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SPECIAL ISSUE: MOVING TOWARDS 1.5°C LIFESTYLES AND SOCIETIES

Enabling 1.5 °C lifestyles in Europe: lifestyle options and structural change for transformation

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ABSTRACT

Scholars have shown that lifestyle change is pivotal for any effective climate-mitigation scenario. But what lifestyle changes are needed and how can they be enabled and mainstreamed? This is the question pursued by the EU 1.5° Lifestyles project, the results of which the article summarizes and synthesizes. The project integrated quantitative and qualitative methods, ranging from input-output analysis-based footprint calculations to co-creative "thinking labs" and policy Delphi workshops across five European countries (Germany, Hungary, Latvia, Spain, and Sweden) to identify the most impactful lifestyle changes; determine conditions for their mainstreaming; suggest how rebound effects could be prevented; uncover the main political, economic, and societal barriers to lifestyle change and governance in its pursuit; and assess how changes in welfare systems and business models could contribute to lifestyle change. Our results show that changing from car-based mobility (especially internal combustion engine-powered cars) to other modes of transport has the largest emissions-reduction potential across a range of European countries, with changes in housing, especially switching to renewable-based heating systems, comprising a second group of impactful options. The article also shows that achieving meaningful changes in lifestyles requires transforming politico-economic, technological, and societal structures to enable (or to cease hindering) the adoption of relevant low-carbon lifestyle options at the household level. Acknowledging the political challenges to achieving such transformations, the article considers the options for mobilizing transformative change.

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Transformation; structural change; lifestyles; sustainable consumption; power; carbon footprint

Introduction

The most recent report of the Intergovernmental Panel on Climate Change (IPCC) has been heralded as the final clarion call, a "now or never" moment for limiting global warming to 1.5 °C, as enshrined in the Paris Agreement (Intergovernmental Panel on Climate Change (IPCC) 2023). Staying as close as possible to this threshold is intended to minimize the risk of triggering feedback loops that could lead to a "hothouse Earth" scenario (Armstrong McKay et al. 2022; Rockström et al. 2023). Delivering on the Paris Agreement requires an urgent, radical, and unprecedented transformation away from today's "carbon- and energy-intensive development paradigm," which affects nearly all spheres of life (Stoddard et al. 2021).

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Integrating demand-side strategies, including lifestyle changes, into climate-mitigation policies could provide essential "breathing space" for meeting agreed near-term climate goals while enhancing societal well-being (Intergovernmental Panel on Climate Change (IPCC) 2022). Researchers expect a much higher ratio of benefits to tradeoffs for demand-side solutions compared to supply-side solutions (Creutzig et al. 2022; Institute for Global Environmental Strategies (IGES) et al. 2019; Ivanova et al. 2016), and identify potential to reduce emissions in end-use sectors by 40–80% and achieve rapid change in consumption domains that are not locked into existing infrastructures (Lettenmeier et al. 2020). Indeed, lifestyle changes are pivotal for any mitigation scenario, as technological solutions such as transitioning to a clean energy system also entail significant material extraction and ecological costs.

However, our understanding of the contribution of demand-side changes to achieving climate targets is limited. A long tradition of inquiry into the motivations and impacts of individual behavioral changes has yielded laundry lists of recommendations on what consumers should and should not do (Maniates 2025). However, this research does not identify the most important changes necessary, based on robust assessments of their relative impact(s). At the same time, inquiries into the structural forces shaping lifestyle choices, while recently growing, remain vastly underrepresented in the literature. This is due, among other reasons, to their complexity and to an emphasis on quantitative approaches and on direct "market" value for political decision-makers and business actors (Fuchs et al. 2025). The social, cultural, and political factors influencing lifestyle changes remain insufficiently understood, with research in this area far less developed than that on technological advancements, for example.

This article aims to help fill the knowledge gap in advancing low-carbon lifestyle change. Summarizing and synthesizing the results of the large-scale, interdisciplinary EU 1.5° Lifestyles research project, we highlight needs and conditions for lifestyle change at both the household and structural levels. The project employed an inter- and transdisciplinary approach, integrating quantitative and qualitative methods, ranging from input-output analysis-based footprint calculations to co-creative "thinking labs" and policy Delphi workshops across five European countries (Germany, Hungary, Latvia, Spain and Sweden), to identify the most impactful lifestyle changes; determine conditions for their mainstreaming; suggest how rebound effects could be prevented; uncover the main political, economic, and societal barriers to lifestyle change and governance in its pursuit; and assess how changes in welfare systems and business models could contribute to lifestyle change.

The article proceeds as follows. The next section provides a brief overview of relevant literature, before section three details our methodological approach. Section four summarizes the results on the various aspects of our analysis. Section five, then, discusses these results in terms of their interaction and joint implications. Finally, section six concludes the article with a summary and a reflection on the limitations of our analysis and implications for future research.

Literature review: the pursuit of lifestyle change for transformation

Due to the breadth of the project that is the background to this article, its activities and results draw on and speak to a range of literatures. While not doing justice to any of them, this brief review aims to embed the article in this prior work, highlighting the most relevant foundations and contributions.

Most fundamentally, the inquiry aligns with the need to focus on consumption reductions and lifestyle changes as strategies to limit emissions. It thus responds to the literature, which criticizes past analyses for overly emphasizing technological solutions and efficiency improvements in production while downplaying the need for reductions in consumption and associated lifestyle changes (Alfredsson et al. 2018). Where earlier research has focused on the latter, it has highlighted the role of the household-consumption categories of food, housing, mobility, and leisure (which are also at the core of the present analysis) as those in which transformative change could drive emissions reduction at scale (Creutzig et al. 2022; European Topic Centre on Circular Economy and Resource Use (ETC/CE) 2024; Ivanova et al. 2016; Koide et al. 2021; Moberg et al. 2019; Tukker et al. 2010).

Analyses of consumer and lifestyle choices have highlighted both their impacts and drivers. With respect to the impacts of consumption choices, different strands of research have assessed the

environmental effects of consumption domains, income segments, and selected products and services, employing methods such as input-output or lifecycle analyses (Beylot et al. 2019); Castellani, Beylot, and Sala 2019; Hellweg et al. 2023); Hertwich and Peters 2009; Lettenmeier 2018). While these studies have yielded a myriad of results, they struggle to identify the most impactful choices amid dynamic developments in settings (e.g., the electrification of energy systems) and regional differences.

Studies have documented a wide range of individual and societal factors that influence consumption choices, including psychological, emotional, normative, socioeconomic, demographic, cultural, geographical, and socio-technical aspects (Amelung et al. 2019; Cantillo, Astorino, and Tsana 2025; Katzeff et al. 2025; Thorman, Whitmarsh, and Demski 2020). In this context, researchers have also highlighted the role of consumption practices and routines resulting from the complex interplay between individual and societal factors and material and ideational motives. Indeed, they have stressed the potential for demand reduction through the recrafting of social practices and the disruption of existing high-consumption norms and routines (Frezza et al. 2019; Huddart Kennedy, Cohen, and Krogman 2015; Sahakian, Fuchs, et al. 2021).

At the same time, another strand of research has asked whether the impact of "more sustainable" consumption choices is enduring. Researchers have particularly highlighted the role of rebound effects, for example, when consumers redirect financial savings from energy-saving lifestyle choices toward other high-emission activities (Sorrell 2007). Estimates of the impact of these effects vary widely, with some reaching 100% for energy-efficiency actions, i.e., canceling out the gains made (Font Vivanco, Kemp, and van der Voet 2015). At the same time, studies have also identified factors mitigating against rebound effects, such as the pro-environmental motivations of household members (Andersson and Nässén 2023; Claudelin et al. 2020).

