COUNTERING REBOUND EFFECTS

POLICY BRIEF 3

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The EU 1.5°C Lifestyles project highlights four key low-carbon behaviours with substantial climate mitigation potential, 1) Reduce car use and switch to public transport, cycling and walking, 2) Use renewable heating/energy systems and reduce floorspace, 3) Move towards plant-based nutrition, and 4) Reduce flying (see **Policy Brief 2**). While such behaviours can lower consumption-related climate impacts, the so-called **"rebound effects"** may inadvertently drive increased consumption. Individuals with pro-environmental values and supportive community networks are more likely to sustain low-carbon behaviours, reduce rebound effects, and offer scalable insights for climate-friendly lifestyles. Policies that aim at influencing these values and strengthen these community networks can guide re-spending toward low-carbon options while fostering mindful consumption and well-being focused on non-material aspects, helping mitigate rebound effects.

This policy brief introduces the concept of rebound effects and, drawing on findings from the EU 1.5° Lifestyles project, provides policy recommendations to prevent or minimise these undesirable outcomes.

1. What are rebound effects?

Policy interventions and individual consumption choices aimed at reducing carbon footprints can sometimes have unintended consequences, known as "rebound effects," which undermine their effectiveness. These effects often arise due to increased consumption stimulated by cost savings generated by efficiency improvements. For example, a car owner switching to a more fuel-efficient vehicle might drive more due to lower fuel costs, reducing the anticipated emissions savings. Likewise, installing a heat pump at home could lead to higher indoor temperatures or increased energy use due to greater affordability. Furthermore, any residual savings may be spent on other goods and services, potentially diminishing or negating the expected climate benefits of the original efficiency improvements. Rebound effects can also arise from savings generated by other consumption strategies, such as prolonging the lifetime of owned goods or buying second-hand. Such choices result in more disposable income, which might then be spent on other high-carbon goods or services, offsetting their environmental benefits.

In some cases, rebound effects can stem from psychological factors, such as "moral licensing". This occurs when individuals use climate-friendly actions to justify or increase their carbon-intensive behaviours. For instance, someone who adopts a plant-based diet may feel entitled to higher-emission activities, like increased personal travel. Similarly, rebound effects can arise from changes in time use. For example, time saved by working from home might be used for carbon-intensive activities like online shopping.

However, economic or time savings from climate-friendly actions can also be redirected towards further positive outcomes, rather than leading to rebound effects. For example, money saved from reduced driving could be invested in insulating a home, adopting a healthier and more sustainable diet, or engaging in enriching activities such as community-building. These choices not only enhance quality of life but also avoid the unintended consequences associated with rebound effects.

2. How can rebound effects be prevented or limited?

Research indicates that individuals with pro-environmental values and awareness of the climate impacts of consumption tend to generate smaller rebound effects. They are more likely to reinvest saved money or time in ways that further reduce their carbon footprints. Moreover, those who belong to communities (e.g. those practising voluntary simplicity, repair cafés, or urban gardening), provide opportunities for peer support, meaning individuals and households are more likely to sustain low-carbon behaviours due to a supportive social context. These communities also serve as valuable test beds for climate-friendly lifestyles, offering insights that can be scaled to more mainstream settings, thereby accelerating the societal transition to 1.5° lifestyles.

Government interventions, such as subsidies and taxes, can guide re-spending or time use toward low-carbon options. There is also growing recognition that downshifting (adopting lifestyles with less time spent on paid work) can help mitigate rebound effects by reducing disposable income, thereby limiting opportunities for high-carbon spending, and encouraging more mindful consumption and a greater focus on non-material aspects of well-being, such as leisure, relationships, and personal growth, which are less likely to drive rebound effects.

The role of social norms, media, and marketing is central to shaping consumption choices, which directly influence rebound effects. By moderating consumerist messaging and promoting narratives of well-being that go beyond material wealth, policymakers can help mitigate re-spending behaviours that contribute to rebound effects.

POLICY RECOMMENDATIONS

Consumers need different forms of support for sustainable consumption and mitigation of rebound effects:

- **Empower consumers with knowledge and skills.** Support educational campaigns and awareness programs that encourage consumers to prioritise needs over wants, evaluate the necessity and long-term value of purchases, and adopt practices of waste reduction, reuse, and recycling.
- **Promote community-based solutions for low-carbon lifestyles.** Provide support for piloting and scaling up initiatives that promote peer-to-peer learning about sustainable practices such as eco-villages, community gardens, community-based recreational activities, repair cafés, and swap shops. They foster solidarity and provide practical experience.
- **Facilitate sustainable choices through market regulation.** Continue implementing policies for choice editing to phase out high-carbon goods and services. Support labelling of goods and services to simplify decision-making for consumers.
- **Encourage sustainable financial practices.** Provide consumers with incentives and tools and resources to direct their savings toward sustainable investments, such as green funds and conservation projects.
- **Introduce regulations that limit exposure to advertisement promoting high-carbon lifestyles.** Reducing exposure to high-consumption narratives helps shift cultural values toward sustainability and reduces the allure of sustainable lifestyles.

