age of global unrest and fragmentation – from regional conflicts to geopolitical rivalries – reconnecting with nature can also mean reconnecting with each other.

1.2. Sufficiency and the fair consumption space

The previous report in this series introduced the concept of the *fair consumption space*. This edition expands on that idea, demonstrating how *sufficiency living* – lifestyles without excess consumption – can support human flourishing while achieving climate stability. The analyses show that a sufficiency approach is essential, especially as we appear on course to transgress the 1.5°C environmental ceiling while a large share of humanity remains below the floor of essential consumption. The dual crises of inequality and climate breakdown are increasingly colliding.

Economistic thinking has falsely equated material accumulation with success – or even with wellbeing itself. This narrow way of thinking has seeped into individual and household choices, as well as into how governments plan, invest and govern. Citizens have been reduced to consumers, and the natural world is treated as capital to be extracted, all in service of endless growth and profits. Since we only measure production growth and do not account for negative effects on the climate and ecosystems, the overall consequences of a growing economy are shrouded in darkness. The worsening ecological crisis, rising social unrest and green backlash episodes, and deepening mistrust in public institutions are not separate problems – they are symptoms of this same flawed logic.

Bounded by this way of thinking, dominant approaches to addressing climate change have failed to recognise that the system of endless accumulation itself is the problem. Instead, the focus has been on optimisation – making the system more efficient and productive, using fewer resources to achieve the same end goal. This ignores that even with the strictest and most efficient standards for production, the current economic system will still end up breaching planetary boundaries. Enhancing efficiency might delay ecological collapse, but it cannot prevent it. By giving the impression that effective action is taken, a narrow focus on efficiency could even be counterproductive, locking us even further into a system that is destined for breakdown.

The starting point for *sufficiency* is fundamentally different. It begins by asking: how much is enough to ensure wellbeing within the regenerative limits of the Earth? Efficiency involves achieving short-term, marginal technological improvements – doing more with less – hoping that these marginal efforts will add up to humanity living within ecological limits. This overlooks that through rebound effects[3], efficiency often ends up enabling increased consumption rather than reducing environmental pressures. Sufficiency, on the other hand, is about reducing absolute consumption in the long term. It is grounded in the biophysical processes of the planet and aims to align human activity with what the Earth can actually sustain (Princen 2003).

Sufficiency is a transformative approach to living well within planetary boundaries – not by striving for "more", but by redefining how much is "enough". It shifts our focus away from accumulating goods and towards cultivating wellbeing and meaningful lives – moving from consumerism to care, from economic growth to shared prosperity. Achieving sufficiency involves reorganising systems and values so that quality of life can be maintained or improved even as material throughput decreases.

3 Efficiency gains can unintentionally increase emissions elsewhere. Direct rebounds (e.g., driving more due to fuel-efficient cars) can offset up to 30% of expected savings, while indirect or economy-wide rebounds can exceed 50% (Schmidt-Bleek 1993; Sorrel 2012). Rebounds can also occur with modal shifts and sufficiency actions (Buhl 2014; Ottelin et al. 2017). Sharing economy models may also risk increasing emissions if they generate additional demand (Clausen et al. 2017).

PART II

Living Within a Fair Consumption Space

This part of the report assesses current lifestyles and consumption patterns through the lens of a *fair consumption space*, exploring the transformations needed to achieve this vision of a fair and sustainable future. Unlike sectoral and territorial accounting approaches, a focus on consumption exposes the gap between needs and wants, and reveals inequalities. The consumption-based perspective provokes questions about values, justice, collective priorities and how much is enough.

2

A Sufficiency Approach to Sustainable Lifestyles

2.1. A fair consumption space for sustainable lifestyles

Lifestyles as used in this report goes beyond individual consumption and behaviours, acknowledging the structural factors – such as institutions, norms, financial means and constraints, and infrastructures – that shape options and choices for individuals (Box 2.1) (Akenji and Chen 2016).

Critical to understanding lifestyle changes are *systems of provisioning*[4], which predetermine the options that become available for consumption and how sustainable they are. Taking into account the role of provisioning systems shifts the focus from consumption as individual behaviour to the systems behind dominant products and consumerism (Figure 2.1). The lifestyle changes required for achieving a climate-safe future need to be underpinned by a transformation of globally dominant systems of provisioning.

For this report, the concept of a *fair consumption space*[5] (Figure 2.2) offers a benchmark for sustainable and equitable lifestyles (Box 2.2).

4 Systems of provisioning can be defined as the entire set of societal arrangements through which people's needs (or wants) are met. This is not limited to supply chain and business processes, but includes economic, political, cultural and institutional structures.

5 For more on the fair consumption space, see 1.5-Degree Lifestyles: Towards A Fair Consumption Space (Akenji et al. 2021).

Box 2.1. The lifestyle approach

Lifestyles are complex, socially shaped patterns of consumption and behaviours, reflecting how people meet their needs and aspirations. The lifestyle approach recognises that consumption patterns are shaped not just by individual preferences, but also by broader socio-technical systems (Figure 2.1). Dominant patterns of consumption and lifestyles reflect three key influences:

- *System structures:* Political, technological, socio-economic and physical infrastructures (and related market forces) that determine what is available, affordable and convenient.
- *Social contexts and aspirations:* Cultural norms, identities and values that shape what people aspire to and view as desirable.
- *Individual preferences:* Personal attitudes, knowledge and motivations that influence decisions regarding ways of living.

Currently, dominant provisioning systems – how and what goods and services are designed, produced and delivered – make unsustainable choices the cheapest, most convenient or socially reinforced option. At the same time, widely held aspirations – driven by materialism and consumption – promote carbon-intensive lifestyles that degrade nature and exacerbate inequality. The lifestyle approach seeks to transform both provisioning systems and societal aspirations, making sustainable options available, attractive and accessible for all.

Crucially, the lifestyle approach recognises that responsibility for what lifestyle and consumption options are available for individuals goes far beyond what individual consumers or citizens can directly influence. This highlights the influential roles of policy makers, businesses and cultural institutions in shaping enabling environments for low-carbon, inclusive and nature-positive ways of living.

Figure 2.1. The building blocks of lifestyles

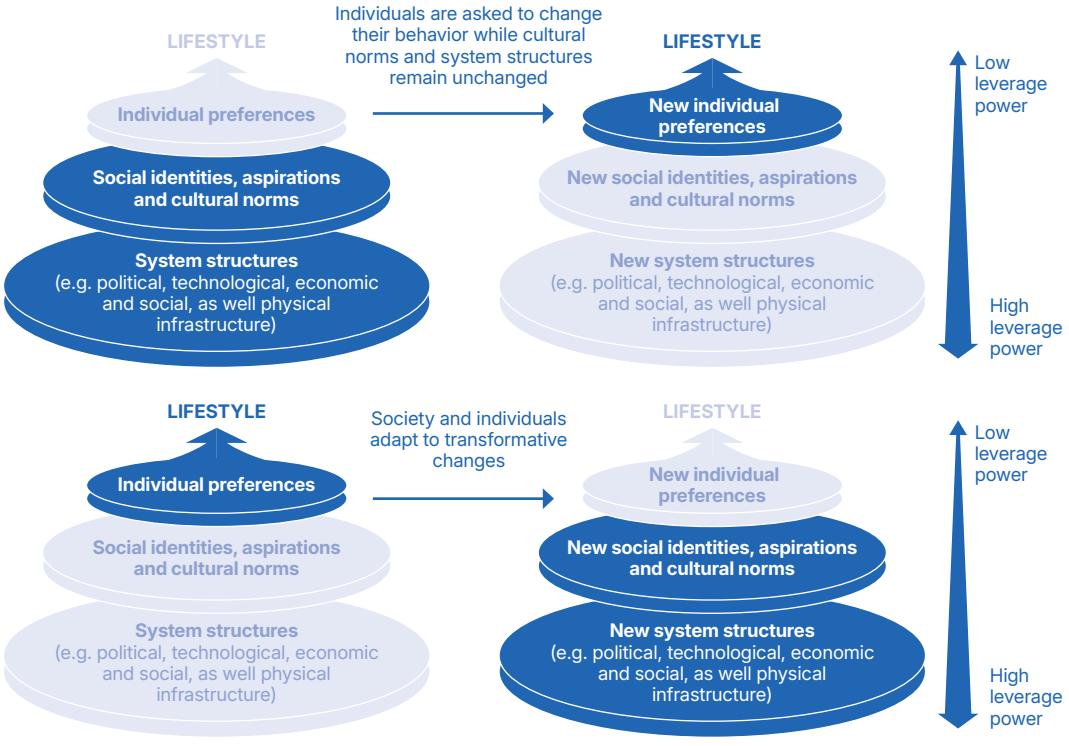
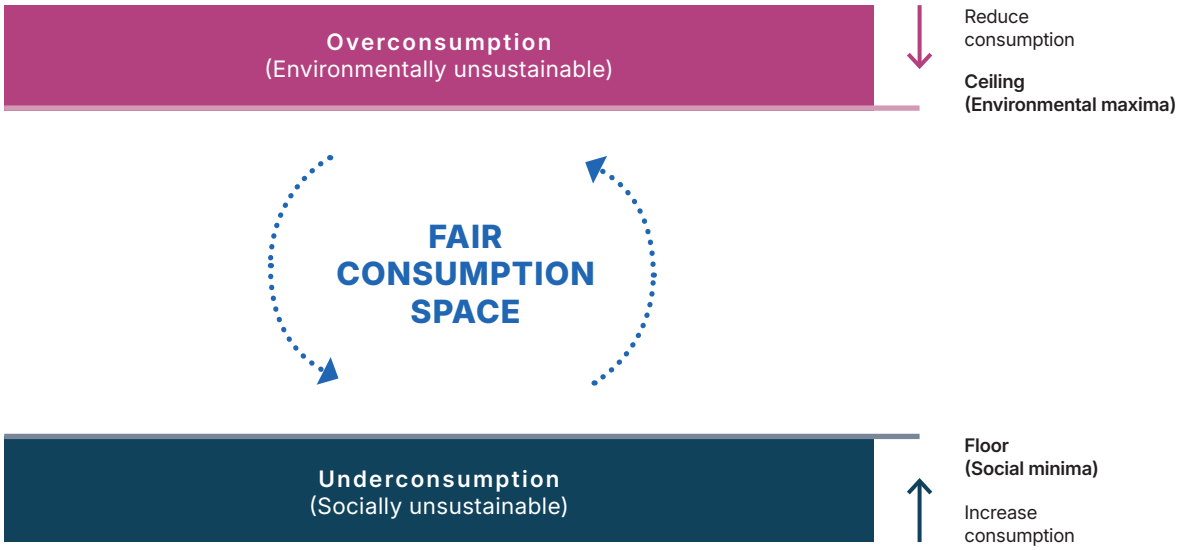


Figure 2.2. A fair consumption space for sustainable lifestyles, defining limits for over- and underconsumption



Adapted from Akenji et al. 2021.

For this report, the fair consumption space ceiling is defined as the maximum allowable emissions for staying within safe climate limits, understood as the 1.5°C target of the Paris Agreement. The 1.5°C target illustrates how delayed mitigation action has led to an extremely narrow space for fair consumption, highlighting the urgency of accelerated action.

This upper limit of society's total emissions is translated into targets for *lifestyle carbon footprints*[6], or the total greenhouse gas emissions associated with an individual's or a household's everyday consumption, measured in tonnes of CO_2 equivalent (tCO_2e) per person per year. Establishing these footprint targets involves allocating 72%[7] of the remaining emission budget to household consumption, excluding emissions from public services and investments. The emission targets are based on the Carbon Budget Explorer (Dekker et al. 2024), which synthesises selected emission reduction scenarios compiled for the IPCC Sixth Assessment . Only scenarios with limited deployment of negative emission technologies are used, resulting in lower emission targets than used in some other studies. For more details on how lifestyle carbon footprint targets are derived, see Annex A.1.

On a global basis, the resulting lifestyle carbon footprint targets are 1.1 tCO_2e per capita per year by 2035 and 0.3 tCO_2e per capita per year by 2050 (Figure 2.3). These targets reflect how the lifestyle-related emissions of an average individual globally would need to decrease. A minimum fairness requirement is that high-emitting countries reduce emissions faster towards the global target, following the principle of "contraction and convergence[8]".

In this analysis, countries' per capita lifestyle emissions are assumed to converge by 2035. Such a convergence would require immediate, deep and sustained emission cuts in high-income countries. However, it is important to understand that our convergence assumption still represents a pragmatic approach to global fairness, allowing high-emitting countries larger per capita shares

6 Taking a consumption-based perspective, the lifestyle carbon footprint was established as a key framework in the 2019 1.5-Degree Lifestyles report (IGES et al. 2019), building on earlier work on consumption-based carbon accounting. For more details, see section 3 of this 2025 update.

7 The estimate that 72% of global carbon footprints are attributable to household consumption is based on Hertwich and Peters' (2009) multi-regional input–output (MRIO) analysis covering 73 countries and 14 aggregated regions, with data from 2001 (Global Trade Analysis Project database).

8 Contraction and convergence calls for global emissions to decline while national per capita emissions equalise, with high emitters cutting faster to enable a fairer share of the remaining carbon budget. It is grounded in the Common but Differentiated Responsibilities and Respective Capabilities (CBDR-RC) principle of the United Nations Framework Convention on Climate Change (UNFCCC), which recognises that all nations share the duty to protect the climate but that high-income countries bear greater responsibility and capacity.

Box 2.2. A fair consumption space

A **fair consumption space** is an ecologically healthy perimeter that supports an equitable distribution of resources and opportunities for people to fulfil their needs and aspirations, and achieve wellbeing. Recognising the power imbalances in society – especially between the rich and the poor – and the growing competition over resources, the approach suggests parameters for ensuring wellbeing for everyone within ecological limits. Analyses using the fair consumption space approach can clarify the political economy of sustainable consumption, while also helping to guide planning and practical decision making regarding the range of consumption choices that exist across key lifestyle domains such as housing, transport, services, food, leisure and consumer goods.

A **social floor (or minima)**: This is the minimum level of material and resource consumption required to ensure human dignity, wellbeing and participation in society. It defines a threshold for a life of dignity, below which no one should fall. This boundary needs to be achieved at the individual level.

An **environmental ceiling (or maxima)**: This marks the upper limits of consumption to keep environmental impacts within safe boundaries and the carrying capacity of the planet. In the case of climate change, the upper limit is defined by the amount of emissions compatible with limiting global warming to 1.5°C. As a framework for sustainability in a wider sense, the ceiling needs to reflect a range of environmental pressures and risks, such as those included among the planetary boundaries (Rockström et al. 2009). This boundary needs to be achieved at the collective level.

The fair consumption space framework does not define hard limits to individual consumption and lifestyle-related emissions. Instead, it provides a ceiling for how society's emissions need to fall from now on and associated benchmark targets for an average person's lifestyle emissions (dividing total permissible emissions by projected world population). As long as emissions fall along this pathway, there can be significant diversity in lifestyles, ways of satisfying needs and even in per capita emissions.

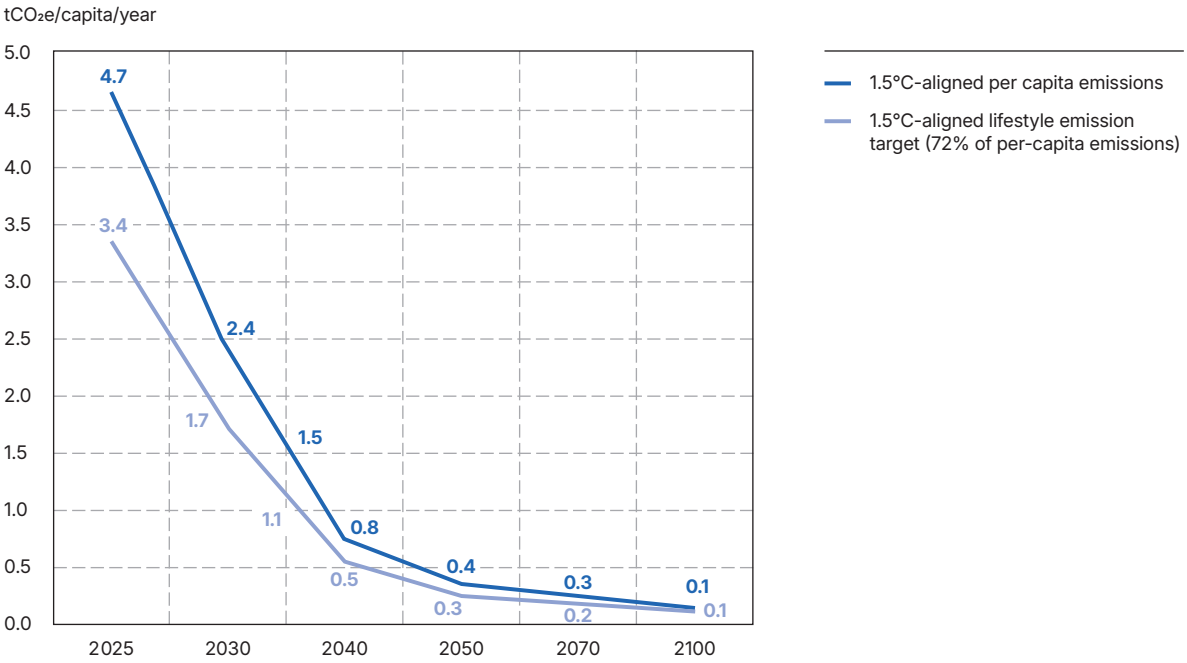
The operating "space" between the floor and the ceiling constitutes a range of lifestyle options and consumption choices – with different combinations of goods and services – that can be exchanged, substituted, and adjusted with time, as the ecological balance shifts. However, the more people who consume above the benchmark target, and the greater their excess consumption, the harder it becomes to ensure that everyone can reach the minimum level of consumption (the social floor). A fair sharing of the remaining space to pollute is not optional but a necessary condition for gaining public acceptance for effective climate policies.

Source: Akenji et al. 2021; Smith and Akenji 2025.

of the limited remaining carbon budget than countries with more modest footprints. An equitable sharing of the remaining carbon budget across the global population would require even more drastic emission cuts in wealthy countries. Additionally, taking into account the historic responsibility of high-income countries for the CO_2 currently in the atmosphere implies that most of these countries have effectively used up their emission budgets already (Lucas et al. 2020; Williges et al. 2022; UNEP 2023a).

Quantifying the social floor to protect dignified living and wellbeing is not straightforward, considering the great variations across cultural, social, climatic and political contexts (Rao and Min 2018a). Nonetheless, definitions of social floors can be guided by international recognised frameworks – such as the Universal Declaration of Human Rights (United Nations 1948) – that articulate shared principles of dignity and equity. The literature on human needs and capabilities frameworks (with notable authors including Len Doyal, Ian Gough, Manfred Max-Neef, Amartya Sen and Martha Nussbaum) provides another fruitful starting point. The following sub-section explains how the present analysis quantified the social floor and related emissions.

Figure 2.3. Per-capita emission targets and lifestyle carbon footprint targets for the period 2025 to 2100, compatible with a 1.5°C heating limit (tCO_2e/capita/year)



2.2. Sufficiency as a blueprint for lifestyles

This fair consumption space framework not only defines the outer boundaries for sustainable and equitable living, but also highlights the space between them. Within this range, the sufficiency principle can be put into practice – defining standards for lifestyles that are compatible with both human flourishing and planetary health[9] (Box 2.3).

The question of how sufficiency can be achieved within a fair consumption space is explored in this report both qualitatively and quantitatively. The UN Environment Programme defines sufficiency as "the need to increase resource use in low-development contexts to enable dignified living, while reducing consumption levels in those parts of the population who live well above the capacity of the planet" (Fanning et al. 2020; 2024).

This definition highlights the dual nature of sufficiency: ensuring improved material conditions where consumption falls short of human dignity, while reducing consumption where it exceeds ecological limits. In practice, this balance is closely tied to the idea of *decent living standards*, understood as a set of essential material pre-conditions for human wellbeing – including shelter, nutrition, basic amenities, health care, transport, information, education and public space (Rao and Baer 2012; Rao and Min 2018; Rao et al. 2019).

Within this framing, the notion of a fair consumption space can be seen as an operationalisation of the sufficiency principle. It provides a way to translate the normative idea of living well within planetary boundaries into quantifiable limits on resource use and a basis for assessing distributional equity.

Sufficiency living can be achieved at a "sweet spot" within the fair consumption space. It is defined not as a separate concept, but as a pragmatic interpretation of where lifestyles can balance wellbeing without material excess. To understand sufficiency living in this report, we draw from the Decent Living Standards (DLS) framework (Rao and Min 2018; Millward-Hopkins et al. 2020; Kikstra et al. 2021; Vélez-Henao and Pauliuk 2023). However, for this report, we extend the material requirements beyond basic necessities to incorporate cultural variations and reflect additional societal needs for dignified living: access to nutritious and healthy food, secure housing, transport, health care, education, sufficient clothing and essential goods, and communication – all provisioned in ways that are equitable and ecologically responsible (Box 2.3).

9 Planetary health refers to "the health of human civilisation and the state of natural systems on which it depends" (Whitmee et al. 2015).

Box 2.3. Provisioning needs for sufficiency living

Sufficiency living can be achieved at a "sweet spot" within the consumption space that ensures wellbeing without material excess. Table 2.1 outlines the key provisioning needs that define sufficiency living, framing each to support dignity, health and participation in society while avoiding overconsumption. The figures provide indicative benchmarks that justify and clarify the service levels used in this report. They illustrate how sufficiency living requirements can be translated into lifestyle carbon footprints, offering one possible balance between essential human needs and ecological limits.

Other institutions have proposed thresholds focused mainly on wellbeing, and while some guidelines approximate a sufficiency approach, they offer partial entry points for aligning wellbeing with environmental sustainability – often in divergent or contradictory ways. Below are a few examples.

- For **nutrition**, our benchmark for sufficiency reflects the EAT-Lancet planetary health diet of around 2,500 kilocalories per capita per day (adjusted for country-specific requirements), emphasising plant-based foods and limiting red meat and dairy within planetary boundaries. This contrasts, for example, with the United States, where attempts to incorporate sustainability into the Dietary Guidelines for Americans (DGA) have been unsuccessful and recommended patterns vary in their environmental impacts (USDA ARS 2015; Blackstone and Conrad 2020). The Nordic Nutrition Recommendations (NNR) moves closer to the sufficiency approach for nutrition, by integrating environmental considerations alongside health (Nordic Council of Ministers 2023).

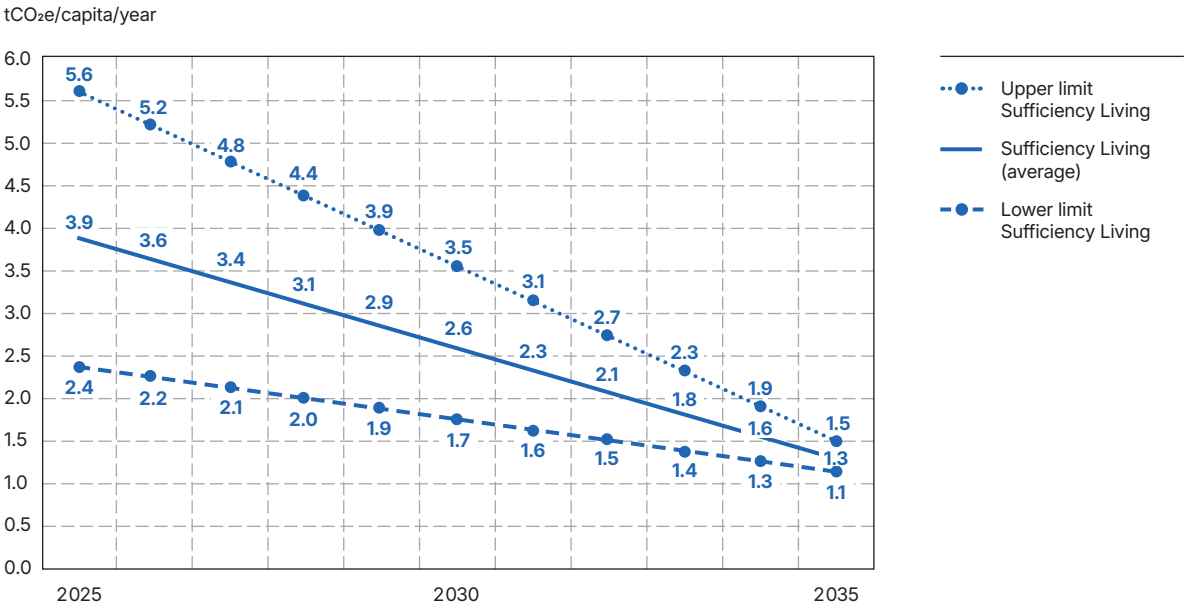
- In **housing**, the sufficiency benchmark is around 15–20 square metres (m^2) per person, derived from Decent Living Standards formulas that scale floor area with household size. Building codes and housing standards typically set minimum room size and requirements for habitability (e.g., minimum dimensions for bedrooms), but they typically do not prescribe a recommended minimum per capita floor space. The World Health Organization's (WHO) Housing and Health Guidelines do not prescribe a universal floor-area standard, but instead they emphasise reducing overcrowding and ensuring adequate living conditions (WHO 2018a). This guideline seeks to ensure comfort, privacy, and health while avoiding material excess, with the added assumption of zero-energy buildings and renewable energy systems by 2035. Even though the WHO guideline is often seen as health oriented, it simultaneously extends the perspective to incorporate environmental boundaries.

- For **transport**, our sufficiency benchmark assumes around 4,200–8,000 passenger-kilometres (p-km) per person per year, compared with more than 25,000 p-km per capita in car-dependent countries. This benchmark prioritises access rather than unlimited mobility and considers the modal split for achieving this level of travel, aligning with the International Transport Forum's Sustainable Accessibility for All framework (ITF 2024a), which calls for transport systems that are equitable, efficient and sustainable. It also resonates with the WHO's Global Action Plan on Physical Activity 2018–2030 (WHO 2018b), which promotes urban and transport design that enables active mobility such as walking and cycling, thereby supporting both health and environmental goals.

Table 2.1. Provisioning needs for sufficiency living

Domain	Provisioning need	How it supports sufficiency living
Nutrition	Diverse and nutritious diet within planetary boundaries (EAT-Lancet planetary diet; 2,500 kilocalories/capita/day, adjusted for country-specific requirements). Access to drinking water.	Provides all essential nutrients while keeping food-related environmental impacts within planetary limits; balances personal health and planetary health by emphasising plant-based foods and moderate animal product consumption.
Housing	Adequate living space of around 15–20 m² per person (measured as average floor area in a household or shared dwelling), zero-energy building standards and renewable energy systems by 2035.	Ensures comfort, privacy and health while avoiding excessive floor area; adjusts minimum living space needs according to household size, while acknowledging existing disparities in per capita space across countries; prioritises zero-energy buildings and renewable energy, reducing long-term resource demand and emissions.
Personal transport	Sufficient mobility for work, education and social life (around 4,200–8,000 p-km/capita/year). Modal split assumes high public and active transport shares (on average 40% public transport, 24% active transport, limited car use and no flying).	Access to opportunities and services without car dependency; priorities walking, cycling and public transport to minimise emissions and resource use. Minimum mobility needs are adjusted using population-weighted density to reflect differences in settlement patterns and accessibility.
Goods	Sufficient, functional wardrobe of 74 clothing items (Coscieme et al. 2022), essential appliances and household items.	Meets functional needs for daily life without promoting unnecessary accumulation; focuses on durability, repairability, sharing systems and low-impact production.
Leisure and services	Access to cultural, educational and healthcare services.	Enables wellbeing, personal growth and participation while relying on shared facilities and efficient infrastructure.

Figure 2.4. Sufficiency Living translated into per capita lifestyle carbon footprint levels (tCO_2e/capita/year)



Note: The estimated lifestyle carbon footprint is based on detailed quantitative analysis for nine countries – Argentina, Brazil, Canada, Finland, France, Japan, South Africa, the United Kingdom and the United States – and reflects a population-weighted average footprint of around 1.3 tCO_2e per capita per year under a low-carbon scenario. The presented range of 1.1–1.5 tCO_2e by 2035 captures variation across these countries in terms of material requirements, behavioural assumptions, and efficiency improvements, and should be interpreted as a plausible interval rather than as a precise threshold. While it offers a meaningful benchmark, the approach has several limitations. First, it assumes continuity in current infrastructure and provisioning systems, without modelling large-scale structural transformations that could further reduce emissions. Second, although material needs are adjusted for national conditions such as climate, population density, and household size, the model applies a generalised sufficiency threshold that may not fully capture cultural or social variation in needs. Third, the results rely on assumptions about behavioural and technological shifts – such as diets, commuting practices and energy efficiency – that carry uncertainty when projected into the future.

To assess the climate implications of achieving sufficiency living, these extended material requirements are translated into lifestyle carbon footprints using life-cycle emission factors (for more on material requirements and calculation method, see Annex A.2). Meeting sufficiency living standards globally with today 's technologies and practices is estimated to result in a lifestyle carbon footprint of around 3.9 tCO_2e per capita per year, which could decline to around 1.3 tCO2e by 2035 (Figure 2.4). This reduction is based on alow-carbon scenario that draws on existing and quantifiable innovations (including social innovations) and current technology in renewable energy, electrified transport, reduced commuting, efficient building standards, sustainable food systems, and shared consumption.[10]

The decline from today's level to the 2035 estimate reflects the adoption of these shifts, which together drive decarbonisation of energy and materials, efficiency gains and demand-side shifts that lower the emissions intensity of meeting sufficiency requirements. However, it assumes continuity in current provisioning systems and does not incorporate yet[11] large-scale systemic transformations such as universal basic services, where housing, mobility and energy are collectively provided to reduce dependence on private consumption.

10 Reductions under the low-carbon scenario are achieved through sector-specific measures: in nutrition, improved livestock feed, fertiliser and manure management, agroforestry, soil carbon storage, and sustainable rice cultivation; in housing, a 100% renewable energy mix, zero-energy building standards, and low-carbon or recycled construction materials; in mobility, electrification, smaller vehicles, higher occupancy rates, more remote working, and shifts toward active and public transport; and across goods, leisure, and services, efficiency improvements, material substitution, and process innovations. Further details can be found in Annex A.2.

11 This reflects a research gap: there is limited quantitative analysis of how systemic transformations such as universal basic services would affect material requirements and lifestyle carbon footprints.

The scenario is socially inclusive, as it recognises diverse national contexts – such as climate conditions, household size and population density – while assuming equitable access to essential services. This prevents the reinforcement of existing inequalities by assuming, as a baseline, universal access to food, housing, personal transport, health care, education, communication, clothing and other essentials. At the same time, it is ecologically responsible, aligning with planetary boundaries by reducing material throughput with measures such as sustainable diets, clean energy and low-carbon construction. For more on material requirements and calculation method, see Annex A.2.

2.3. Targets for lifestyle carbon footprints and sufficiency living

The 2024 UN Emission Gap Report warns that delayed action and weak decarbonisation efforts risk locking the world into a 2.6-3.1°C warming trajectory (UNEP 2024a). The present report underscores that concern, while also showing that a sufficiency living path could achieve shared prosperity within the warming range of the Paris Agreement.

Our analysis shows that achieving sufficiency living for all is unlikely to be compatible with the 1.5°C warming limit under current provisioning systems. By 2035, the 1.5°C- and 1.7°C-aligned lifestyle carbon footprint targets range between 1.1 and 2.3 tCO_2e per capita per year. However, meeting sufficiency living standards by 2035 is estimated to result in around 1.3 tCO_2e per capita per year (Figure 2.4).

While 1.5°C remains the most ambitious and widely-endorsed goal of the Paris Agreement, the likelihood of staying within this limit is rapidly diminishing (Forster et al. 2025). Therefore, we also include a 1.7°C benchmark (Figure 2.5). This supplementary target helps illustrate the narrowing window for effective climate action and the urgency of accelerating emissions cuts to ensure a fair and liveable future.

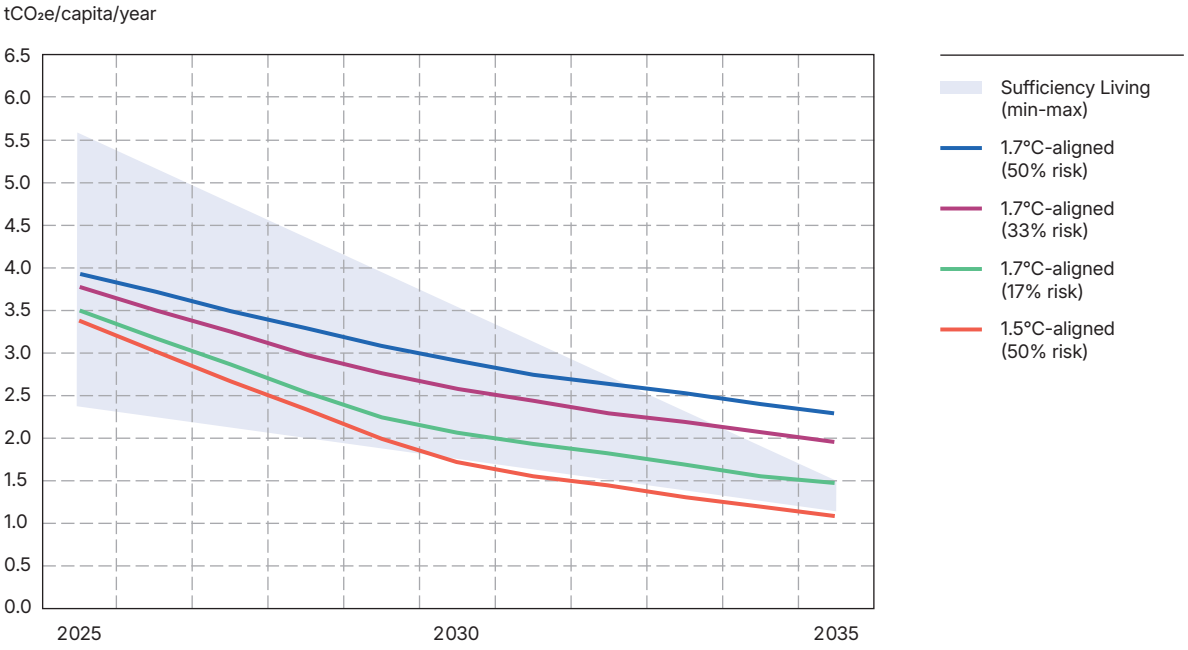
The sufficiency living scenario indicates that eradicating poverty, as promised in the 2030 Agenda and the Sustainable Development Goals, and avoiding catastrophic climate change is possible. However, it shows that this requires a radical equalisation of consumption opportunities. The scenario assumes that everyone adopts sufficiency living by 2035, including those that currently consume much more than this level. The scenario also highlights the need for systemic changes in provisioning systems. The scenario analysed in this study includes a range of decarbonisation options in production systems (see Section 2.2), but it does not consider all possible options.

Further ambition is both needed and achievable. Regarding nutrition, deeper decarbonisation can be achieved through regenerative agricultural practices and reforestation or rewilding of land freed up due to reduced meat production. In personal transport, investment in infrastructure and space reallocation could shift the focus from mobility to accessibility, allowing people to meet their needs and maintain social connections with much less travel and fewer emissions.

Achieving such a pathway with deeper emission cuts, will require more than rapid technological deployment: it demands deep reforms in provisioning systems and resource-use patterns, together with cultural and social value shifts that place equity and ecological responsibility at the center of development. This means rethinking how goods and services are provided, restructuring resource flows, mainstreaming sufficiency within climate, economic, and social agendas, and engaging new actors who have not yet been part of the conversation – including for example urban planners, financial institutions, educators, cultural and community organisations, and citizen or youth movements.

The results of our analysis highlight a worrying challenge. As global emissions continue to rise, the remaining carbon budget for 1.5°C – or even 1.7°C – is rapidly diminishing. The implication of this narrowing space is simple but profound: the further 1.5°C slips out of reach, the harder it becomes to ensure equitable wellbeing on the planet! Further delays are unacceptable.

Figure 2.5. Lifestyle carbon footprint targets: ceiling (1.5°C- and 1.7°C-aligned lifestyle carbon footprint) and sufficiency living translated into per capita LCF level (tCO_2e/capita/year)



5.6	5.2	4.8	4.4	3.9	3.5	3.1	2.7	2.3	1.9	1.5	Sufficiency Living (max)
3.9	**3.6**	**3.4**	**3.1**	**2.9**	**2.6**	**2.3**	**2.1**	**1.8**	**1.6**	**1.3**	Sufficiency Living (average)
2.4	2.2	2.1	2.0	1.9	1.7	1.6	1.5	1.4	1.3	1.1	Sufficiency Living (min)
3.9	**3.7**	**3.5**	**3.3**	**3.1**	**2.9**	**2.7**	**2.6**	**2.5**	**2.4**	**2.3**	1.7°C-aligned (50% risk)
3.7	**3.5**	**3.2**	**3.0**	**2.7**	**2.6**	**2.4**	**2.3**	**2.2**	**2.0**	**1.9**	1.7°C-aligned (33% risk)
3.5	**3.2**	**2.8**	**2.5**	**2.2**	**2.0**	**1.9**	**1.8**	**1.7**	**1.6**	**1.4**	1.7°C-aligned (17% risk)
3.4	**3.0**	**2.6**	**2.3**	**2.0**	**1.7**	**1.5**	**1.4**	**1.3**	**1.2**	**1.1**	1.5°C-aligned (50% risk)

Note: The light blue band represents the "sufficiency living sweet spot." Its lower bound corresponds to the lowest sufficiency living-aligned lifestyle carbon footprint among the selected countries, while the upper bound corresponds to the highest.