In addition to household-focused inquiries, researchers have increasingly examined the structural dimensions of necessary change in recent years. They have stressed, in particular, that decarbonizing lifestyles is not possible without a transformative policy approach that changes sociocultural and politico-economic systems (Welch and Southerton 2019; Wittmann et al. 2025). Different researchers employ various definitions of "structures." Yet the common denominator of these arguments is that lifestyles are not solely a function of individual decision-making at the household level, but are strongly shaped by societal, economic, political, technological, and environmental contexts that precede and inform individual consumption choices (Hirth et al. 2023). Following this line of argument, we employ an embedded concept of lifestyles that accounts for both the potential of individual agency and the influence of structural contexts. Accordingly, we combine insights from household-level inquiries and structurally-focused literature to develop a comprehensive understanding of the conditions and the likelihood of a shift to 1.5 °C lifestyles.

As outlined above, research on these structural influences on household-carbon footprints has developed more recently than research with a behavioral focus. Yet, important insights on relevant structures in the societal, political, economic, and technological domains have already emerged. Technology, for example, affects consumption choices and has a profound impact, particularly through infrastructure developments in mobility systems and energy provisioning, as well as broader trends like digitalization and AI.

Economic structures matter for supply and demand, as well as for the market characteristics that shape them. Such structures range from price mechanisms, including the internalization or externalization of social and environmental production costs, to questions of investment (Antal and van den Bergh 2013; Spangenberg 2013; Spash 2016). All of these factors, in turn, shape and are shaped by dynamics of competition, concentration, and dependencies, and by ideas and narratives that legitimize them (Brand, Görg, and Wissen 2020; Gunderson, Stuart, and Petersen 2018).

Importantly, the existence and role of economic structures cannot really be conceived independently of the political structures that interact with them. Power asymmetries between actors, both internationally and within nations, strongly influence the regulation of industrial, technological, and financial markets. Research has shown the overwhelming influence of corporate actors and their alliances – both relative to civil society and to small and medium-sized enterprises – and delineated the various channels through which this power is exercised (Fuchs 2007; Newell and Levy 2022). Similarly,

researchers have documented that governments exhibit varying degrees of responsiveness to economic elites compared with non-elite segments of society (Elsässer and Schäfer 2023)). Further integrating the analysis of political and economic forces, some researchers have stressed that the ongoing affordability of unsustainable commodities compared to more sustainable alternatives is a function of socioeconomically ingrained patterns of unequal exchange between the Global North and Global South, and between economic elites and increasingly disenfranchized segments of society and nature (Dorninger et al. 2021; Lessenich 2023).

Finally, societal structures play an important role in both their discursive and material dimensions, as well as in terms of their interactions. On the discursive side, for example, scholars have shown that narratives of prosperity and well-being and ideas of what constitutes and signals status in society have a strong influence on consumption and lifestyle choices. The discursive dimension interacts with the material dimension of changing residential forms and use patterns. Together, they significantly impact environmental footprints, as exemplified by the rise of McMansions in the United States in the 1990s (Cohen 2020). More fundamentally, different dimensions of inequality, including class, gender, ethnicity, and religion, shape sustainable consumption choices in terms of status as well as the distribution of work behind the provisioning of sustainable consumption options (Anantharaman 2024).

While one may attribute structures to a specific realm (e.g., societal, political, economic, or technological), the most persistent and influential structures span multiple realms. For example, scholars have shown that the persistent promotion of consumer culture in industrialized economies continues to elevate expectations of material comfort, thereby fueling rising per capita resource use (Alfredsson et al. 2018; Cohen 2017). We cannot understand this consumer culture independently of the politico-economic forces that promote it and uphold systems of production and consumption that are reliant on ever-increasing material throughput, nor of the underlying ideational systems that legitimize this mode of economic organization (Fuchs et al. 2019; Middlemiss, Isenhour, and Martiskainen 2019).

The literature thus shows that sustainability in consumption and lifestyles will not be possible without deep structural changes and an associated reorganization of consumption and provisioning. Scholars have proposed a range of relevant models for such a transformation, among them consumption corridors (Fuchs et al. 2021; Pirgmeier 2020; Sahakian, Rau, et al. 2021) and sufficiency as a paradigm (Cohen 2020; Princen 2005). Similarly, they have delineated the potential for reorganizing welfare provisioning, with a focus on eco-social welfare (Büchs and Koch 2017; Fritz and Koch 2019) as well as for new business models and a reorganization of work (Kreinin and Aigner 2022, Neier et al. 2024).

In our inquiry, then, we draw on both the household- and the structurally-focused literature to arrive at a comprehensive understanding of the conditions and potential for a shift to 1.5 °C lifestyles. Specifically, we ask how the adoption and impact of 1.5 °C lifestyle options could be enabled and strengthened at household and structural levels.

Methods

We collected empirical data using a large, transdisciplinary, and iterative research methodology. This included input-output analysis, expert interviews, co-creative thinking labs, and policy Delphi processes. The research team selected this transdisciplinary approach to enable the project to address complex, value-laden, "wicked" problems prevalent in this research field (Keitsch and Vermeulen 2020; Lawrence et al. 2022). Our iterative methodology was set up with methods and analyses from the different empirical data feeding directly into one another. Thus, results from input-output analysis (Cap et al. 2024, 2025), systematic literature reviews, and expert interviews (Hirth et al. 2023; Kreinin et al. 2024) informed the citizen and stakeholder-thinking labs as well as policy Delphis (Kreinin, Mamut, and Fuchs 2024; Laksevics et al. 2025; Lehner et al. 2024; Richter et al. 2024; Vadovics et al. 2024). The research focused on five case countries across Europe – Germany, Hungary, Latvia, Spain, and Sweden – where citizen and multi-stakeholder, participatory, co-creative thinking labs were held in parallel. [1] The case countries provide a diverse representation of European Union (EU) member

states, and we strategically selected them to capture variations in geographic locations, cultural contexts, historical backgrounds (including post-Soviet experiences), as well as socioeconomic conditions (Kreinin et al. 2024; Lehner et al. 2024; Vadovics et al. 2024).

Figure 1 depicts the various steps of our methodology and their interconnections. As the transdisciplinary co-creative activities were central to our research, we explain them more extensively below. More detailed information on the other methods, as well as on the implementation and data collection across the different thinking labs, is provided in the Supplementary Material. All quantitative and qualitative analyses were based on systematic literature reviews (SLRs), with the qualitative analyses further informed by expert interviews to ensure a strong substantive foundation for all subsequent activities.

