



Fundamental decarbonisation
through sufficiency by lifestyle changes

Working Paper with Recommendations

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Fundamental decarbonisation through sufficiency by lifestyle changes








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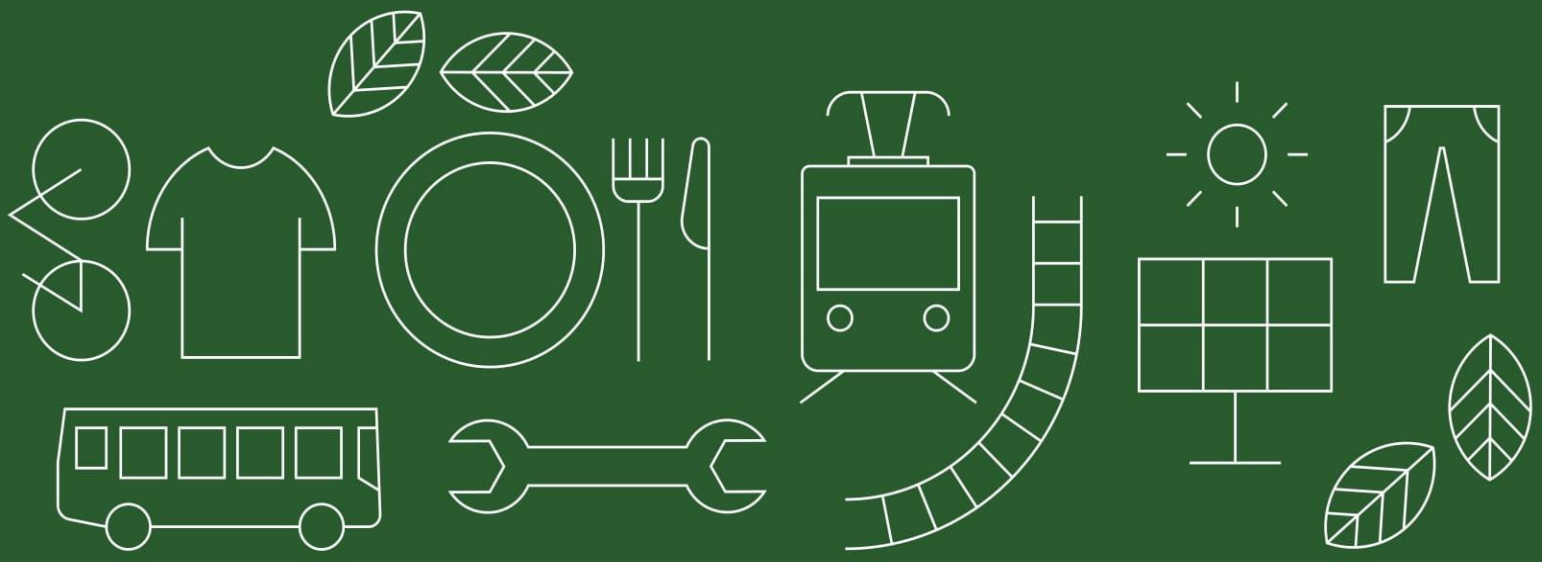
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List of Abbreviations

| | |
|--------------|-------------------------------------|
| EU | European Union |
| NDC | Nationally Determined Contributions |
| SSH | Social Sciences and Humanities |
| NECPs | National Energy and Climate Plans |
| WP | Work Package |
| T | Task |

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Abstract / Summary

This working paper synthesizes policy recommendations derived from extensive research conducted across Work Packages (WP) 2-6 of the FULFILL project, integrating insights from citizen engagement exercises and policy workshops. The recommendations aim to facilitate the scaling-up of low-carbon practices while addressing barriers encountered at the local level. Key recommendations emphasize the need for inclusive decision-making mechanisms, infrastructural support, and targeted interventions to democratize sufficiency policymaking processes and make low-carbon behavior attractive and accessible to all. Additionally, the paper advocates for a comprehensive policy design approach that prioritizes human well-being, extends sufficiency policies beyond the energy sector, and leverages co-benefits across various domains. By promoting a multi-sectoral, inclusive, and democratic approach to policymaking, the recommendations seek to place sufficiency at the heart of European, national, and local policies. Through dissemination via a policy brief and infographic, essential insights of this paper will be provided to decision-makers to support effective communication and implementation of the recommendations.