Ceiling and sufficiency values are based on different accounting approaches (input–output versus life-cycle assessment): the ceiling, or lifestyle carbon footprint targets, are based on a consumption-based approach that allocates 72% of the global carbon budget to household consumption, following Hertwich and Peters (2009). This excludes emissions from public services and most infrastructure, which are recorded under government or investment accounts in input–output (IO) models. However, emissions from "dwellings" consumed by households are included under the category "shelter", which accounts for 19% of household emissions – primarily from direct energy use, with a smaller share of embodied emissions in housing. A small share of construction-related emissions, likely linked to renovations or minor household projects, is also included. Broader societal infrastructure remains outside the household share in this approach.

In contrast, the sufficiency living-aligned lifestyle carbon footprint is calculated using a bottom-up life-cycle assessment (LCA) approach, which includes both direct household consumption and a share of public services and infrastructure required to meet material requirements for good, aspirational sufficient lifestyles. As a result, the carbon footprint required to meet the sufficiency living footprint reflects a broader scope of household-related emissions than the 72% household share derived from IO-based ceiling calculations. This methodological difference in system boundaries introduces a challenge when comparing the ceiling and sufficiency living values directly. The LCA-based estimate of the sufficiency threshold likely may overestimate the emissions attributable to individual households, as it includes structural and collective inputs that extend beyond the IO-defined 72% household share. Conversely, the IO-based ceiling may underestimate the full carbon cost of providing those same services, as it excludes essential societal infrastructure. Therefore, the gap between sufficiency living and the ceiling should not be interpreted as a precise overshoot, but rather as a boundary mismatch. Future efforts to harmonise accounting scopes would improve analytical comparability and enhance the robustness of the fair consumption space framework.

3

Lifestyle Carbon Footprints

Building on the fair consumption space framework, this section examines the structural determinants of personal lifestyles and consumption patterns, their climate implications and their compatibility with the "sweet spot" of sufficient living – situated between the social floor that ensures wellbeing and the environmental ceiling that prevents material excess.

To assess the climate impact of lifestyles and consumption activities, the report uses the metric of *lifestyle carbon footprints* – that is, the greenhouse gas emissions both directly emitted and indirectly induced by household consumption[12]. This includes goods and services purchased and used by households, while excluding emissions from government consumption and capital formation. The approach allows for a more precise analysis of how structural determinants shape household provisioning systems and individual behaviours, and of the resulting emissions linked to everyday consumption.

By using *consumption-based accounting*, the lifestyle approach accounts for the emissions embedded in goods and services consumed by households, regardless of where these emissions are produced (Box 3.1). This provides a clearer picture of the climate impact of lifestyles, especially in high-income countries that rely heavily on imported products. Importantly, this approach also highlights the influence of socio-technical lock-ins – such as urban form, transport infrastructure and energy systems – that shape or constrain the choices that individuals and households end up making.

The analysis in this section covers 25 countries, representing a wide range of income levels, regional contexts and lifestyle patterns: Argentina, Australia, Brazil, Canada, China, Estonia, Finland, France, Germany, Greece, India, Indonesia, Italy, Japan, Kenya, Nigeria, Norway, Poland, Portugal, Slovenia, South Africa, South Korea, Türkiye, the United Kingdom and the United States. These countries were selected based on three overlapping rationales:

G20 Membership: Eighteen of the countries are part of the G20, representing the world's largest economies and highest emission contributors.

European representation[13]: To allow for detailed comparisons within Europe and with the United States, a set of European Union (EU) countries beyond the G20 members was included (i.e., Estonia, Finland, Greece, Poland, Portugal, Slovenia).

Geographic and economic diversity: Kenya and Nigeria were added to broaden coverage to under-represented regions, particularly in sub-Saharan Africa, where inclusion was possible based on data availability.

12 Estimates for lifestyle carbon footprint include not only carbon dioxide (CO_2) but also other major greenhouse gases: CO_2, methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF_6), expressed as CO_2 equivalents.

13 The Horizon-funded project Positive Sustainable Lifestyles (PS-Lifestyles, or PSL), which focused on enabling lifestyle shifts in Europe, involved several EU countries for which data were already gathered in the course of the project. Since Hot or Cool Institute is a partner in the project, it was natural to involve the project as a partner and thus analyse participating countries for this report.

Box 3.1. Consumption-based accounting for lifestyle carbon footprints

This report uses a consumption-based accounting approach to estimate lifestyle carbon footprints. Unlike production-based inventories – which count only emissions from domestic production – consumption-based accounting captures the full climate impact of household consumption by including emissions embedded in imported goods and services and excluding those from exported products.

Unlike traditional consumption-based accounts, however, the analyses in this report focus on emissions associated with the lifestyle of individuals, leaving out emissions from government and capital investment. This focus makes the lifestyle carbon footprint approach especially valuable for connecting everyday consumption choices with their structural drivers and for identifying the emissions that arise from household provisioning systems and individual behaviours. This makes it a more accurate reflection of a population's standard of living and global climate impact.

The analysis focuses on six lifestyle domains: food, housing, personal transport, consumer goods, leisure and services. However, while most other consumption-based studies use data on how much money is spent on individual categories of goods and services, the lifestyle carbon footprint studies are based largely on physical consumption data, such as passenger-kilometres travelled by car and kilograms of cheese consumed annually.

Such physical data are used for nutrition, housing and personal transport – the three domains that in most countries account for the majority of lifestyle-related greenhouse gas emissions. The lifestyle carbon footprint of these domains is calculated by combining the physical consumption data with lifecycle assessment data* on the greenhouse gas emissions associated with each product or service. The consumption data are obtained mainly from national statistics, surveys and publications.

For the other three domains – consumer goods, services and leisure – data on monetary spending are used similarly to conventional consumption-based studies. This is due to the limited availability of both detailed physical consumption data and related life-cycle assessment data. The emissions from consumer spending in these three domains are calculated using a multi-regional input-output (MRIO) model**, which shows the carbon intensity of each major economic sector.

For more on consumption-based accounting, see Akenji et al. (2021).

* Most of the carbon intensities used in the study are from the Ecoinvent database (Wernet et al. 2016).
** The EXIOBASE model (Stadler et al. 2018) is used.

Countries are classified by income level, using World Bank categories of gross national income (GNI) per capita[14]:

- High income countries: Australia, Canada, Estonia, Finland, France, Germany, Greece, Italy, Japan, Norway, Poland, Portugal, Slovenia, South Korea, United Kingdom, United States
- Upper-middle income countries: Argentina, Brazil, China, Indonesia, South Africa, Türkiye
- Lower-middle income countries: India, Kenya, Nigeria.

Compared to the previous edition of this report (Akenji et al. 2021), the expanded selection of countries reflects diversity in political, economic, cultural and infrastructural conditions. This offers valuable insights into both the diversity of current lifestyles and the potential for future transitions towards sustainable living across diverse geographical and socio-economic contexts.

14 Low-income countries are not included in this analysis due to limited availability of high-resolution, comparable consumption and emissions data required for lifestyle-level assessments. As data quality and coverage improve, future work should aim to include these countries to ensure a more globally representative analysis. For more on data gaps, see Annex D.

The global average lifestyle carbon footprint is 7.1 tCO_2e per person per year – more than four times the level compatible with a 1.5 °C pathway. Every country in the 25-nation study exceeds the Paris-aligned target.

3.1. Comparing lifestyle carbon footprints across countries and income categories

Per capita lifestyle carbon footprints vary notably across the countries analysed in this report (Figure 3.1 and Table 3.1), with an overall average of 7.1 tCO_2e per capita per year across all 25 countries assessed. The contrast is striking: the United States has the highest national average lifestyle carbon footprint at 18.1 tCO_2e per capita per year – over 10 times higher than Nigeria's (1.5 tCO_2e), a lower-middle income country with the lowest footprint in the full dataset. Among high income countries, the averages range from below 8.0 in France and Greece to a peak of 18.1 in the United States. Most of the upper-middle income countries fall between 5.0 and 5.7 tCO_2e, while Brazil (4.0 tCO_2e) and Indonesia (3.0 tCO_2e) remain lower. Lower-middle income countries have the smallest footprints, with India at 3.2, Kenya at 1.6 and Nigeria at 1.5 tCO_2e.

These results show that emissions correlate with income: an income–emissions gradient emerges both across and within income categories (Figure 3.1). On average, high income countries emit roughly four times as much per person as lower-middle income countries, while upper-middle income countries fall in between. At the same time, variation within each group – such as the gap between the United States and Greece, or between Argentina and Indonesia – shows that income alone does not fully explain differences in lifestyle carbon footprints. To understand these differences more fully, it is necessary to look beyond the income–emissions relationship and examine how emissions relate to human development outcomes. Figure 3.2 compares lifestyle carbon footprints with the UN Inequality-adjusted Human Development Index (IHDI)[15], showing strong saturation effects: beyond a certain point, higher emissions do not translate into significantly higher levels of wellbeing.
This pattern can be seen across all income groups:

- Within the **lower-middle income** group, India has the highest per capita lifestyle carbon footprint, yet its development level remains modest, while Nigeria and Kenya have lower emissions and a lower IHDI score.

- Among the **upper-middle income** countries, noticeably different development levels are found in countries with almost identical lifestyle carbon footprint values (such as China, South Africa and Türkiye), while Indonesia achieves notably higher IHDI at a much lower carbon cost than South Africa.

- Finally, major differences are found within the **high income** cluster, with lifestyles in the United States, Australia and Canada emitting 106%, 51% and 28% more greenhouse gases than the group average to provide about the same development level.

These results imply that the correlation between income, climate impact and development is not linear[16], and that opportunities exist to move towards a fair consumption space within the climate limits. Grounded in a sufficiency approach, these opportunities are discussed in section 4.

While this highlights the social dimension of carbon footprints, it is equally important to consider the environmental thresholds within which lifestyles must operate. When measured against climate and sufficiency benchmarks (Box 2.4), all countries exceed sustainable levels. The average lifestyle carbon footprint across the 25 countries (7.1 tCO_2e) is more than six times the 1.1 tCO_2e

15 The IHDI is a measure of human development that adjusts the standard Human Development Index (HDI) for inequalities within a country (UNDP 2025).

16 Similar conclusions have been drawn by Steinberger and Roberts (2010) and Dorn et al. (2024).

target for 2035 aligned with limiting warming to 1.5°C. Compared to this target, high income and upper-middle income countries heavily exceed the target; India and Indonesia moderately exceed it; and even countries with relatively small footprints, such as Kenya and Nigeria, exceed it slightly. As a result, lifestyle carbon footprints must drop by the following percentages by 2035 to keep global warming below 1.5°C: 82–94% in high income countries, 64–81% in upper-middle income countries, and 29–67% in lower-middle income countries.

To complement this picture, the sufficiency living-aligned footprint provides a different perspective – focusing on the minimum carbon required to meet material needs for sufficiency living for all. Globally, this is estimated at around 1.3 tCO_2e/capita by 2035 (see Annex A.2), and most countries – especially the high and upper-middle income countries – far exceed this level. This translates into deeply embedded patterns of overconsumption, consumerist aspirations and materially intensive lifestyles,

Yet averages can conceal inequalities even in high income countries: some groups still fall short of sufficiency living standards, while others overshoot through overconsumption – highlighting the dual challenge of reducing excess and ensuring decent living for all. Substantial reductions are therefore needed, not just through individual behaviour change, but especially through transformative shifts in provisioning systems, and a redefinition of what constitutes a good life, leading to a broader societal transition towards sufficiency-oriented values.

However, a few countries – notably Nigeria, Kenya, and in some domains India and Indonesia – are already near the sufficiency living benchmark. This partly reflects the impact of inequality: while affluent groups drive higher emissions, large segments of the population in these countries still lack access to sufficiency living standards, and in some cases even to basic, decent living standards – particularly in areas such as housing, energy and transport[17]. While these countries may not face the same pressure to reduce total emissions, they face a different challenge: enabling low-carbon development pathways that expand access to basic services equitably and sustainably.

17 See, for example: Rao et al. (2019); Kikstra et al. (2021); Huo et al. (2023); Millward-Hopkins and Oswald (2023).

Figure 3.1. Lifestyle carbon footprint by country and consumption domain, and globally unified targets for lifecycle carbon footprint and sufficiency living (tCO_2e/capita/year)

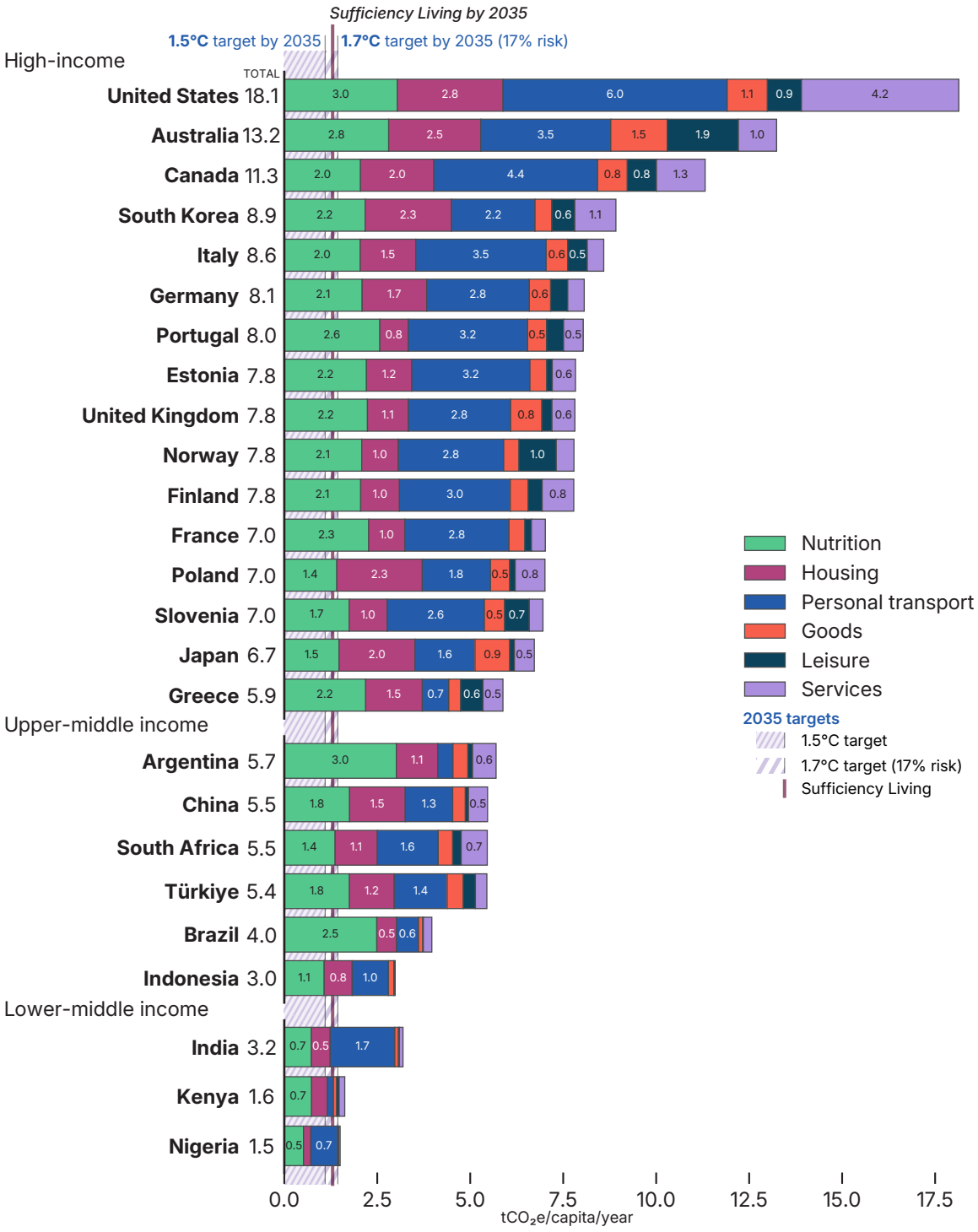
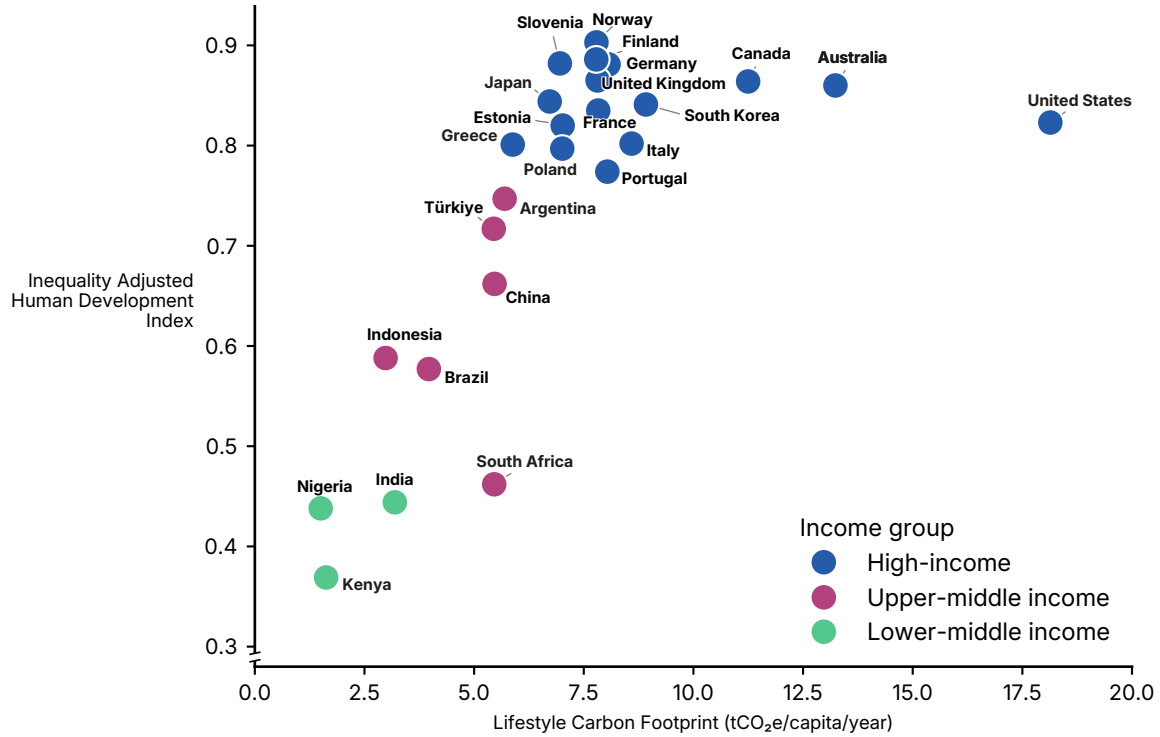


Table 3.1. Average lifestyle carbon footprint (tCO_2e/capita/year) by country, consumption domain and economic grouping

	Nutrition	Housing	Personal transport	Goods	Leisure	Services
High-income countries, mean	**2.2** 24.4%	**1.6** 18.3%	**2.9** 33.3%	**0.7** 7.4%	**0.6** 6.5%	**0.9** 10.1%
United States	**3.0** 16.8%	**2.8** 15.7%	**6.0** 33.2%	**1.1** 6.0%	**0.9** 5.0%	**4.2** 23.3%
Australia	**2.8** 21.2%	**2.5** 18.7%	**3.5** 26.4%	**1.5** 11.5%	**1.9** 14.4%	**1.0** 7.8%
Canada	**2.0** 18.1%	**2.0** 17.4%	**4.4** 38.9%	**0.8** 7.0%	**0.8** 6.9%	**1.3** 11.6%
South Korea	**2.2** 24.4%	**2.3** 26.0%	**2.2** 25.2%	**0.5** 5.1%	**0.6** 6.9%	**1.1** 12.4%
Italy	**2.0** 23.8%	**1.5** 17.4%	**3.5** 40.8%	**0.6** 6.7%	**0.5** 6.1%	**0.4** 5.2%
Germany	**2.1** 26.0%	**1.7** 21.5%	**2.8** 34.2%	**0.6** 7.1%	**0.5** 5.7%	**0.4** 5.5%
Portugal	**2.6** 32.0%	**0.8** 9.5%	**3.2** 40.0%	**0.5** 6.4%	**0.5** 5.7%	**0.5** 6.6%
Estonia	**2.2** 28.2%	**1.2** 15.6%	**3.2** 40.6%	**0.4** 5.7%	**0.2** 1.9%	**0.6** 8.0%
United Kingdom	**2.2** 28.6%	**1.1** 14.1%	**2.8** 35.2%	**0.8** 10.7%	**0.3** 3.5%	**0.6** 7.9%
Norway	**2.1** 26.7%	**1.0** 12.6%	**2.8** 36.4%	**0.4** 5.2%	**1.0** 12.9%	**0.5** 6.1%
Finland	**2.1** 26.4%	**1.0** 13.4%	**3.0** 38.3%	**0.5** 6.1%	**0.4** 4.9%	**0.8** 10.9%
France	**2.3** 32.3%	**1.0** 13.8%	**2.8** 39.9%	**0.4** 6.0%	**0.2** 2.6%	**0.4** 5.3%
Poland	**1.4** 20.2%	**2.3** 32.8%	**1.8** 26.2%	**0.5** 7.3%	**0.2** 2.1%	**0.8** 11.4%
Slovenia	**1.7** 25.1%	**1.0** 14.7%	**2.6** 37.6%	**0.5** 7.8%	**0.7** 9.6%	**0.4** 5.3%
Japan	**1.5** 21.9%	**2.0** 30.3%	**1.6** 24.0%	**0.9** 13.9%	**0.1** 1.9%	**0.5** 8.0%
Greece	**2.2** 37.2%	**1.5** 25.9%	**0.7** 12.1%	**0.3** 5.4%	**0.6** 10.2%	**0.5** 9.1%
Upper-middle income countries, mean	**1.9** 39.5%	**1.0** 21.5%	**1.1** 21.8%	**0.3** 6.3%	**0.1** 2.7%	**0.4** 8.3%
Argentina	**3.0** 52.9%	**1.1** 19.5%	**0.4** 7.2%	**0.4** 7.0%	**0.1** 2.2%	**0.6** 11.1%
China	**1.8** 32.1%	**1.5** 27.4%	**1.3** 23.3%	**0.3** 6.2%	**< 0.1** 1.5%	**0.5** 9.4%
South Africa	**1.4** 25.1%	**1.1** 20.8%	**1.6** 30.0%	**0.4** 7.1%	**0.2** 4.2%	**0.7** 12.8%
Türkiye	**1.8** 32.2%	**1.2** 22.1%	**1.4** 26.1%	**0.4** 7.9%	**0.3** 6.0%	**0.3** 5.7%
Brazil	**2.5** 62.7%	**0.5** 13.4%	**0.6** 14.9%	**0.1** 2.9%	**< 0.1** <0.1%	**0.2** 5.8%
Indonesia	**1.1** 36.0%	**0.8** 25.3%	**1.0** 32.7%	**0.2** 5.1%	**< 0.1** <0.1%	**< 0.1** <0.1%
Lower-middle income countries, mean	**0.7** 31.3%	**0.4** 17.8%	**0.9** 41.4%	**< 0.1** 3.5%	**< 0.1** 1.5%	**< 0.1** 4.5%
India	**0.7** 22.8%	**0.5** 15.9%	**1.7** 54.4%	**< 0.1** 3.1%	**< 0.1** <0.1%	**< 0.1** 3.0%
Kenya	**0.7** 45.2%	**0.4** 25.8%	**0.2** 10.3%	**< 0.1** 5.4%	**< 0.1** 4.0%	**0.2** 9.3%
Nigeria	**0.5** 34.5%	**0.2** 13.0%	**0.7** 47.4%	**< 0.1** 2.3%	**< 0.1** <0.1%	**< 0.1** 2.6%

Note: The figures indicate the lifestyle carbon footprint of the domains in tCO_2e/capita/year and their percentage share of the country's total footprint.

Figure 3.2. Comparing Inequality-adjusted Human Development Index (IHDI) and lifestyle carbon footprint (tCO_2e/capita/year)



3.2. Overall patterns and analysis by economic grouping

This section elaborates country-specific results by comparing the overall patterns and hotspots of the average lifestyle carbon footprints by economic grouping. Although cultural and infrastructural differences shape lifestyle-related consumption patterns across countries (Akenji and Chen 2016; Akenji et al. 2016; Ottelin et al. 2018), income level offers a more straightforward basis for comparison – not only because data on income groups are widely available, but also because income levels correlate with levels of consumption and impacts of lifestyles (Figure 3.1 and Table 3.1).

Despite regional and cultural differences, three domains – transport, nutrition and housing – consistently emerge as the primary sources of lifestyle-related emissions. Together, they account for 66% to 95% of the total footprint across income groups, with their relative share increasing as income decreases. This pattern reflects in part the essential nature of nutrition and housing, which are generally less easy to reduce and therefore make up a larger share in low-income settings. Meanwhile, excessive and often discretionary consumption patterns – notably in transport – drive much of the footprint in high-income contexts.

- In **high income** countries, the average lifestyle carbon footprint is 8.8 tCO_2e per capita per year, with personal transport representing the largest emission hotspot, accounting for 33% of the total footprint on average. This is driven by high rates of private car travel and frequent air travel. Nutrition and housing also contribute significantly (on average, 24% and 18%, respectively), reflecting diets rich in animal products and energy-intensive, large homes.

- **Upper-middle income** countries show lower but still substantial lifestyle footprints, averaging 4.8 tCO_2e/person. Here, emissions are more evenly distributed across domains, with nutrition (40%) and personal transport (22%) as the main contributors.

- **Lower-middle income** countries have the lowest footprints, averaging 2.1 tCO_2e/person. In these contexts, personal transport makes up the largest share (41%), followed by nutrition (31%), although the absolute levels remain low due to limited access and resources.

The following analysis examines domain-level results across the country income groups, showing how nutrition, housing, transport, goods, leisure and services contribute differently to average lifestyle carbon footprints.

Nutrition

Overall, the food-related carbon footprints of the 25 case countries are relatively similar (Figure 3.3), except for Indonesia, India, Kenya, and Nigeria, where meat consumption is notably lower (Figure 3.4). Emissions reflect either high consumption volumes, the carbon intensity of specific products, or a combination of both. In the United States, Australia, Canada, Portugal, Argentina, and Brazil, high food-related carbon footprints are driven by heavy meat consumption – especially of beef, which is more abundant than in other countries and has a higher carbon intensity compared to other meats. Dairy products also contribute substantially, particularly in high income countries, where high milk intake and carbon-intensive cheese add greatly to food-related emissions.

Different food cultures and dietary habits are also reflected in food footprints, as consumption patterns vary among the case countries: fish consumption is high in South Korea, Portugal, Japan, China, and Indonesia, while dairy consumption is generally low in these countries (Portugal being an exception with high dairy consumption). Beans are most widely eaten in India, Kenya, Nigeria, and Indonesia, and in these same countries meat accounts for the lowest share of total food consumption. High consumption of carbon-intensive rice also shapes food footprints in Indonesia, China, India, Japan, Greece and South Korea.

High income countries

In high income countries, dietary patterns are marked by high consumption of animal-based products. Meat consumption alone accounts for 51% of diet-related emissions on average, underscoring the need to reduce meat consumption to mitigate the climate impact of animal-based diets. In terms of meat consumption, high-income countries show both high volume and variety. Poultry and pork dominate overall consumption patterns, with countries such as the United States, Canada and Australia recording particularly high intake levels (23–30 kilograms for pork, and 49–79 kilograms for poultry). Beef consumption is also substantial in some countries (e.g., 38 kilograms in the United States and 26 kilograms in Australia) and contributes greatly to emissions due to its high carbon intensity. Meat preferences also vary culturally: South Korea and Japan favour pork, while lamb holds stronger roots in Australia and Greece.

Dairy is the second largest contributor to the nutrition-related lifestyle carbon footprint in all high income countries, accounting for 18% on average. This is due largely to higher dairy consumption compared to upper- and lower-middle income countries – especially in the United Kingdom, the United States, Australia, Finland, Estonia, and Norway, where high intake of milk, carbon-intensive cheese, and other dairy products drives up emissions. In these countries, cheese consumption is notably higher than in lower-income groups, reflecting cultural preferences. That said, regional dietary cultures vary: Japan and South Korea consume little cheese, while milk intake in South Korea, Greece, France and Poland is well below the high-income average. Greece stands out with the highest per capita cheese consumption despite low milk intake, reflecting a strong cultural preference.

Beyond meat and dairy, other major contributors to nutrition-related lifestyle carbon footprints in high income countries include beverages (7.3% on average), other food items (7.1%) and cereals (5.2%). Coffee is the main driver of beverage-related emissions, especially in Estonia, Germany, Slovenia, and Greece, reflecting high consumption of this carbon-intensive product. The "other food" category covers carbon-intensive items such as vegetable oils (notable in the United States and South Korea), cocoa products (such as chocolate, which is significant in France, the United Kingdom, Slovenia, Portugal, Australia, the United States, Germany and Greece) and sugar (notably in Australia). Cereal impacts are generally modest but higher in Japan and South Korea due to methane emissions from paddy fields.

Plant-based protein consumption remains low in most high income countries, although higher levels in Australia, Greece, Slovenia, France and the United Kingdom may reflect dietary diversity or traditional reliance on legumes and pulses. In contrast, in high meat- and dairy-consuming countries such as the United States, Germany, and Canada, plant-based protein intake remains modest, suggesting limited substitution from animal- to plant-based sources.

Upper-middle income countries

In upper-middle income countries, overall food consumption levels are relatively similar to those in high income countries. Meat remains the largest contributor to nutrition-related footprints in all countries, particularly in Argentina and Brazil, where consumption is dominated by beef and poultry. Argentina records the highest beef intake (46 kilograms per capita per year), alongside poultry (48 kilograms) and pork (17 kilograms). Brazil's consumption is similarly meat-heavy, dominated by poultry (47 kilograms) and beef (35 kilograms). In China, high pork consumption reflects traditional diets, while Türkiye shows nearly absent pork consumption due to cultural and religious factors. Indonesia has the lowest meat consumption (20 kilograms) and focused mainly on poultry.

Dairy consumption in upper-middle income countries varies widely. Türkiye, Argentina and Brazil consume quantities comparable to high income countries, although cheese and butter consumption remains low, suggesting limited adoption of Western-style dairy products. South Africa, China, and Indonesia consume much less dairy, leading to smaller dairy-related footprints.

On average, this group consumes more dairy than lower-middle income countries, but with a stronger focus on milk and less on processed products than in high income countries, which shapes the intensity of their footprints. However, dairy consumption is increasing in many countries (OECD and FAO 2023).

Cereal consumption is particularly high in China and Indonesia, where large rice intake drives comparatively high cereal-related footprints, as rice is more emission-intensive than wheat or maize. China and Türkiye show dietary diversification, with relatively high vegetable consumption (485 and 290 kilograms per capita per year, respectively) and moderate consumption of plant-based proteins (17 and 26 kilograms, respectively). Cultural preferences and traditional diets, such as legume-based dishes, may support these patterns and help mitigate the climate impact of an increasing consumption of animal products.

Lower-middle income countries

In lower-middle income countries, overall food consumption is lower than in other income groups, with diets largely plant-based, resulting in low per capita footprints. However, in the area of nutrition, these low footprints often reflect not only the absence of overconsumption but also nutritional deficiencies or insufficient food supply, rather than true sufficiency. Meat and dairy consumption average around 10 kilograms and 57 kilograms per capita per year, respectively, resulting in emissions less than 0.4 tCO_2e per capita per year in total.

India stands out for higher dairy consumption (85 kilograms per capita per year), largely from milk, reflecting cultural and religious norms that favour vegetarian diets. Meat consumption remains very low (7 kilograms), contributing to its low total nutrition footprint (0.7 tCO_2e per capita per year). Kenya and Nigeria have a relatively high vegetable consumption (150 and 360 kilograms per capita per year, respectively), diversifying diets without notably increasing emissions. Plant-based protein consumption averages 20 kilograms per capita per year in this income group – slightly above the 15 kilogram consumption in both high and upper-middle income countries.

In high-income countries meat accounts for about half of diet-related emissions, with dairy adding nearly one-fifth.

Figure 3.3. Nutrition-related carbon footprint (tCO_2e/capita/year) by country and consumption components

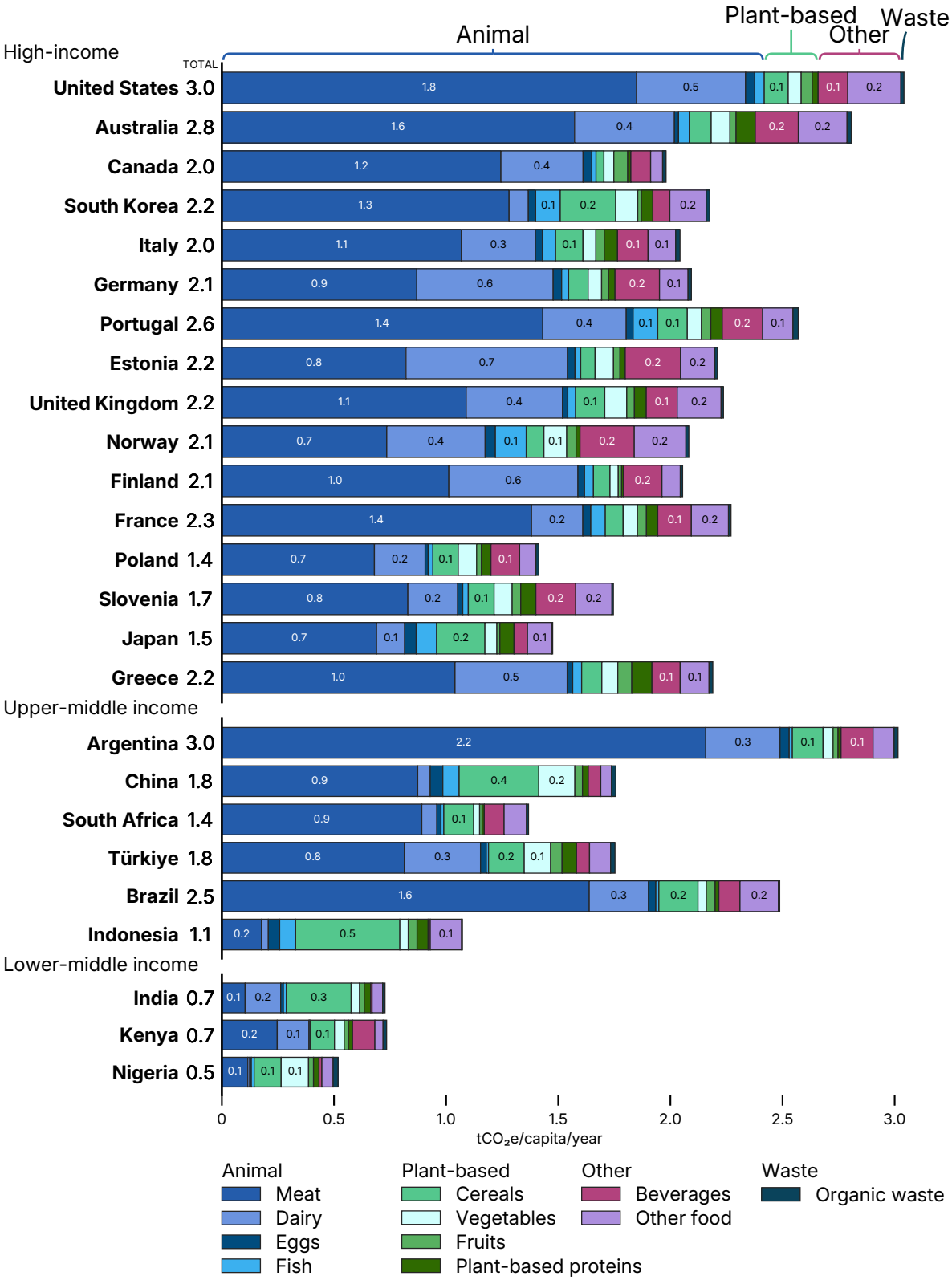
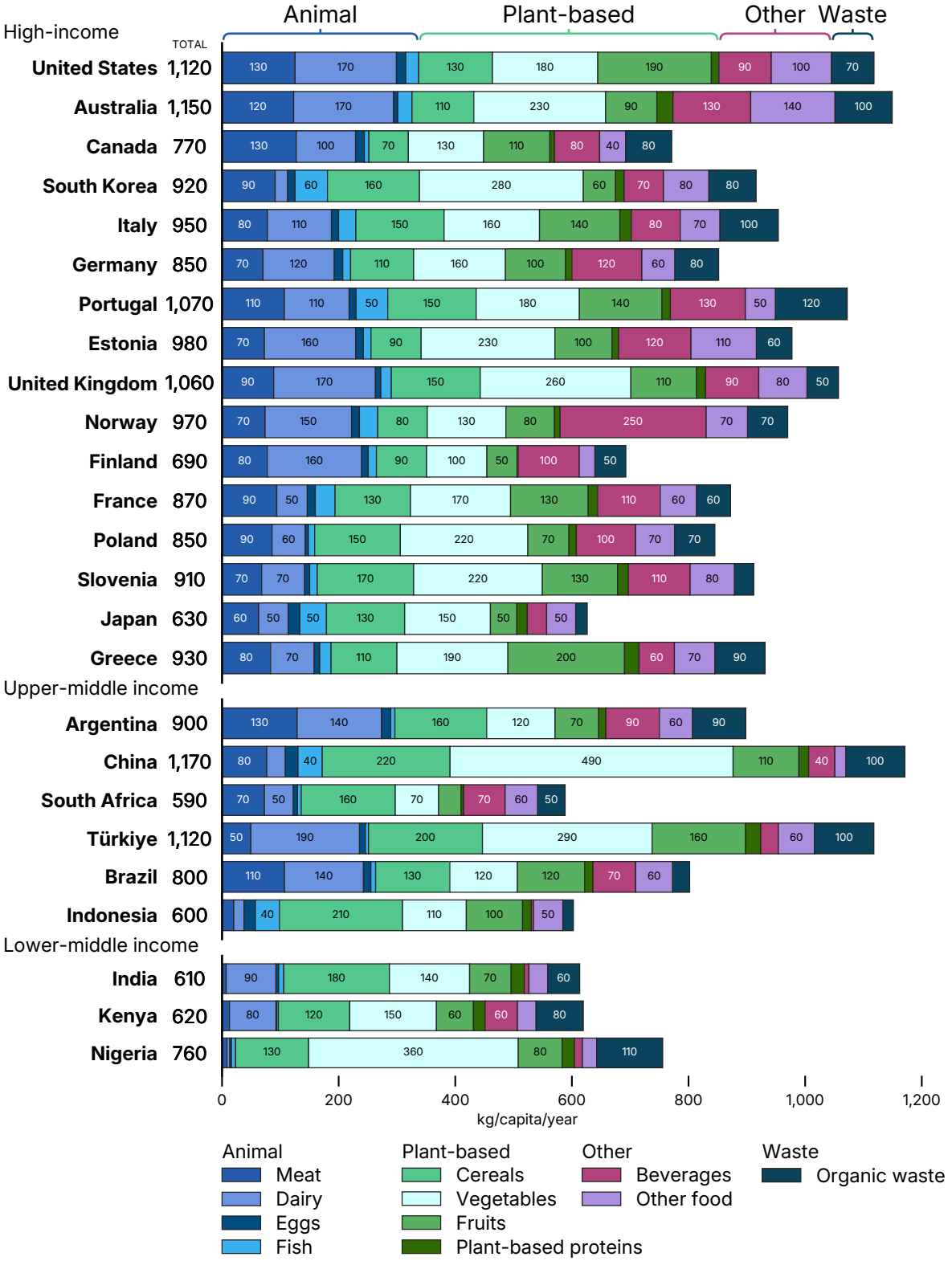


Figure 3.4. Nutrition-related consumption (kg/capita/year) by country and consumption components



Housing

In the housing domain, footprints show substantial variation across income groups, shaped not only by the amount and type of energy consumed but also by the size of constructed living spaces and the materials required to build and maintain them. High income countries tend to have the highest emissions per capita, driven by large living spaces and greater energy consumption (Figures 3.5 to 3.7). Upper-middle income countries follow a similar pattern but, on average, have smaller living spaces and lower energy consumption. Lower-middle income countries show significantly lower footprints, although these often reflect limited access to modern energy and infrastructure rather than efficiency or sufficiency.