The Thinking Lab approach developed for and employed in the project emphasizes the creation of open, inspirational, and trusted spaces for co-creative work with citizens and stakeholders, respectively. The first Citizen Thinking Labs (CTLs) explored individual acceptance of low-carbon lifestyle changes through co-creative processes involving a diverse group of residents in each of the five countries (Vadovics et al. 2024).[2] Specifically, CTL1 used gamification to identify motivations and conditions for accepting changes, such as giving up private cars, becoming vegan or vegetarian, or reducing floor space per capita.[3] This approach assessed acceptance of nearly 50 low-carbon lifestyle options across nutrition, mobility, leisure, and housing (identified via a structured assessment of relevant literature), challenging participants to consider how they would use lifestyle changes to limit their annual greenhouse-gas (GHG) emissions to 2.5 tons per person by 2030, as well as further reductions leading up to 2040/2050 (Kreinin, Mamut, and Fuchs 2024; Lehner et al. 2024; Vadovics et al. 2024).[4] Subsequently, the CTLs on rebound effects (CTL2) brought together citizens who had already adopted key lifestyle changes. Using a focus group workshop approach, these labs explored rebound effects and strategies for mitigating them (Lehner et al. 2024; Richter et al. 2024). Finally, CTL3 was on achieving acceptance for 1.5 °C lifestyles. Here, groups of citizens envisioned a future where low-carbon lifestyles were the norm and explored the benefits and conflicts (and possible solutions) that would arise (Lehner et al. 2024).

On the stakeholder side, the first Stakeholder Thinking Lab (STL1) brought together participants from civil society, academia, business, policy, and media to discuss overcoming structural barriers to a transformation to 1.5 °C lifestyles in each of the five case countries.[5] Specifically, the lab focused on how seven key structural barriers and enablers, identified in the preceding research steps (Hirth et al. 2023; Kreinin et al. 2024), manifest across different consumption fields, and explored strategies to reduce barriers and strengthen enablers. Using the backcasting method, stakeholders were asked to think back from an envisioned 1.5 °C future in 2040/2050 and imagine and identify political and societal steps that they could take to enable that future (Kreinin et al. 2024, Kreinin, Mamut, and Fuchs 2024; Lehner et al. 2024). We organized another STL at the

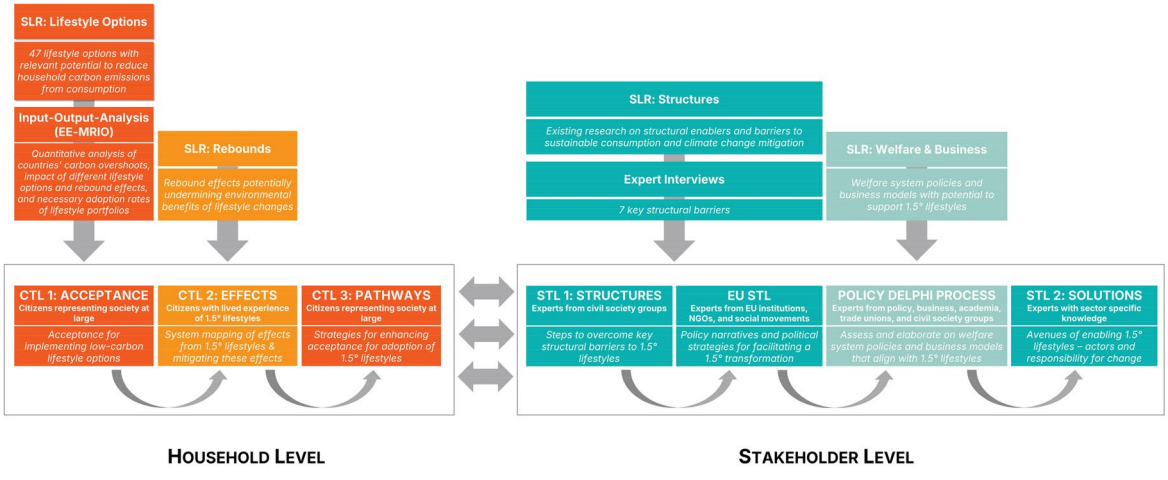

Figure 1. The multi-method research approach.

European level, focusing on alliances and narratives for transformation. Subsequently, a policy Delphi process was implemented via workshops in each of the five case countries. At these events, experts from civil society, academia, policy, and business evaluated six eco-social policies and business models for 1.5 °C lifestyles and societies in terms of their desirability and political feasibility (Laksevics et al. 2025). To that end, the experts engaged in multiple rounds of structured focus group discussions, which were iteratively combined with quantitative surveys. Unlike traditional Delphi approaches, this policy Delphi aimed to highlight diverse perspectives rather than seek consensus. Finally, STL2, also conducted in each of the five case countries, relied on a series of trialogues between stakeholders from diverse backgrounds (e.g., business, civil society, government, academia) on six transformative policy approaches to structural change identified as particularly desirable in the previous steps.[6]

The total of 95 participants across the five Delphis identified pathways, responsible actors, and the potential for joint strategies and alliances to pursue these aims (Lehner et al. 2024). In addition to these transdisciplinary, co-creative activities, we carried out quantitative analyses of countries' carbon overshoots, the impact of different lifestyle options (for the baseline year 2015 as well as for 2030 and 2050), and societal adoption rates of lifestyle portfolios (also considering rebound effects) that would be necessary to reach the Paris Agreements' climate targets, drawing on environmentally extended multi-regional input-output analysis (EE-MRIO) (Cap et al. 2024, 2025).[7] Sustainable consumption and lifestyles research with an industrial ecology perspective often uses EE-MRIO to estimate emissions and emission-reduction potentials (Fuchs et al. 2025).[8] The approach assesses transnational and trans-sectoral resource flows using financial data, in combination with territorial emission accounts that assign emissions to different production sectors. In our analysis, we used this data not only to calculate current emissions, but also to forecast potential future developments.[9] Given the project's focus on 1.5 °C lifestyles, we use a sustainable development scenario, specifically the IPCC's Shared Socioeconomic Pathway 1 with Representative Concentration Pathway 1.9 (SSP1-RCP1.9) and its assumptions regarding expected developments in the energy mix.[10] The results of the quantitative analyses served as inputs to the transdisciplinary engagement, enabling citizens and stakeholders to work with a concrete understanding of different lifestyle options, including their expected relative impacts and the scale of change required to achieve the 2030 and 2050 targets through adoption rates.

Results

Impactful lifestyle changes and their necessity

The impact of lifestyle options depends on existing consumption patterns and their emissions intensity. From both individual/household perspectives and for policymakers, it is important to identify options with higher GHG emissions per unit. From the nearly 50 lifestyle options that we identified based on a structured analysis of the literature as likely effective, our (EE-MRIO-based) analysis identified the following alternatives (in declining order) as most impactful (on average in 2030): (1) replace car with active transport, public transportation, or an electric vehicle; (2) reduce leisure/holiday driving; (3) switch heating at home to a heat pump or biomass boiler; (4) raise the occupancy rates of passenger vehicles; (5) switch to a vegan diet; and (6) reduce animal-based foods. Figure 2 shows the impact of all consumption change options considered in the analysis.

Mobility-related lifestyle changes emerge as a key factor in reducing carbon footprints at both the individual and national levels. The most impactful option in everyday mobility is to refrain from using internal combustion engine (ICE) vehicles. Replacing private ICE vehicles with non-motorized transport, public transport, or electric vehicles (EVs) has significant potential to reduce emissions. For example, shifting away from ICE vehicles could reduce per-capita carbon footprints by almost a quarter by 2030 (impact varies by country). In countries where individual travel is a major contributor to emissions, such as Spain, the impact is greater. Conversely, countries with lower transport emissions, such as Latvia, show smaller reduction potentials. The underlying changes in the energy mix, such as a cleaner electricity grid, play a crucial role in maximizing the benefits of these shifts and enhancing the effects of vehicle electrification (including public transport).