ANNEX 3

DETAILED METHODS SUMMARY

1. Literature review

Rebound effects associated with sustainable lifestyle transitions were identified and analysed via a systematic review of the scientific literature. The primary aim was to explore how changes in mobility, housing, nutrition, and leisure activities can trigger unintended consequences that offset their environmental benefits.

The literature review began with a systematic search of the SCOPUS database, supplemented by secondary methods such as reference chaining (also known as "breadcrumbing"). Articles were included if they met specific criteria: published before May 31, 2023, peer-reviewed, and written in English. Additional sources were identified through keyword searches combining "rebound" with specific lifestyle changes (e.g., "carpool" and "rebound effect") and targeted searches on work time reduction. After removing duplicates, the final sample consisted of 131 articles.
Each article was reviewed and coded using NVivo 12, a qualitative analysis tool. Coding was performed to classify findings based on consumption domains, types of rebound mechanisms (economic, psychological, and time-use related), magnitude of rebound effects, and proposed mitigation strategies. The review emphasized the interconnectedness of direct, indirect, and economy-wide rebound effects.

2. Stakeholder workshops

To complement the literature review, a series of stakeholder workshops were conducted in five case countries. These workshops aimed to contextualize the rebound effects identified in the literature and provide a platform for co-creating mitigation strategies. Participants included policymakers, researchers, and early adopters of 1.5° lifestyle behaviours.
The workshops were structured around three core objectives: mapping potential rebound effects, evaluating associated risks and ripple effects (both positive and negative), and identifying actionable mitigation strategies. Data from the workshops were systematically documented, including detailed notes and transcripts. Thematic analysis was used to uncover patterns and insights, focusing on how participants perceived and proposed managing rebound effects in their contexts.

3. Analytical framework

The analytical framework adopted in the project integrated multiple perspectives on rebound effects. Economic mechanisms, such as the redistribution of cost savings, were examined alongside psychological factors like moral licensing, where individuals offset one environmentally positive behaviour with another negative one. Time-use rebound effects, a less-explored dimension, were also considered, focusing on how changes in time allocation might lead to increased consumption of high-impact activities. Additionally, the embodied energy and emissions within lifecycle stages of new technologies were analysed as part of the broader rebound framework.

DOMAIN SPECIFIC RESULTS

Mobility: In the domain of mobility, significant rebound effects were observed across various lifestyle changes. Shifting from car ownership to cycling or walking often resulted in rebound effects ranging from 23% to 68%, largely because financial savings were redirected to activities like air travel. Car-sharing services, while reducing the need for personal vehicles, induced indirect rebound effects of up to 135% as participants increased their travel frequency or distances. Teleworking, initially viewed as a low-impact solution, was found to encourage relocations farther from workplaces and increased non-work-related travel.

Housing: Housing-related changes, particularly those involving energy efficiency improvements, demonstrated notable rebound effects. For example, the direct rebound effects of installing insulation or heat pumps ranged from 10% to 30%, with additional embodied energy effects reaching up to 67%. Downsizing living spaces, a sufficiency-based strategy, often led to indirect rebounds as financial savings were reallocated to other carbon-intensive goods and services. Behavioural shifts, such as reducing indoor temperatures, showed relatively lower rebound effects (7%) due to minimal embodied energy impacts. However, the financial benefits of these changes often triggered re-spending, undermining overall sustainability gains.

Nutrition: In the nutrition domain, changes like reducing food waste or shifting to plant-based diets exhibited high variability in rebound effects. Reducing food waste, while impactful, often led to re-spending on higher-quality food or unrelated consumption, resulting in rebound effects ranging from 23% to 77%. Similarly, dietary shifts away from meat showed rebound effects between 25% and 88%, driven by increased consumption of other goods. High-income households tended to exhibit lower rebound effects compared to low-income groups, likely due to differences in spending patterns.

Leisure: In leisure activities, positive impacts such as reduced emissions from shared accommodation services (e.g., Airbnb) were often offset by increased travel. Peer-to-peer home sharing reduced the carbon footprint of accommodations but contributed to a 2% net increase in overall travel and tourism. These findings underscore the complex interplay between sustainable practices in leisure and their unintended consequences.

FURTHER READINGS

Richter, J.L. et al. (2024) "1.5° lifestyle changes: Exploring consequences for individuals and households." Sustainable Production and Consumption, 50, 511-525. https://doi.org/10.1016/j.spc.2024.07.018.

Richter, J.L. et al. (2023) "Rebound and Risks Summary Report" EU 1.5° LIFESTYLES (Policies and tools for mainstreaming 1.5° Lifestyles) - Deliverable D4.2. https://onepointfivelifestyles.eu/sites/default/files/attachment/2024-01/EU%201.5%20lifestyles_Deliverable%204.2%20final.pdf

ABOUT US:

The EU 1.5 LIFESTYLES consortium includes ten research partners (universities, research institutes, enterprises and NGOs) from **Germany, Finland, Hungary, Latvia, Netherlands, Spain and Sweden.**

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You can also contact us at **info@onepointlifestyles.eu**