Regional characteristics, such as climate, can greatly shape these footprints, for example by determining heating and cooling needs. Cold climates in countries such as Finland and Canada drive higher absolute energy use, much of which reflects necessary energy for thermal comfort – a matter of sufficiency rather than excess. At the same time, the carbon intensity of this energy depends heavily on efficiency factors such as the energy mix: for instance, Norway and Brazil maintain relatively low footprints due to high shares of renewable energy despite considerable consumption. Cultural expectations, such as thermal comfort standards, appliance use, and shared living, also might impact how much energy is consumed in practice.

Settlement structure also matters. For instance, high-density urban areas – such as those found in Japan – consume less than half the per capita electricity for heating and cooling compared to more sprawling cities. Other studies confirm this pattern, showing that compact housing in places such as Japan and South Korea leads to lower energy demands per person relative to sprawling suburban models seen in the United States and Australia (OECD 2018).

High income countries

In high income countries, housing-related footprints are generally the highest, driven largely by expansive living spaces and high levels of energy consumption – which in many countries rely on non-renewable electricity sources and natural gas consumption. Footprints in this group range from 1.4 to 2.8 tCO_2e per capita, with living spaces of 27–73 m^2 and annual energy use of 2,990–11,330 kilowatt-hours (kWh) per person. Countries such as the United States, Australia and South Korea stand out with the largest housing footprints due mainly to heavy reliance on fossil-based energy sources.

Differences within this group reflect a combination of factors: the size of living spaces, the energy mix and cultural expectations around thermal comfort. Larger dwellings increase emissions both through the embedded carbon of construction and through higher demand for heating, cooling, lighting and appliances. In Australia and the United States, where average living space exceeds 70 m^2 per person, this effect is especially pronounced. Smaller homes can help moderate demand, but the energy mix remains decisive – as shown by Poland, where relatively small dwellings still yield high housing footprints because more than 70% of household energy use comes from coal.

By contrast, Canada, Norway and Finland combine relatively large homes with comparatively low emissions due to extensive hydropower, nuclear and biomass energy sources. Norway generates around 89% of its electricity from renewables, offsetting[18] emissions from large average living spaces and high heating demand. Conversely, countries such as the United States, Japan and Australia record high emissions due to their continued dependence on fossil fuels – gas, oil and coal – for both electricity generation and residential heating. In Japan and South Korea, compact housing (<30 m^2 per capita) moderates energy needs, but still a significant share of electricity and other energy comes from non-renewable sources.

More broadly, many European countries achieve more moderate housing footprints through smaller living spaces, cleaner energy mixes and stronger energy efficiency measures. In general, these patterns reflect not only levels of material comfort, but also regional factors such as climate (Eurostat 2024), infrastructure and cultural expectations (Sovacool and Griffiths 2020; Lehner et al. 2024; Richter et al. 2024)regarding thermal comfort and household energy use.

Upper-middle income countries

For upper-middle income countries, overall housing footprints, size of living space and energy demand are mainly lower compared to high income countries (0.5–1.5 tCO_2e, 19–36 m^2, 950–4,250 kWh, respectively; Figures 3.5 to 3.7). Housing-related footprints are largely influenced by mixed energy sources with a larger share of non-renewables, use of gas for cooking and heating, and smaller average living spaces. Argentina and Türkiye show relatively high housing-related footprints from electricity and gas, with Türkiye sourcing only 41% of electricity consumption from renewables and over 60% of "other energy" from fossil gas. By contrast, Brazil's carbon intensity is

18 Even with low-carbon electricity, high energy use remains problematic, straining renewable infrastructure and requiring constant investment. Efficiency and sufficiency must therefore complement clean supply.

notably lower due to the country's high renewable share (87%) and minimal gas and oil use.

On average, living space is 29 m² – well below the high-income average of 48 m² – helping to moderate energy demand. Smaller dwellings in Brazil, Indonesia, South Africa, and China, for example, combined with broader energy mixes, keep footprints moderate – despite heavy reliance on non-renewable electricity and "other" energy in South Africa and Indonesia (80–82% and 72–79%, respectively). China's elevated footprint reflects heavy use of coal and oil, although growing renewable capacity (IEA 2024) and urban planning measures (United Nations 2023) may shift this trend.

Lower-middle income countries

In lower-middle income countries, housing-related footprints, energy use and living space are the lowest across all income groups – ranging from 0.5 to 0.2 tCO_2e per capita, 6–12 m² per person and 830–1,320 kWh of energy use annually. These low footprints stem from small dwellings and minimal use of electricity or other energy sources. For example, average living space per capita is only 6 m² in Nigeria and 8 m² in Kenya, well below the sufficiency living threshold (see Annex A.2). Overall energy and electricity use in these countries is low. For example, in India per capita electricity consumption is only around 245 kWh, while many households still rely on traditional biomass or other low-tech fuels for cooking and heating. In Nigeria, 89% of total household energy use comes from biofuels and waste such as wood, agricultural residues and animal dung.

Despite the reliance on inefficient technologies, the overall housing-related footprint remains low due to limited consumption and, in many cases, warmer climates that reduce heating demand. However, these patterns that result in low emissions are not necessarily signs of climate-friendly lifestyles, but often reflect limited access to energy infrastructure and unsatisfied basic needs, rather than intentional low-carbon living (Rao et al. 2019; Huo et al. 2023).

Housing emissions are driven by living-space size, energy use, and fuel mix. High-income countries have average living space of 27–73 m² per person, while lower-middle-income countries have just 6–12 m².

Figure 3.5. Housing-related carbon footprint (tCO_2e/capita/year) by country and consumption components

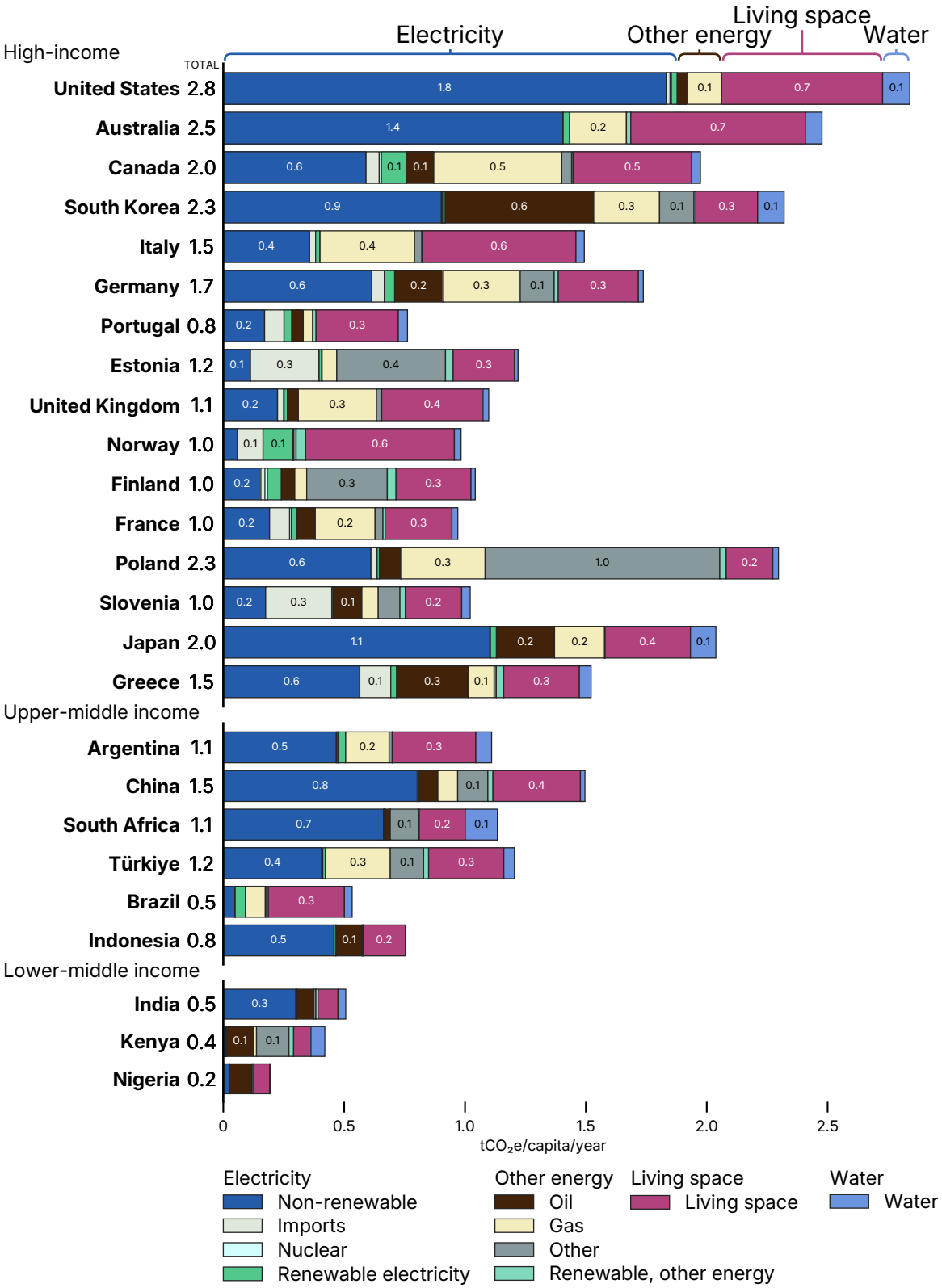


Figure 3.6. Housing-related energy consumption (kWh/capita/year) by country and consumption components

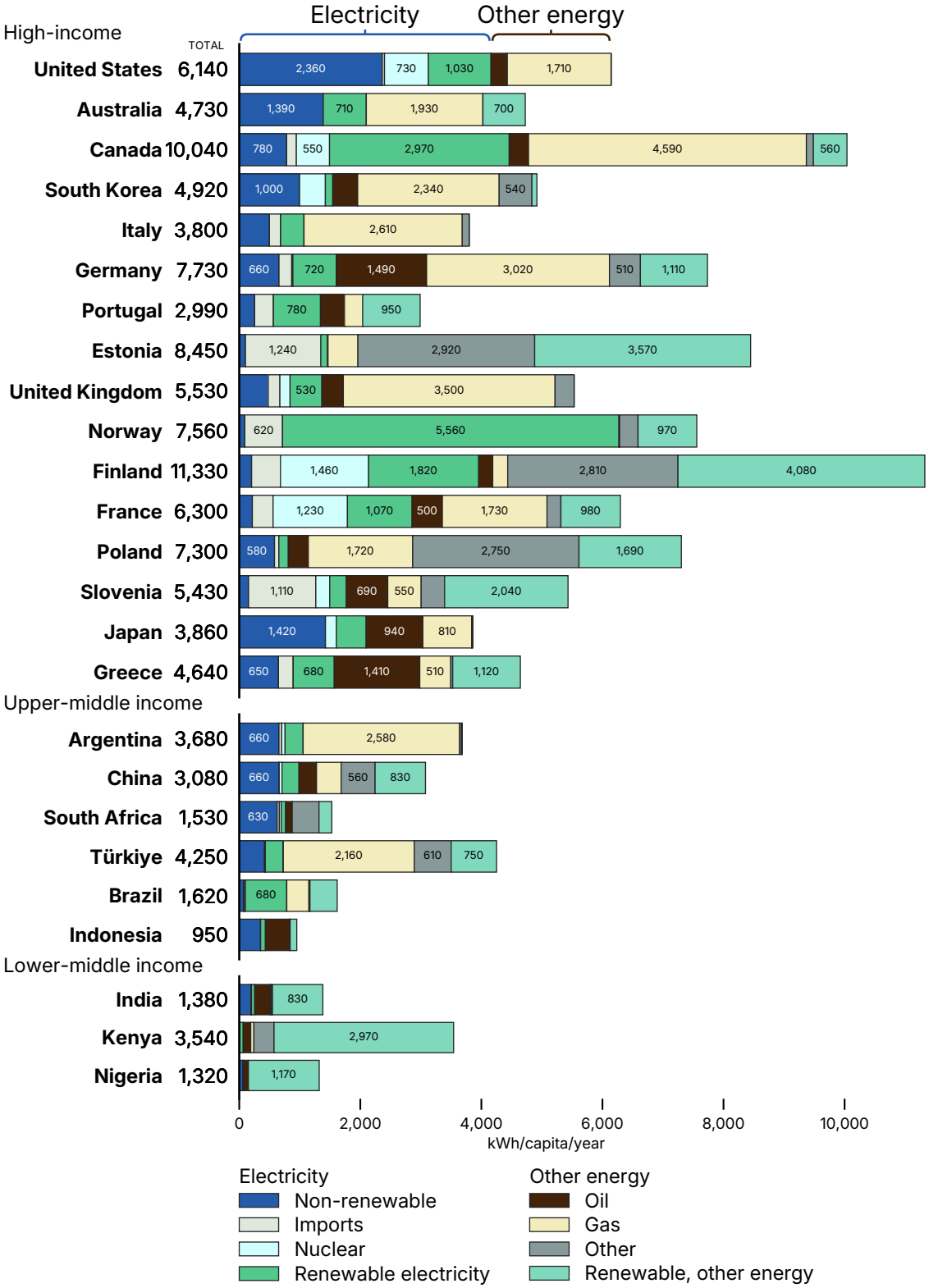
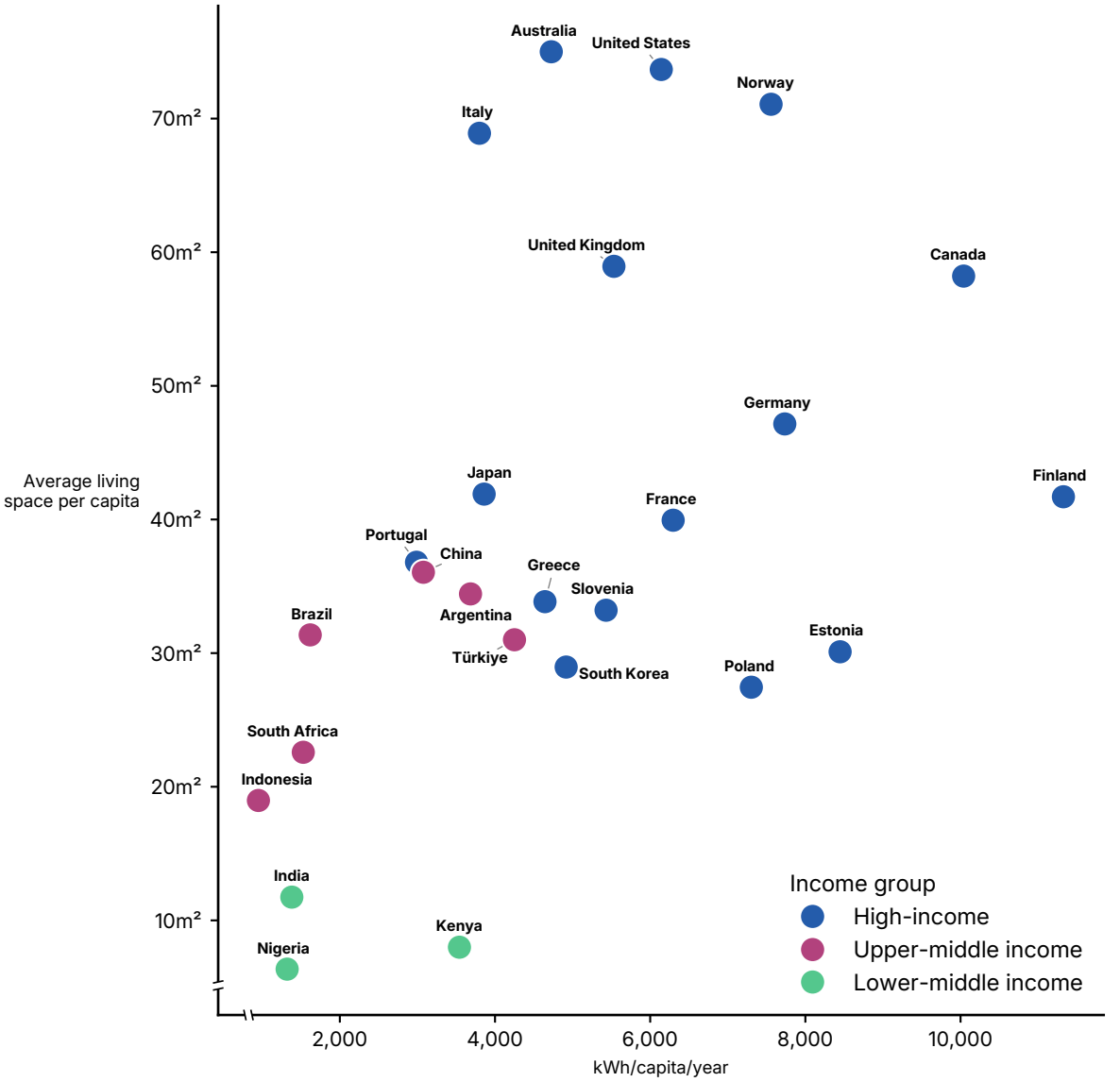


Figure 3.7. Living space (m²/capita) by country



Personal transport

Transport is one of the most carbon-intensive lifestyle domains, with substantial variation across income groups. High income countries have the highest transport-related footprints (0.7 to 6.0 tCO_2e per capita), driven by high travel demand and heavy use of private cars and air travel (Figure 3.8). Annual travel distances in this group vary from 10,000 to 25,000 passenger-kilometres per capita, with private car use alone reaching 19,300 p-km per capita in the United States. This results in a car-related footprint of around 4.2 tCO_2e per capita – a value that exceeds the total per capita lifestyle carbon footprint in Brazil, Indonesia, India, Kenya and Nigeria. However, there are notable exceptions within high income countries. Japan, for example, has a high overall transport demand (9,900 p-km per capita) but a much greater reliance on public transport, especially rail (30% of the total demand), resulting in a much lower footprint (1.6 tCO_2e per capita).

In upper-middle and lower-middle income countries, cars and air travel play a smaller role. Instead, mobility is often supported by public transport and two-wheelers. In India and Indonesia, motorcycles dominate (3,800–4,800 p-km per capita), contributing 0.5–0.6 tCO_2e annually. Non-motorised transport, including walking

and cycling, is most prominent in lower-middle income countries. However, this pattern often reflects economic necessity and limited access to motorised transport, rather than deliberate low-carbon choices. While likely under-reported due to data gaps, walking and cycling remain critical in meeting everyday mobility needs, particularly in low-income and informal urban areas.

High income countries

High income countries have the highest transport-related footprints and demand – with Greece as an exception, showing overall lower transport demand compared to rest of this group (Figure 3.9). The United States records the highest demand at 26,690 p-km, 45% higher than the second highest Canada (18,440 p-km), 51% higher than Finland (17,630 p-km) and 58% higher than Norway (16,940 p-km). Cars are the largest contributor to personal transport emissions in all high-income countries, ranging from 0.9 to 4.2 tCO_2e per capita. Car modal shares vary from very high (91%) in Slovenia to moderate (40%) in Greece.

Modal splits by fuel type reveal a dominance of fossil-based road vehicles, with electric and hybrid cars still contributing only minimally in most countries. South Korea shows slightly higher carbon intensity due to a larger diesel share and the lowest vehicle occupancy rate among countries analysed. In contrast, Norway stands out with nearly one-third of its passenger-kilometres being electric, supported by greater reliance on low-intensity renewables.

Air travel is the second largest contributor to transport footprints, despite its smaller share of distance travelled. For example, in the United Kingdom aviation accounts for 1.3 tCO_2e per capita (48% of transport emissions), while comprising only 34% of total demand. Some countries deviate from these air travel-dominated patterns by relying more on rail. Japan, for example, has a relatively low footprint (1.6 tCO_2e/capita) despite high demand (9,860 p-km) due to its efficient rail system, which makes up 29% of its transport demand. Countries such as France, Germany and the United Kingdom also benefit from extensive rail networks, while in Norway and Finland rail transport's carbon intensity is especially low due to clean electricity supply.

Upper-middle income countries

In upper-middle income countries, average transport demand is lower than in high-income countries, although it still varies widely – from around 2,000 to 10,800 p-km per capita. China and South Africa lead this group in total demand with 10,760 and 8,690 p-km per capita, respectively. Car travel is the largest contributor to transport-related carbon footprints in most countries, except in Indonesia, where motorcycles dominate (72% of demand and 70% of the transport footprint). In China, motorcycles account for 16% of demand and a similar share of emissions, while their role in other countries is more limited.

Air travel is generally less significant, contributing under 0.3 tCO_2e per capita in most cases. Türkiye stands out as an outlier, with the highest aviation-related emissions (0.8 tCO_2e) and air travel demand (2,200 p-km) in this group.

Public transport plays a substantial role, particularly in Brazil, China, and South Africa, where it accounts for over 40% of total demand. Bus use dominates in Brazil, while China and South Africa show a more balanced mix of bus and rail travel. These public systems help moderate emissions, especially in China and South Africa, where overall demand approaches high-income levels.

Data on non-motorised transport are limited, but available figures suggest that walking and cycling comprise only a small share of total transport demand in most countries.

Lower-middle income countries

In lower-middle income countries, transport demand is highly uneven. India records 15,350 p-km – comparable to high income countries – while Kenya and Nigeria report less than 7,000 p-km each. Transport-related carbon footprints are generally below 1.0 tCO_2e per capita, with India an exception at 1.7 tCO_2e due to high demand and reliance on motorised travel, particularly buses and motorcycles. In Kenya and Nigeria, modest demand corresponds to low emissions (0.2 and 0.7 tCO_2e, respectively).

Private car use is limited, accounting for 15% of demand in India and less than 10% in Kenya, reflecting low car ownership and greater reliance on more affordable modes. In Kenya, these include buses, informal services as matatus, and walking. Nigeria shows a distinct pattern: while car travel is modest (910 p-km), light trucks contribute substantially (1,610 p-km), bringing car related emissions to around 0.7 tCO_2e per capita.

Motorcycles and buses dominate across the group, possibly reflecting both affordability and limited access to comprehensive public infrastructure. In India, buses represent over half of total travel (8,370 p-km), while motorcycles make up around a quarter. Air travel is minimal in all countries in the group, typically under 0.1 tCO_2e, reflecting affordability constraints and limited access.

Walking and cycling are more common than in the higher-income groups, although these modes are likely under-represented in available data. Nonetheless, observed mobility patterns suggest that walking and cycling play an essential role, particularly where access to motorised transport is limited.

Figure 3.8. Transport-related carbon footprint (tCO_2e/capita/year) by country and consumption components

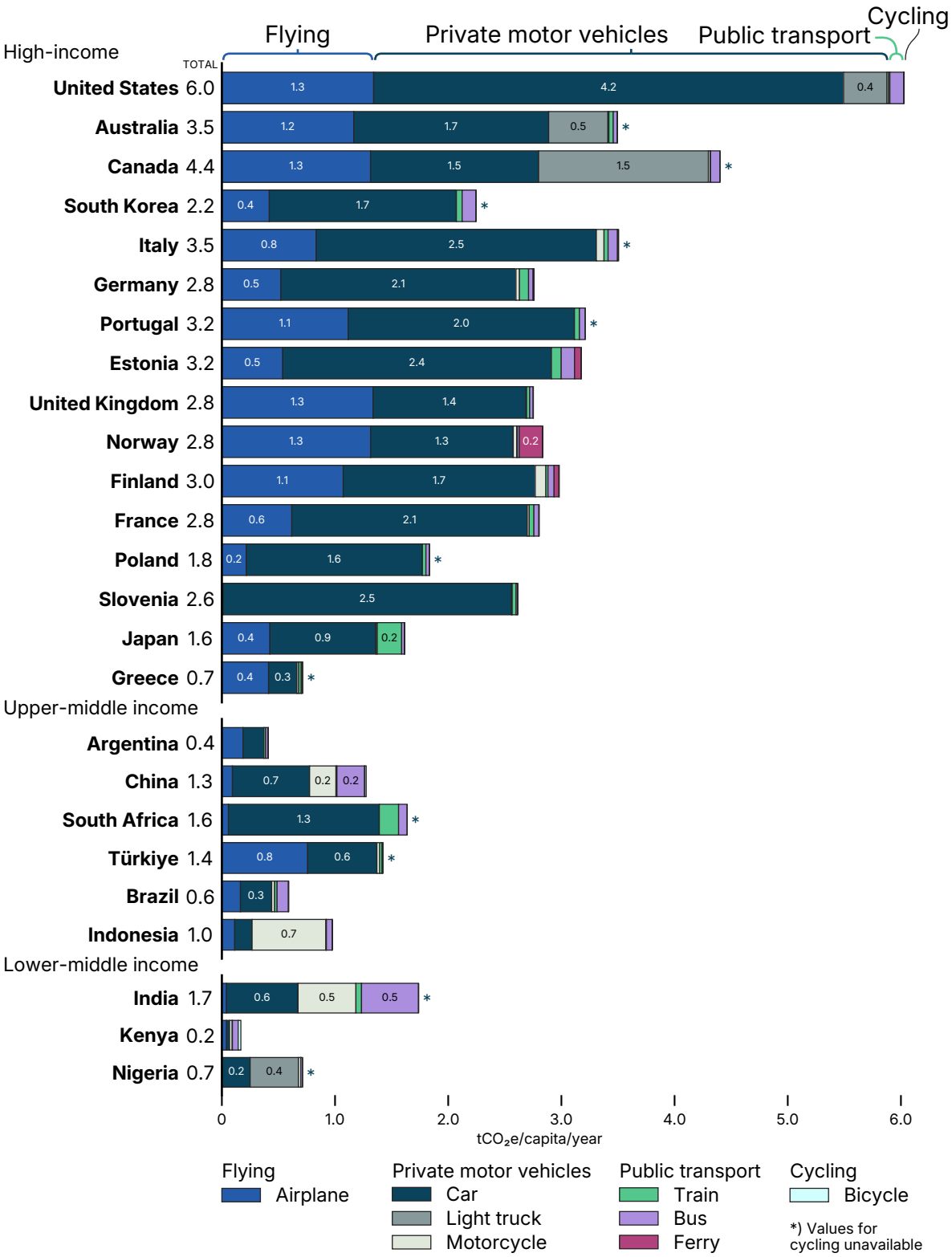
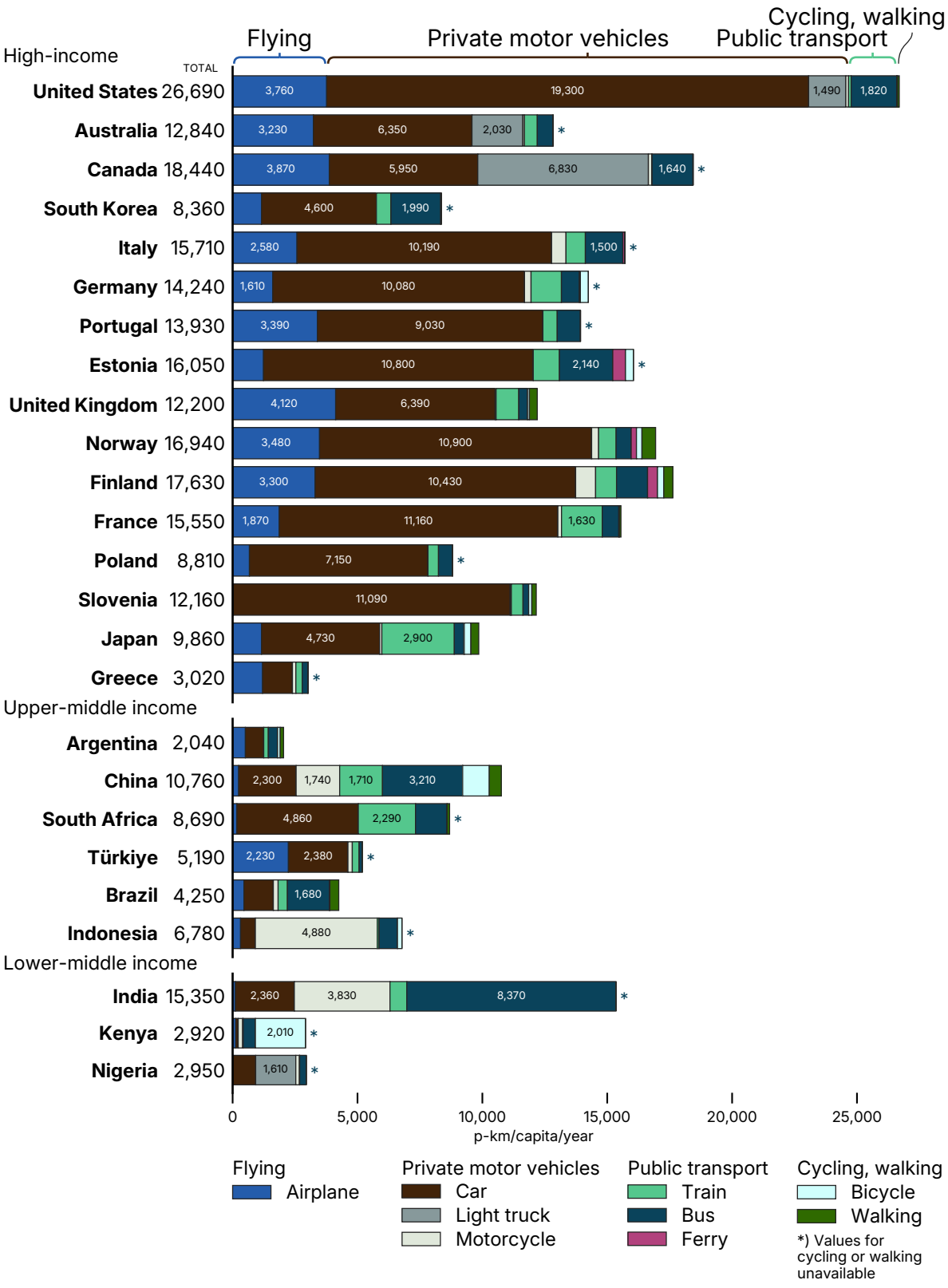


Figure 3.9. Transport-related demand (passenger-km/capita/year) by country and consumption components



Goods, leisure and services

Carbon footprints from goods, leisure and services correlate strongly with income (Figure 3.10). Services account for the largest share in most countries, but results are not always comparable: differences in how health care and education are organised – whether publicly funded or privatised – affect both spending levels and associated footprints. For example, the United States records by far the highest services footprint (4.2 tCO_2e per capita), with health care alone representing more than 70% of services emissions, reflecting exceptionally high private expenditure (Figure 3.11). By contrast, in many European countries where these services are heavily subsidised, footprints remain lower despite similar provision levels.

High income countries

Among high income countries, services typically dominate (23–68% of the carbon footprint across the three domains), followed by goods and leisure. High services footprints in the United States, Australia, Canada, and South Korea are driven by health and financial services, with South Korea further affected by a carbon-intensive energy mix (Figure 3.6). Goods are the second largest contributor, particularly furnishings and household equipment, which are closely linked to consumption culture and large living spaces. Leisure-related emissions vary widely: in Japan they are minimal, while in Australia and the United States they are substantial, reflecting high spending on recreation, cultural activities and dining.

Upper-middle income countries

In upper-middle income countries[19], combined carbon footprints from goods, leisure, and services remain modest (0.2–1.3 tCO_2e per capita), although services often make up more than half. Argentina's footprint is shaped by health and education, China's by communication and South Africa's by a balance of categories. Goods also contribute substantially, especially furnishings, while leisure emissions are generally low.

Lower-middle income countries

In lower-middle income countries[19], carbon footprints from goods, leisure, and services are very small (around 0.2 tCO_2e per capita), with most spending directed towards necessities. Services – mainly health, education and insurance – dominate, while goods come second and leisure plays only a negligible role. Here, higher carbon intensities reflect both low renewable energy shares and the reliance on basic, often inefficient, production and service systems.

19 For upper-middle and lower-middle income countries, available expenditure data are highly aggregated, and several consumption categories that are present in higher-income country datasets are missing, which may limit the detail and comparability of domain-level results.