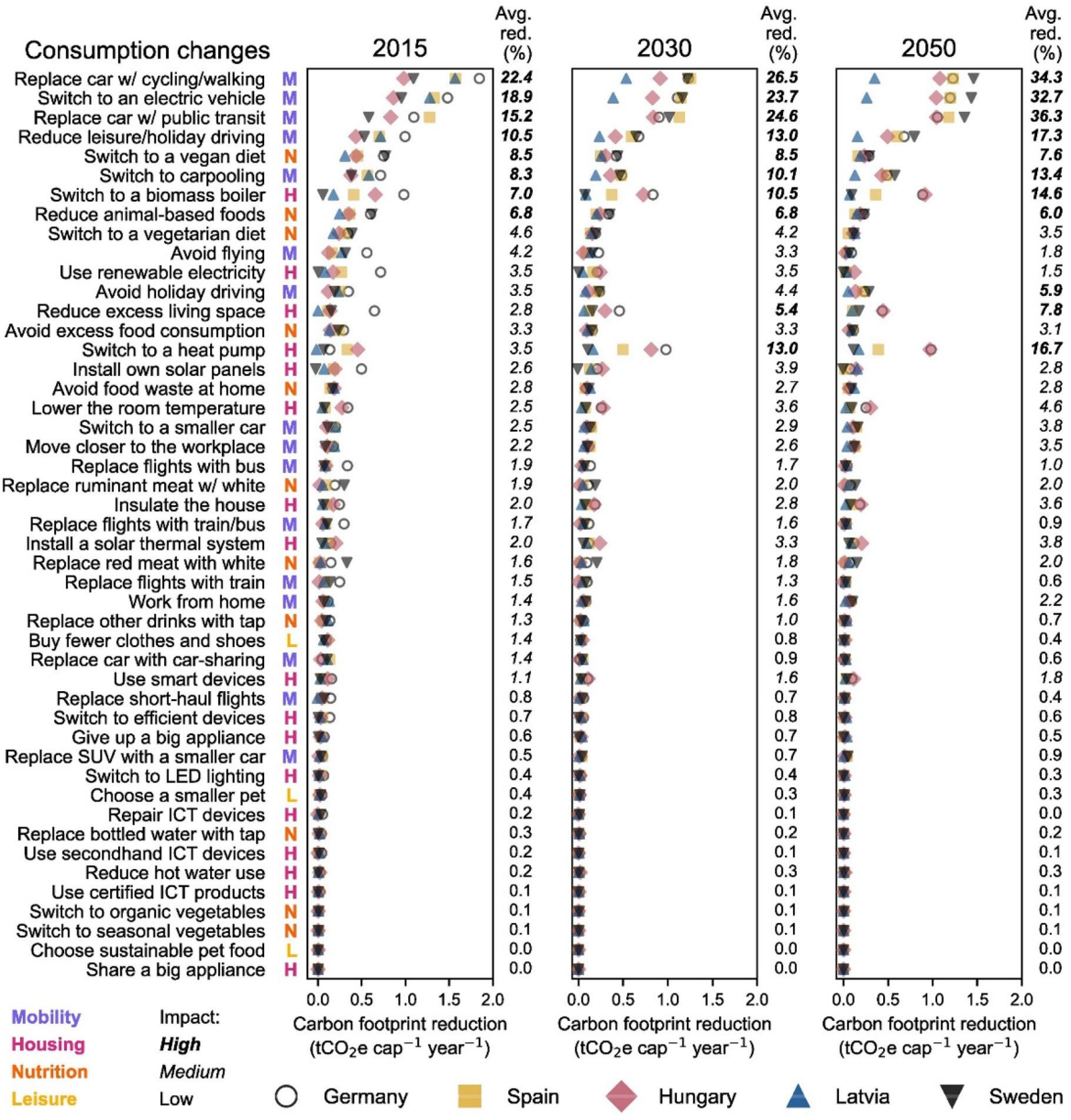

Figure 2. Per-capita absolute carbon footprint reduction potential for 47 consumption change options in five EU countries in 2015, 2030, and 2050. *Source:* Cap et al. (2025).

Emission-reduction potentials related to housing result primarily from changes in heating and energy systems. Switching from fossil fuel-based heating to renewable alternatives such as heat pumps and biomass boilers offers an average carbon-saving potential of over 10% in 2030, with considerable cross-country variation. These effects can be enhanced by improved insulation and the use of energy-efficient technologies in household appliances could further induce reductions. For countries with high baseline-carbon intensities in heating and electricity, such as Hungary, these changes offer particularly significant potential. Conversely, countries such as Sweden, which already have a renewables-heavy energy mix, would realize a relatively smaller impact from similar options. In countries such as Hungary, where household space and heating emissions are initially lower but are expected to increase with economic growth, this alternative will become more impactful by 2030.

Dietary changes, particularly the reduction or elimination of animal-based products, are the most impactful lifestyle options for nutrition, with adopting a vegan diet having the strongest effect. While not as impactful as shifting away from ICE vehicles or integrating renewable energy into heating systems, shifting to a vegan diet still has a sizable effect, with the potential to reduce per-capita

carbon footprints by an average of 9% in 2030. Country-specific dietary preferences and consumption patterns influence the mitigation potential of dietary changes. As all of the case countries studied here have relatively high levels of per-capita meat and dairy consumption, the reduction potentials of dietary changes remain among the most impactful lifestyle options.

Reducing carbon-intensive leisure activities, particularly air travel, also contributes to emissions reductions. From a country perspective, it has a comparatively smaller impact due to the limited proportion of the population that flies frequently (which also varies between countries) (Eurostat 2022).[11] Nevertheless, the political and social importance of addressing high-emission leisure behavior is considerable, particularly in terms of equity and justice. Moreover, trends toward greater normalization of air travel among the younger generations need to be considered. From an individual perspective, choosing to fly or not is one of the most emission-intensive consumption decisions one can make. Thus, policies aimed at reducing air travel can have a substantial impact.

The effectiveness of lifestyle changes varies over time due to changing contexts, such as the increasing decarbonization of energy systems and socioeconomic developments. For example, the impact of switching from fossil fuel-heating systems to heat pumps increases as electricity grids incorporate more renewable energy sources. Similarly, the cleaner the energy mix, the higher the benefits of EVs. These dynamics pinpoint the importance of aligning individual actions with systemic changes to maximize reductions. Regional differences also influence the effectiveness of lifestyle changes. For example, countries with higher shares of renewable energy, such as Sweden and Latvia, experience relatively smaller gains from switching to renewable heating systems. Conversely, countries with higher transport- or heating-related emissions will benefit more from these changes.

Importantly, our results show that achieving a 1.5 °C-compatible carbon footprint will require extensive lifestyle changes across the board; in other words, they will need to be both population-wide and impact many aspects of our lives. Without a comprehensive approach and relying solely on changes in the background system, mainly the decarbonization of energy systems, EU countries will not meet the 1.5 °C target by 2030 or 2050 (Figure 3). For 2030, a distributed portfolio of lifestyle changes achieves substantial reductions but leaves some of the case countries in overshoot. The required uptake varies between countries, with higher rates needed in countries such as Germany and Latvia where emissions overshoots are larger. By 2050, when further reductions will be needed, the 1.5 °C target will remain elusive without systemic changes that complement households' adoption of all impactful lifestyle options. Our findings highlight the urgency of coupling early, high-impact lifestyle changes with broader structural changes to accelerate progress toward global climate goals.