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Introduction and Overview

Purpose of this Document

The purpose of this document is to consolidate policy recommendations derived from research findings under Work Packages (WP) 2-6., integrating the outcomes of the citizen engagement exercise (task 7.1), as well as the discussions from three policy workshops (task 7.2). These recommendations aim to facilitate the scaling-up and duplication of low-carbon practices while addressing barriers encountered at the local level.

The document will outline various measures, including legislative proposals, suggestions for political framing and policy design, and best practices, to contribute to a comprehensive policy framework centred around sufficiency. The primary audience for these recommendations includes EU, national, and local policymakers, with some measures also applicable to non-EU countries.

Additionally, key messages extracted from the recommendations will be published in a short version policy brief and an infographic (D.7.3). The policy brief will provide essential insights to decision-makers, while the infographic will support communication activities, particularly on social media. On top of that, Deliverable 5.4 will further expand on the recommendations made in this report.

Project Summary

The project FULFILL takes up the concept of sufficiency to study the contribution of lifestyle changes and citizen engagement in decarbonising Europe and fulfilling the goals of the Paris Agreement. FULFILL understands the sufficiency principle as creating the social, infrastructural, and regulatory conditions for changing individual and collective lifestyles in a way that reduces energy demand and greenhouse gas emissions to an extent that they are within planetary boundaries, and simultaneously contributes to societal well-being. The choice of the sufficiency principle is justified by the increasing discussion around it underlining it as a potentially powerful opportunity to actually achieve progress in climate change mitigation. Furthermore, it enables us to go beyond strategies that focus on single behaviours or certain domains and instead to look into lifestyles in the socio-technical transition as a whole. The critical and systemic application of the sufficiency principle to lifestyle changes and the assessment of its potential contributions to decarbonisation as well as its further intended or unintended consequences are therefore at the heart of this project. The sufficiency principle and sufficient lifestyles lie at the heart of FULFILL, and thus constitute the guiding principle of all work packages and deliverables.

Project Aim and Objectives

To achieve this overarching project aim, FULFILL has the following objectives:

- Characterise the concept of lifestyle change based on the current literature and extend this characterisation by combining it with the sufficiency concept.
- Develop a measurable and quantifiable definition of sufficiency to make it applicable as a concept to study lifestyle changes in relation to decarbonisation strategies.
- Generate a multidisciplinary systemic research approach that integrates micro-, meso-, and macro-level perspectives on lifestyle changes building on latest achievements from research into social science and humanities (SSH), i.e. psychological, sociological, economic, and political sciences, for the empirical work as well as Prospective Studies, i.e. techno-economic energy and climate research.
- Study lifestyle change mechanisms empirically through SSH research methods on the micro- (individual, household) and the meso-level (community, municipal):
 - achieve an in-depth analysis of existing and potential sufficiency lifestyles, their intended and unintended consequences (incl. rebound and spillover effects), enablers and barriers



(incl. incentives and existing structures) as well as impacts (incl. on health and gender) on the micro level across diverse cultural, political, and economic conditions in Europe and in comparison to India as a country with a wide range of economic conditions and lifestyles, an history which encompasses simple-living movements, and a large potential growth of emissions.