Figure 3.10. Consumer goods, leisure and services-related carbon footprint (tCO_2e/capita/year) by country and consumption components

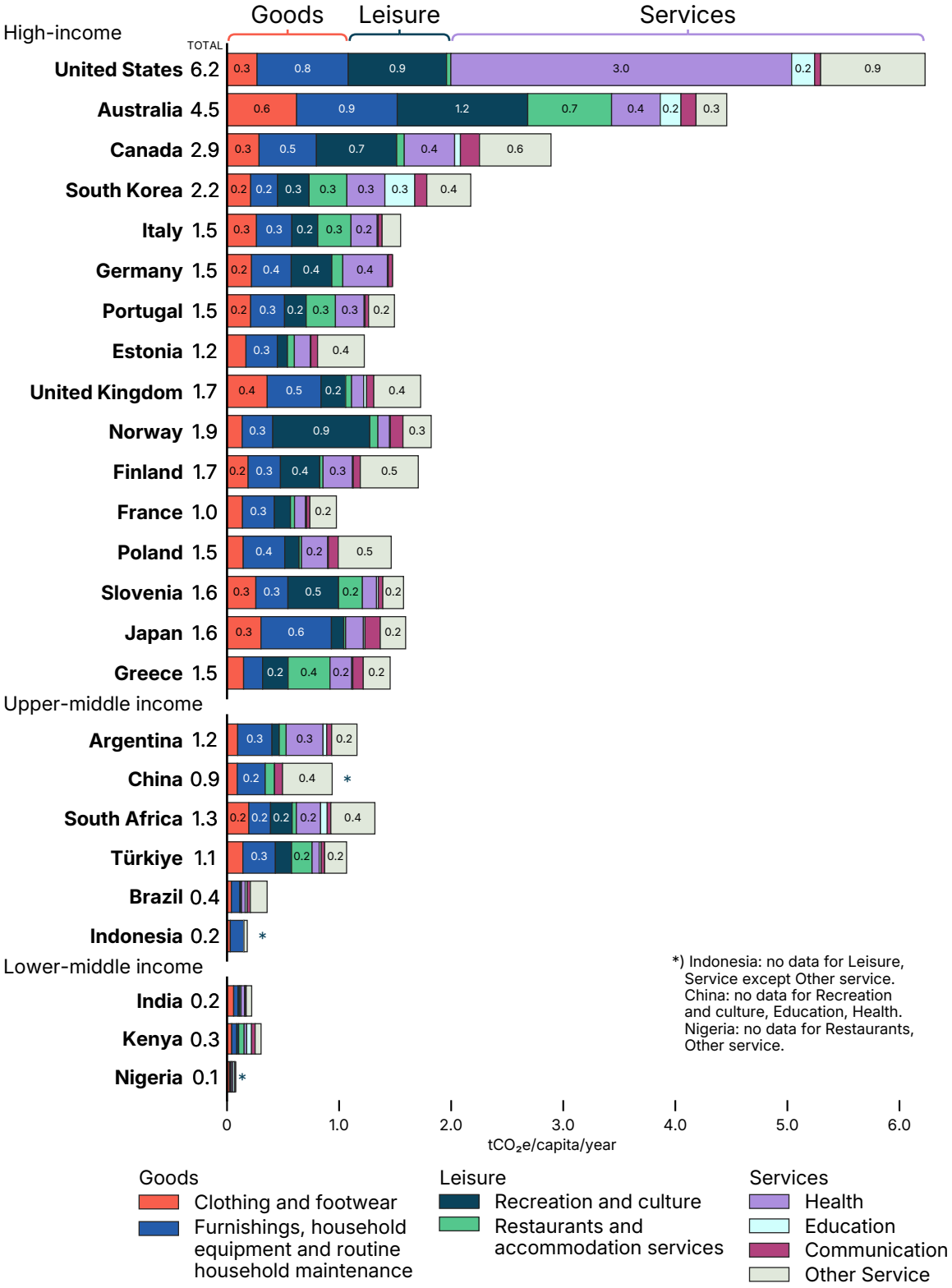
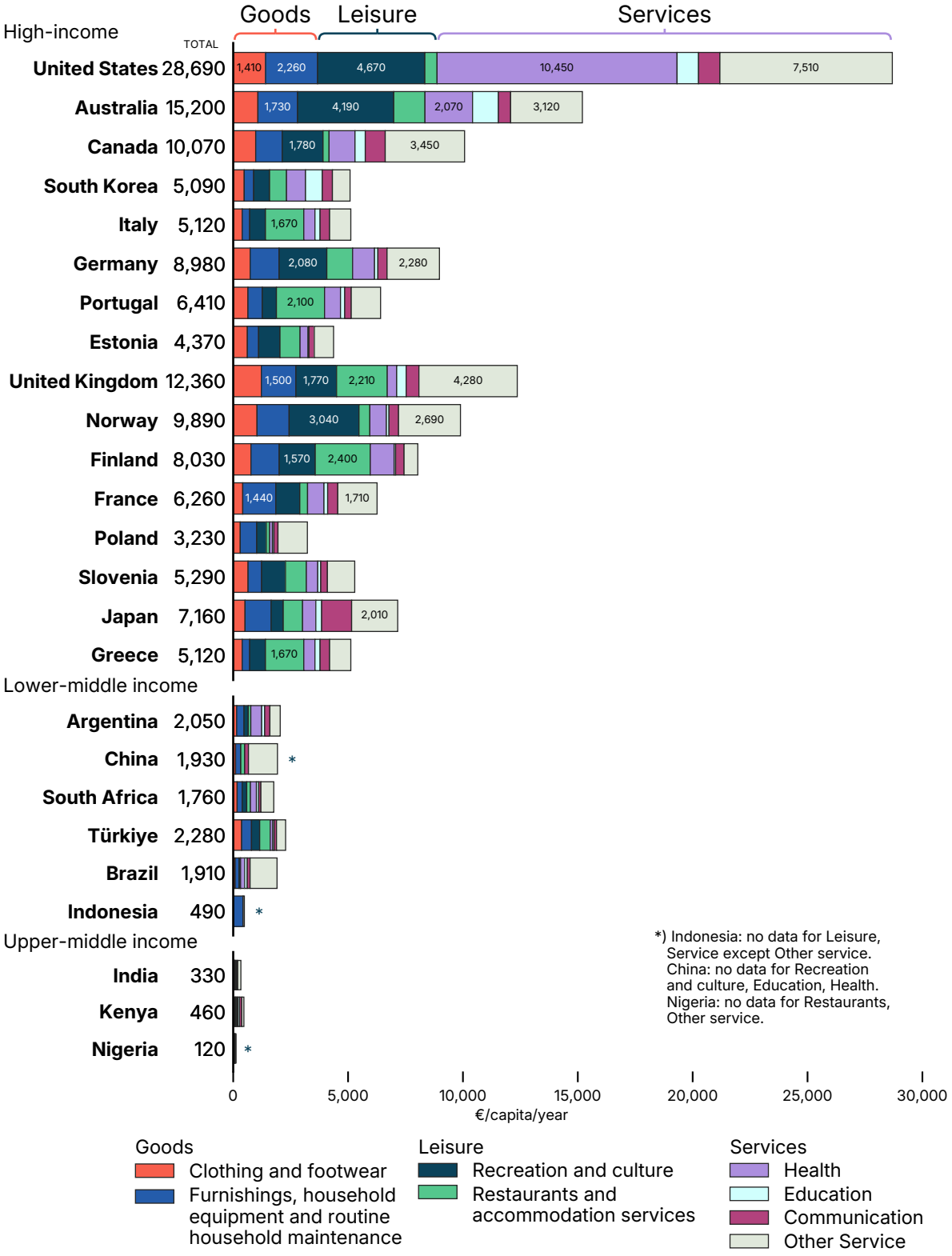


Figure 3.11. Consumer goods, leisure and services-related consumption (EUR/capita/year) by country and consumption components



4

Strategies for Reducing Lifestyle Carbon Footprints: Sufficiency as a Guiding Approach

This section presents strategies for reducing *lifestyle carbon footprints* and examines their mitigation potential in relation to the 1.5°C and 1.7°C targets (Figure 2.5). While the target for *sufficiency living* provides a bottom-up estimate of the minimum carbon required to meet alternative consumption patterns, this section focuses on transforming existing lifestyles. Based on estimates of current lifestyle carbon emissions and proposed per capita targets, it assesses how combinations of changes on the demand side and on the supply side can deliver deep emission reductions consistent with climate goals.

The report adopts the Avoid–Shift–Improve (ASI) framework (IPCC 2022a) as the basis for assessing reductions in lifestyle carbon footprints. The ASI framework provides a systematic approach for strategies to mitigate emissions related to lifestyles:

- ***Avoid* strategies** focus on reducing or eliminating high-emission activities altogether – for example, cutting down on unnecessary travel, preventing energy waste, and reducing excessive energy and material consumption.

- ***Shift* strategies** involve changing the way needs are met – such as shifting protein sources form animal-based to plant-based, and substituting private car use with public transport or active transport (walking and cycling).

- ***Improve* strategies** enhance the efficiency of existing behaviours and technologies – such as upgrading to energy-efficient appliances or switching to renewable energy sources – thereby reducing emissions intensity while maintaining the same level of service.

To guide the analysis, this section adopts sufficiency as a foundational approach (Box 2.3). Sufficiency offers a critical lens for interpreting lifestyle mitigation strategies, highlighting the need to move beyond incremental efficiency improvements (at the core of *Improve* strategies) towards more transformative lifestyle changes (centred on Avoid strategies) that remain within planetary boundaries while ensuring wellbeing. It asks not only how we consume, but *how much is enough*, and challenges the dominant socio-economic systems that equate high consumption with success and wellbeing (Lorek and Spangenberg 2014; Akenji and Chen 2016)

Within the sufficiency framing, *Avoid* and *Shift* strategies are central. These strategies go beyond technological substitution to redefine needs, reshape aspirations and desires, and open space for low-carbon lifestyles (Schlesier et al. 2024; Serrano et al. 2025). *Avoid* and *Shift* strategies are not merely about consuming differently. Within a sufficiency framing, they provide practical approaches to critically questioning what is necessary and desirable, recognising that many human needs can be met in a variety of ways, including through immaterial satisfiers. They challenge prevailing norms of consumption, offer pathways for changing social expectations and reduce the material intensity of daily life (Akenji and Chen 2016; Fanning et al. 2020).

In contrast, *Improve* strategies, which focus on increasing the efficiency of goods and services, often perpetuate existing consumption patterns. While they are

essential for lowering the carbon intensity of current systems and for enabling sufficiency-oriented lifestyles, they have limited capacity to achieve absolute reductions in emissions if pursued in isolation (Spangenberg and Lorek 2019; European Commission et al. 2024). Efficiency gains may be offset by rebound effects, where savings in time, money or energy lead to increased consumption of either the same product or service, or other goods.

Additionally, consumption "lock-ins"[20] – such as car-dependent infrastructure, social norms around housing size, the status attached to meat-based diets, or inflexible work arrangements – can constrain behavioural shifts, often leaving the efficiency-based solutions as the more accessible, although ultimately limited, option. Also, over-reliance on technological fixes risks reinforcing materialistic aspirations and may leave the root causes of overconsumption unaddressed.

4.1. Estimated impact of low-carbon lifestyle options

This sub-section assesses the emission reduction potential of a wide range of lifestyle-based mitigation options for 9 of the 25 countries investigated – Argentina, Brazil, Canada, Finland, France, Japan, South Africa, the United Kingdom and the United States – selected for their diversity in income levels and regional contexts, as well as the availability of detailed data. This assessment highlights common patterns across all nine countries, while also showcasing the diversity of opportunities that emerge from country-specific circumstances, such as differences in consumption patterns and energy mixes. The drastic reductions in lifestyle carbon footprints that are required to achieve the 2035 targets (e.g., 82–94% in high income countries) highlight the need to adopt high-impact carbon reduction options across all lifestyle domains.

The selected low-carbon options reflect the latest available literature on reducing greenhouse gas emissions related to lifestyle behaviour (Salo and Nissinen 2017; Willett et al. 2019; Huan-Niemi et al. 2020; Project Drawdown 2020; Akenji et al. 2021; UNEP ; European Commission 2024a; Li et al. 2024; Brad et al. 2025; Guan et al. 2025). While they represent measures that can be understood through the ASI framework, in this study they are assessed based on their estimated per capita annual mitigation potential.

Using the calculation methods introduced in section 3, country-specific effects were projected until 2035. To support a more strategic approach to low-carbon living, the options are grouped into three categories indicating their relative significance in reducing lifestyle carbon emissions: **high impact** (reductions of ≥800 kilograms of CO_2e per capita per year), **medium-high impact** (300–800 kilograms) and **moderate impact** (<300 kilograms). Detailed methodological assumptions are provided in Box 4.1.

Box 4.1. Calculating the reduction potential of low-carbon lifestyle options

Country-specific impacts of selected low-carbon lifestyle options were estimated using data on physical consumption combined with life-cycle assessment (LCA)-based carbon intensities. Depending on the option, reductions were estimated by adjusting either the intensity and/or consumption amount or the carbon intensity of the relevant components. The analysis assumes that individuals fully adopt each of the options to estimate its maximum reduction potential. The analysis does not predict behavioural change or policy uptake; rather, it provides an indicative benchmark of what is possible, against which strategies and interventions can be considered. The results of the estimated carbon footprint reduction impacts are summarised in Figure 4.1.

Carbon intensity values for 2035 are derived from published estimates of efficiency improvement potentials for specific consumption components – for example, technological and operational advances in private vehicles, or enhanced production efficiencies in the food system.

The selected portfolios of low-carbon lifestyle options and their assumptions differ slightly across countries, reflecting contextual applicability and data availability. For further methodological details, see Annex C.

20 Infrastructure, market availability, social norms and institutional conditions can constrain behaviour change (Unruh 2000; Foxon 2002; Sanne 2002; Lorek and Spangenberg 2014; Akenji and Chen 2016). Consumers are often "locked-in" by work-and-spend lifestyles and systemic barriers to low-carbon choices.

High impact options

The low-carbon options with the largest emission reduction potentials – more than 800 kilograms of CO_2e per person annually – are mostly lifestyle changes that directly address overconsumption (Figures 4.1 to 4.10). These include dietary shifts such as **adopting plant-based, vegetarian, or planetary diets**, which reduce emissions by 1,000 to over 2,500 kilograms of CO_2e per capita depending on the country. The United States, Brazil, and France, where people on average consume large amounts of meat, especially beef, show particularly high potential for emission savings through dietary change.

In many countries, such shifts can cut more than a third of current average lifestyle carbon footprints, underscoring their essential role in mitigating emissions on the demand side. In the transport domain, **avoiding car use in urban areas, switching to public or active commuting**, reshaping urban planning to enable people to **live closer to work and places of study, and switching to biofuels or other alternative fuels** can yield reductions of over 1,000 kilograms of CO_2e per capita per year. The potential is especially large in car-dependent countries such as the United States, South Africa and Canada.

While modal shifts address the demand side of mobility, fuel switching can cut the carbon intensity of travel that remains. Realising these savings requires supportive policies and infrastructure, such as urban redesign, biofuel supply chains and electrification synergies – highlighting the importance of tackling structural challenges to sufficiency that are associated with land use, commuting infrastructure and energy systems. In the housing domain, strategies such as **reducing living space, switching to renewable electricity** (e.g., in the United States or Japan), and **retrofitting homes** with heat pumps offer substantial savings, although their potential varies greatly depending on existing energy systems.

These high impact strategies not only reduce emissions but also question dominant norms around meat-heavy diets, car ownership and oversized housing – challenging carbon-intensive conceptions of status and wellbeing.

Medium-high impact options

Medium-high impact options, which can result in reductions of 300-800 kilograms of CO_2e per person per year, also play a crucial role in emission mitigation. These include teleworking, ridesharing, electrification of private vehicles and public transit, improved food production efficiency[21], and reduced consumption of goods and services.

While less impactful than the options in the high impact category, these medium-high options are often more widely accessible because they build on existing infrastructures and behaviours. They typically require incremental adjustments rather than transformative shifts such as abandoning car ownership or adopting fully plant-based diets. However, their feasibility and potential mitigation effects are context dependent. For example, ridesharing offers large savings in the United States and Canada (reducing up to 1,000 kilograms of CO_2e), while public transit improvements show greater gains in urbanised countries that have dense public transport networks, such as France and the United Kingdom. These options complement high impact measures and can serve as enablers of broader systemic change.

Moderate impact options

Moderate impact options – resulting in emission reductions of less than 300 kilograms of CO_2e per capita per year – tend to have more incremental effects but remain important as part of broader transformation. Their direct mitigation potential is smaller compared to high and medium-high impact options, yet they can reinforce systemic change by shifting social norms and everyday practices. Choosing smaller private cars, limiting air travel to one international flight every three years, or reducing spending on monetary consumption on leisure and services may not transform systems alone, but can disrupt expectations of consumption and social signalling. Other low-barrier actions such as lowering indoor temperatures, reducing food waste, and limiting consumption of alcohol and sugar-rich foods help build a culture of sufficiency, supporting shifts in values and everyday habits.

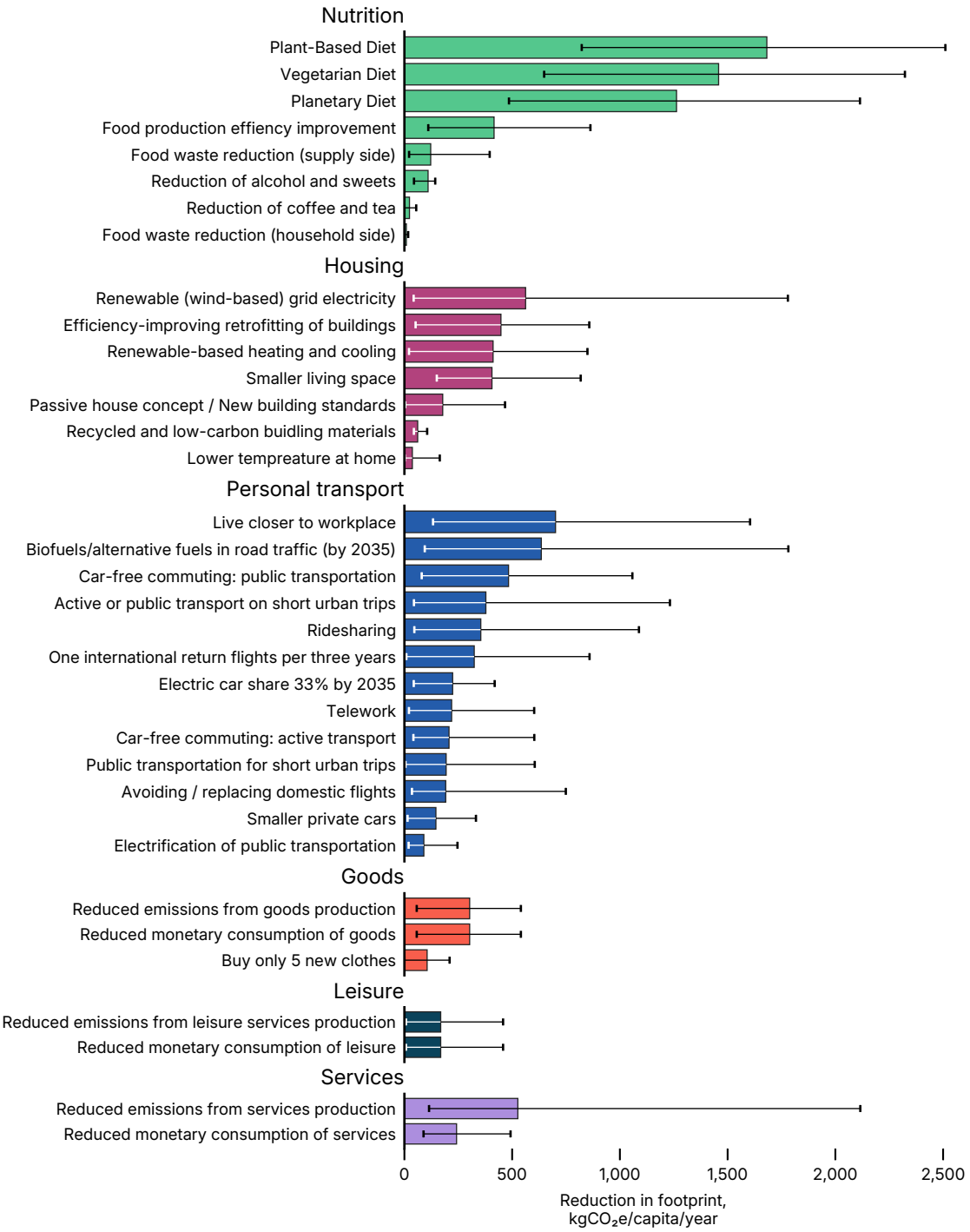
4.2. Estimated mitigation potentials of low-carbon options by country

While these three categories of low-carbon mitigation options reveal overarching trends and strategies, their actual potential and feasibility vary greatly across countries due to different infrastructure, cultural norms and policy environments. To better understand these contextual dynamics, we present country-specific estimates for the nine case countries. These insights highlight commonalities and divergences in lifestyle carbon footprints and the effectiveness of various mitigation measures, offering a more nuanced understanding of how national contexts shape the pathways to low-carbon futures.

Country-specific reduction potentials are represented in Table 4.1 and in Figures 4.2 to 4.10. For detailed country-specific assumptions for low-carbon lifestyle options, see Annex C.

21 For example, optimising livestock feed to reduce enteric fermentation, improving fertiliser management and adopting agroforestry practices.

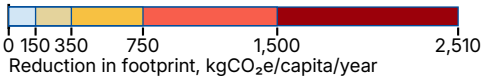
Figure 4.1. Average per capita footprint reductions ($kgCO_2e$/capita/year) from adopting low-carbon lifestyle options (all nine countries)



Note: Error bars indicate minimum and maximum reduction potential ($kgCO_2e$/capita/year) across selected case countries: Argentina, Brazil, Canada, Finland, France, Japan, South Africa, the United Kingdom and the United States.

Table 4.1. Average per capita footprint reductions ($kgCO_2e$/capita/year) from adopting low-carbon lifestyle options, by country (rounded values)

Nutrition	United States	Canada	France	Finland	United Kingdom	Argentina	South Africa	Japan	Brazil
Plant-Based Diet	2,510	1,550	1,740	1,540	1,680	2,510	870	820	1,920
Vegetarian Diet	2,270	1,240	1,370	1,230	1,490	2,320	780	650	1,770
Planetary Diet	2,050	1,080	1,180	1,000	1,300	2,110	590	490	1,570
Food production effiency improvement	860	280	670	350	250	500	230	110	500
Food waste reduction (supply side)	120	150	100	30	20	250	20	20	400
Reduction of alcohol and sweets	140	110	130	130	120	100	100	40	100
Reduction of coffee and tea	30	0	30	50	40	10	10	20	10
Food waste reduction (household side)	10	0	10	10	10	20	10	0	10
Housing									
Renewable (wind-based) grid electricity	1,780	600	240	110	230	390	630	1,020	40
Efficiency-improving retrofitting of buildings	770	860	320	440	280	310	500	500	50
Renewable-based heating and cooling	760	850	270	380	330	200	510	390	20
Smaller living space	820	580	280	310	320	310	300	580	150
Passive house concept / New building standards	320	470	130	200	150	90	110	120	0
Recycled and low-carbon buidling materials	70	60	60	50	60	110	50	40	70
Lower tempreature at home	30	40	20	20	20	10	160	20	0
Personal transport									
Live closer to workplace	1,600	850	990	570	320	130	1,160	390	300
Biofuels/alternative fuels in road traffic (by 2035)	1,780	1,150	810	500	370	90	490	370	160
Car-free commuting: public transportation	1,060	640	750	430	230	80	820	190	160
Active or public transport on short urban trips	1,230	910	110	520	80	40	300	140	60
Ridesharing	1,090	570	140	250	300	50	350	350	100
One international return flights per three years	240	590	360	670	860	30	10	120	30
Electric car share 33% by 2035	420	300	410	170	390	40	120	110	50
Telework	600	300	370	220	70	20	200	140	60
Car-free commuting: active transport	600	400	60	190	130	40	310	60	60
Public transportation for short urban trips	600	460	200	90	260	10	90	30	10
Avoiding / replacing domestic flights	750	370	70	60	40	110	40	200	90
Smaller private cars	330	110	180	180	140	10	230	90	30
Electrification of public transportation	20	90	60	140	40	40	250	40	150
Goods									
Reduced emissions from goods production	540	400	210	240	420	200	190	470	60
Reduced monetary consumption of goods	540	400	210	240	420	200	190	470	60
Buy only 5 new clothes	160	170	20	90	210	20	90	200	0
Leisure									
Reduced emissions from leisure services production	460	390	90	190	140	60	120	60	10
Reduced monetary consumption of leisure	460	390	90	190	140	60	120	60	10
Services									
Reduced emissions from services production	2,120*	650	190	420	310	320	350	270	110
Reduced monetary consumption of services	490	400	130	290	240	130	210	180	90



* US expenditure is significantly higher compared to any other country analysed, particularly in health care. The reduction potential (in the previous option regarding reduced monetary consumption) is relatively smaller for the United States compared to other countries, since the savings in monetary consumption do not include education, social and healthcare services.

Argentina

In Argentina (Figure 4.2), the most impactful lifestyle-based mitigation opportunities lie in nutrition and housing, reflecting both national consumption patterns and structural energy challenges. The potential of dietary shifts is striking: adopting a plant-based diet could reduce emissions by more than 2,500 kilograms of CO_2e per capita annually, with vegetarian and planetary diets offering similar savings. These shifts represent the single largest sufficiency-aligned opportunity, although it challenges Argentina's deeply rooted meat-centred dietary culture and its economic dependence on livestock production (Ranganathan et al. 2016). Improvements in food production efficiency add further but small reduction, highlighting the combined importance of consumption and production-scale strategies.

In the housing domain, switching to renewable electricity sources, retrofitting buildings with heat pumps and insulation, and reducing living space yield savings of 310–390 kilograms of CO_2e per capita annually each. These measures not only improve energy performance but also challenge the expectations around large residential spaces, aligning with sufficiency principles.

Transport and other consumption (goods, leisure and services) offer more modest reductions, but remain important in shaping broader cultural transitions. Options, such as car-free commuting, living close to work, and reducing consumption of goods and services provide savings of 80–200 kilograms of CO_2e per capita per year each.

Brazil

Brazil presents a similar profile (Figure 4.3), with dietary changes emerging as the most prominent mitigation options. Adopting a plant-based diet offers a reduction potential of up to 1,920 kilograms of CO_2e per capita per year, with vegetarian and planetary diets providing similarly high savings (1,770 and 1,570 kilograms of CO_2e, respectively). Improvements in food production efficiency add a further 500 kilograms of CO_2e in savings, highlighting the importance of rethinking both production and consumption in a food system heavily shaped by cattle ranching. While the cultural and economic significance of meat poses barriers, sufficiency-oriented dietary shifts remain the single most impactful lever for lifestyle-related emissions.

In transport, medium-high impact measures, such as electrification and adoption of public transport, shifting to biofuels and alternative fuels, and living closer to places of work and study offer reductions of 150–300 kilograms of CO_2e per capita annually. These measures highlight the importance of infrastructure provision and lifestyle change.

Housing-related options yield smaller reductions than in other countries, due to Brazil's relatively decarbonised electricity system. Nevertheless, improvements in building performance and reduced living space remain relevant sufficiency measures.

Canada

In Canada (Figure 4.4), transport, housing and nutrition stand out as the most significant domains for lifestyle-based emission reductions, currently shaped by long transport distances, large homes and energy use, and carbon-intensive diets. Many of the most impactful options reflect the need to rethink daily routines and infrastructure through a sufficiency lens.

Transport offers particularly high-impact options; switching to biofuels and alternative fuels offer the largest reduction potential at 1,150 kilograms of CO_2e per capita, while car-free commuting, living closer to work and studies, and shifting to public transport each deliver savings of 640–910 kilograms of CO_2e per capita. Together, these measures reflect the importance of rethinking daily mobile routines and reducing dependence on private vehicles.

In housing, measures such as retrofitting existing buildings, switching to renewable energy, and reducing living space offer large per capita savings, cutting energy demand and reliance on fossil systems while challenging norms around oversized homes. In nutrition, adopting plant-based, vegetarian or planetary diets contribute savings well above 1,000 kilograms of CO_2e per capita, directly addressing overconsumption and meat-heavy diets.

Together, these options demonstrate the scale of Canada's sufficiency potential: rethinking food choices, transport dependency, expectations around large homes, and residential energy demand could transform lifestyles to make them more equitable and resource conscious.

Finland

Finland offers a contrasting example to Argentina, as a high income country with a cold climate and relatively low-carbon electricity mix. While its current lifestyle carbon footprint is much lower than that of countries like the United States, it still exceeds the 1.5°C-aligned target by a wide margin.

Avoid-based measures are essential, particularly in the domains of transport and nutrition (Figure 4.5). Avoiding high-emission behaviours – such as long car commutes, frequent air travel and meat-heavy diets – offers substantial mitigation potential even within Finland's relatively efficient system. For instance, adopting a plant-based diet can reduce emissions by over 1,500 kilograms of CO_2e per person annually, making it one of the highest-impact actions available. Similarly, avoiding car use for commuting – through relocating closer to work or shifting to remote work – can lead to reductions of 500–600 kilograms of CO_2e per person, while reducing the need for short-distance car travel adds further gains.

In the housing domain, although Finland's electricity is already largely decarbonised, the shift can still be made towards more sufficient consumption patterns. Substantial reductions can result from retrofitting buildings with heat pumps and better insulation (440 kilograms of CO_2e), along with reducing living space (310 kilograms of CO_2e).

France

In France (Figure 4.6), nutrition, transport and housing provide the largest lifestyle mitigation opportunities. Dietary change emerges as the most impactful measure: shifting towards more plant-based diets could reduce emissions between 1,200 kilograms and 1,740 kilograms of CO_2e per capita annually. In the transport domain, measures that avoid car use or travel demand, especially related to commuting, offer large reductions (such as 990 kilograms of CO_2 by living closer to work or study, thus reducing travel distance, or 750 kilograms of CO_2e by car-free commuting with public transport). Shifts towards low-carbon private transport modes using biofuels or alternative fuels, or adopting electric vehicles, show large potential in reducing the carbon emissions from transport (810 and 410 kilograms of CO_2e per capita, respectively).

In housing, retrofitting existing buildings, downsizing living space, and transitioning to renewable-based heating and electricity offer meaningful but moderate reductions, reinforcing the role of sufficiency – cutting energy demand while simultaneously lowering material use associated with residential infrastructure. Measures across goods, leisure and services domains – such as reducing consumption and improving production efficiencies – add reductions of up to 200–210 kilograms of CO_2e per capita per action. These findings underscore the combined importance of dietary change, transport demand reduction and energy-efficient housing – all framed by sufficiency principles of lowering demand and rethinking everyday choices.

Japan

In Japan (Figure 4.7), the largest reduction potential lies primarily in housing and nutrition. Because Japan's transport emissions are already relatively low due to its efficient public transport systems and high-density urban form, the remaining potential for further reductions in this domain is limited. Housing offers the single largest reduction opportunities: switching to renewable electricity could cut around 1,020 kilograms of CO_2e per person annually, while downsizing living space and retrofitting with heat pumps and insulation offer additional reductions of 580 kilograms and 500 kilograms of CO_2e, respectively. These options directly reduce energy demand while promoting sufficiency through more compact and efficient living arrangements.

In nutrition, dietary change to plant-based diets delivers reductions of around 820 kilograms of CO_2e, with vegetarian and planetary diets offering somewhat smaller impacts (650 kilograms and 490 kilograms, respectively). While the overall impact is lower than in countries with higher meat consumption, such changes remain significant and align with Japan's culinary traditions that historically emphasised plant-forward meals.

Additional reductions are possible through lower consumption of goods and services, showing the continued importance of lifestyle shifts in complementing a transport system that is already relatively low-carbon by design.

South Africa

In South Africa (Figure 4.8), the largest lifestyle-based mitigation opportunities arise in transport and housing, with further potential in nutrition. In transport, reducing commuting demand by living closer to work could cut around 1,160 kilograms of CO_2e per person annually, while car-free commuting with public transport reduces around 820 kilograms of CO_2e and ridesharing saves around 350 kilograms. Shifting to active or public modes for short distances adds further reductions of 300–310 kilograms of CO_2e. These measures reduce dependence on private vehicles while enhancing access to affordable mobility, aligning with sufficiency principles of equity and reduced resource use.

In housing, switching to renewable electricity offers reductions of around 630 kilograms of CO_2e per person, retrofitting homes saves around 500 kilograms, and renewable-based heating and cooling contribute reductions of roughly 510 kilograms. Downsizing residential space adds a further 300 kilogram reduction, supporting sufficiency transitions in urban and suburban living.

In nutrition, adopting a plant-based diet reduces emissions by around 870 kilograms of CO_2e per person annually, with vegetarian and planetary diets providing slightly lower but still substantial savings. The potential reductions are smaller than in countries such as Argentina, Brazil, and the United States, where average meat consumption – particularly of beef – is much higher. In South Africa, the lower baseline meat and dairy intake limits the scope for absolute reductions from dietary shifts, even though the country's meat production systems are highly carbon intensive and amplify the climate impact of existing diets. Although meat remains culturally significant, sufficiency-oriented dietary changes both lower emissions and support health co-benefits.

United Kingdom

In the United Kingdom (Figure 4.9), nutrition, housing and transport stand out as the most impactful lifestyle mitigation domains. In nutrition, adopting a plant-based

diet reduces emissions by around 1,680 kilograms of CO_2e per person annually, while vegetarian and planetary diets cut around 1,490 kilograms and 1,300 kilograms, respectively. These options align with growing public awareness of the health and environmental benefits of dietary change.

In housing, downsizing living space reduces emissions by around 320 kilograms of CO_2e per person; retrofitting with heat pumps and insulation saves roughly 280 kilograms; and switching to renewable-based heating contributes reductions of around 330 kilograms. These measures combine energy efficiency with sufficiency by reducing both energy demand and material use.

In transport, commuting by public transport reduces emissions by around 230 kilograms of CO_2e per person, ridesharing cuts around 300 kilograms and living closer to work or study saves around 320 kilograms. Additional options such as adopting electric vehicles (390 kilograms) and using biofuels (370 kilograms) further support decarbonisation, although they remain secondary to demand-reduction measures.

Smaller reductions from goods and services consumption (up to 420 kilograms of CO_2e) point to the importance of sufficiency-oriented cultural shifts across domains.

United States

The United States (Figure 4.10) presents the highest absolute lifestyle mitigation potential among the countries studied, reflecting its large per capita carbon footprint. High-emission patterns of meat consumption, private car use, long commutes and energy-intensive housing translate into particularly large savings from sufficiency-oriented actions.

In nutrition, shifting to a plant-based diet reduces emissions by around 2,500 kilograms of CO_2e per person annually, while vegetarian and planetary diets reduce around 2,100 kilograms and 1,900 kilograms, respectively.

Transport in the United States offers some of the largest opportunities for demand reduction across the nine case countries. Car-free commuting with public transport cuts around 1,220 kilograms of CO_2e per person annually; avoiding short car trips reduces roughly 1,060 kilograms; and living closer to work or study saves around 1,600 kilograms. Efficiency-based measures also add significant potential: ridesharing reduces around 1,020 kilograms of CO_2e, while switching to biofuels contributes around 1,780 kilograms. Together, these options highlight the central role of rethinking mobility patterns and reducing car dependency in lowering emissions.

In housing, switching to renewable electricity reduces around 1,780 kilograms of CO_2e per person, retrofitting homes saves around 860 kilograms, and teleworking contributes reductions of around 600 kilograms.

Reductions in the consumption of goods and services also add around 500 kilograms of CO_2e per person annually, pointing to the importance of addressing material consumption as part of broader sufficiency transitions.

Summary

Across all nine case countries, the largest lifestyle mitigation potentials lie in food, housing, and transport, with sufficiency-oriented changes – such as dietary shifts, reducing car use and downsizing homes – delivering the biggest savings. While these common trends are clear, their relative importance diverges by context. In middle-income countries like Argentina, Brazil, and South Africa, dietary change is the single most impactful option, whereas in high income countries such as Canada, the United States, France, and the United Kingdom, transport and housing dominate due to long commutes, car dependency and oversized homes. Japan shows greatest potential in housing and food, reflecting its already efficient transport system, while Finland demonstrates that even with a low-carbon electricity mix, avoiding meat-heavy diets and long car commutes remains crucial. Together, these findings highlight both the universality of key lifestyle domains and the need for context-specific pathways to low-carbon futures.