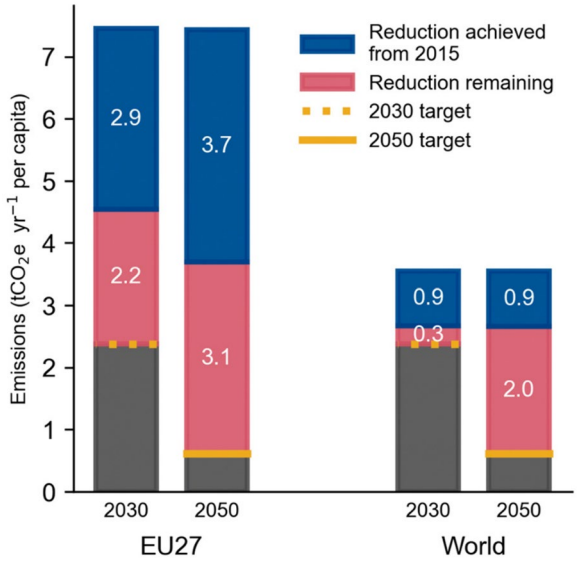

Figure 3. Calculation of per-capita emission reductions (to be) achieved through background system changes alone, as well as of emissions reduction remaining to achieve a 1.5 °C target by 2030 and 2050 (EU27 and global average). *Source:* Cap et al. (2024).

Strategies aimed at pursuing 1.5 °C targets through lifestyle changes, however, may be undermined by rebound effects, which frequently reduce the effectiveness of changes over the mid- to long-term. These effects occur when reductions achieved are partially or fully offset by increases in other emission-causing consumption (Richter et al. 2024).[12] In our analysis, rebound effects significantly affect the adoption rates of sustainable lifestyle options required to meet climate targets. For example, when we modeled economic rebounds, the required adoption rates of sustainable lifestyle options for 2030 increased from 54 and 66% to 69 and 90% in Hungary and Spain, respectively. In contrast, Germany, Latvia, and Sweden would not meet their 2030 1.5 °C targets at all under these conditions. These findings highlight the need to address rebound effects through policy interventions targeting both structural and behavioral change.

Acceptability of lifestyle changes

Given that impactful lifestyle options will need to be adopted by a large share of the population, the question of the extent to which and the conditions under which these are acceptable to households becomes crucial. Our CTL-based analysis, drawing especially on CTL1, shows that acceptance varies across individuals and countries, by lifestyle domain, and between needs for behavioral change or financial investments (Domröse et al. 2024; Vadovics et al. 2024). Acceptance (and resistance, respectively) was measured by how often participants selected a specific lifestyle option to reduce their carbon footprint to a level compatible with the 1.5 °C target (Table 1).

In general, investment-oriented options showed the highest levels of acceptance (Vadovics et al. 2024). This likely reflects participants' preference for technological solutions and upgrades. Importantly, however, participants in our CTLs frequently associated these options with expectations of public financial incentives.

As Table 2 shows, behavioral change-based lifestyle options faced more resistance; in other words, fewer participants chose these alternatives and they explicitly voiced concerns about them. Mobility-related changes, such as using public transport instead of a car or traveling by train instead of flying, are in the upper medium range. By contrast, changes in diet, such as adopting a vegetarian or vegan diet, and changes in housing, such as giving up excess square meters or opting for shared accommodation, were among the least preferred options.

Table 1. The five most preferred lifestyle options (acceptance rates >90% of participants).

Lifestyle option	Consumption domain	Below (B)/Above (A) average impact[13]	Mainly financial investment (FI)/Mainly behavior change (BC)
1. I will install efficient lighting	Housing	B	FI
2. I will switch to using energy-efficient household devices	Housing	B	FI
3. I will avoid food waste at home	Nutrition	B	BC
4. I will eat only as much food as I need to stay healthy	Nutrition	B	BC
5. I will insulate my house	Housing	A	FI

Source: Adapted from Vadovics et al. (2024).

Table 2. The five least preferred lifestyle options (lowest acceptance rates).

Lifestyle option	Consumption domain	Below (B)/Above (A) average impact	Mainly financial investment (FI)/ Mainly behavior change (BC)
1. I will switch to a vegan diet	Nutrition	A	BC
2. I will choose shared housing	Housing	A	BC
3. I will switch to a vegetarian diet and eat no more meat or fish	Nutrition	B	BC
4. I will give up excess square meters (i.e., have a smaller home)	Housing	A	BC
5. I will get a smaller pet if I get a new one	Leisure	B	BC

Source: Adapted from Vadovics et al. (2024).

Across all areas, cost, convenience, cultural norms, and lack of access and awareness were the main obstacles to lifestyle changes that citizens named in the CTLs (Domröse et al. 2024; Vadovics et al. 2024). Proposed solutions to improve uptake addressed these obstacles by making sustainable choices more attractive, accessible, and feasible. In the consumption field of mobility, reluctance (or in some cases, inability) to use public transport was linked to perceptions of inconvenience, a lack of infrastructure (especially in rural areas), and the perceived importance of cars for emergencies. Concerns about the sustainability and cost of EVs also hindered their uptake. Participants suggested measures to aid the transformation, including improving public transport infrastructure, offering financial incentives, enabling remote working, and expanding EV charging networks. They also considered awareness campaigns and regulations that prioritize sustainable mobility as crucial.

Regarding housing, there was resistance to downsizing due to housing-market challenges and the cultural value placed on owning a large, private home. Shared housing raised concerns about privacy and conflicts, among others. Solutions to these problems included implementing better urban planning with smaller and well-designed dwellings, promoting shared living spaces to ensure a high quality of life, and introducing economic disincentives for excessive living space. Participants also suggested financial support for retrofitting, such as installing heat pumps or solar panels, to further improve acceptability.

In the consumption field of nutrition, meat consumption was strongly linked to cultural values, perceptions of quality of life, and concerns about nutritional adequacy. In addition, citizens identified high prices of meat substitutes and limited availability of alternatives as obstacles to change.

Discussions with citizens in CTL2, conducted across the five case-study countries, provided insights into how rebound effects might be mitigated, with participants demonstrating varying levels of awareness of rebound mechanisms and of proactive strategies to prevent them (Richter et al. 2024). Suggestions for avoiding rebound effects co-developed with participants included (1) avoiding high-carbon activities such as air travel or impulsive purchases, (2) investing savings in sustainable alternatives, such as home-energy improvements or healthier food choices, and (3) adopting hobbies and work practices consistent with a low-carbon lifestyle, including gardening, cycling, and teleworking. The outcomes also showed that structural factors, such as living in urban areas with reduced car dependency, played a key role in limiting rebound effects. However, effective rebound mitigation will still require deliberate action by households and citizens, including adopting sustainability-focused personal budgets and participating in community-based initiatives (Richter et al. 2024).

Finally, strategies to increase acceptance and adoption rates developed in CTL3, in particular, included reducing the cost of plant-based alternatives, promoting the variety and health benefits of vegan/vegetarian diets, improving labeling transparency, and incorporating nutrition and food preparation in education. Notably, participating citizens also suggested that a more gradual approach to dietary change might work. Specifically, instead of switching to an animal-free diet, adopting a diet that includes progressively fewer animal products could gain more acceptance, especially if positive health effects were emphasized. In the field of leisure, finally, citizens preferred air travel due to convenience, emotional attachment to certain vacation narratives, and perceptions of fairness ("if others still fly, why shouldn't I?"). They also pointed to outdated rail infrastructure in certain regions as an obstacle to change. Participants considered the development of reliable, affordable transnational rail networks, the implementation of air-travel regulations, and the raising of awareness of the climate impact of flying as critical for change. In addition, the CTL results included a suggestion to extend holiday allowances to include slower modes of travel as a strategy for increasing public acceptance.

Acceptance rates for lifestyle changes varied between countries to some extent, reflecting different cultural, economic, and infrastructural contexts (Domröse et al. 2024; Vadovics et al. 2024). Participants from Germany, Sweden, and Hungary widely accepted replacing fossil-fuel heating systems with heat pumps, but Spaniards and Latvians expressed resistance due to cost concerns and doubts about the technology. Similarly, Swedish, Spanish, and Hungarian participants preferred train travel (for holidays) to flying, but Latvians were less enthusiastic due to the country's underdeveloped rail infrastructure. Compared to other case countries, the initial acceptance rates for electric cars were considerably lower in Germany, likely due to skepticism fueled by the political and economic power of the German automobile industry. Discussions at the CTLs, however, led to increased acceptance.

Structural enablers and barriers

The CTLs identified various obstacles to adopting lifestyle changes that were beyond citizen control and proposed strategies to overcome them that require structural change. Indeed, building on the literature on lifestyle change, our research shows that structural enablers and barriers significantly hinder the widespread adoption of 1.5 °C lifestyles and perpetuate unsustainable patterns of consumption and production. Furthermore, as we pointed out above, the quantitative analysis underlines that even with almost perfect uptake of low-carbon lifestyle options and effective mitigation of rebound effects, none of the case countries will be able to achieve the reduction in per-capita carbon footprints compatible with the Paris climate target by 2050. Accordingly, it is important to consider how broader economic, political, and societal forces influence the carbon footprints of lifestyles and societies.

Our analysis, based on a systematic literature review and expert interviews, revealed seven particularly impactful structural enablers for change. These interlinking and mutually reinforcing factors must be addressed if societies are to achieve transformative change (see Figure 4 and Kreinin et al. 2024). These enablers target deeply embedded barriers within economic, political, social, and technological systems and shape development trajectories more strongly than any surface-level policy action (Hirth et al. 2023). Building on this foundation, STL1, STL2, and the EU STL then developed strategies for enhancing structural enablers.

First, the undifferentiated pursuit of economic growth across political, economic, and societal arenas obstructs transformation. Indeed, the international experts from diverse disciplinary backgrounds that we interviewed identified the economic growth paradigm as the most significant barrier to transformation. To achieve change, we must urgently move beyond a simple focus on quantitative growth and instead identify which sectors and areas require further growth and which are particularly harmful to the pursuit of other societal objectives. This process will require broad and open public and political debate.

Second, our results show that consistent, predictable, and integrated policies are a central enabler of transformation. Encompassing regulatory measures is essential to driving change and supporting

Figure 4. Seven most impactful structures enabling 1.5 °C lifestyles. *Source:* Adapted from Kreinin et al. (2024).

efforts to maintain collective motivation and acceptance. Experts and stakeholders found that coherent policy strategies currently face challenges, particularly due to policy silos and institutional inertia.

Third, experts and stakeholders identified the power of vested interests, especially formal and informal alliances between industry and government, as a significant barrier to change. Given that these actors established their power within the unsustainable status quo, they tend to have strong vested interests in unsustainable technologies, commodities, and overconsumption and thus oppose the necessary structural changes. Their resources and influence tend to outweigh any pressure for change from progressive businesses, politicians with climate agendas, or relevant sections of the public, and create a crucial barrier to mainstreaming alternative business models and provisioning approaches.

Fourth, experts and stakeholders noted that the internalization of environmental and social costs (associated with the power of vested interests discussed above) would provide a powerful enabler for a shift toward 1.5 °C lifestyles. Subsidies for high-carbon products and services, including meat production and air/car travel at the national and European levels, reinforce the impact of the current lack of internalization. Being able to externalize environmental and social costs has fueled a normalization of comfortable, cheap, and often emission-intensive consumption patterns, which also perpetuates eco-social inequity at the expense of the Global South, low-income individuals, and nature.

Fifth, experts and stakeholders highlighted the importance of strengthening alternative narratives and measures of a good life. They pointed out that current livelihood narratives are deeply intertwined with the economic growth paradigm, perpetuating a focus on high consumption and material wealth as societal ideals. Powerful interests that control informational structures, shape social discourses, and influence education systems invested in the unsustainable status quo support these aspirations. Accordingly, experts and stakeholders emphasized the need for cultural change, stressing the importance of fostering individual and collective visions of a good life that are less dependent on material consumption. In this context, they also noted that political discourse underutilizes existing alternatives to GDP/GNP.

Sixth, experts highlighted that improvements in social equity are a necessary enabler of a transformation toward 1.5 °C lifestyles. They described inequity as a fundamental problem that affects all aspects of society and significantly constrains the space for action. Experts and stakeholders both suggested that those with power and who benefit from the status quo often obstruct efforts to achieve change, while those with the least power have limited agency despite being most affected. They noted that certain actors exploit inequalities to strengthen populist appeals and disrupt democratic processes.

Finally, experts and stakeholders emphasized the importance of integrating knowledge, skills, and education as critical levers for societal change. They noted that the current education system, influenced by the economic growth paradigm, prioritizes skills and knowledge geared toward the market and economic growth rather than societal well-being and sustainability. Both experts and stakeholders stressed the need for systemic change, a shift in mindset and funding mechanisms within educational institutions and research infrastructures to promote critical thinking, and collective knowledge about the impact of individual actions. They pointed to the lack of holistic sustainability education in schools as a barrier to transformation, noting that younger generations otherwise would be particularly receptive to change.

The combined influence of these seven structural enablers and barriers explains the reluctance and inability of political and societal actors to adopt effective climate-mitigation measures. Achieving a comprehensive and just transformation, however, requires tackling these structural aspects, and the stakeholders developed a range of ideas for doing so in the STLs. Alongside a large number of smaller ideas for change developed in the first round of case country STLs, the EU-level STL and the second round of case country STLs identified broader needs and starting points for structural change (Kreinin et al. 2024). Stakeholders emphasized the importance of a joint focus on broader leverage points by coalitions of actors from civil society, politics, and business, strengthening democracy and democratic control, especially in provisioning for basic needs, and societal dialogue about collective social and environmental objectives as core elements of a relevant roadmap for change.

The powerful role of deep structural barriers is particularly evident in welfare systems and business models. These two societal domains rely heavily on economic growth and reinforce the lock-in of

various structural barriers (Laksevics et al. 2025). The welfare state's structure, designed to thrive on and support economic growth, impedes the adoption of policies that balance human needs with climate goals. Similarly, business models oriented toward maximizing profits from mass consumption are difficult, if not impossible, to align with a transformation toward 1.5 °C lifestyles. They are, therefore, a crucial and particularly challenging element of the much-needed transformation. In our policy Delphi process, we gauged the political feasibility of different transformative options for welfare states and business models with stakeholders from policy, civil society, and business. In these assessments, the participants perceived business and eco-social policies as feasible only as components of a policy mix, while they thought single initiatives would bring significant risks to state and business competitiveness and unclear effects on consumption. Policy-mix proposals included combining expanded universal basic services with income caps and higher taxes on wealth and working hour reduction with high-emission product choice editing (Laksevics et al. 2025). While they thought voluntary pathways to introducing social and environmental bottom lines to business models were more desirable, they perceived green public procurement and state regulations as more effective.