Figure 4.2. Average per capita footprint reductions ($kgCO_2e$/capita/year) from adopting low-carbon lifestyle options (Argentina)

Figure 4.3. Average per capita footprint reductions ($kgCO_2e$/capita/year) from adopting low-carbon lifestyle options (Brazil)

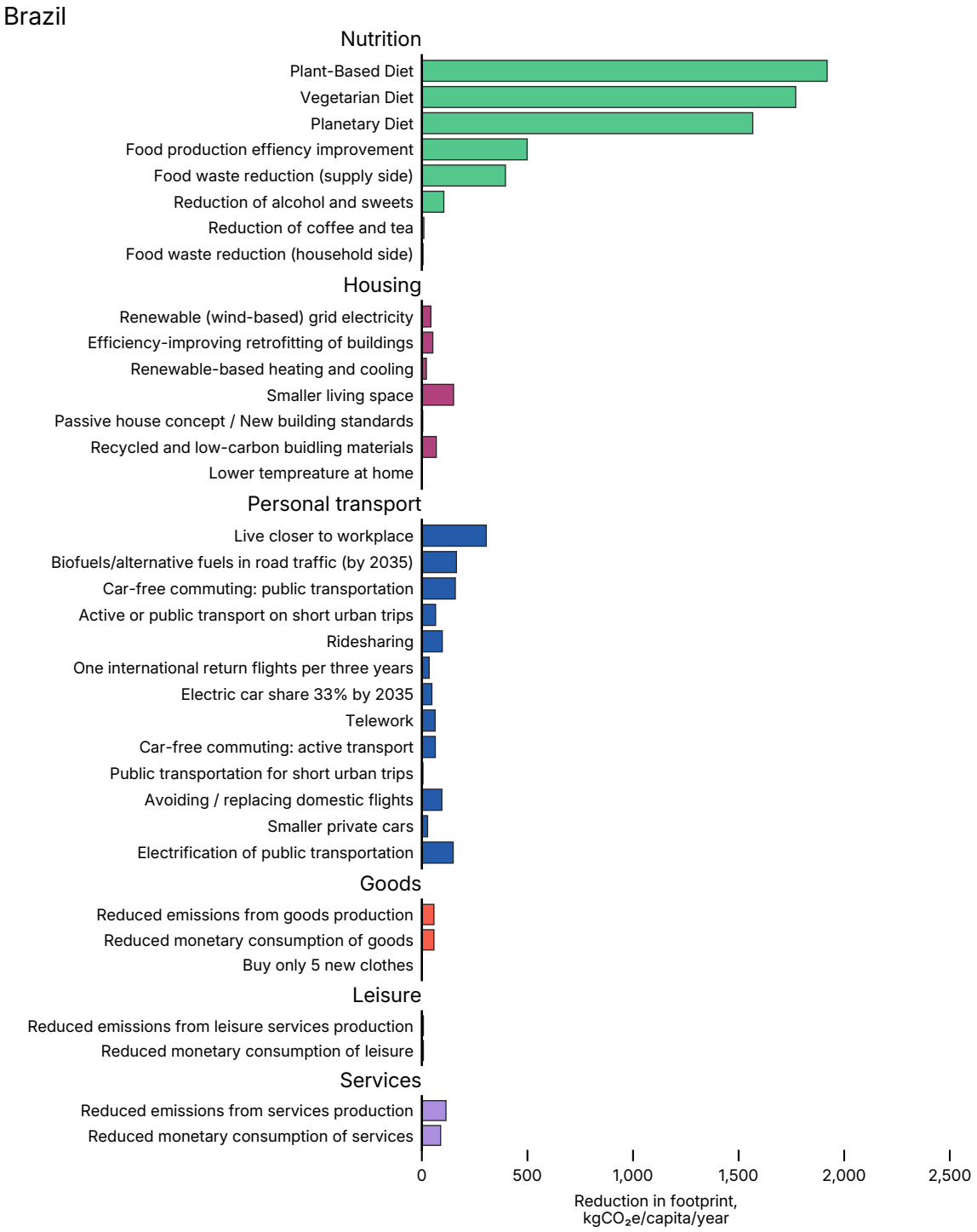


Figure 4.4. Average per capita footprint reductions ($kgCO_2e$/capita/year) from adopting low-carbon lifestyle options (Canada)

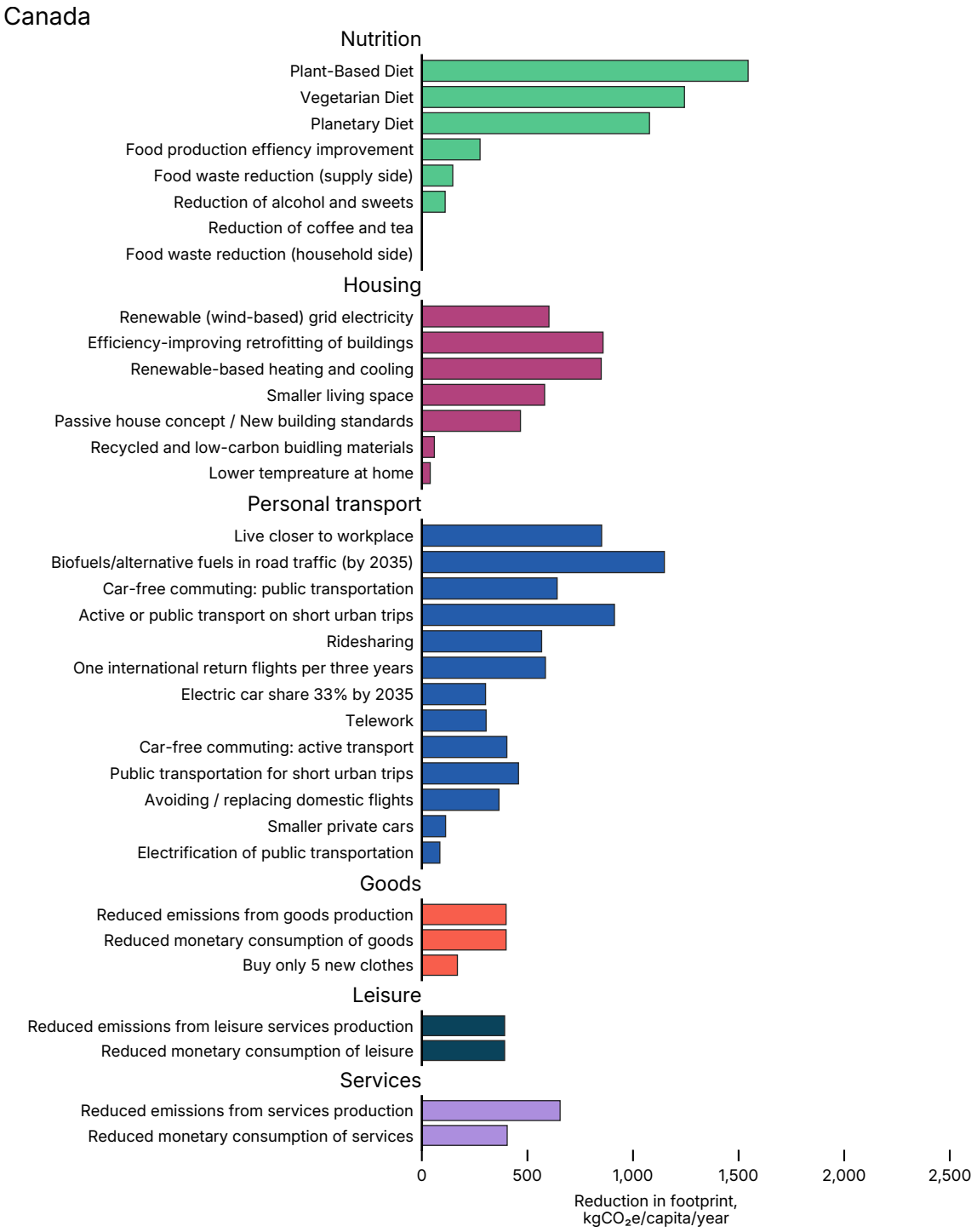


Figure 4.5. Average per capita footprint reductions ($kgCO_2e$/capita/year) from adopting low-carbon lifestyle options (Finland)

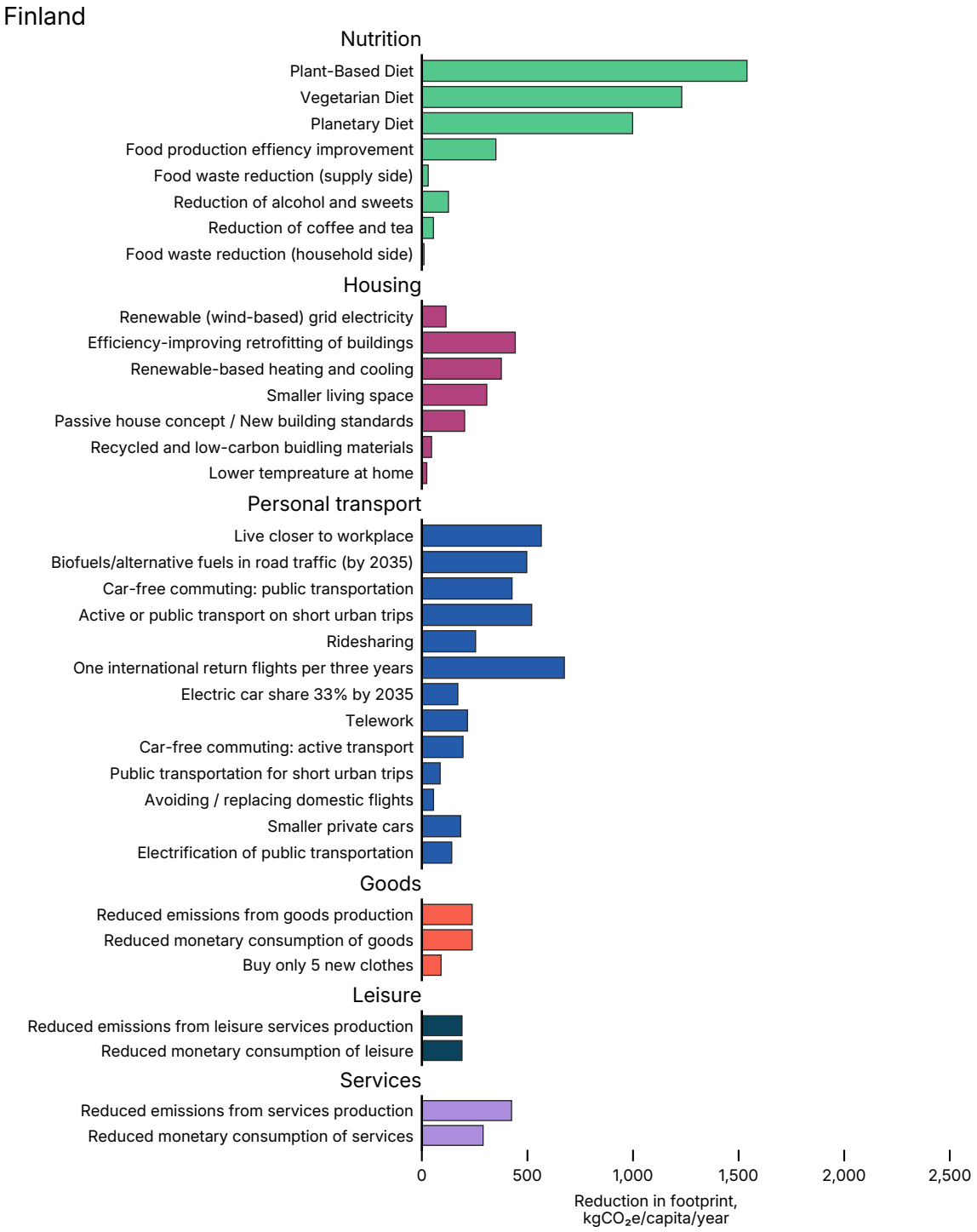


Figure 4.6. Average per capita footprint reductions ($kgCO_2e$/capita/year) from adopting low-carbon lifestyle options (France)

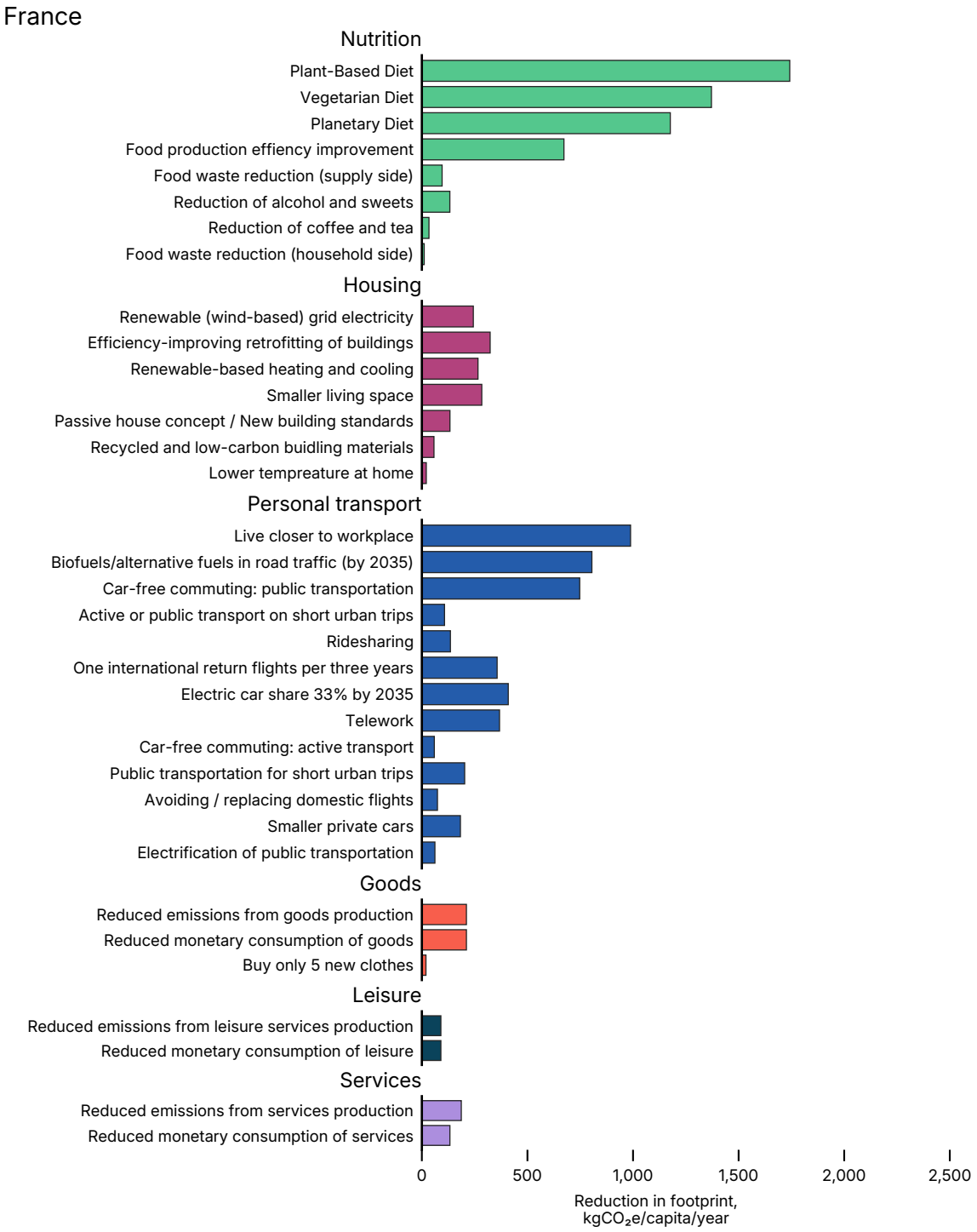


Figure 4.7. Average per capita footprint reductions ($kgCO_2e$/capita/year) from adopting low-carbon lifestyle options (Japan)

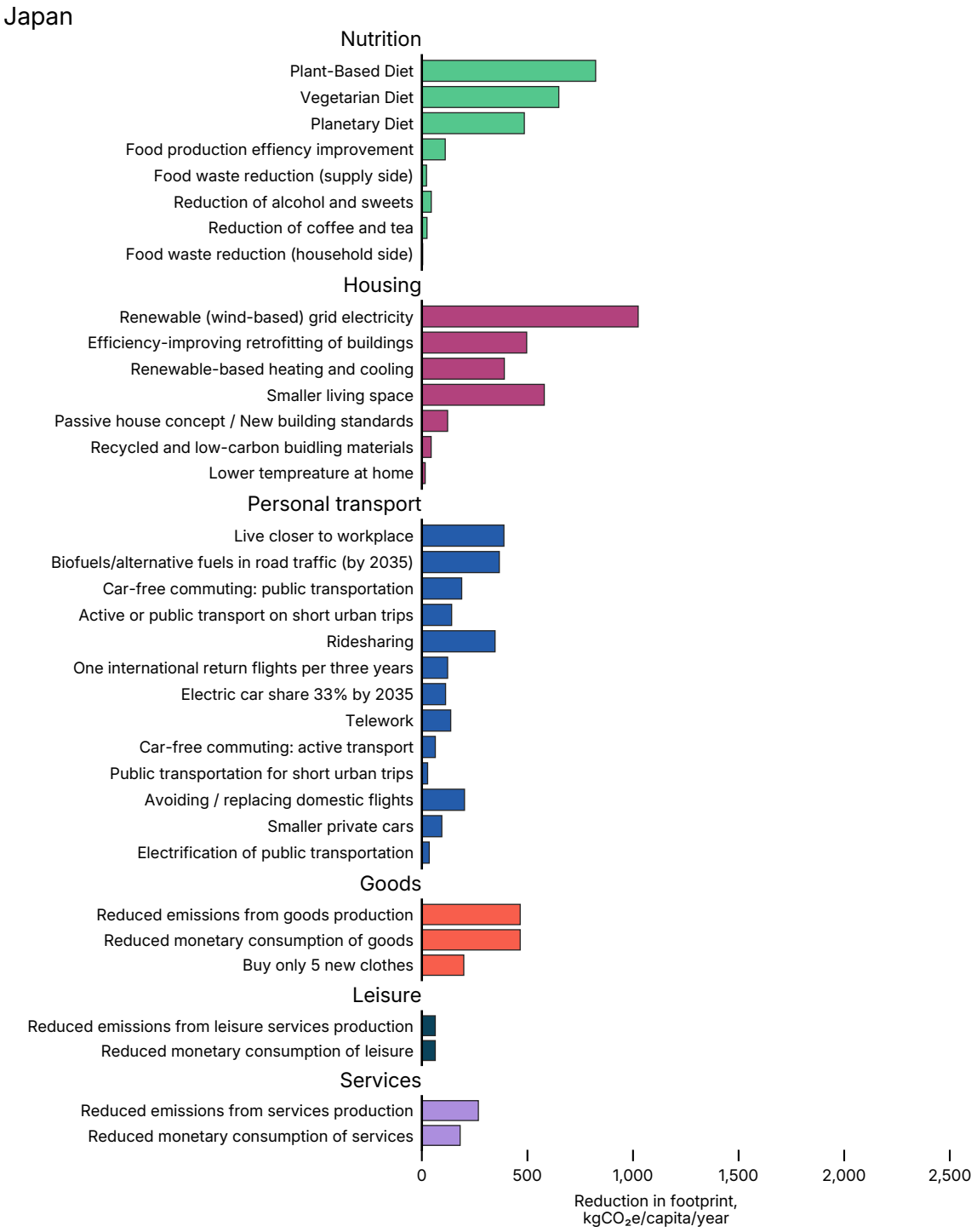


Figure 4.8. Average per capita footprint reductions ($kgCO_2e$/capita/year) from adopting low-carbon lifestyle options (South Africa)

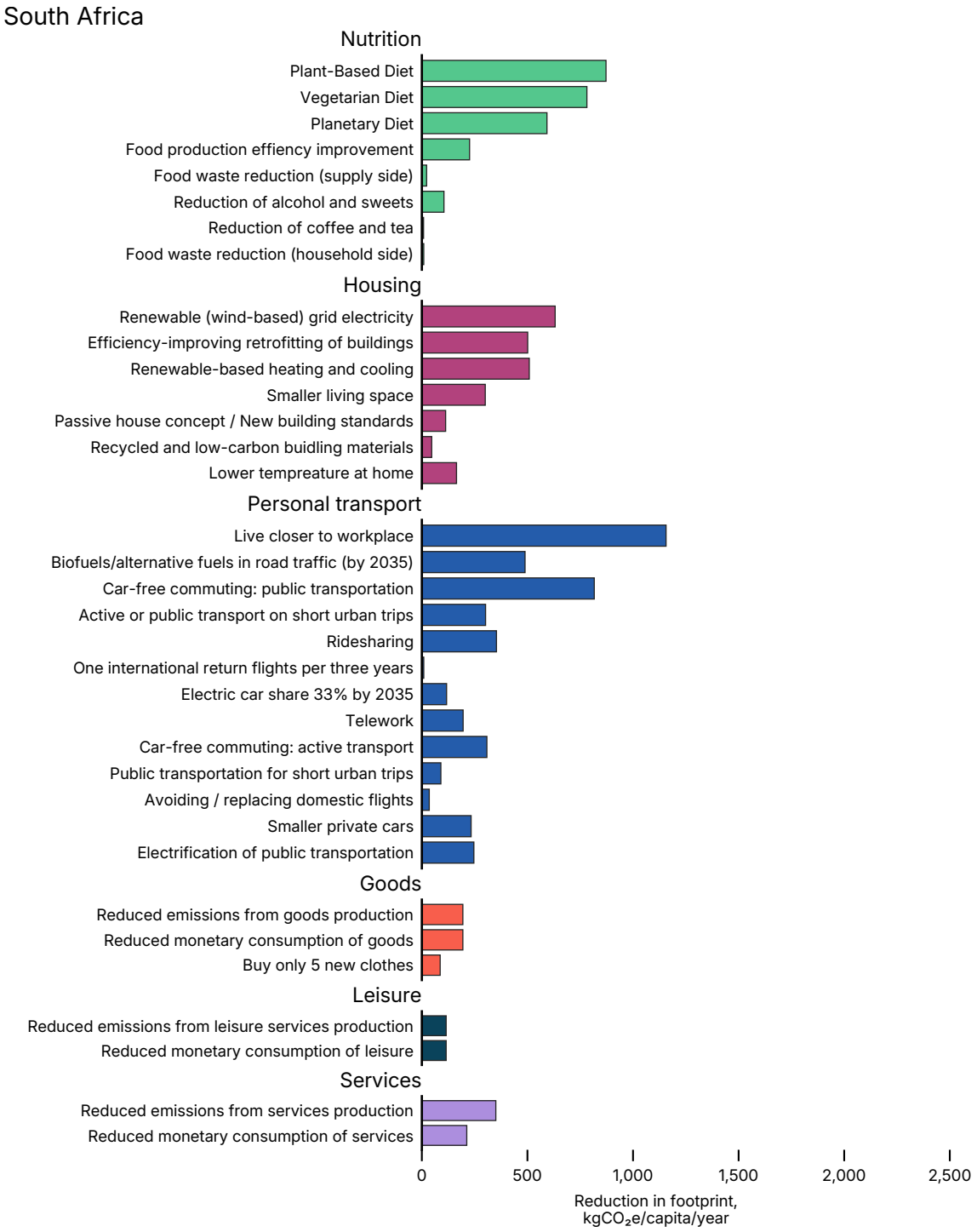


Figure 4.9. Average per capita footprint reductions ($kgCO_2e$/capita/year) from adopting low-carbon lifestyle options (United Kingdom)

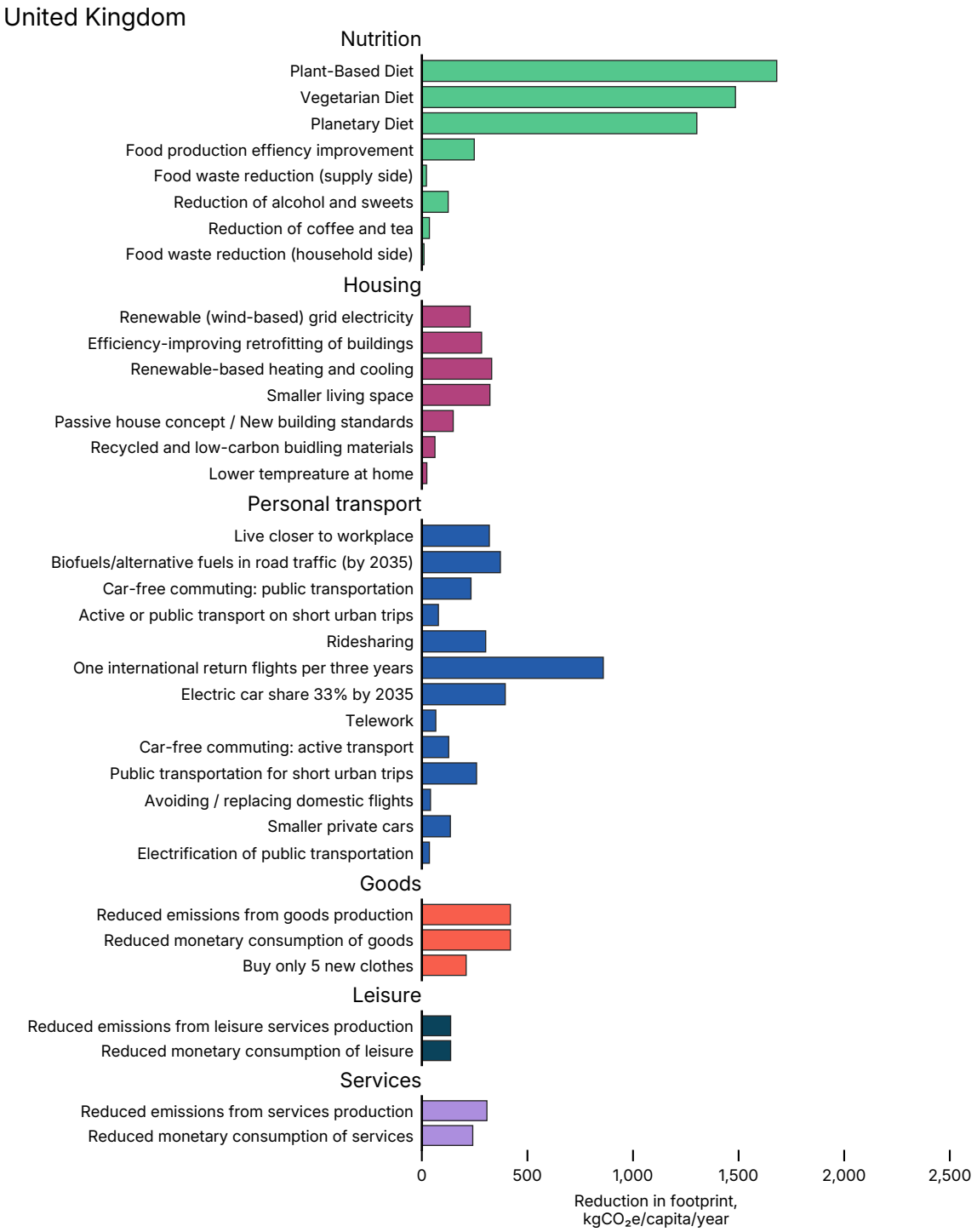
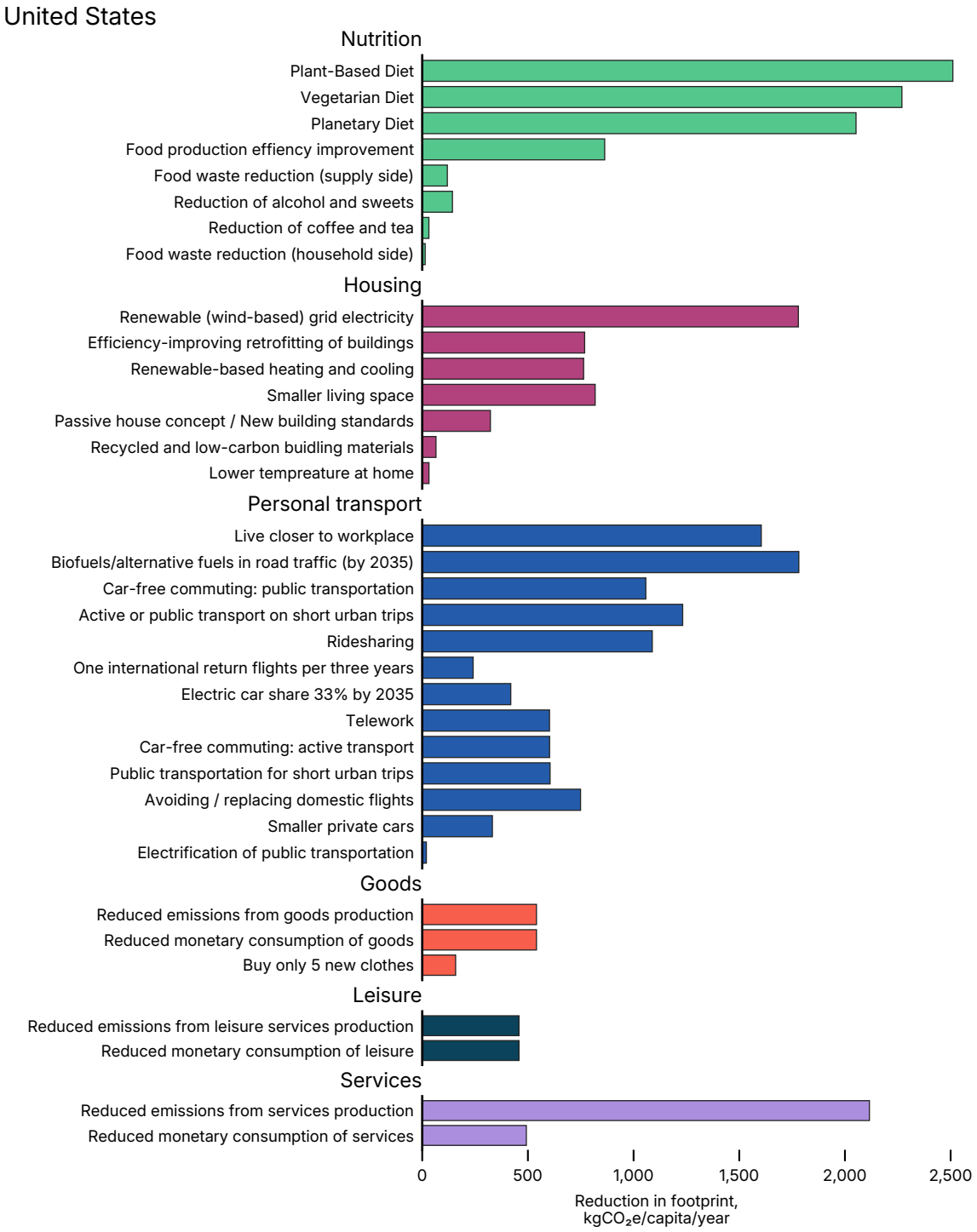


Figure 4.10. Average per capita footprint reductions ($kgCO_2e$/capita/year) from adopting low-carbon lifestyle options (United States)



PART III

Perspectives on Sufficiency and Wellbeing

This section builds on the evidence presented earlier by broadening the focus from data to the deeper societal shifts it implies. After outlining current consumption patterns and emissions, this section presents six reflection pieces that discuss how societies can address emerging biophysical and societal limits. The contributors question private property, the carbon cost of poverty eradication, and the idea that sustainable lifestyles necessarily involve sacrifice. They also suggest practical strategies for collective action and for integrating 1.5-degree lifestyles into everyday life. Together, these perspectives link the report's quantitative findings to wider question of values, justice, and systemic change needed to achieve a fair consumption space.

5

Social Tipping Dynamics: Catalysing Transformative Change

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Limiting global warming below levels of overshoot requires greenhouse gas emissions to decrease by around 7% annually (Otto et al. 2020) – an unprecedented challenge given that greenhouse gas emissions have increased steadily since the Industrial Revolution. Only exceptional events such as economic crises or wars have temporarily halted or inverted this rise. During the COVID-19 pandemic, for example, global emissions fell around 6%, with the European Union achieving a 13% decline (Statista 2025). The critical question today is: how can we sustain emission reductions at similar rates without undermining human wellbeing and social stability?

5.1. Social tipping dynamics: understanding rapid societal change

Social tipping dynamics provide a conceptual framework to understand how small interventions can trigger large, systemic changes in society. This framework involves tipping elements – key components within society that, when changed, can have a major impact on the entire system. When these tipping elements reach their tipping point, they pass a critical threshold where even small changes can quickly lead to big, self-reinforcing shifts[22]. Like ecological tipping points (Lenton et al. 2008), social *tipping points* (Otto et al. 2020) are key moments that trigger fast and wide-reaching transformations in behaviours, norms, technologies and infrastructure.

22 These two terms have been used in the climate sciences to describe parts of the climate system that are susceptible to change due to increased global temperatures and that can influence the stability of the Earth's climate system.

Several key interventions have been identified that are capable of causing rapid systemic tipping and reducing greenhouse gas emissions within this decade (Otto et al. 2020). These include removing fossil fuel subsidies and incentivising decentralised energy generation, building carbon-neutral cities, promoting fossil fuel divestment, exposing the moral implications of fossil fuel use, strengthening climate education and engagement, and disclosing information about greenhouse gas emissions. Such interventions can be applied across different time scales and levels of social structure.

For example, a global breakthrough could be initiated by redirecting financial flows from fossil fuel assets to clean energy sources, alongside transparently revealing information on the carbon footprint of products and services to consumers. Changes in financial and consumer markets happen continuously, and rapid shifts (e.g., 50% or more) can occur within just a few months. The 2008 financial crisis (although not climate-related) was an example of rapid change in financial markets.

However, such changes can be equally quick to reverse. To make their effects more durable, they must be supported by institutional and infrastructural changes, such as transforming public transport, providing subsidies for desired products and services, and revising taxation systems. Institutional and infrastructural changes take longer to implement but are essential to stabilise the emerging system.

Another pathway to global transformation could be seen in the school children who participated in the #FridaysForFuture strikes. This movement caused "irritations" in personal worldviews and has already influenced norms, values and individual behaviours. It has the potential to drive changes in policies, regulations, infrastructure, as well as consumption and lifestyle choices. Growing awareness of the seriousness of climate change increases recognition of the inter-generationally unethical and immoral nature of fossil fuels. This, in turn, strengthens the legitimacy of climate change mitigation policies, including the removal of fossil fuel subsidies.

5.2. The role of social networks and critical mass

Recent discussions around tipping points towards climate neutrality have focused largely on technological development and costs. Nijsse et al. (2024) have argued that the relative cost of clean energy technologies compared to fossil fuels critically influences the pace of the low-carbon transition by affecting affordability for consumers, profitability for business and political feasibility for governments. They suggest that cost-parity between clean energy technologies and fossil fuels could represent a social tipping point – when new technologies become more attractive than old ones and the transition gains self-reinforcing momentum.

Solar panels illustrate this well: as cumulative installed capacity increased, the cost of solar energy declined exponentially, with panel prices falling 20% every time global capacity doubled (Roser 2023). Additional factors shaping the expansion of solar included the uptake of electric cars, large electric trucks, and heat pumps across selected countries, as well as different policy interventions, such as carbon taxes, subsidies and regulations.

While technological advances such as cheaper solar panels or electric vehicles are essential, their adoption takes place within complex social networks. A singular focus on technology may therefore be misleading. The spread of new norms and technologies depends heavily on social structures, trust, access to information and network connectivity.

An analysis of both simulation and empirical studies on tipping in social networks found that a tipping point often occurs when around 25% of the population adopts a new norm or behaviour[23] (Everall et al. 2025). Within a critical mass range of 10–43%, the rate of adoption can accelerate rapidly. However, although rapid change is possible, it is not guaranteed – and depends on the population and context. Factors influencing the tipping threshold include clustering, trust, social proximity, population size, access to information, memory length and network connectivity.

The position of an actor within a network – especially how central or well-connected the actor is – strongly shapes its ability to influence change. Central actors, such as media figures or social influencers, often have greater visibility and access to others, giving them potential influence. However, when it comes to spreading ideas or behaviours that require reinforcement from multiple sources, these highly connected individuals are not always the most effective. In such cases, change is more likely to take root through repeated, trusted interactions within smaller social circles. "Ordinary" individuals, embedded in diverse and overlapping networks, can often be more effective agents of change, especially in today's information-saturated environments.

This highlights that agency depends not just on how connected someone is, but also on the type of influence needed and on the context in which change is unfolding. In contexts where individuals or groups have conflicting interests, so-called change agents play a pivotal role.

23 Above this critical mass, the share of individuals adopting new norms or behaviours increases rapidly.

These individuals introduce innovative solutions within their communities, advocate for change, build networks of early adopters, and help co-ordinate the emergence of a new social equilibrium and institutional restructuring (Centola 2021; Everall et al. 2025).

The strategies that change agents and early innovators use to attract and retain group members are also crucial. Oliveira et al. (2024) described the phenomenon of "homophily traps" in smaller groups – situations in which group members prefer to interact with others who are similar to themselves. When minority groups comprise less than 25% of a network, strong homophily can reduce their structural visibility, limiting opportunities to connect with others and scale their innovations. Without strategic outreach to acquire new members, such groups risk remaining isolated and failing to spread their innovations to the broader population.

In the context of the transformation towards net zero greenhouse gas emissions, innovations in low-carbon behaviours, norms and technologies that are confined to tight-knit social networks – where members rarely interact with outsiders – are unlikely to spread widely.

In contrast, recent studies have noted the success of right-wing political parties, which have leveraged their active presence in social media and online networks to expand their reach. These parties actively recruit new members, use emotionally charged language, are easy to find and offer low barriers to entry. Meanwhile, the climate movement has become increasingly homophilic, operating largely within its own circles and relying heavily on scientific arguments that do not resonate emotionally with many people. This makes it more difficult for climate advocates to connect with audiences outside their own network bubble (Gerbaudo et al. 2023).

5.3. Policies and regulations to accelerate social tipping points

Policies and regulations can foster conditions conducive to reaching social tipping points by expanding the critical mass of adopters (Table 5.1). A whole range of policies – including subsidies, taxes and fiscal structures, technology standards, bans, education and improvements in information access – can support change agents and early adopters to embed sustainable behaviours and technologies more broadly.

Encouraging progress can be observed across the EU, where net greenhouse gas emissions fell 31% between 1990 and 2022. Preliminary estimates indicate a further 8% reduction in 2023, bringing the total reduction from 1990 to around 37%. The most significant emission cuts have occurred in electricity production and heating, as well as power and industrial installations covered by the EU Emissions Trading System (ETS). In 2023, the ETS

Table 5.1. Typology of tipping dynamics and examples of policies increasing the critical mass of adopters.

Types of tipping dynamics	System control parameters	Policy examples (that help increase the critical mass of adopters)
Changes in socio-ecological system	Environmental pollution, climate extremes, health outcomes, availability of resources and energy, access to resources and energy.	Environment, resource and climate protection policies; regulating access and use of resources and energy, rationing, bans, taxation, tradable permits.
Technological changes	Specific technology adoption, access to infrastructure, costs of specific technologies	Subsidies, taxation, technology standards, bans on specific products, advertisement bans.
Norm changes	Perception of specific behaviours, norms, technologies as moral or socially desired, or as immoral or socially undesirable.	Education, advertisement bans, supporting art projects, non-governmental organisations.
Network structure changes	Changes in the structure of social networks, centrality of certain agents or groups of agents; polarisation.	Governance changes, participatory processes, regulating algorithms that are used in social media (e.g., increasing the share of random content displayed to users instead of similar content).
Information access (and misinformation) changes	Availability and access to new information or knowledge.	Education, informational campaigns, communication, regulating algorithms used in social media (e.g., increasing the likelihood of displaying content of users with a lower number of followers).

generated EUR 43.6 billion in revenues, which is mainly being used to support the transition of energy supply systems, grid upgrades, energy storage and electricity-intensive industries (EEA 2024a; European Commission 2024b).