Thus, the participating stakeholders emphasized the interconnectedness of well-being, consumption, emissions, and lifestyle choices, and called for multi-sectoral strategies to reduce social and income inequalities and create a level playing field for businesses. While many found it hard to critique the growth imperative embedded in dominant welfare and business thinking, they agreed that democratic dialogues, broad coalitions, sectoral sustainability agreements, and transnational approaches are required to foster more just provisioning systems and allocations of responsibility for change (Laksevics et al. 2025).

Discussion

Our analyses at both the household and structural levels reveal the immense potential for emissions reductions through individual lifestyle change, but also the need for structural changes to unlock this latent capacity. The evidence shows that individual motivation alone is insufficient without supportive systems and policies that lower barriers and increase the capacity for change. Structural interventions, such as investments in public transport infrastructure, renewable energy systems, and urban (re) design, are needed to create the conditions that make sustainable choices not only possible, but easy, attractive, and equitable. Beyond these interventions, however, broader economic, political, and societal reforms will be necessary as well if we want to mobilize the potential for 1.5 °C lifestyles and societies.

In terms of the *relative impact* of low-carbon lifestyle options, our analysis shows that reducing automobile use, especially for fossil-fuel-based cars, should be given the highest priority, followed by shifts to renewable heating systems, a switch to predominantly plant-based diets, and efforts to address flying. Our results from CTLs in the five case countries show that acceptance of high-impact lifestyle options varies, with investment options (e.g., installing renewables-based heating systems) receiving relatively higher approval rates (especially when public actors provide financial incentives) (Vadovics et al. 2024). Most fundamentally, however, our results on the acceptance of high-impact lifestyle options reveal that adoption rates required to meet the 1.5 °C climate target are far from achievable under current conditions. Governments must set their sights on improving and supporting uptake through investments in accessibility, convenience, and comfort. Specifically, investments in collective provisioning systems (e.g., public transport, district heating) or – where these are not easily achievable – income-sensitive subsidies for individual solutions (e.g., EVs, heat pumps) are pivotal to achieving effective and lasting emissions reductions. These initiatives would contribute to the perceived fairness and democratic legitimacy of measures.

Low-carbon lifestyle options with limited acceptance, such as increasing the share of plant-based nutrition and reducing residential space per person, will require the support of both awareness campaigns and public planning (e.g., preferred access to attractive downtown areas and festivals for vegan-food suppliers), alongside structural changes to internalize environmental and social costs. In sum, improving uptake requires a multifaceted but targeted approach. At the same time, politico-economic reforms will need to reduce access to high-carbon lifestyle options, both in terms of availability and costs, to ensure uptake of low-carbon options as well as its lasting impact. Citizens and stakeholders

in our thinking labs considered taxes and bans appropriate for this objective, with the latter receiving a more positive evaluation in terms of perceived fairness. In addition, the dialogue with and among citizens and stakeholders that our Thinking Lab approach enabled underlined the importance of communication and exchange in pursuit of societal acceptance.

Our results on household-lifestyle choices show that policies must focus on increasing adoption and acceptance of the most impactful lifestyle options and on reducing the associated rebound effects. Unfortunately, our calculations also show that even 100% uptake of the most impactful lifestyle options will not be sufficient for achieving the 2050 targets of the Paris climate agreement. For that goal, structural changes beyond the level of the individual policies and regulatory instruments identified above will be required.

Indeed, our structural analysis has identified deep political, economic, and societal barriers that currently hinder a comprehensive and effective transformation to 1.5 °C lifestyles and societies. While much political and public debate focuses on the details of specific policies, the overall direction of development is more strongly shaped by these underlying structures, which remain profoundly aligned with an unsustainable development paradigm. Acknowledging and targeting these structural forces is necessary to address public frustrations at the perceived burden of environmental regulation, which often delivers little actual change. Specifically, our inquiry reveals an impressive consensus among international experts that the undifferentiated prioritization of economic growth across all business and societal sectors is the major barrier to transformation. How can we shift society toward low-carbon lifestyle options if we are not prepared to reduce, if not abandon, our consumption of those products, services, and sectors that are most harmful to the climate? How are we going to enlist governments to adopt and implement stringent and holistic policy bundles, including a shift toward an eco-social welfare state and regulations that support sustainable business models, as long as the political power of interests vested in the unsustainable status quo remains unchecked?

The interaction and mutual reinforcement, as well as the taken-for-granted nature and opaqueness of the deep economic, political, and societal barriers to transformation, make targeting and changing them difficult. Indeed, the persistence of unsustainable patterns of production and consumption, despite increasing clarity on the climate and ecological crises, demonstrates the power and stability of these structures. What, then, must be done to enable the policy and infrastructure changes necessary to improve the availability and affordability of low-carbon lifestyle options? Our thinking labs with stakeholders from politics, civil society and business in the five case countries as well as at the European level suggest that we should pursue three concrete strategies to mobilize for transformative change: (1) making eco-social transformation the cornerstone of all efforts, (2) building and strengthening eco-social coalitions, and (3) enabling a sharing of responsibility and accountability. All three, in turn, will rely on effective and targeted communication by coalitions of transformation-oriented actors from civil society, science, politics, and business, requiring particular attention to current developments in communication structures and their ownership, especially regarding social media and AI.

First, eco-social justice must be a central focus of all strategies and policy changes to ensure an effective and resilient transformation. Equity considerations and equity-oriented communication must start with the injustice of the current situation, in which (highly asymmetric) benefits from emissions are privatized while consumers socialize the costs of climate change and impose them on others not able to protect themselves against heat waves, droughts, floods, or storms. Equity considerations also need to influence policy choice and instrumentation: investments in public transport infrastructure benefit society as a whole and investments in eco-social housing ensure that societies can pursue social and environmental objectives simultaneously. In general, collective approaches to provisioning tend to be environmentally more effective and socially just. They can be well supported by messaging that highlights the benefits to individual and societal health and well-being. Moreover, they can ensure that no one is left behind, thereby building democratic resilience and defending eco-social societal objectives against populism. In addition, the introduction of mandated, inclusive, and transparent citizen assemblies at all levels of governance offers a means to counter the power of resource-rich interests and promote greater political equity.

Second, the creation and strengthening of (new) eco-social coalitions is necessary. Our stakeholder labs revealed both the insufficiency of current collaboration between environmental and social non-governmental organizations (NGOs) and the range of actors "on the fence" or not involved. Currently, a small, well-organized coalition of resource-rich actors invested in the unsustainable status quo actively opposes transformative change by influencing political and public discourse. However, broad coalitions built on shared recognition of fundamental alignments between social and environmental societal objectives offer a clear potential for countering this opposition. For civil society actors (including science), investing in the design and maintenance of such coalitions via well-designed spaces for shared learning and participation, conflict resolution, and the co-creative development of solutions and strategies would likely be highly worthwhile. While being attentive to the risk of co-optation, bringing policy, business, and media actors with eco-social targets into such coalitions could enhance their political impact.