Globally, by the end of 2023, renewable energy accounted for 43% of installed power capacity – the largest increase to date. Renewables also made up a record 86% of all new global power additions, with solar and wind playing leading roles (IRENA 2024). Despite these achievements in territorial emissions[24], current estimates indicate that the EU is projected to only reduce its greenhouse gas emissions 49% by 2030, falling short of the 55% reduction target set for that year.

At the same time, the international political situation – and the political climate in many individual countries – remains deeply concerning. The climate crisis has been pushed down political agendas due to other pressing global issues, including the COVID-19 pandemic (2020–2022), the Russian invasion of Ukraine (which escalated in 2022) and the Gaza–Israel conflict (which intensified in 2023). These conflicts have not only diverted political attention but have also generated substantial greenhouse gas emissions. Recent estimates suggest that the Russian invasion of Ukraine resulted in around 175 million tonnes of CO_2-equivalent emissions over two years (Hunder 2024), while the Gaza–Israel conflict is projected to produce more than 32 million tonnes when including direct conflict-related emissions, debris clearance and reconstruction (Neimark et al. 2025). Combined, these emissions exceed the annual emissions of many countries.

Despite these challenges, hope can be found at the local and regional levels, where numerous positive developments are emerging. These include the actions of Indigenous groups in Canada resisting gas pipeline expansion; the rapidly decreasing cost of renewable energy generation worldwide; countries such as Uruguay that now generate nearly 100% of their electricity from renewables; and the growing number of financial investors divesting from fossil fuel in favour of less-polluting assets.

One particularly powerful example is the Dutch organisation Social Tipping Point Coalition, which is calling on the Dutch government to phase out fossil fuel subsidies, introduce mandatory climate certification for products, support citizen-led clean energy initiatives, ban fossil fuel advertising and expand climate education in schools. One of the coalition's early successes was persuading city authorities in Amsterdam to ban advertisements for cheap flights.

Examples like these offer hope that transformative actions are possible within the coming decade. However, unlocking this potential requires more than technical solutions: it also depends on addressing rising inequality, conflicts and emerging issues of social injustice. Only by tackling these inter-connected challenges can humanity show the collective commitment and co-operation needed to confront the climate crisis.

5.4. System redesign for wellbeing and sustainability

Promising policy examples also focus on system redesign and strategies that improve wellbeing while reducing energy and materials use and lowering emissions. For example, for decades, policies aimed at reducing greenhouse gas emissions in the transport sector have focused mainly on improving vehicle efficiency within car-dependent urban and transport systems. A systemic approach, however, involves a broader rethinking of these systems. This can include three key steps:

- *envisioning* the desired outcomes of a well-functioning system;
- *understanding* why current systems fail to deliver those outcomes and how they could be redesigned for better results; and
- *developing* policy packages that reverse unsustainable trends and dynamics, redesign systems, and support the transition to more effective systems (OECD 2021).

Policies that shift key physical or social "stocks" to critical thresholds can trigger social tipping points, accelerating progress on climate goals and wellbeing. In many systems, such stock changes may be gradual at first, but once thresholds are crossed, positive feedback loops can drive rapid, transformative change.

Both physical and meta-physical stocks can help activate these tipping points. For example, product standards and tax policies (e.g., incentives) can boost the supply of affordable, circular fashion (a physical stock), while information campaigns can shift consumer attitudes in favour of slow fashion (a meta-physical stock). When both types of stocks reach critical levels, reinforcing feedback loops can emerge, making sustaina-

24 Territorial emissions refer to greenhouse gas emissions produced by activities within the EU's borders. These differ from consumption-based emissions, which underpin the lifestyle carbon footprint approach used in this report, and which account for the emissions embedded in traded goods and services. Consumption-based emissions have declined more slowly, in part due to the EU's increasing net carbon imports.

ble fashion the new norm. An example in the transport domain is the recent shift towards cycling adoption in Paris, France (Box 5.1)

5.5. Conclusions

Adopting a system approach and focusing on tipping points and interventions that shift system dynamics offers a new, promising path for policy and decision making. However, real change also requires the support of a broad range of change agents. The climate movement needs to become more attractive and accessible to new individuals and groups, ensuring the inclusion of a broad spectrum of diverse stakeholders and perspectives.

Climate scientists too should become more open to engaging with new themes, particularly by fostering greater collaboration with researchers in the social sciences, humanities and arts. Building bridges to spiritual and religious groups, as well as Indigenous people and local communities, could also help expand the reach and emotional resonance of climate action.

Most human institutions operate on time frames ranging from a few years to 30–50 years. These timelines, however, fall short of what is needed to address the climate crisis, which unfolds over decades to centuries. Ethics, religion and spirituality are among the few domains that naturally extend concerns across generations, offering valuable perspectives for long-term thinking.

Finally, understanding the role of emotions in human decision making and social organisation and dynamics is essential. Research shows that emotions such as anger or enthusiasm can be powerful motivators, helping to mobilise people and inspire collective action (Kundzewicz et al. 2020). Recognising and embracing this emotional dimension can strengthen efforts to drive transformative change.

Box 5.1. Tipping point example: cycling adoption in Paris

Arnoldus (2024) applied a system dynamic model to explore the potential for a social tipping point in urban systems, using Paris as a case study. The study examined how reallocating road space from cars to bicycles could accelerate cycling uptake. Findings suggest that once a safe cycling network (a physical stock) reaches around 75% completion, adoption accelerates significantly, potentially reaching 20% of total distance travelled by 2050.

The system dynamic model shows that slow initial adoption can shift into exponential growth (in cycling, in the Paris case) once key conditions are met. A major factor influencing the tipping point is the openness of the "cautious majority" to cycling (a meta-physical stock). As the number of cyclists grows, word-of-mouth adoption increases, creating a temporary positive feedback loop, until most potential cyclists have taken up cycling. Similarly, more cyclists lead to stronger public support for cycling infrastructure, which in turn accelerates the expansion of the cycling network.

These feedback loops activate only when key conditions – such as a minimum level of safety and connectivity in the cycling network – are met. The insights from this model can help policy makers plan phased interventions, ensuring that infrastructure development is complemented by behavioural initiatives and supportive facilities such as bike parking. The resulting policy recommendations address both physical measures (road space reallocation and expanded bike parking) and social dynamics (campaigns to normalise cycling).

6

Using the *"Carbon Cost"* of Top Consumers to Eradicate Poverty

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Is poverty eradication in conflict with stopping global warming? One could easily get the impression that there is an unescapable trade-off between these two objectives when following the debate. For instance, in 2017, Science published a news item stating that "lifting people out of poverty is a noble goal, but it could make it harder to fight climate change". The reasoning: "When people earn more, they pump out more greenhouse gases" (Wilkinson 2017). The basis for these statements was a recently published study on the carbon implications of poverty alleviation (Hubacek et al. 2017). Unsurprisingly, the study had shown that, all else staying equal, lifting the world's poorest above a minimal income level is more carbon-costly if this minimal level is higher. A scientist not involved in the study commented that "it really kind of depends on what level of poverty we're OK with" (Wilkinson 2017).

Unfortunately, this is just one example of many in which overcoming material deprivation is played off against fighting climate change. Certainly, all else being equal, an increase in consumption among the poor would lead to higher total emissions. However, the all-else-being-equal argument hides a crucial aspect: the very large carbon footprints on the other end of the income distribution. While the literature on poverty and climate mitigation has pointed this out for years, the role of carbon inequality remains under-appreciated in public debate.

When inequality *is* considered, it is usually to justify the assumption that the emissions of the rich have to *increase* to eliminate poverty – as the latter, so the argument goes, happens through economic growth, which does not alter the distribution of income (Wollburg et al. 2023). Concretely, this assumption implies that increasing the income of a sub-Saharan African farmer from EUR 0.9 to EUR 1.9 per day will also require increasing the EUR 0.92 million per year income of a CEO in North America to EUR 1.85 million. Morality aside, this presents two issues. First, current rates of economic growth in many Global South countries are extremely unlikely to eradicate poverty, when inequality is not addressed (Min and Rao 2023). Second, this assumption leads to overestimated carbon costs of poverty alleviation, and to the illusion of a strong trade-off between ending poverty and reducing emissions.

Here, we approach the links between poverty eradication, inequality and climate mitigation from two perspectives. First, we show why there are reasons for optimism that a decent living standard for everyone can be achieved within the remaining carbon budget for the temperature limits of the Paris Agreement and within all the planetary boundaries. We then explain how high inequality greatly complicates this task. Next, we present evidence on the carbon mitigation potential of reducing overconsumption. Lastly, we derive policy proposals from these two perspectives and discuss existing knowledge gaps.

6.1. The energy and resource requirements of decent living

Poverty is typically measured in monetary terms, such as living on less than EUR 2.0 per day[25]. Alternatively, material deprivation can be defined as lacking access to one or more goods and services considered essential for human wellbeing. The Decent Living Standards (DLS) framework has become a common way to assess such deprivation in sustainable development and environmental sciences research. Decent living standards describe a minimum set of material conditions to which everyone should have access – for example, sufficient floorspace at a comfortable temperature, enough food and nutrients, sufficient motorised transport, health care and education, and access to telecommunication infrastructure (Rao and Min 2018).

A key advantage of assessing poverty using decent living standards (as compared to monetary poverty lines) is that it reliably captures concrete deprivation independent of its reasons. For instance, someone might in principle have enough money to afford internet access, but the necessary infrastructure is not available[26]. From a scientific perspective, another advantage is that decent living standards allows for bottom-up modelling of the energy and resource requirements of providing the minimal material prerequisites for human wellbeing.

Recent research shows that a very large number of people globally live below decent living standards (Rao and Pachauri 2017; Kikstra et al. 2021), including more than half the population of the Global South (Millward-Hopkins and Oswald 2023). While this is a devastating record for humanity, there is reason for hope. Providing a global population with decent living standards requires surprisingly little energy and materials (Millward-Hopkins et al. 2020; Kikstra et al. 2021; Vélez-Henao and Pauliuk 2023; Schlesier et al. 2024), even accounting for the roll-out of necessary infrastructure (Kikstra et al. 2021).

The most optimistic estimate for energy, based on advanced technologies, indicates that 10 billion people could enjoy decent living standards with the global final energy consumption of the 1960s (Millward-Hopkins et al. 2020). Compared to today, this would imply improved living standards for around 4 billion people. Another study found that around 5 tonnes of materials per person are needed per year to provide decent living standards, which is only 20% of the current average German material footprint (Vélez-Henao and Pauliuk 2023; materialflows.net n.d.)[27]. Using less energy and materials than today would make decarbonisation much easier. Moreover, other studies show that providing decent living standards for a 10 billion population is compatible not only with climate goals but with planetary boundaries in general (Schlesier et al. 2024).

While the exact energy and resource estimates in these studies depend on assumptions regarding technological progress and how exactly decent living standards are met (e.g., dietary compositions, passenger transport mode shares), researchers agree that a materially decent and sustainable life for everyone is technically possible. However, current high inequalities make it considerably more difficult to lift everyone above decent living standards while staying within a 1.5-degree budget (Millward-Hopkins 2022; Millward-Hopkins and Oswald 2023; Kikstra et al. 2024), due to the energy requirements of those consuming far above the fair consumption space.

If we are to successfully eliminate global deprivation and mitigate the ecological crisis, it is thus necessary to consider both lower *and* upper consumption limits. Put differently, we must begin to think about both how to enable essential consumption and how to discourage and reduce unnecessary (or even less necessary) consumption.

6.2. Huge reduction potential among the world's rich

The top 1% of the global population emits more CO_2 than the least-emitting 50% together (Bruckner et al. 2022; Chancel 2022). It will come as no surprise that membership in this extreme-polluting club is mostly gained by being rich. In fact, offsetting the pressure on the climate (and other ecological systems) caused by the wealthiest 1% of people globally would be sufficient to provide access to minimum energy, water, food and infrastructure for the one-third of humanity currently being deprived of this (Rammelt et al. 2023). For context, the entry threshold for a German to join the richest 1% globally would be a wealth of around EUR 900,000, attained by 3% of the country's population (World Inequality Database, n.d.). A disproportionally large share of the emissions from the global top 1% come from an even smaller subset of

25 USD 2.15 per day is the extreme poverty line for low-income countries according to the World Bank, in USD 2017 based on purchasing power parity (PPP). The amount has been converted to euros using the European Central Bank's annual average market exchange rate for 2023 of 1 USD = 0.9239 EUR.

26 Also, while monetary poverty lines based on purchasing power parity account for price differences between countries, PPP conversion factors are based on a "basket" of commodities representative for the entire economy. Therefore, the actual standard of living associated with a PPP poverty line depends on the costs of meeting basic needs relative to the prices in the entire economy (Hickel and Sullivan 2024).

27 Vélez-Henao and Pauliuk (2023) report Total Material Requirements as their main material footprint results, but here we compare their estimates of Raw Material Inputs (from supplementary data), which are comparable with other available data from the UN and Eurostat.

super-rich people, with multiple homes, and often large yachts and private jets (Otto et al. 2019).

Such luxury consumption contributes little to societal wellbeing (Jebb et al. 2018; Abdallah et al. 2024; Tamberg et al. 2024) and could thus be considered an ineffective use of humanity's ecological capacity. Reducing this consumption would thus be an effective way to make room for increased consumption by those below decent living standards. However, the mitigation potential on the upper end of the world's income and wealth distribution is not restricted to banning secondary villas and private jets. A recent study showed that if the top 10% of global consumers aligned their consumption levels and patterns with the European average, this alone would lead to a reduction in global CO_2 emissions of more than 20% (Tian et al. 2024). Additionally, adopting the least environmentally intense consumption patterns in their decile would allow this group to reduce global emissions by 36% (Tian et al. 2024).

Not only do rich people on average consume more energy and resources than the poor, but they also consume differently. Analyses of household energy footprints have shown that for high-income households, a large share of their total energy use is related to transport (mostly car-driving and flying) and luxury consumption. Under scenarios of redistribution, where high-end consumption is scaled down to free up room for meeting basic needs, the composition of total energy would shift towards essential consumption, such as heating homes (Oswald et al. 2021). Besides contributing to a fairer use of energy, such a shift can also facilitate carbon mitigation, as decarbonising essential consumption (such as household heating) is often easier than decarbonising luxuries (such as aviation).

6.3. Policy implications and directions for further research

Scientists researching the distributional dimensions of ecological problems agree: there is a need to shift focus from the "carbon cost" of poverty alleviation towards the mitigation potential of reduced overconsumption. Ending human deprivation is recognised by a global political consensus in the form of the UN's 2030 Agenda and the Sustainable Development Goals. Fortunately, it can be achieved within planetary boundaries if society begins to address the massive inequalities in wealth, energy and resource use that the economy currently produces. Worrying about the carbon emissions of eliminating poverty while others heat oversized houses and fly a great number of times per year is proverbially like focusing on a dripping faucet while the bathtub is overflowing.

Reducing overconsumption can be achieved through a variety of policies. Taxes, bans and rationing could address luxury consumption directly by making it harder or even impossible to access certain goods or services. Since the rich are by definition less constrained by financial budgets, policies such as bans and rationing are more likely to be effective than taxes, especially for the super-rich. Such measures also avoid the risk of governments becoming financially dependent on revenues from the consumption meant to be disincentivised – as in the case of tobacco taxes (Corlett 2023). Outside of wartime, the idea of rationing may appear extreme. However, rationing is standard practice in times of drought, for example, and is an elementary part of government emergency plans of all kinds. Given the emergency of the climate crisis, it could be argued that the typical requirements for this policy are met.

Another approach is to address income and wealth distributions directly. Classical instruments include highly progressive taxes on income, capital gains, wealth and inheritance[28]. However, such redistribution measures can only mitigate the effects of capital accumulation, not eliminate them, and are subject to constant attack by vested interests and the wealthy themselves. Therefore, more far-reaching proposals aim directly at forms of ownership, arguing that only collective and public ownership of the systems that satisfy human needs can break the protection of financial interests from redistributive measures.

Designing effective redistribution and/or anti-luxury policies is made difficult by the fact that there is surprisingly little knowledge of the wealth, income and expenditure of rich people. Researchers have pointed out that the upper end of the wealth scale is under-represented in census and expenditure data (Otto et al. 2019; Bhar et al. 2024). And in contrast to the well-defined decent living standards, concepts such as luxury consumption or overconsumption are poorly defined, making it harder to estimate the mitigation potential of reducing them.

Nevertheless, the evidence currently available is sufficient to be optimistic about the possibility of securing wellbeing for all within planetary boundaries. This is true with respect to the material consumption required to lift people out of deprivation. It is also true for subjective wellbeing, which becomes nearly independent of income once material and immaterial human needs are satisfied (Tamberg et al. 2024). Therefore, poverty alleviation should be approached by focusing on the satisfaction of human needs, instead of untargeted economic growth. The minor increases in energy and resource demand that this alleviation entails can, in theory, easily be offset by reducing the unnecessary luxury consumption that is pervasive among the world's rich.

28 Many people are surprised to learn how progressive taxes were in Western countries during the post-war period. For instance, in the 1950s and early 1960s, the effective income tax rate of the highest incomes in the United States was around 70%, with a maximal marginal rate of 91% (Jebb et al. 2018).

7

Overcoming Fear of Change: Co-benefits of 1.5-Degree Lifestyles

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(Hot or Cool Institute)

Climate change mitigation, particularly when it involves changes in consumption or lifestyles, is typically presented as a sacrifice. We are told that we *have* to accept policies that lead to reduced car use, meat consumption and smaller living spaces to reduce our environmental impact. The implication is that sensible moral people who care about future generations and more vulnerable societies will choose to support such sufficiency policies despite the loss to their own living standards, and that only selfish, short-sighted people will resist and insist on continuing as they do now. Or that we need to all agree globally to make this shift, because it would not be fair to those countries that do change systems if other countries continue to enjoy their current lifestyles. The assumption behind this framing is that, all things being equal, we would be better off having the choice to live as we do. Being green is portrayed as an undesirable burden.

Of course, all things are not equal. The impact of climate mitigation policies is often compared to the situation today. A more appropriate counterfactual would be to compare with the projected situation in 15 or 30 years, where we have not adopted effective mitigation policies, with frequent natural disasters, reduced agricultural output and climate-induced exoduses. In that comparison, more people would prefer a sustainable lifestyle, even if it does mean consuming less and forfeiting some of today's luxuries, such as frequent air travel. But of course that requires a certain degree of farsightedness.

However, sustainable lifestyles may also be preferable to the status quo, at least for the majority. There is now a rich body of research that demonstrates that the structural and lifestyle changes consistent with reduced environmental impact are not associated with worse outcomes in terms of wellbeing, and may even be beneficial (Creutzig et al. , compared to the current status quo. In other words, our lives would be better *now* if we adopted policies that ensured that our lives are better in the future.

7.1. Understanding wellbeing

What does it mean for our lives to be "better"? In mainstream analysis, there is an assumption that living better comes from having more purchasing power. That is why gross domestic product (GDP) is so central to analyses, and why sustainability is so often measured with efficiency indicators such as CO_2 per real GDP. A wellbeing approach distinguishes between wellbeing outcomes that are valuable to us in their own right, and determinants of wellbeing – which are important but are not ends (for individuals) in themselves.

In 2010, the UK government defined wellbeing as "a positive physical, social and mental state" (UK Department of Health 2010). This definition highlights the intrinsic importance of health and social relationships as well as the subjective experiences of the individual. Being healthy, having positive relationships, feeling happy and having a sense of autonomy, competence and meaning in one's life are all outcomes that we value in and of themselves, and not because they lead to other positive outcomes. In contrast, having a job, access to public or private transport, and even living in a democracy are all important means, but not ends in themselves. Although they are normally important in today's societies, one can

imagine contexts where a human being can live well without these things.

More importantly, one can see how means can be traded off one another, both at the individual and at the societal level, to achieve good lives in different ways. This is key to understanding how sustainable lifestyles can be positive. Certain changes may appear to be sacrifices because they involve reducing certain means to wellbeing, but they can afford improvements in other means, leading to a net positive impact in terms of wellbeing. Changes that reduce environmental impact and improve wellbeing can be understood as win-wins, or double dividends.

7.2. Win-wins: some examples

There are several areas where there is strong evidence that win-wins are possible. Two examples are transport and working hours.

Transport

In high income countries, transport is the single largest contributor to CO_2 emissions from lifestyles, accounting for a third of the average lifestyle carbon footprint according to the latest figures in this report (see section 3.1). Nearly two-thirds of these emissions come from private car use. Reducing car use is among the top three most effective lifestyle changes to reduce CO_2 emissions in all the high income countries studied.

Leading authorities, including the WHO, the International Transport Forum (ITF), and the Lancet Pathfinder Commission, have highlighted in recent years that reduced car use (including electric cars) will also lead to substantial health benefits (WHO 2023; ITF 2024b; Whitmee et al. 2024), given the harmful impacts of current car-dominant transport systems. For example, road traffic accidents cause over 1 million deaths per year worldwide (ITF 2024b).

Systematic reviews have demonstrated the detrimental impact of air pollution, and in particular traffic-related air pollution, on a range of health conditions, especially cardiovascular and respiratory (Anenberg et al. 2019; Boogaard et al. 2023). Determining the proportion of the 4.2 million air pollution-related deaths per year (WHO 2024) that can be attributed to transport emissions is not straightforward, but transport is one of the biggest emitters of several deadly pollutants, including nitrogen oxides (NO_x), particulate matter ($PM_{2.5}$ and PM_{10}) and ozone. For example, during the COVID-19 lockdown in spring 2020, NO_x levels in Paris fell 75%, most of which can be attributed to the sharp decline in transport use (Vincendon 2020).

Notably, while the replacement of combustion engines by electric vehicles may reduce overall vehicle emissions, it will not address many of the wider challenges associated with private car transport. In addition to still contributing to road accidents, electric vehicles will not on their own eliminate the harmful impacts of air pollution. According to Whitmee et al. (2024) more than half of the $PM_{2.5}$ from vehicles comes from brake, tyre, and road wear, rather than from tailpipe emissions. Given that electric vehicles are typically heavier than vehicles with combustion engines, such pollution would only increase, if electric vehicles are key to sustainable transport.

Lastly, the current transport system, in many places dominated by the private car, contributes to a general context of physical inactivity (Hinde and Dixon 2005). A greater role for active transport, particularly cycling, would lead to substantial health benefits, reducing cardiovascular disease, cancer (Celis-Morales et al. 2017; Shaw et al. 2020) and obesity rates (Flint and Cummins 2016).

All in all, a more sustainable transport system has been estimated to lead to 4.9 million years in reduced life lost globally (Whitmee et al. 2024). The ITF calculates total savings of EUR 809 billion in reduced health costs in the regions it considers (including Europe, North and South America, China and India).

Alongside the health benefits, other researchers have considered the broader benefits to subjective wellbeing of a less car-dominated transport system (Reardon and Abdallah 2013; ITF 2024b). These include the benefits to subjective wellbeing of greater physical activity, but also more green space (freed up from space currently devoted to roads and parking), less time spent in traffic, less noise pollution and the improved social fabric of communities that are not divided and broken up by large roadways (Glazener et al. 2021).

Working hours

The idea that transforming our travel habits can lead to both reduced environmental impact and improved wellbeing is now becoming mainstream. Perhaps the next step is to consider the consequences of broader economic changes. A reduction in working time has attracted increasing attention as a pathway to multiple goals related to both sustainability and wellbeing (NEF 2018; Mayrhofer and Wiese 2020; De Spiegelaere and Piasna 2021). Conceptually, working time reduction represents a deprioritisation of paid work in the formal economy and an increased prioritisation of other aspects of life, including unpaid care work, democratic engagement and social relationships.

Both sides of this change have the potential to reduce environmental impact. In terms of reducing working hours, this should lead to a reduction in output – provided that productivity increases do not entirely counteract this effect. Given that almost all economic activity has *some* environmental impact, this is good news for the planet (Mallinson and Cheng 2022). If reduced working hours also means reduced commuting, this can also have a positive impact in terms of transport emissions.

A reprioritisation of aspects of life beyond paid work also has the potential to limit our environmental impact.

Many of the lifestyle changes required to reduce our environmental impact – for example, repairing instead of replacing, reducing food waste, using less motorised transport – require more time, time that people who work 40 hours or more a week often do not have. Longitudinal studies have shown that those who reduce their working hours also reduce their environmental impact (Neubert et al. 2022), an effect that has been confirmed in systematic reviews (Antal et al. 2020). Cross-sectional studies have shown how territories with longer average working hours have higher per capita CO_2 emissions (Mallinson and Cheng 2022).

The relationship between working hours and wellbeing is more complicated. Although extremely long working hours (around 45–55 hours per week) are always associated with lower subjective wellbeing, shorter working hours also appear to be associated with lower subjective wellbeing. However, a longitudinal study found that voluntary reductions in working hours lead to improvements to subjective wellbeing, despite declining income (Neubert et al. 2022). Meanwhile a systematic review of seven studies found that reducing working hours leads to improvements in sleep quality and reductions in stress (Voglino et al. 2022). In other words, people who currently work shorter hours do not necessarily have higher wellbeing, but those who reduce their working hours (because they or their company choose that option) do.

Conceptually, there are good reasons to believe that a societal decrease in working hours could lead to improved wellbeing. As well as freeing up time for sustainable lifestyles, it should free up time for healthy lifestyles – with smoking, alcohol consumption and obesity all associated with longer working hours (De Spiegelaere and Piasna 2021). More generally, greater free time allows for other meaningful activities, including hobbies, democratic engagement, social relationships, and family, all of which are important to wellbeing. Box 7.1 introduces the argument that improved social relations could reduce the need for certain forms of consumption.

The challenge is that *individuals* choosing to reduce working hours, while the broader population continues to work longer hours, also have to contend with the negative impacts of reduced relative income (Schalembier et al. 2019) and falling behind in their careers (Gerold et al. 2017). For the full benefits in terms of wellbeing of reducing working hours to emerge, there needs to be a societal shift, not just an individual choice.

This is also the case in relation to some of the other arguments made for working time reduction – for example, that it would allow for a redistribution of employment and therefore reduce unemployment; that it would allow for greater gender equality through a redistribution of care work; and that it would allow for strengthened democratic participation, making democracies work better (NEF 2018). These are benefits that emerge at the societal level, not just for the individual whose working hours are reduced.

7.3. So let's do it!

Transport and working hours – as well as stronger social relations – are just a few areas where a society-wide change in lifestyle can reduce environmental impact *and* improve wellbeing. Other win-win societal changes include diet (Verhofstadt et al. 2016), industrial policy that favours the care sector (Women's Budget Group 2022; Hot or Cool Institute 2025), reducing

Box 7.1. Social relations and defensive consumption

Researchers have observed that one of the key triggers of our multiple current crises has been the degradation and devaluation of social relations (Sarracino 2025; Sarracino and O'Connor 2023). From this perspective, one of the drivers of environmental degradation is an increase in the perceived need for consumption that stems from weakening social ties and greater mistrust. For example, it has been argued that nearly a quarter of our individual consumption can be understood as defensive expenditure, protecting us against inequality, crime and air pollution (Sarracino and Slater 2025).

Sarracino (2025) proposes a virtuous circle, whereby improved social relationships would lead to increased wellbeing and reduced defensive expenditure. This would lead to a decrease in what has been called "defensive growth", with concomitant reductions in CO_2 emissions and pollution, reduced inequality and better social relations. Better social ties also makes shared provisioning and "public luxury" a more viable approach. It also strengthens resilience in society.

materialism by limiting advertising (Purpose Disruptors 2021; Hartmann et al. 2023) and – perhaps the most fundamental shift – a decrease in economic inequality (Jorgenson et al. 2017).

But if these changes are so great for people's wellbeing, why are we not doing them? And, why is the public not supportive of them? This is the most important question if we are to move towards a sustainable wellbeing society.

There are several reasons for public scepticism. Misinformation is perhaps the first challenge. Many policies that have been designed to achieve sustainability and wellbeing outcomes are deliberately miscommunicated by opponents. The "15-minute cities" conspiracy is perhaps the most disturbing example of this, whereby a sensible aspiration to ensure that all the goods and services that an urban resident regularly needs can be reached within 15 minutes by foot or public transport has been twisted into a dystopian vision where people would be kept in "ghettos" and not allowed to leave (BBC 2023; Marquet et al. 2025). Other examples include how media in Germany distorted the green agriculture minister's plans to reduce meat in schools, into a "meat ban".

A second challenge is being able to imagine a societal change, as opposed to just an individual change. This was alluded to in the earlier discussion on working hours. Many people are wary of reducing working hours because they do not want to fall behind in their careers. This makes sense in many sectors, particularly among professionals whose incomes would allow them to otherwise reduce working hours and accept an income reduction. The idea of everyone working less, so that no one is left behind in their career, is harder to imagine.

This applies to other areas as well. Ask many people why they do not cycle more, or encourage their children to cycle to school, and they will cite safety concerns. But if *everyone* was cycling more, there would be fewer motorised vehicles on the roads, and the streets would be safer for everyone (including those people who need to drive). Similarly, there would be less air pollution and noise, making cycling (and walking) more pleasant. These are just two examples illustrating why societies need to act as a whole, rather than rely on individuals making changes.

Sometimes, however – and this is the third challenge – it is hard to convince people that a change in lifestyle would be beneficial for them. And of course, sometimes, it might not be the case – there is no evidence that banning flying to the Canary Islands for holiday will improve wellbeing. In these cases, a society-wide change is all the more important, as one of the biggest arguments against individual change is fairness. Surveys show that most people are willing to make what they perceive as sacrifices to their quality of life as long as they feel that everyone is doing their bit (Maestre-Andrés et al. 2019).

Change is always unsettling. One of the best-known psychological phenomena is loss aversion – that we pay more attention to losses than gains. People focus on the loss of bacon, the loss of comfort from driving to work on a rainy morning, or the loss of income from reducing working hours. The societal transformation needs to be able to highlight the gains: the health gains from eating better and using active transport, as well as the gains from having more time and opportunity for social interactions, and to develop skills and engage in meaningful activities.

Intuitively, most people know that a simpler lifestyle prioritising health, relationships and purpose is better for us. It's written into religious thinking from Christianity to Buddhism, it was advocated for by eudaimonic Greek philosophers such as Aristotle. We need to reawaken that intuition, support it with evidence and mobilise the political will to move towards it together.

8

Citizen Assemblies: Deliberative Mini-Publics for a Sustainable Future

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To enable "immediate and deep emissions reductions across all sectors" of society (IPCC), there is a need to change societal norms and behaviour. Unfortunately, just when structural changes are needed the most, trust in governments is historically low, and many citizens feel that the current systems do not work for them (OECD 2024). Therefore, there is also a high risk of political conflict and polarisation around climate politics, where different groups weigh the costs and benefits involved in a societal transformation towards more sustainable lifestyles (Patterson 2023). How might societies navigate this new and challenging situation?

A crucial part of the answer lies in fostering genuine democratic participation that can bolster political decision making and collective action (Willis 2020). To be both effective and enduring, societal transformations must engage citizens directly to foster a sense of ownership and legitimacy. Therefore, the deep societal transformations required to address the ongoing crises demand inclusive and democratic approaches (Dryzek and Niemeyer 2019; Willis et al. 2022).

This raises a whole new set of questions: What kind of sustainable world can people envision? What does "the good life" look like in such a world? And what are people willing to change, as individuals and as collectives, in order to bring us there? Answering such questions collectively is going to require new democratic platforms where citizens can meet and deliberate about shared values, priorities and difficult trade-offs.

One solution is the promise of deliberative mini-publics, and specifically citizens' assemblies, as a way to include citizens in conversations around climate politics and sustainable lifestyles.

8.1. The deliberative wave

In recent years, there has been a surge of interest in deliberative democratic practices – a development that the Organisation for Economic Co-operation and Development has popularly referred to as "the deliberative wave" (OECD 2020). At the heart of this development lies a series of democratic innovations called "deliberative mini-publics" – which include citizens' assemblies, citizen juries and citizen panels – that bring together small but representative samples of citizens to discuss complex issues and propose new solutions (Setälä and Smith 2018). These deliberative formats emphasise respectful debate, expert knowledge, and collective decision making, making them well-suited to addressing the multi-faceted challenges of sustainability.

The format of citizens' assemblies has become one of the most prominent examples of deliberative mini-publics. These assemblies bring together a large group of ordinary citizens, usually between 30 and 250 people, who have been randomly selected to reflect the demographic diversity of the broader population. Over the course of

several structured sessions, participants are exposed to expert knowledge, engage in facilitated discussions and ultimately produce policy recommendations for political decision makers on a given issue.

In recent years, citizens' assemblies have been employed to tackle many different issues, including abortion, Brexit, welfare and more – but they are increasingly being used specifically to address the complex issues of climate politics (Cherry et al. 2021; Boswell et al. 2023). In the past five years alone, more than 15 national-level climate citizens' assemblies have been organised across the world, with many more at local, municipal and regional levels[29]. The experience is that the climate assemblies produce policy recommendations that are at least a few steps ahead of the climate-political status quo.

8.2. The potentials of climate assemblies

Deliberative mini-publics hold great potential for reinvigorating our existing democracies. Engaging in a collective political dialogue, learning from diverse perspectives and contributing to new solutions promotes a sense of empowerment and civic responsibility that is lacking for many citizens today. The experience of participating in a climate citizens' assembly is often felt as transformative. In evaluations, most assembly participants describe it as a deeply meaningful experience, and many go on to integrate parts of their newly gained knowledge in their lives even after the assembly ends.

Meanwhile, the process of deliberation is designed to lead to the formation of more informed and reflective preferences, as participants get to reconsider their initial views and develop what is sometimes called "deliberated" preferences – preferences shaped by thoughtful discussion, exposure to evidence and the collective reasoning of diverse individuals (Niemeyer et al. 2024). This might help explain why the policy recommendations of citizens' assemblies often end up being more ambitious on climate-related issues than the political status quo. This includes, for example, recommendations about climate targets being more important than economic growth, the need to reduce consumption and animal agriculture, and in general pushing for more transformative changes in society[30].

Beyond the transformation of individual participants and their opinions, the assemblies also serve as part of a broader push for re-democratisation that might help revitalise trust in democratic processes. In many countries, there is a local distrust in new green development projects, which stems in part from previous experiences of not being heard or only included in "public hearings", which are often perceived as little more than show trials (Møller 2023). Here, citizens' assemblies offer a better and more demanding way of including citizens, which aims at genuine co-creation rather than instrumental attempts by public authorities to check the box of citizen participation.

Finally, researchers are beginning to study whether deliberative mini-publics can help catalyse more systemic shifts that go beyond their immediate legislative impacts (Ejsing et al. 2023; Wilson and Mellier 2023). By showcasing constructive dialogue and compromise, citizens' assemblies provide a counter-narrative to political polarisation and climate backlash. When well-designed and well-timed, citizens' assemblies might help move political discussions beyond their status quo and break existing political gridlocks.

8.3. The limits of climate assemblies

While the recent surge of deliberative mini-publics offers some hope for the future of democratic decision making around climate issues, they are not without limitations. A key challenge has been the anchoring of mini-publics within formal political institutions – what is also sometimes referred to as the "mandate" debate. Without a clear pathway for integrating citizens' recommendations into policy, deliberative assemblies risk becoming symbolic exercises rather than engines of real policy change (Mulvad and Popp-Madsen 2021).

While weak political mandates are not an inherent limitation to citizens' assemblies themselves, they have been a recurring challenge. In the case of the French national climate assembly, President Macron initially promised to implement the assembly's policy recommendation "without filter". However, the actual implementation process ended up weakening several of the recommendations, and assembly members eventually rated Macron's implementation of their recommendations as a 3 out of 10 (Courant 2021; Giraudet et al. 2022).

In the Danish national Climate Citizens' Assembly, green groups declared the assembly a failure even before it had started, because it did not entail a strong political

29 See KNOCA (n.d for an overview of the national climate assemblies, and for a map of all recorded climate assemblies across Europe.

30 See, for example, the recommendations from the national Danish Climate Citizens' Assembly, which concluded that it was more important that Denmark provided its fair share to the Paris Agreement than whether the country experienced economic growth (KEFM 2022, 26). Or the national German climate assembly, which recommended that "the speed of the energy transition takes precedence over the costs" and "climate neutrality must be the top priority in any and all measures and decision … in the field of mobility".

mandate (Whyte et al. 2020). These fears were later substantiated by the fact that only a handful of politicians showed up when the assembly members formally handed over their recommendations to the parliament after the first round concluded in 2021 (Tønder et al. 2021).

Although citizens' assemblies can help circumvent the existing gridlock of parliamentary politics, offer meaningful experiences of political engagement, and produce promising outcomes on climate-related issues, their immediate impacts at the level of climate policy have remained limited.

8.4. Strengthening climate assemblies

To realise the promise of deliberative mini-publics as catalysts for a more sustainable world, the following need to be addressed.