Finally, ending the widespread "responsibility ping-pong" between actors is essential to advancing an effective transformation. To achieve this aim, the coalitions of transformation-oriented actors described above will need to develop spaces and mechanisms to enable and organize the sharing of responsibility between actors. This will also require transparent and effective means of (mandatory) impact assessment to identify each actor's positive or negative contribution to the pursuit of 1.5 °C lifestyles. Importantly, responsibility must be reconceptualized in this context. Specifically, the existing and looming sustainability crises highlight the need for a forward-looking attribution of responsibility rather than one limited to past legal liabilities (Young 2011).

Conclusion

This article contributes to an understanding of how Europe can advance lifestyles compatible with the 1.5 °C Paris climate target. It identifies the lifestyle changes with the greatest emissions-reduction potential, the conditions for their acceptance and sustained impact, the structural barriers to necessary changes, and the potential to transform welfare states and business models into enablers of structural change. Its findings draw on the work of the EU 1.5° Lifestyles project, a large-scale, inter- and transdisciplinary study that employed quantitative and qualitative methods, ranging from input-output analysis to co-creative thinking labs, integrated the analysis of household-level and structural dynamics, and focused on five European countries (Germany, Hungary, Latvia, Spain, and Sweden).

The analysis identified a small group of high-impact low-carbon-lifestyle options that, if adopted by large shares of the population, would contribute significantly to achieving the climate targets established under the Paris Agreement. In addition, the analysis identified enabling conditions for adopting these options, providing crucial insights beyond the typical laundry lists of potential lifestyle changes that regularly overwhelm consumers and political decision-makers alike. At the same time, the analysis pinpointed the need for structural changes to achieve the required high adoption rates. Moreover, our results showed that even if close to a 100% of the population were to embrace the high-impact lifestyle options, reductions would still fall short of the 2030 target in some countries and of the 2050 target in all our case countries. The resulting message is very clear: Focusing on the household level – on informing, incentivizing, and regulating consumers – is not sufficient! A fundamental change in the politico-economic, societal, and technological structures and their interactions is needed.

The relevance of these structural barriers is probably best demonstrated by the limited progress in improving the sustainability of lifestyles, despite decades of research and increasing knowledge of the necessary lifestyle changes. Indeed, achieving the necessary structural changes is probably the greatest challenge of all. Strategies that can mobilize for transformation and target change-resistant structural conditions and actors are urgently needed. We identify three strategies: (1) placing eco-social equity at the core, (2) building and strengthening eco-social coalitions, and (3) enabling and organizing shared responsibility. These broad and, admittedly, challenging strategies are mutually reinforcing and must be pursued together to enable a successful transformation to 1.5 °C lifestyles and societies. Their breadth is also their strength, in that they empower societies and

strengthen their resilience in the face of cascading environmental, social, democratic, and geopolitical risks.

Any analysis, especially one pursuing such a broad inquiry as the one presented here, has its limitations. In this case, our intensive and co-creative engagement with citizens and stakeholders imposed limits on the number of participants and case countries. While these countries exhibit some degree of cultural and socioeconomic diversity, they are all European and do not reflect global differences. Additionally, quantifying the impact of structural change remains a challenge. Our input-output analysis addressed only a few concrete structures, such as the energy mix and narrow policy choices (e.g., pricing). Future research should carefully combine this citizen- and stakeholder-focused approach with broader quantitative assessments, such as representative surveys, and extend to other countries and regions. Additionally, methodological developments to assess the structural dimensions of transformation, particularly the political and societal dimensions, are urgently needed. Without these developments, quantitative analyses will continue to overemphasize the household level and economic and technological dimensions, potentially misdirecting decision-making and obscuring the fundamental need for structural change.

Notes

1. In this article, we use the term "citizen" in a generic sense, in other words, to refer to any member of the population without any political or legal sanctions.
2. Recruitment for CTL1 and 3 focused on gathering as representative a group of citizens (approximately 25 per country) as possible, while recruitment for the CTLs on rebounds (CTL2) focused on citizens (15–20 per country) who had adopted low carbon lifestyle choices.
3. See https://onepointfivelifestyles.eu/news/climate-puzzle-one-of-the-stars-of-the-eu-15deg-lifestyles-project-with-more-than-30-on-demand.
4. Due to the more volatile political conditions in Hungary, 2040 was chosen as the target for that country, as the Hungarian project partners felt that planning toward 2050 might be too difficult for the participants.
5. Recruitment for the STLs focused on creating a diverse group of stakeholders, with participants reflecting civil society, policy/administration, business, and media perspectives. For STL1 and the EU STL, we recruited approximately 25 stakeholders per country/at the EU level.
6. A trialogue, as carried out in our project, is the moderated discussion between three participants representing three of the four different backgrounds (policy, civil society, business, academia).
7. For a detailed description of the technical aspects of the methods used here, see Cap et al. (2024, 2025) as well as the Supplementary Material.
8. Compared to life cycle analysis (LCA), another method frequently employed in quantitative and qualitative sustainable consumption and lifestyles research, EE-MRIO performs better in attributing emissions to upstream economic drivers as well as in capturing trade impacts. LCA, however, is stronger in assessing the impacts of changes in a given product and differences in the production characteristics of similar products, something the limited resolution of input-output tables does not allow EE-MRIO to do (Fuchs et al. 2025).
9. Specifically, the project used EXIOBASE 3 and adjusted its supply and use tables in line with the developments delineated in the chosen IPCC scenario.
10. The Shared Socio-Economic Pathways (SSP) scenarios model different assumptions about socioeconomic trends such as population and economic growth or urbanization, as well as associated policy developments. We chose the scenario that seemed most appropriate for our analysis, as it makes assumptions about climate action, in particular the decarbonization of energy systems that would help limit global warming to below 1.5 °C.
11. Our inquiry is limited to leisure-based air travel and assumes successes in the decarbonization of aviation fuels. We did not account for the stronger radiative forcing from high-altitude emissions.
12. Rebound effects can be categorized into three main types: (1) economic rebounds, when savings from energy-efficient technologies or low-carbon practices are diverted to other high-carbon goods or activities, (2) time-related rebounds, when efficiency improvements save time, which is then spent on activities with a substantial carbon footprint, and (3) psychological rebounds, when moral licensing induces individuals to justify high-carbon activities after adopting a pro-environmental action. The magnitude of rebound effects varies, with studies reporting reductions in expected benefits ranging from 5% to over 100%.
13. To distinguish between high- and low-impact options, we averaged the potential reductions of individual carbon footprints under conditions of full adoption across countries. This average was then used as a threshold to sort the list of lifestyle options into high- (above-average) and low- (below-average) categories (Vadovics et al. 2024).

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Ethical approval

When engaging citizens and stakeholders, we adopted the International Sociological Association's code of ethics (https://www.isa-sociology.org/en/about-isa/code-of-ethics). Case-country partners ensured compliance with local ethics approval requirements. As described in the methods section, the thinking labs were intended to identify citizens' and stakeholders' views on lifestyle and structural changes, not to make interventions in lifestyles. We obtained informed consent from all participants, including consent to use the data for research and publication as well as photographs, audio recordings, and other documentation. All data collected in the labs, including survey data, were handled according to the EU's General Data Protection Regulation (GDPR) rules and as defined in the Statement of Ethics and Data Handling Guidelines of the project (see https://onepointfivelifestyles.eu/sites/default/files/attachment/2024-02/EU%201.5%20Lifestyles_Ethics%20Data%20Handling%20Statement.pdf). The information collected from participants has been encrypted to protect their identity and prevent identification by third parties. The information is stored securely and only authorized persons have access to it.

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