- **Improving institutional Integration:** From the onset, it is important to incorporate design mechanics that help create ownership of the process not only among participating citizens, but also among political recipients. Just as important is to identify institutional mechanisms that would be needed to ensure accountability and follow-through. Among these are opportunities for broader political pressure to accept and implement recommendations, and means by which incumbent politicians can recognise the powers and create space for these assemblies. These will contribute to more effectively linking the outputs of deliberative assemblies to formal political decision making.

- **Strengthening public engagement:** This involves identifying existing opportunities and barriers for citizens' assemblies at the local and regional levels, as well as how deliberative assemblies can be multiplied and scaled to cover larger parts of the population. New digital tools could also help bridge the gap between mini-publics and society at large. Strategic public communication about the process is crucial in order to make its outcomes a rallying concern, and to strengthen the voice of the assemblies, and their members in the media.

- **Better inclusion of marginalised voices:** Although deliberative mini-publics strive to be representative, they are rarely fully inclusive. Participation in formats such as climate assemblies is time and energy consuming, which makes less privileged groups less likely to engage and more likely to drop out of the process; meanwhile, language barriers and cultural differences can make participation more difficult. Attention should be given to inclusivity, particularly for marginalised groups whose voices are often under-represented in traditional political processes.

- **Assessing impacts from a systems perspective:** While participating in deliberative assemblies is felt as a transformative experience from the perspective of the participants, other broader implications need to be considered. These include: effects not only on individual behaviour, but also on community dynamics and policy outcomes; ripple effects that create change in the long term; and how they lead to broader cultural change towards a reinvigoration of democracies. Planning at the beginning of the process should include how these broader impacts can be systematically evaluated.

Addressing these questions – through research and ongoing experimentation with a deliberative format – will be crucial in refining the role of deliberative mini-publics as tools for fostering sustainable behaviour and societal transformation. Deliberative mini-publics are not a silver bullet that is going to solve all the multiple crises facing societies at the moment. Far from it. But by learning from ongoing experiments and adapting to new insights, they can help to build more robust and inclusive democratic institutions and culture that will be necessary to tackle these crises more effectively.

9

From Exclusion to Reciprocity: Rethinking Private Property

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All of us were born into a world where most of life's vital sources – land, minerals, energy, seeds, housing – are already spoken for, claimed by a small minority. Sometimes those claims are made by private capital, sometimes by states, sometimes both.

The result is a world of abundance turned artificially to scarcity, of overfull storehouses next to empty cupboards, of billionaires in private jets and families evicted from modest apartments (Piketty 2017). It is also a world of mounting exhaustion: of soils depleted, oceans stripped, forests cleared. A world driven by a single imperative – growth – that promises prosperity to the top while delivering ever more inequality and ecological breakdown to everyone else (Philipsen 2015).

At the root of these paradoxes lies an old question: who controls the resources we need to live, and for what ends? How do we define, and enforce, concepts such as property, possession, ownership? Does the Earth belong to those who have fenced and claimed it, or to those who depend on it and nurture it? Or – as many Indigenous traditions remind us – do we belong to the Earth? Our answers shape not just our economies, but our freedoms, our democracies, our sense of justice.

In the modern imagination, private property has long been celebrated as a foundation of security. The idea is simple enough: a home to keep us safe, tools to earn our bread, the fruits of our own labour. In this sense, property feels like a condition of dignity. But the same institution that offers protection can just as easily produce exclusion when its role shifts from meeting needs to maximising profit. When property means a roof over one's head, a field that feeds a family, or a workshop to practice a trade, it strengthens the bonds of life together. It remains rooted in people and places.

But when ownership detaches from use – when houses are bought not to live in, but to flip or hoard; when farmland is held not to nourish, but to speculate; when patents are accumulated not to invent, but to block competitors, then property becomes an abstract instrument. It turns into a mechanism of extraction rather than sustenance, a tool for the few to leverage against the many. For every private equity firm that buys up homes, there are countless families priced out of shelter. For every fence around an agribusiness empire, there are thousands cut off from the soil that could sustain them.

Property can safeguard personal freedom and collective flourishing only when it remains tethered to the shared needs of people and their environments. Once it is scaled up into an impersonal ledger of transactions – concentrated in the hands of corporations, states or billionaires – it mutates into a weapon of denial, extraction and control.

We see this contradiction everywhere. Entire apartment towers sit empty, held as investment vehicles, while families sleep in their cars (Desmond 2016). Fertile fields lie fallow or grow food for distant markets, while local food banks pulse with need (Shiva 2016; Gallop 2022). Pharmaceutical companies patent seeds and medicines, locking life itself behind a paywall. Artificial intelligence systems scrape the cultural commons, harvesting art, writing and knowledge from

the public domain to build private platforms (Crawford 2021). Fossil fuel corporations hold legal rights to reserves of oil and coal that, once burned, will make large parts of the planet uninhabitable. The pattern repeats: exclusionary property regimes prioritise profit and control, even at the cost of life (Waring 1990).

The climate crisis, if nothing else, teaches us that systems built on extraction and exclusion cannot last. They exhaust their base, hollowing out both society and ecology.

What remains to us is a different possibility: a way of living not anchored in ownership, but in reciprocity and care.

9.1. The historical roots of enclosure

For most of human history, survival depended on gifting and sharing. Land, water and forests were treated as inheritances to be tended, not commodities to be bought or sold. Among the Haudenosaunee in what is today the North American regions of New England and Quebec, decisions were weighed for their impact on the seventh generation. In the Andes of South America, the Ayllu organised communal land and labour. Across much of Africa, lineage systems governed access to fields and forests, ensuring that no one was left landless (Wall Kimmerer 2015).

The idea of private property as exclusion would have seemed very alien to our ancestors. Historically, it is relatively new. In Europe, beginning in the late Middle Ages and accelerating into the modern era, wealthy landowners fenced off shared fields and forests. This "enclosure" was not just an economic maneuver but a profound social rupture. "Thousands of rural communities were destroyed …; crops were ripped up and burned, whole villages razed to the ground. Commoners lost their access to land, forests, game, fodder, water, fish – all the resources necessary for life" (Hickel 2021). As Silvia Federici noted in her detailed study on this process of primitive accumulation, it included a war against women and against the reproduction of life itself, severing people from the land that sustained them and forcing people into the market to survive (Federici 2004).

Colonialism globalised this pattern. In India, the British imposed property regimes that manufactured landlord classes and transformed subsistence farmers into tenants. In Africa, colonists crushed communal tenure systems into plantations and mines that redirected massive wealth to Europe. In the Americas, colonists stole Indigenous nations and pressed Native people into systems of labour and trade that enriched empires while devastating ecosystems (Guha 1990; Rodney 2012; Dunbar-Ortiz 2014).

This was not an unfortunate side effect of modernisation – it was its very foundation. By turning land, labour, and knowledge into property, enclosure laid the groundwork for the inequalities and ecological destruction we now confront. The climate crisis is, in this sense, a direct descendant of the enclosures from centuries past (Hickel 2021).

9.2. Property as power

Philosopher Pierre-Joseph Proudhon made a distinction that is often forgotten. Not all property is the same. Personal property, he argued, secures the fruits of one's

labour and the means of individual autonomy. Private property, by contrast, enables accumulation and exclusion. One protects freedom, the other undermines it (Proudhon 1970).

To live with dignity, we need forms of property that are personal and communal. We need the security of our own bodies, the tools we work with, the home that shelters us, and the creative products of our labour. These are the anchors of independence. They allow us to determine our own lives rather than have our lives determined for us. In this sense, property is not only useful but necessary.

But property also takes another form. Once it is enlarged beyond what is needed for subsistence or independence, it begins to confer power over others. Private property, in the modern legal sense, grants the right not just to use, but to exclude; not just to sustain, but to dominate. It makes it possible for one person's security to depend on another's dispossession.

The distinction is subtle but decisive. A pair of shoes you wear is personal property. A factory that makes shoes, owned by someone who does not labour there, is private property. The first preserves freedom. The second produces inequality, binding the lives of many to the interests of a few.

Private property's logic may appear neutral – it is simply the right to exclude. But in practice, it structures whole societies. It dictates who has access to land, water, or shelter, and who does not. It privileges the few while exposing the many to precarity. It shapes not only wealth but the very contours of possibility for communities.

Understanding this distinction is crucial now, in an age of climate disruption and run-away inequality. The property we need to secure our independence – homes that protect us, land that sustains us, commons that belong to all – is precisely what is put at risk by the property that excludes and extracts. To defend personal and communal property is to defend freedom. To challenge private property is to recognise that its unchecked power threatens both human survival and the earth itself.

Jean-Jacques Rousseau was one of the first to eloquently warn, at the very time (1754) when landowners had begun to establish more exclusive and exploitative legal forms of private property, that herein lies the very origin of social inequality: the declaration that one person's use of a resource excludes all others is the seed of conflict, domination and deprivation (Rousseau 1993).

As a result of this history of enclosure and expropriation, modern law tends to describe private property with four features, both fundamental and historically new: exclusivity, transferability, control and enforceability. At first glance, each seems benign on its own; together, they structure power and explain why private property lies at the heart of nearly every challenge we face today (Locke et al. 1978).

- **Exclusivity** creates a world of winners and losers. The right to exclude ensures that those with property enjoy safety, security, and sustenance, while those without are left precarious. For ordinary consumer goods, this may seem trivial. But when the same logic governs housing, health care, farmland, or water, it produces systematic deprivation.

- **Transferability** transforms temporary advantage into permanent hierarchy. The ability to sell or bequeath property ensures that privilege hardens into dynasties of wealth and poverty. This dynamic explains the persistence of inequality across generations, and why societies marked by private property regimes tend toward polarisation rather than mobility (Piketty 2017).

- **Control** gives owners wide latitude to decide how property is used, altered or destroyed – even when those choices undermine the common good. Corporations can pollute rivers, clear-cut forests, or burn fossil fuels, all under the legal cover of control. This is not an incidental abuse of the system but its very design: owners are empowered to prioritise profit over people or planet, and they face few structural obligations to care.

- **Enforceability** ensures that these rights are not just abstract but backed by the coercive power of the state. Police protect property rights before they protect lives; militaries defend resource claims more fiercely than they defend human rights. This fusion of law and force means that the institution of private property is not voluntary or natural – it is imposed and maintained through violence, both threatened and actual (Harvey 2003).

When combined, these four features turn private property from an instrument of freedom into an engine of inequality, conflict and ecological breakdown. Exclusivity divides, transferability entrenches, control legitimises destruction, and enforceability ensures compliance. Together, they form a structure that rewards extraction and accumulation while eroding care, reciprocity and sustainability.

We must then ask a logical question: can a socially just, reasonably fair or sustainable future be built on the existing foundations of private property? The challenges of our age – soaring inequality, mass displacement, the erosion of democracy, the destabilisation of climate – are not aberrations but logical outcomes of the regime of private property.

To imagine otherwise is to mistake symptoms for causes. The irony is that systems as different as capitalism and communism have shared this same logic of cen-

tralised control – one through market rules determined by a centralised few, the other through bureaucracies. Both have proven dysfunctional in successfully addressing any major challenge.

What has endured, especially in disaster, are not markets or states but the webs of mutual aid and care that ordinary people build to sustain and protect one another (Solnit 2010).

9.3. Waste as an outcome, not an accident

But why has private property not only failed to protect the Earth and its inhabitants, but actively contributed to its exhaustion? Private property is, at its core, a logic of exclusion. To own something privately is not only to use it for oneself, but to deny others the right to use it, regardless of their need. This is why Rousseau saw the fence as an act of violence in slow motion: once erected, it transforms what could be a space of shared sustenance into a site of competition and deprivation.

Private property insists on boundaries where life itself knows none – water flowing through a watershed, seeds scattered by wind, soil providing our collective sustenance, air breathed by every lung. To privatise these is to sever the possibility of care, because care depends on openness, circulation and the recognition that what sustains me also sustains you. That we need each other to survive and thrive.

Unlike personal property, which supports autonomy, or communal property, which flourishes through shared stewardship, private property thrives on indifference. It authorises owners not to care. The logic of possession allows a landlord to keep an apartment empty if it yields higher future rent, even as people sleep in the streets below. It allows agribusiness to plow surplus crops into the soil to maintain prices, even as hunger spreads.

A logic prioritising care, in contrast, demands use, sharing, repair. Private property demands only the defense of claims, often by force, and the maximisation of exchange value. Corporations design washing machines and refrigerators and planes to wear out, so they can sell replacements. Oil companies flare gas into the sky, wasting energy while stoking climate chaos (Slade 2006). In this way, the regime of private property is not simply neutral – it actively corrodes practices of care.

This is not a by-product or accident. It is a structural feature of private property regimes. Profit depends on scarcity – even manufactured scarcity. As the political strategist David Bollier succinctly explained in his book on the commons, the tragedy of the commons is not the abuse of collective resources by communities. It is "the tragedy of the market", which converts shared wealth into private gain and systemic ruin (Bollier 2014).

In contrast, commons-based systems show remarkable capacity to conserve. Nobel Prize-winning economist Elinor Ostrom documented dozens of communities – from Swiss alpine pastures to Japanese irrigation ditches – that sustained shared resources for centuries. These systems thrive not because they deny human self-interest, but because they embed it in webs of reciprocity and responsibility (Ostrom 1990).

9.4. Climate breakdown as a crisis of property

What, exactly, is the connection between private property and the climate crisis? We are accustomed to thinking of climate change as a crisis of emissions, a technical problem with a technical solution – if only we can capture enough carbon or switch to renewable energy quickly enough. But this way of seeing is too narrow. As this report on 1.5-Degree Lifestyles makes clear, the crisis extends far beyond emissions. It is also a crisis of biodiversity, of resilience, of belonging in a world that is shared.

Property, in its modern form, is defined by exclusion. You may keep others off your land, deny them your surplus, use what you own to profit, or let it sit idle. By definition, what you hold is yours to use without obligation to others, or to the world itself. Under these rules, the climate crisis reveals itself as far more than a crisis of carbon. It is a crisis of private property.

The pursuit of endless growth follows naturally from this arrangement. Growth is not a by-product of capitalism but its central commandment. Profit becomes the measure of success, and profit requires both accumulation and expansion. Firms that fail to grow are swallowed by those that do. Investors demand returns that exceed what exists now. Debt obliges repayment through future gains. Growth is not optional – it is the treadmill on which the entire system runs. And the treadmill does not stop, even as it wears the ground beneath our feet to nothing.

This compulsion collides directly with the finite nature of the planet. To keep profits rising, more forests must be cleared, more minerals mined, more waters fished, more carbon released. Extraction feeds production, production feeds consumption, and the cycle repeats, leaving behind exhaustion – of soils, of species, of workers, of entire ecosystems. When breakdown arrives – whether in the form of collapsed fisheries, polluted rivers or destabilised climate – the system does not pause to repair. It seeks new frontiers: deeper ocean floors, more remote rainforests, even the colonisation of outer space. Each breakdown is treated as an opportunity for further accumulation (Bakan 2020; Fressoz 2024).

What makes this a catastrophe for worldwide ecosystems is that the logic of private property rewards destruction as long as it is profitable. Fossil fuel corporations are not irrational in burning reserves; they are fulfilling their legal obligation to maximise shareholder value. Agribusiness is not irrational in exhausting soils;

it is rational within a system that values quarterly earnings over centuries of fertility. This is why property, in its current form, is inseparable from climate breakdown. It embeds exploitation into law, making extraction not just legal but *required*.

In this logic, care is not just unnecessary, but economically punished.

What to do? Many people have recognised parts of this reality long before the current moment. Their attempts to soften this system with redistributive schemes – whether universal basic income, carbon dividends or proposals for a social wage – do not, however, reach the heart of the logic. At best, they redistribute a share of the spoils after extraction has already taken place. At worst, they entrench the very system they claim to remedy by legitimising endless growth so long as some portion of the "loot" is shared more widely. A universal basic income, for example, can provide temporary relief to individuals, but if funded by continued fossil fuel extraction, financial speculation, or exploitative labour practices, it simply launders destructive profits into socially acceptable formats.

The problem is not merely who gets access to the proceeds of growth. The foundation of climate crisis is the logic of growth itself. As long as relations remain governed by the profit motive, redistribution schemes can only redistribute the costs of destruction, not prevent it. They leave intact the property regime that rewards exclusion, the growth imperative that drives exhaustion, and the transactional ethos that hollows out community and reciprocity.

If solutions cannot be found in everyone getting a bigger slice of the same poisoned pie, one might ask, do we need a different recipe altogether? How might we build economies around sufficiency, renewal, and belonging, in place of a logic of extraction and accumulation that must decimate all?

9.5. From ownership to belonging

To move forward, how might we re-imagine property not as dominion but as relationship? Ownership, understood narrowly as the right to exclude and exploit, has brought us to the brink of collapse. But ownership, redefined as stewardship, is something different: it is the recognition that care requires responsibility, and responsibility requires a secure relationship to what sustains us. To care for a home, for a forest, for a body of knowledge, we must be able to count on it, to tend it, to shape it without fear that it will be taken away. In this sense, some forms of ownership – personal, communal, co-operative – are indispensable to freedom and dignity. They form foundations for belonging and inter-generational sustenance.

What would we be able to imagine if we understood that what stands in the way of this belonging is not personal property, but the system of private property that now dominates the globe? Vastly concentrated, financialised, and narrowly focused on efficiency and growth, this system transforms the essentials of life into vehicles for profit. It rewards extraction over renewal, exclusion over reciprocity, growth over balance. It severs us from the very webs of care – ecological, social, inter-generational – on which survival depends.

This is why the world of private property, in its current form, is fundamentally incompatible with the possibility of a sustainable and caring future, or with what this report calls a "1.5-degree lifestyle." It seems an inescapable question: to meet that threshold, do we require not just technological substitution or behavioural nudges, but a wholesale rethinking of property itself?

Commons-based models show us what that rethinking can look like. Community land trusts anchor housing in affordability across generations. Co-operative farms regenerate soil while feeding communities. Indigenous stewardship traditions remind us that land and water are not objects to be owned but relations to be honored. Open-source knowledge and cultural commons sustain innovation by keeping ideas in circulation. Each of these practices affirms that care is possible only where belonging is universal, and belonging is possible only where property is structured around responsibility, reciprocity and renewal rather than exclusion and accumulation.

This choice appears so stark. Are we clinging to a logic of private property that promises security to a few while delivering crisis to all? Or we can reclaim older and wiser traditions that understand freedom not as the right to fence off the world, but as the ability to live in right relationship with it? To belong to one another, and to the Earth, is not to erase ownership – it is to rethink and transform it (Wall Kimmerer 2015; Philipsen 2020; Fraser 2022).

10

Escaping the Carbon Tunnel: Reconnecting Climate Action with Nature

Luca Coscieme
(Hot or Cool Institute)

In recent decades, the global focus on decarbonisation has yielded a powerful but limited narrative – a "carbon tunnel vision" that views climate change largely as a challenge of atmospheric chemistry, solvable through emission reductions and removal alone. This narrowing of scope risks ignoring the wider living systems that support and include humanity. Climate change, nature degradation and pollution are not isolated crises but intertwined facets of a broader "triple planetary crisis" (UNEP 2021). Yet the ongoing crisis is even more profound and multi-faceted. It encompasses a deepening crisis of self – our collective sense of identity and role within nature – alongside a crisis of inequality that is eroding social empowerment and mutual trust.

Such fragmentation has caused divided responses and threatens to deepen social divides. The Earth's climate and living systems are inseparable. Forests, wetlands, soils, and oceans regulate climate, but they are also habitats, cultures and sacred spaces. Nature is not merely a carbon sink or a provider of ecosystem services – it is the living context of human existence. The Kunming-Montreal Global Biodiversity Framework (CBD 2022) reminds us that safeguarding nature is indispensable, and not only for planetary health but for the continuity of human cultures, values and wellbeing.

A more holistic perspective demands reconnecting climate action with nature protection and social justice, through the common lens of lifestyles and sufficiency. This is not simply a technical addition but a profound cultural and philosophical shift.

10.1. The multiple crises: why climate action must include nature and society

Whereas the "triple planetary crisis" highlights the mutual entanglement of climate change, biodiversity loss, and pollution, lifestyle patterns – in particular diets, mobility, housing and consumption – are primary drivers simultaneously affecting all three. But these environmental pressures are part of a bigger picture: declining trust in democracy, reduced civic participation and inaction on transforming economic systems that fail to improve wellbeing or ease social tensions. These social crises shape, and are shaped by, how we engage with nature.

A carbon-centric climate policy risks causing unintended harm to nature and society. Large-scale bioenergy plantations might reduce atmospheric CO_2 but destroy habitats, displace communities and threaten food security; rising demand for electric vehicles cuts tailpipe emissions but increases mining pressures on vulnerable ecosystems and peoples (Sonter et al. 2020). Even nature-based solutions, if poorly designed, risk becoming ecological monocultures rather than supporting biodiverse systems (Seddon et al. 2020). For example, wetland restoration projects that focus solely on water filtration may overlook the need to reintroduce native vegetation and wildlife, leading to simplified ecosystems.

In contrast, a shift to sufficiency-oriented lifestyles offers a convergence pathway – addressing environmental pressures while fostering social equity. Footprint assessments – whether focusing on climate-, land-, material- or water-related externalities – indicate that transformative changes in diet, mobility, housing and consumption could reduce pressures on land, water, materials and climate simultaneously (Ivanova et al. 2020).

10.2. Nature as a forgotten ally: Indigenous, traditional and plural knowledge systems

A deeper reason for our ecological and social failures may be that modern societies have tended to value scientific knowledge and technology over other ways in which people understand and relate to nature. Indigenous and local knowledge systems, built over generations of living in close connection with ecosystems, contain valuable wisdom about how to live sustainably.

People relate to nature in many ways – seeing it as a resource, as sacred or as part of their identity – and these diverse perspectives can guide more holistic and effective sustainability paths (Díaz et al. 2018). Traditional and small-scale agricultural systems – including those maintained by Indigenous peoples, local communities and smallholder farmers – play a crucial role in conserving agrobiodiversity, supporting an estimated 70–80% of the world's food diversity and sustaining many of the genetic resources vital for future food security (Garnett et al. 2018).

Similarly, religious and faith traditions offer eco-centric worldviews: sacred groves in India, Christian creation care, Shinto forest rituals, Islamic stewardship. Yet these worldviews remain sidelined in mainstream policy and public discourse.

Ignoring this plurality risks more than policy failure. As societies lose their sense of place and belonging, disconnection from nature feeds isolation, alienation, anxiety and even social conflict. Direct experience with nature is associated with improved mental health outcomes, including reduced risk of depression and anxiety, and increased feelings of social cohesion (Bratman et al. 2019; Lin et al. 2025). This is echoed in recent cultural phenomena like the growing popularity of "forest bathing" experiences and mindful hiking apps such as AllTrails, reflecting a societal craving for reconnection with nature and community.

Recent research highlights how policy frameworks and dominant narratives contribute to this disconnection by framing humans as separate from nature rather than part of it (Coscieme et al. 2020; Reyers and Bennett 2025). This divide is evident in conservation policies that have historically focused on protecting "nature for itself", emphasising wilderness preservation separate from human activity. However, there has been a growing shift towards more integrated approaches that emphasise "people with nature", recognising the inter-dependence between human wellbeing and healthy ecosystems.

Such shifts reflect an increasing awareness that unsustainable consumption patterns are primary drivers of biodiversity loss and climate change, necessitating policies that address underlying socio-economic systems rather than solely managing protected areas. Embracing diverse governance models – including Indigenous stewardship, community-led conservation and care-based ethics – enables more holistic responses that align environmental goals with social equity and sustainable livelihoods, ultimately supporting transformative pathways to tackle the planetary crises (EEA 2024b; Reyers and Bennett 2025).

10.3. Sufficiency living: the missing link in climate-nature strategies

Lifestyle patterns do more than shape emissions – they express our relationships with nature and with one another. Whether in how we grow food, design cities, or move through the world, these patterns reflect deeper values and priorities. Yet many current responses to environmental crises remain narrowly framed, privileging carbon metrics while overlooking broader impacts on ecosystems, cultures and wellbeing.

We need approaches that realign daily life with ecological realities and social care. This means shifting away from consumption-heavy models towards ways of living that regenerate nature and strengthen communities. Sufficiency – when rooted in justice and place-based knowledge – offers a pathway: not a return to the past, but a creative reimagining of prosperity that works within planetary boundaries.

In contrast to narrow, techno-centric fixes, nature-sensitive sufficiency emphasises changes in how we live and consume – favouring plant-rich diets that reduce both greenhouse gas emissions and land-use pressures, compact and efficient homes that lower energy demand and urban sprawl, local and circular economies that limit resource extraction and pollution, and mobility shifts towards active and public transport that minimise land fragmentation. For instance, dietary shifts towards plant-based foods alone could cut food-related emissions up to 70% while also substantially reducing habitat loss (Poore and Nemecek 2018).

These changes yield co-benefits: healthier and more vibrant communities, and less stress on nature (see also section 7). Policies must embed this integration: footprint-based targets (greenhouse gases, land, materials), indicators of wellbeing beyond GDP, and public support for community-scale living solutions. Such measures can simultaneously address environmental, social and cultural crises.

10.4. Expanding visions: reconnection for planet and people

What is needed is more than technical optimisation – it is a cultural renaissance and a chance for societal renewal. Direct contact with nature correlates with reduced depression, anxiety, and loneliness, and improved physical health outcomes (Lin et al. 2025). **In an age of global unrest and fragmentation – from regional conflicts to geopolitical rivalries – reconnecting with nature can also mean reconnecting with each other.**

Indigenous and traditional worldviews remind us: humans are not apart from nature but part of it. This perspective offers a foundation for a new era of civilization – one that values sufficiency not as sacrifice, but as a shared flourishing that nurtures both people and the planet. Embracing this holistic vision can inspire innovative economic and social systems that promote equity, wellbeing and democratic empowerment alongside environmental sustainability.

As the Kunming-Montreal Global Biodiversity Framework suggests, policies must safeguard not only ecosystems but cultural and spiritual relationships with nature. Education, urban planning, health care and social policy all play essential roles in restoring this vital bond.

10.5. Conclusion: integration or fragmentation?

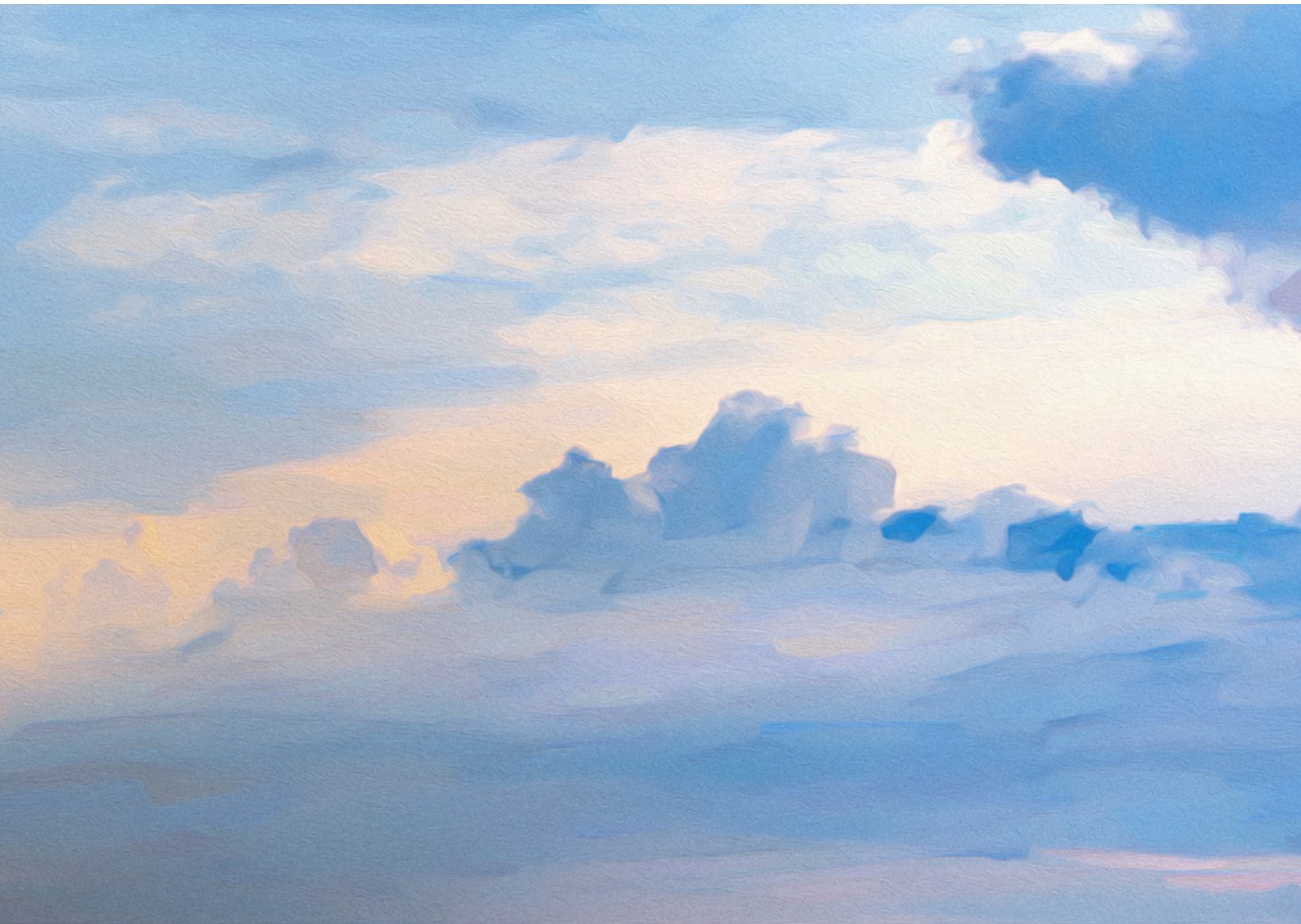
The 1.5°C transition is not only about carbon – it is about life in all its dimensions. Ignoring nature, culture and social justice courts failure; embracing them opens the door to systemic resilience and a revitalised civilization.

This perspective invites climate strategies to honour the living context they depend on, bridging carbon, nature, pollution and the human spirit through lifestyle shifts that rekindle our sense of belonging to the Earth.

By doing so, the multiple intersecting crises before us become not threats, but catalysts for regeneration, hope and a thriving future.

PART IV

Recommendations



11

Where Do We Go from Here? Six Actions to Avoid Crossing Socio-Ecological Red Lines

This latest global edition of the 1.5-Degree Lifestyles report carries an added sense of urgency: given our remaining carbon budget and current emission rates, it is hard to avoid the scientific conclusion that we will drive into climate overshoot – the window for preventing warming above 1.5°C has (temporarily) closed (Forster et al. . We have failed in our global governance commitments, which puts us on course to transgress a biophysical threshold that has kept humanity safe and comfortable, and marks the crossing of an important psychological barrier that had guarded collective hope. Beyond our own generation, it consigns our children and the next several generations to a more unstable world than the one we inherited.

We now have a biophysical crisis, a socio-economic crisis and a crisis of (institutional) legitimacy. The last one might prove to be the biggest obstacle to implementing radical solutions that are needed to address the other crises.

As things heat up, soon today's political and cultural tensions arising from economic migration will have to contend with relocating entire coastal communities of refugees displaced by climate impact (The White House 2021). Today's inconvenience with seasonal heat waves will turn to pandemics as centuries-old glaciers thaw, unleashing long-dormant microbes for which we have not had time to build immunity (Liu et al. 2022). Everyday living will become more unpredictable as our infrastructure – hospital equipment, asphalt paved roads, precision machines – designed and calibrated for "normal" temperature ranges will falter in high temperatures (BSR n.d.). The seasons will confuse the sun, the soils, and the bees, and our food systems will question our appetites (Li, Christine et al. 2025).

As shown earlier in this report, 1.5°C is not an abstract number. There are people and systems behind it: millionaire jet-setters and subsistence farmers; fast fashion advertisements and microplastics in the food chain, digital data centres and misinformation, three-week long-distance vacations and local housing shortages, forest fires and people fleeing floods. Behind the figure 1.5°C are stories of disharmony, fear, innovation, resilience.

As we look at crossing ecological thresholds, we now have no choice but to also cross social ones; we must act differently in order to meet the times. Any further delays would only amplify and multiply the consequences.

It is important to understand drivers and impacts of climate change from a consumption and human-centred perspective. A consumption-based perspective, as used in this report, reveals needs and justice dimensions of our system; it brings to the fore questions about our individual and collective values and reveals structural pre-determinants of our everyday choices. Choices do not happen in a vacuum, and lifestyles are an accumulation of these choices – lifestyles are clusters of habits and patterns of behaviour shaped and facilitated by institutions, norms and infrastructures that frame individual choices.

The concept of the *Anthropocene* suggests that climate change is a human-made problem – but is it truly a shared responsibility? We live in a world where a relative few fly around in private jets between their second

homes and yachts, while hundreds of millions live one paycheck away from homelessness and others are losing their homes to floods and desertification, despite having contributed almost nothing to the climate crisis. In a world where a handful of individuals hold as much wealth as half the population, where the rich hold strong control over resources and systems that lock-in choices of others to options that pollute, responsibility is anything but equal.

Limiting global warming to levels in the 2015 Paris Agreement, and from then onwards, required that greenhouse emissions be halved every decade (Rockström et al. 2017) or be decreased by around 7% annually (Otto et al. 2020). By now, with limited action, that timeline is obsolete. Even so, such reductions presented an unprecedented challenge, given that greenhouse gas emissions have increased steadily since the Industrial Revolution. Only exceptional events such as economic crises or wars have temporarily halted or inverted this rise. During the COVID-19 pandemic, for instance, global emissions fell around 6% (Statista 2025).

The irony is not lost that, given the current trajectory of social tensions and natural hazards, it could take a series of human-made disasters from impacts of climate change to temporarily technically fix the emissions problem – but not the human toll. Thus, the critical question today is how we can sustain emission reductions at similar rates without undermining human wellbeing and social stability.

As we assess what options lay before us, one of the key determinants of whether we manage a way forward together, and with some legitimacy, is if we manage to quell the social tensions building underneath the economic and ecological disasters. The levels of inequality we are seeing, and efforts by governments to protect the already-rich, are not only morally questionable, they are foundations for social collapse – and that risks happening even before environmental collapse. Poverty is increasing while collective wellbeing is going down, trust in public institutions is falling, and all the while democratic gains – cornerstones of modern organisation that citizens have come to expect – over most of the last century are being dismantled.

Where do we go from here?

We cannot keep "solving" climate change the same way we have done so far, up to this point of failure. Below are six ways forward to serve as starting points for new directions. As starting points, they constitute only the minimum that is needed, given the magnitude and urgency of the current crises. If we want higher certainty or a quicker turnaround in the current direction of socio-ecological decline, more would have to be done, and much faster.

11.1. Bend back the emissions curve: recommit to 1.5°C

The climate ambition remains the same: keeping temperature rise as low as possible above pre-industrial levels. In the context of overshooting 1.5°C of heating, this requires limiting the level and duration of such overshoot as much as possible. This makes 1.5°C still the target, only now more urgent; the longer we stay in overshoot, the more consequential we would experience impacts of climate change (Li et al. 2025), the greater the risks of triggering feedback mechanisms that can accelerate heating, and the more difficult it becomes to bring the global temperature back to pre-overshoot. Every tonne of CO_2 matters, every fraction of a degree of heating makes a difference.

As such, governments need to, as soon as possible, recommit to getting back to an average global temperature below 1.5°C, to limit the damage. Commitments by governments this time must include 1) concrete timelines and 2) verifiable action plans, and these must 3) be preferably legally binding, 4) with compulsory reduction targets for business and 5) be internationally co-ordinated. Action plans must also be based on responsible and realistic assumptions regarding carbon dioxide removal (CDR), reflecting recent research indicating that the potential for tree planting and geological storage of CO_2 is likely to be far less than commonly thought (Fesenmyer et al. 2025; Gidden et al. 2025).

National governments, as part of their plans to bend back the curve to below 1.5°C limits (Stoddard et al. 2021), should establish emergency annual emission reduction targets, and treat these with similar structural and administrative reverence to current annual GDP projections. These targets should be monitored and outcomes reported nationally and internationally every year, with industrialised countries taking the lead and bearing proportional and financial responsibility for most of the reductions and penalties associated with failure to meet targets.

Part of taking responsibility by rich countries also requires using emission accounting methods that reveal embedded emissions in the value chains of products consumed, usually from induced carbon-intensive production in exporting, and often poorer, countries. Therefore, international negotiations need to adopt consumption-based accounting[31] methods, and also require that

31 Improving the accuracy of consumption-based accounting requires better data, updated more frequently. More and better data on lifestyles and consumption patterns of different demographic groups, including of different socio-economic strata, would be especially valuable for designing more targeted and effective policies and programmes.

national governments take responsibility for value chain emissions related to their consumption – that is, supplement their greenhouse gas emission reduction pathways with consumption-based emission targets. Such changes would reflect the role of consumption and lifestyles of their citizens both as a driver of global emissions and as part of solutions. They would also bring a stronger justice dimension to global solutions to climate change.

Litigation is increasingly becoming a powerful tool (Figure 11.1); courts and legal systems around the world are overwhelmingly agreeing with lawsuits that force governments and companies to act on the science of climate change (UNEP 2023b). In Europe alone, climate litigants have launched more than 400 legal cases against governments and big companies in the last 10 years (Callaghan et al. 2025). According to the Sabin Center's Climate Change Litigation databases of climate litigation hosted by Columbia University, as of September 2025 there were a total of 3,168 cases, of which 2,018 cases were filed in the United States and 1,150 were filed in all other jurisdictions combined. These cases were filed in international or regional courts, tribunals, quasi-judicial bodies or other adjudicatory bodies, such as special procedures of the Human Rights Council, arbitration tribunals and the European Union (Sabin Center for Climate Change Law 2025).

To maintain a steady trajectory and achieve the downward 1.5°C target within an accepted time frame, **a revised "carbon law"** (Rockström et al. 2017) and decadal roadmap is needed – to radically cut gross greenhouse gas emissions by at least 80% over the next decade, and after 2035 halving emissions every decade until 2100.

This time, technical changes need to be aligned with societal goals and aspirations. Thus, as well as renewed global efforts towards emission reduction, governments need to work with citizens to articulate a new, shared vision of a future society that acknowledges ecological challenges and that goes beyond materialism to reflect values, community and aspirations beyond self. A primary consideration of bending back the curve to below 1.5°C should be ensuring equity, shared prosperity and global justice. Success in a safe global future will therefore be measured by governance for delivering on wellbeing within ecological carrying capacity, not by an open-ended economic growth that has led to current destruction. Unless there is a change in the indicators by which governments measure success, there will be little change in government planning and investments.

To complement these measures, national strategies must also address the remaining 28% of emissions, which stem from the production side of the economy and the direction of public investment (Hertwich and Peters 2009). Governments should commit to full decarbonisation of production systems and capital flows, ensuring that industrial processes, infrastructure, and supply chains align with 1.5 °C pathways. Public budgets need to be reoriented toward low-carbon living, prioritising clean energy, efficient housing, accessible transit, sustainable food systems, and reassessing spending on high-emission sectors, such as national defense, and carbon-intensive infrastructure. Cutting the footprint of everyday goods and services is only possible

Figure 11.1. Number of climate litigation cases within and outside the US, 1986–2024

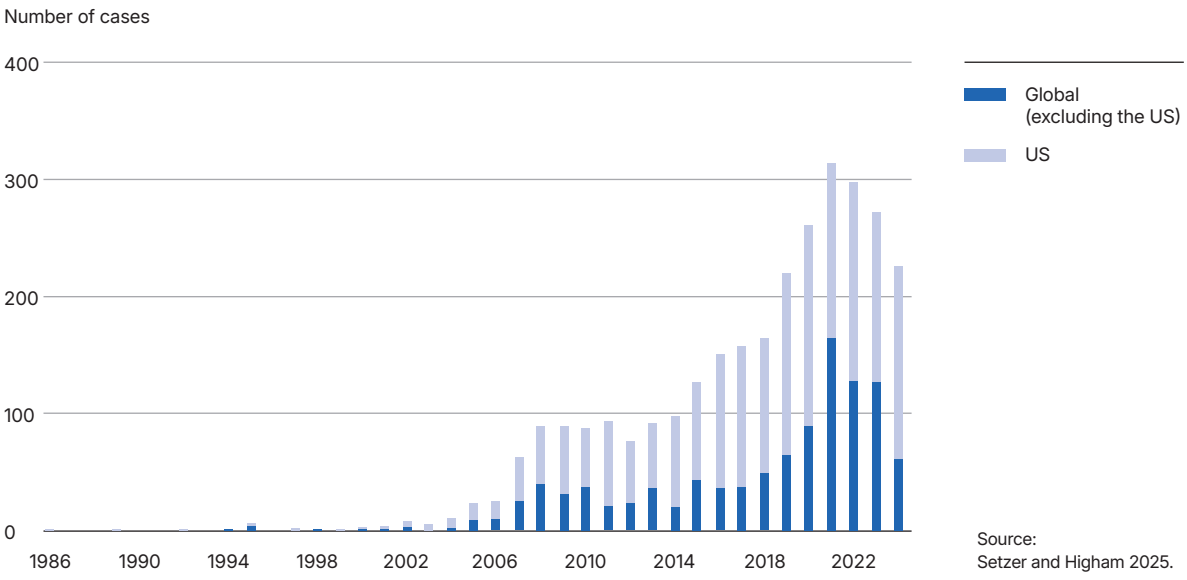
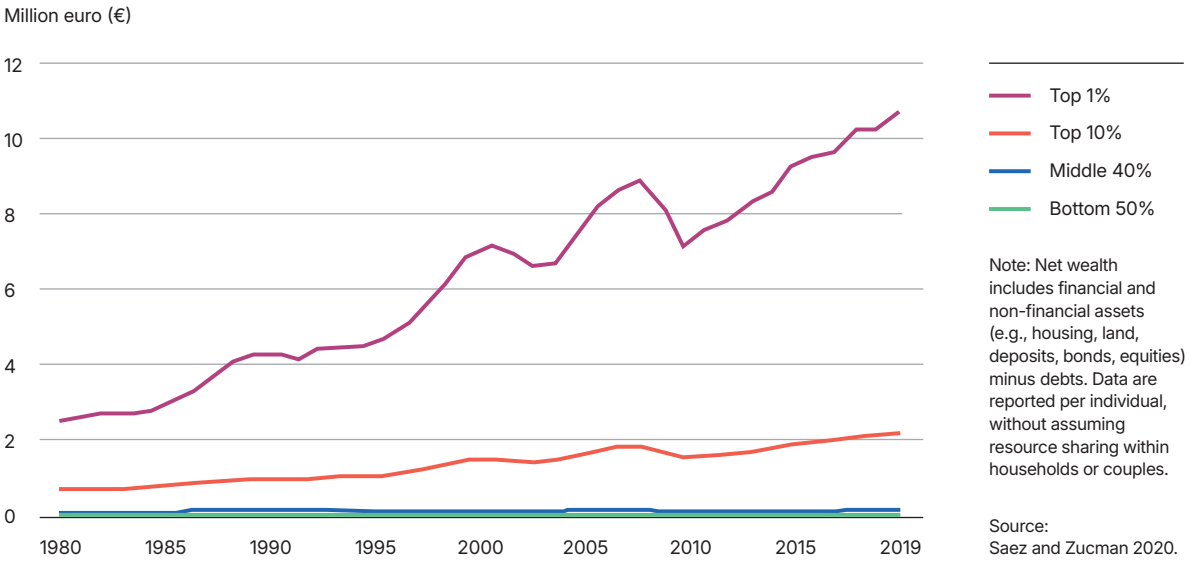


Figure 11.2. Average net personal wealth by percentile group in the United States, 1980–2019.



Note: Net wealth includes financial and non-financial assets (e.g., housing, land, deposits, bonds, equities) minus debts. Data are reported per individual, without assuming resource sharing within households or couples.

Source:
Saez and Zucman 2020.

if the supply chains and public services that sustain them are decarbonised to the highest extent possible. Clear targets for climate-positive investment and procurement are essential to accelerate this shift.

11.2. Implement globally co-ordinated taxes and wealth caps

"Tax the rich!" used to sound like a slogan; the current socio-ecological crisis makes it an imperative (Oxfam et al. 2022). To highlight what the data in this report and several other assessments make clearer: one of the biggest threats to the world now, directly and indirectly, is the super-rich. In Australia, for example, with a population of 27 million people, the wealth of the top 200 people is as high as almost one-quarter of the entire country's GDP in 2024 (up from 8.4% just 20 years earlier) (Richardson and Stilwell 2024).

Although progressive taxation is widely accepted globally, including by some wealthy people themselves, most of the rich have rather typically contributed to government inaction on the subject or, in some cases, to further reducing taxes. Yet, even simply as a healthy exercise in state funding, no responsible government or political stripe can afford to not tax the rich (Box 11.1). But taxing the rich is no longer enough; capping wealth is a quicker, and more practical – not to mention more just – way to address our current ecological emergency.

Reinforcing negative patterns can clearly be observed in the current global socio-ecological dynamic, which causes both resentment and further entrenchment. The top 10% richest segment of society is responsible for almost half of all the emissions leading to climate change, while the bottom 50% is responsible for less than a third (Chancel et al. 2025).

Further disenfranchisement is caused when the scope of solutions to climate change prioritises green technology – a domain that is proprietary to the already wealthy – as well as so-called free-market interventions that structurally favour colonialist tendencies and industrialised countries. Some estimates show that the top 1% global wealth share could rise from around 38.5% today to 46% in 2050 if the wealthiest individuals own all the new low-carbon infrastructure (see also, Figure 11.2). Conversely, if low-carbon investments are financed by a tax on the top 1% and then owned by governments or not-for-profit actors, the top 1% wealth share could drop to 26% (Chancel et al. 2025).

Continuing climate change and growing inequality are therefore largely a result of a transfer of wealth and opportunity from the majority, and exploitation of global commons to benefit those at the top. And this is leading to wide-scale poverty. Research shows that workers from the Global South contribute 90% of the labour that powers the world economy, yet they receive only 21% of global income (Hickel et al. 2024).

It is impossible to perceive how we can continue to co-exist in a world where, as analysis in this report shows, the environmental impact from someone owning and using a car in Germany is bigger than the

Box 11.1. Brazil supports globally co-ordinated tax on billionaires

The government of Brazil, in its capacity as G20 presidency, recently embraced a proposal for an internationally co-ordinated minimum taxation standard on billionaires, building on previous efforts of international co-operation to address the issue of low effective taxation of the super-rich. In the baseline proposal, individuals with more than EUR 0.92 billion in total wealth (assets, real estates, equities, participation in companies' ownership, etc.) would be required to pay a minimum amount of tax annually, equal to 2% of their wealth.

Accordingly, a minimum tax on billionaires equal to 2% of their wealth would raise EUR 185–230 billion per year globally from around 3,000 individuals; extending the tax to individuals with a net worth over EUR 92 million would add EUR 92–130 billion a year.

Success of the proposal depends on international co-ordination to avoid leakages or escape to tax havens or non-participating countries. It notes that progressive taxation is a key pillar of democratic societies, strengthening social cohesion and trust in governments to work for the common good, including funding public goods and services such as education, health care, and public infrastructure that, as well as being sound economic investments, are also needed to address the climate crisis.

Source: Zucman 2024.

Table 11.1. Imperatives, instruments and use allocation for wealth taxes and gaps

Imperatives for progressive taxes and wealth caps	Parameters and policy instruments	Allocation of generated funds
• Reduce harmful consumption and environmental overshoot • Reduce inequalities, increase fairness and prevent unlimited wealth accumulation • Reduce poverty • Build legitimacy for radical actions needed to address climate change • Fund universal basic services and social experiments • Prevent corruption, support public governance and protect democracy • Protect and improve global commons	• Wealth tax above specified thresholds • Inheritance and wealth transfer tax • Progressive tax (e.g., up to 100%) • Comprehensive taxation of capital gains • Set ratio between maximum and minimum income (e.g., 1:10) • Distribution of dividends from exploiting commons or use of public resources • Expropriation • Caps on income and wealth	• Social experiments and measures • Public deficit • Environmental protection • Protect and improve on the commons • Universal basic provisioning – including health care, education, public infrastructure • Minimum income

impact from the entire lifestyle of someone in Nigeria, or where one person in America has a bigger impact than 50 million other people in the same country. Addressing runaway global warming is therefore predicated on addressing runaway wealth inequality. Given the gravity of the situation, we need to both tax wealth, as has already been widely acknowledged, and to cap wealth.

Several proposals already exist that could form the basis to further develop such actions (Oxfam et al. 2022). Examples include wealth taxes, progressive taxes, inheritance taxes, absolute wealth ceilings per individual or household, ratios between maximum and minimum income, or caps on percentage ownership of wealth by certain groups (Table 11.1). Herman Daly, for example, proposed a ratio of 5 between maximum income and average

income, to be achieved through progressive taxation of up to 100% of income (Daly 1996). Other economists have argued along similar lines, but widening the ratio to 10, between maximum and minimum income. The Earth4All initiative has suggested limitations where the richest 10% should not earn more than 40% of national income (Dixonson-Declève et al. 2022). And several economists have proposed restrictions on inter-generational wealth transfers through, for example, inheritance taxes and limits to values of transfers between generations within families.

While the above might seem overreaching in today's economic environment of runaway capitalism, it is not new, and not even as stringent as history shows. In 1942, in the United States, the tax rate was as high as 94% for incomes above EUR 185,000. This helped reduce inequality; the income share of the top 1% fell from 21% in 1941 to 10% in 1970 (François et al. 2023).

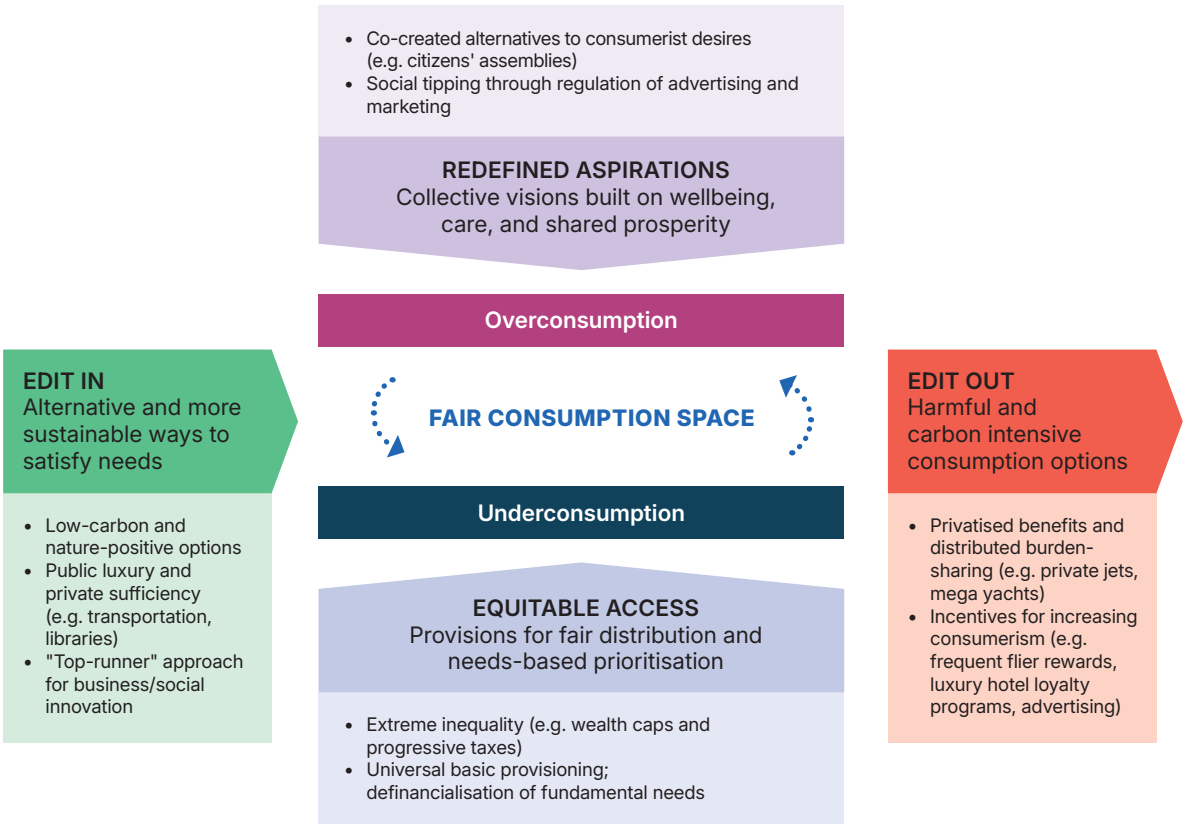
Progressive taxation and caps on wealth will not only lower global average temperatures over time, they will also lower global social tensions that result from growing inequality and poverty. Because such measures will be a departure from prioritising patented technological investments and market mechanisms that continue to empower the already rich and reproduce the same structures that caused the problem, progressive measures and caps will help grant legitimacy to other radical solutions (such as equitably reduced consumerism) that are needed.

As an additional benefit, the revenue from wealth taxes and caps would be used to provide for more social and universal basic services such as education, health care and housing, guaranteed minimum income, etc. – which will in turn get more people out of poverty. Getting more people out of poverty ensures that they are active participants in society with the agency to contribute.

11.3. Change aspirations and catalyse large-scale social innovation

Visions provide orientation and serve as lighthouses, which are especially useful when direction is lost. The world is sorely in need of visions that can shape our collective aspirations and inspire and guide us to a sustainable future civilization. Imagining sustainable futures is a powerful catalyst for transformative change and for co-creating. As such, **visioning** needs to become integral to developing new aspirational systems that are not appropriated by commercial advertising and captured by market profits.

Figure 11.3. Choice editing for sustainability



Our common aspirations and sustainability transition strategy should be based on sound science (e.g., assessments of resource availability, carbon budgets, etc.), political economy of change, and knowledge of psychological wellbeing. Collective visioning of sustainable prosperity on a shared planet could result in a blossoming global "palette" of multiple local aspirations and possible scenarios that reflect knowledge from diverse disciplines, practices and communities meeting needs through satisfiers that keep us all living well within a fair consumption space.

Changing societal aspirations would also need **new business models**, social innovation, institutional changes, and community rights and responsibilities.

Social innovation can be stimulated by taking out the environmentally and socially harmful consumption options that proliferate in the market, perpetuated by the current economic system. An effective approach is using **choice editing** (UNEP 2022) – a well-established governance tool that has proven effective for ensuring public safety, security and welfare – to discourage consumption of public bads (e.g., personal firearms) and to encourage public goods (e.g., public libraries).

An example of a framework for choice editing involves editing out, editing in, and equity provisions (Figure 11.3). Editing out involves restricting carbon-intensive products (private jets) or free-rider services that have privatised benefits and distributed burden (e.g., frequent flier loyalty programmes that drive consumerism). Editing out harmful options creates room to edit in more sustainable alternatives (e.g., well-funded public transport networks) that would otherwise be competing unfairly with the public bads. To ensure a just system, provisions then can be placed to ensure more equitable access (progressive taxation).

An understanding of **social tipping** dynamics (section 5) – how small interventions can trigger large, systemic changes in society – can be used to trigger rapid change. Borrowed from the concept of ecological tipping points in earth system sciences, social tipping requires identifying key elements within society that, when changed, can have a major impact on the entire system, driving it to a tipping point – or a critical threshold where even small changes can quickly trigger fast and wide-reaching transformations in behaviours, norms, technologies and infrastructure.

Otto et al. (2020) identify several key interventions capable of causing rapid systemic tipping and reducing greenhouse gas emissions within this decade. These include removing fossil fuel subsidies and incentivising decentralised energy generation, building carbon-neutral cities, promoting fossil fuel divestment, exposing the moral implications of fossil fuel use, strengthening climate education and engagement, and disclosing information about greenhouse gas emissions.

Changing societal aspirations and catalysing social innovations goes with the need to revisit the nature of the relations between citizens and institutions of governance. The social contract has long been a cornerstone of modern societies, defining the relationship between individuals and the state, and establishing the rights and responsibilities of citizens (Moehler and Thrasher 2024). However, this understanding and resulting governance mechanism was based on realities of several centuries ago, before more recent dramatic transformations and fundamental changes in technology, environment and social norms.

As we confront the unprecedented challenges of the 21st century, a **new social contract** is needed, in a vision

Box 11.2. Towards a 21st-century "Eco-Social Contract"

The concept of an Eco-Social Contract, as envisaged by IDDRI and Hot or Cool Institute, provides a compelling framework for opening up a democratic dialogue among citizens about more sustainable lifestyles. Building on principles of inclusivity and collective responsibility, the concept of an Eco-Social Contract seeks to align environmental sustainability with social equity and economic wellbeing. Preliminary findings from focus groups and interviews carried out in France and the United Kingdom indicate that the framing of an Eco-Social Contract resonates with citizens and offers a vision that can potentially help integrate environmental goals with social fairness. For this new societal contract to gain popular traction, deliberative processes can play a vital role by giving citizens a voice in shaping its contours.

Source: IDDRI and Hot or Cool Institute 2024.

Box 11.3. Regulating advertising and marketing

Advertising is not a neutral backdrop – it is a powerful form of "choice editing" that curates what is visible, desirable and socially rewarded. Today, that largely advances material status and short product use cycles, locking societies into consumeristic aspirations that drive nature loss and undermine wellbeing. Rebalancing this system means editing out harmful signals and editing in healthier, collaborative and nature-positive visions of a good life – so that sustainable choices become affordable, convenient and aspirational by default.

Advertising and media shape social meaning at scale; regulating them is therefore a high-leverage way to trigger positive social tipping points. Evidence on tipping dynamics shows that well-targeted policies – standards, bans, taxes, education – can expand the critical mass for rapid norm adoption, accelerating the uptake of pro-social, low-carbon behaviours. In parallel, policies that regulate platform algorithms (e.g., increasing exposure to diverse content rather than only "more of the same") can help new norms spread beyond niche audiences.

In other words, regulation must address both content and the systems that distribute it, steering aspirations from "more stuff" towards health, care, reciprocity and shared prosperity. Some concrete measures for aligning advertising and marketing with sustainable consumption are:

- **Tax high-impact advertising.** Introduce a graded excise on ads for high-impact goods and services (e.g., fossil-fuelled mobility, fast fashion, single-use products), indexed to life-cycle footprints; levy a surcharge on the emissions of digital ad supply chains; earmark revenues for repair grants, sharing libraries, public transit and cultural programming that model sufficiency and care.

- **Regulate attention infrastructures.** Cap ad density in public spaces; require large platforms to provide users a higher share of non-profiling, randomly surfaced public interest content; limit targeted marketing to minors; and mandate independent audits of ad delivery algorithms for societal and environmental risks.

- **Edit the retail default.** Ban "free returns" models that fuel impulse buying; apply penalties to ultra-short use, high-frequency business models (e.g., fast fashion); strengthen right-to-repair and extended producer responsibility; require affordable spare parts and repair information.

- **Set content and disclosure rules.** Require ads to disclose repairability and expected product lifespan; prohibit greenwashing and misleading environmental claims; restrict consumeristic framing in ads (particularly those targeting youth); phase out fossil fuel advertising and other promotions of clearly nature-harming consumption.

- **Invest in new aspirations.** Fund public interest storytelling, arts and education that normalise slower fashion, shared mobility, seasonal diets and care-centred time use (to give some examples); co-create city-level visions with creatives, youth and communities to make sustainable lifestyles visibly desirable.

- **Governance, equity and metrics.** Create an independent Advertising for Public Interest regulator with powers across content, placement and platform algorithms; require sustainability impact assessments for major campaigns; and embed choice editing goals into procurement and city branding. To ensure fairness, dedicate revenues from advertising taxes to services that reduce everyday costs – such as free public libraries, affordable public transport or repair cafés – and to support communities most targeted by heavy marketing.

of sustainability as a risk management approach that recognises (and enshrines responsibilities towards) the inter-connectedness of social, ecological, and economic systems, and prioritises the long-term wellbeing of both present and future generations (Shafik 2022). Preliminary findings from focus groups and interviews carried out in France and the United Kingdom indicate that the framing of an Eco-Social Contract resonates with citizens and offers a vision that can potentially help integrate environmental goals with social fairness (Box 11.2) (IDDRI and Hot or Cool Institute 2024).

Changes in social aspiration also need changes in economic organisations that produce to meet the needs of people – hence, business innovation. To create business innovation, we would need to shift away from the tyranny of economic efficiency measures that tend to prioritise material and measurable economistic outcomes and towards sufficiency approaches that prioritise human and environmental wellbeing. (See also Box 11.3 on regulating advertising.)

A **business licence to operate** would be linked to measures that demonstrate value to society and contributions to ecological health. For this, more public policy and resources are needed to encourage alternative business models such as circular businesses, non-profit businesses, worker-owned corporations, co-operatives, etc. In addition to new business models, we need to investigate the types of social innovation that could occur or that are needed, in order to create demand for or accommodate services that prioritise the new businesses and sectors over the traditional (and thus more entrenched) ones.

Finally, changing social aspirations and enabling large-scale innovation needs recognition that the obsessive focus of sustainability interventions on market mechanisms and technologies has limited the deployment of social capital, undermined community agency and stunted bottom-up innovation. With the observed failure of efficiency measures, sufficiency approaches require active engagement of non-market agents, participation of citizens in massive efforts to ensure legitimacy for drastic change and to engineer large-scale social innovation. Real, and especially rapid, change requires a broad range of agents and support (Willis 2018). Community energy projects, shared urban and peri-urban agriculture, time banks, local currencies, etc., would need both recognition and incentivisation.

11.4. Prioritise the emissions budget: provisioning systems for fundamental needs

Rapid and wide-scale social innovation that requires us to meet our needs within our ecological means also necessitates that we prioritise how to spend the rest of the limited carbon budget. The remaining budget should be spent on meeting fundamental and wellbeing needs, especially those of vulnerable groups, instead of continuing to squander on the wants of the already rich and influential.

But policy makers have argued that there is a political challenge to addressing consumption, especially in so-called democratic and industrialised countries that tend to stretch privileges into the domain of rights, and that have a knee-jerk demand for rights without attending to corresponding responsibilities. Therefore, instead of putting pressure on citizens, a more suited alternative is to address over- and underconsumption by approaching the social and economic organisations – policies, practices, norms of production, distribution, retail – that precede the delivery of goods and services to people. Taken as a whole, these structures, processes and actors at various stages of the supply chain – or provisioning system – pre-determine what options are available for consumption by citizens and how sustainable or not they are.

A provisioning systems approach shifts the focus from consuming products to meeting needs, from focusing on consumption to addressing the systems behind products and consumerism. What we need as humans is healthy, nutritious food; instead, we have a bloated agri-food industry churning out ultra-processed foods creating health problems. We need safe, affordable housing, but have built highly commercialised and speculative housing markets, with many properties under-utilised while homelessness remains rife. We need transport systems that enable us to go places, but have developed car cultures that demand publicly financed infrastructure and that disproportionately use up land for driving and parking, while polluting cities and trapping us in traffic jams.

There is a double dividend on focusing the remaining carbon budget on provisioning for needs over wants. First, the systems of production and consumption that have the highest climate impacts are also areas where social tensions tend to manifest. Food, health, housing and transport sectors account for more than 80% of climate-warming gases; they are also domains where inequalities manifest most glaringly and where failure to meet people's needs tends to cause social uprising. Thus, provisioning for fundamental needs in a low-carbon manner would reduce both climate and social pressures.

This double dividend from prioritising carbon budgeting for food, health, housing and transport can yield even more advantages once these needs are met through **universal basic provisioning** (Coote 2023). Universal basic provisioning draws from recognition of universal human rights to fundamental needs such as food, health, shelter and protection – and that access to

these needs is not pre-conditioned on personal wealth nor subject to means of control by others. These rights have already been declared as universal and ratified by governments, but, in clear violation, their provisioning is still subjected to means of control by private economic actors.

A universal basic provisioning approach requires different ways of meeting needs than under the current ultra-capitalistic economic system where corporate profit maximisation, political power asymmetries and grandfathered privileges have grotesquely skewed access to opportunity. Governments need to de-commodify fundamental sectors and systems such as food; open up patents for medical products and completely definancialise primary and emergency health care; protect housing from speculative financial investment; and encourage private sufficiency through restrictions on private car use, as well as public luxury through free, frequent and fear-free public transport systems.

Collective and public ownership of the systems that satisfy fundamental human needs is a powerful opportunity to break the protection of financial interests from redistributive measures. Universal basic provisioning would further require incentivising non-profit businesses, collaborative community schemes such as in agriculture, and de-emphasising the role of profit-driven high tech in favour of responsible social innovation.

11.5. Take personal responsibility: REDuse to sufficiency living

Using lifestyles as an entry point to understanding and addressing climate change should not be toyed about in a chicken-and-egg game of which should go first: individual change or systems change. The question of systems change versus individual change is a false dichotomy; it is an effective tool used to distract, cause internal rifts and slow progress towards an urgently needed transformation. In an ecological emergency, we do not have the luxury to choose; we need systems change, individual change, and every other lever of change that affects the urgency and scale of the challenge at hand.

While the global political economy and supply chains largely pre-determine lifestyle consumption options, individuals also have agency and personal responsibility. This is especially the case for those in industrialised countries whose systems and lifestyles caused and continue to exacerbate the socio-ecological emergency. Ironically, it is the privileged, with much to lose, that continue to protect the extractive and harmful economic system, while the poor and disadvantaged are on the front lines of impact and remedial action.

Taking responsibility for mitigating climate change requires understanding areas where action can have high impact, and also where strategic intervention can

Table 11.2. REDuse framework approach to taking personal responsibility towards sufficiency living

	Refuse	Effuse	Diffuse
Everyday living	• Boycott harmful products and businesses. • Reduce personal consumption of high-impact products, especially meat, flying, excessive clothing.	• "Buycott" products that align with pro-sustainability values. • Repair and recycle.	• Use collaborative or shared living spaces and facilities. • Non-financialised social engagements and platforms.
Political	• Do not support corporate-sponsored political platforms nor patronise privatised profits from exploiting the commons.	• Vote for pro-sustainability candidates. • Resist and protest public programmes and public policies that create inequality or environmental harm.	• Demand a new eco-social contract that recognises not only citizen rights but also responsibilities, including towards environmental protection.
Workplace / employment	• Refuse to work for businesses that create or depend on harmful and unjust practices. • Avoid long-distance commutes.	• Set up a workplace sustainability taskforce to influence workplace facilities and practices. • Ask your employer to set up a 1.5°C compliant and workplace equality strategy.	• Set up local co-operatives or worker-owned businesses. • Campaign for harmful businesses to leave your communities.

have multiplier effects to the community and broader system. To this end, REDuse (Refuse, Effuse and Diffuse) (Table 7.2), developed by Akenji and Chen (2016), is a useful framework that can empower individuals and households in their daily lives to understand and take actions towards sustainable lifestyles.

The first component, *Refuse*, targets individual behaviours and harmful products (e.g., frequent flier mileage programmes) that perpetuate negative impacts on the environment or society. The *Effuse* component encourages behaviours and products (healthy plant-based diets) that have minimal and/or positive impacts. The third component, *Diffuse*, goes beyond the individual and seeks multiplier effects by using the power of communities (e.g., organising workplace resistance) to build momentum and create collective impact. Together Refuse, Effuse and Diffuse form components of the REDuse framework and bring together complementary sets of practices that gradually expand from those taken by individuals to engagement on a community level, and potentially driving systems-level changes.

11.6. Establish a Council on Global Ecological Stability and Justice

The current confluence of crises calls for a new governance architecture that addresses the problems from a global perspective; ensures a collaborative approach rather than destabilising competitiveness; and ensures that there is justice and needs-based prioritisation of remaining carbon budgets and resources.

While climate change impacts and the global economy driving it are transboundary and on one common planet, the principal mechanisms – such as Nationally Determined Contributions (NDCs) towards reducing greenhouse gas emissions under the Paris Agreement, and regulation of carbon-polluting industrial activity – have largely been left to national governments. Positive decisions taken at a national level by one national government can easily get cancelled out by the counteracting actions of another, acting in self-interest.

Global political economy only makes it worse. While many African and Latin American countries need more carbon budget, as well as their natural resource endowments, to raise standards of living in their countries to dignified levels, they are pressured to trade these under unfavourable terms to already industrialised countries that have mostly saturated their own material needs. Examples include carbon offsets from rich to poor countries, and resource conflicts in the Democratic Republic of the Congo, the South China Sea and the Amazon rainforest. This is causing increased, destabilising competition that in practice leads to emitting more climate-warming gases instead of collaboration to reduce emissions.

It is also becoming apparent that multinational corporations have become so big, powerful, and in some

cases even corrupt, that individual national governments find it challenging to regulate their actions. This is already apparent in the corporate capture of climate change solutions, directing most of the focus to market interventions and technologies that at best do not cause a decline in consumerism. But increasingly limited room for climate-warming gases and resource constraints will only see more power disparities on display, with consequences being universal and the worst falling on the most vulnerable.

This report proposes the establishment of a Council on Global Ecological Stability and Justice that will become a world government body and authoritative platform for addressing global environmental emergencies and long-term ecological risks. The climate change, biodiversity loss, resource constraints and socio-political tensions are all inter-linked and reinforcing; the drivers and impacts go beyond national boundaries, and the governance architecture to address it would have to be global in scope, collaborative across countries, and integrative across issues.

One model of setting up such a council could be as part of a reformed United Nations system. The UN system already has multiple agencies, programmes and treaties focused on various aspects of ecological stability – such as the UN Environment Programme (UNEP), the UN Development Programme (UNDP), the World Meteorological Organization (WMO), the UN Framework Convention on Climate Change (UNFCCC) and the Biodiversity Convention. But these suffer from multiple limitations: they tend to act independent of each other albeit with overlapping mandates, have under-resourced enforcement and accountability mechanisms, and generally depend on the whims of governments and even corporations.

The proposed Council on Global Ecological Stability and Justice would bring these agencies, programmes and secretariats of conventions under its umbrella to strengthen cross co-ordination and elevate the urgency of their mandates. Recognising that the absence of legally binding enforcement is the weakness of most important environmental agreements, the proposed UN Council on Global Ecological Stability and Justice will be similar in stature to the UN Security Council but focused on planetary security and justice.

The justice mandate is very central to the legitimacy of the Council and to maintaining global stability. Extraction and processing of materials account for roughly half of global greenhouse gas emissions, 90% of biodiversity loss and a third of air pollution. Yet these impacts are not equally shared: high-income countries consume more than six times the per capita resources of low-income nations, reinforcing deep global inequalities (UNEP 2024b). Current economic frameworks have failed to secure fair distribution or to protect the Earth's life-support systems.

To ensure that the Council operates in an ecologically just manner, it also needs to establish carbon and resource allocation mechanisms that ensure equitable access, so that low-income or less powerful countries also have access to the resources needed to develop and decarbonise their economies. Sustainable transitions require treating minerals not as extractive commodities and the atmosphere not as a carbon dump but as global commons, stewarded with transparency, equity and ecological responsibility.

A number of existing proposals provide blueprints for setting up trusts for ecological governance. For example, experts have called for a Global Minerals Trust (GMT) (Ali et al. 2025), a multilateral framework to govern critical minerals as planetary commons, ensuring transparent, equitable and circular access for the green transition. Current mineral and critical raw material supply chains are geopolitically unstable, ecologically destructive, and socially unjust, with high-income nations consuming disproportionately while low-income countries bear the environmental and human costs.

The GMT would balance sovereignty with global responsibility, linking resource access to commitments on material footprint targets, circular economy transitions, and benefit sharing with producer nations, including Indigenous and front-line communities. As such, the GMT is a peace and justice mechanism – stabilising markets, preventing conflict and embedding planetary ethics into global trade. It offers a critical pathway for building an equitable, low-carbon and regenerative economy.

12

Afterword: Silent Streets

A key lesson tracking along the route to overshoot, through this and past reports in this series, is this: it is not the absence of solutions that has led us here. It is the absence of leadership, and an active refusal by the powerful minority to allow social and economic alternatives to be imagined and developed.

Yet transformation is still possible – or even inevitable. Political history teaches us that what seems immovable can shift dramatically when pressure builds – when a critical mass of people crosses a threshold of understanding and demands action. The end of apartheid in South Africa, the fall of the Berlin Wall, the gains of civil rights movements in the United States, and even recent court victories against major fossil fuel companies – these all testify to the power of collective awakening.

Calls for equality and civil or political rights had been building, and people had been organising, for decades before such profound political transformations took place. In the same way, we are not at the beginning of the climate crisis or the movements to address it. But we may still be at the beginning of a political turning point.

The systems, laws and socio-cultural norms that shape and orient our societies are human constructs. We created them – and as we did with past systems and practices that did not conform with our evolving understanding and experiences, we have the power to change them.

What is required now is not just a scientific recalibration, but a political and cultural reckoning. We must face the reality that addressing climate change is inseparable from addressing extreme inequality and maintaining justice. That protecting ecosystems requires redistributing power. That moving from "more" to "enough" means redefining success and wellbeing beyond GDP. And that we cannot continue to treat environmental limits as negotiable.

This report presents not only a diagnosis of where we are, but a framework for how we might yet chart a liveable path forward. It makes the case for recommitting to the 1.5°C target not as a lost dream but as an emergency fallback strategy. Every fraction of a degree matters. Every tonne of carbon avoided now reduces future suffering.

The needed transformations span every level of society. At the personal level, we must redefine what constitutes a dignified life – embracing sufficiency over excess and prioritising collective wellbeing. At the communal level, we must rediscover forms of mutual care that reduce both the need for and appeal of excessive individual consumerism as sources of satisfaction. At the business level, we must redefine value and restructure incentives, recognising that infinite growth is incompatible with a finite planet. At the local and state level, governments must plan and invest in infrastructures – public transport, renewable energy, social housing – that enable low-carbon living. And at the national and global level, we need bold governance to reset the conditions for collective engagement in society, binding agreements, enforcement mechanisms, and above all, justice.

The 1.5-Degree Lifestyles series has consistently shown that equity is not a footnote to sustainability – it is its foundation. We will not cut emissions fast enough without changing the systems and powerful agents that drive them. And we will not maintain social cohesion unless those with the least, the global majority, are lifted. Ignoring either of these will delegitimise any process or outcome that claims to build a sustainable civilization. Sufficiency is not a compromise between climate and justice; it offers us one of the most viable approaches to turning things around as we stand at the cusp of crossing ecological and societal red lines.

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