- assess the dynamics of lifestyle change mechanisms towards sufficiency on the meso-level by looking into current activities of municipalities, selected intentional communities and initiatives as well as analysing their level of success and persisting limitations in contributing to decarbonisation.
- Integrate the findings from the micro and meso-level into a macro, i.e. national and European, level assessment of the systemic implications of sufficiency lifestyles and explore potential pathways for the further diffusion of promising sufficiency lifestyles.
- Implement a qualitative and quantitative assessment of the systemic impact of sufficiency lifestyles which in addition to a contribution to decarbonisation and economic impacts includes the analysis of further intended and unintended consequences (incl. rebound and spillover effects), enablers and barriers (incl. incentives and existing structures) as well as impacts (incl. on health and gender).
- Combine the research findings with citizen science activities to develop sound and valid policy recommendations contributing to the development of promising pathways towards lifestyle
- Generate findings that are relevant to the preparation of countries' and the EU's next NDCs and NDC updates to be submitted in 2025 and validate and disseminate these findings to the relevant stakeholders and institutions for exploitation.
- Consider the relevance and potential impacts of sufficiency lifestyles beyond the EU.



1. Introduction

This working paper presents policy recommendations derived from the comprehensive research conducted throughout the FULFILL project, notably work packages (WP) 2-6., integrating the outcomes of the citizen engagement exercise (task 7.1), as well as the discussions from three policy workshops (task 7.2). These recommendations aim to facilitate the scaling-up and duplication of low-carbon practices while addressing barriers encountered at the local level.

To give a brief overview of what this paper builds on, in Work Package 2, the foundation of the project has been established through an extensive literature review on sufficiency and the definition of indicators for sufficiency. WP3 aimed to understand sufficiency lifestyles at the individual level using a mixed-method approach, including longitudinal surveys and interviews. Conducted across five European countries and India, the study sought to uncover the prevalence of sufficiency-oriented lifestyles and identify factors influencing their adoption. Work Package 4 extended this analysis to the meso level, investigating local sufficiency initiatives, their relation to the multi-level governance of the European Union and in particular municipalities as well as their multiple effects. Meanwhile, Work Package 5 delved into sufficiency at the macro level, exploring the national and European policy framework. This part of the project focused on sufficiency's upscaling potential, and the analysis of structural variables and conditions behind the diffusion of sufficient lifestyles. Work Package 6, which is still ongoing at the time of writing, evaluates the impacts of sufficiency lifestyles on climate, economy, and society through macroeconomic models, aiming to determine the potential effects of adopting sufficiency lifestyles across Europe.

On top of these research findings, the recommendations laid out in this working paper also draw upon the discussions and recommendations generated during citizen engagement exercises and policy workshops conducted as part of work package 7. The citizen engagement exercise consisted of three participatory workshops with European citizens, as well as interactions on social media and through a dedicated section on the project website. The policy workshops gathered stakeholders from various policymaking and stakeholder organizations, including EU and non-EU institutions, citizens' organizations, local initiatives, experts on related topics, researchers, members of think-tanks and academia. The first and second policy workshops were held in person in Brussels and Berlin with local and European stakeholders. The third workshop took place online, targeting stakeholders from non-EU countries to discuss research findings and reflect upon ways to implement sufficiency beyond the EU.

In the following sections, we will synthesize the inputs from WP2-6, integrating the outcomes of the citizen engagement exercise (task 7.1), as well as the discussions from three policy workshops (task 7.2), to formulate policy recommendations that can contribute to a comprehensive policy framework centred around sufficiency. These recommendations will encompass legislative proposals, political framing and policy design suggestions, as well as best practices to be shared. Our aim is to address the complex challenges of sustainability and societal well-being by promoting a multi-sectoral, inclusive, democratic approach, putting sufficiency at the heart of European, national and local policies.

Following this introduction, the working paper will be structured as follows: Chapter 2, "Sufficiency beyond individual lifestyle change," will establish the need for sufficiency policies, infrastructures, and societal frameworks, and call for making sufficiency easy, accessible and attractive. It further reveals the democratic potential of sufficiency exploring why it is likely that sufficiency policies are met with high approval rates by citizens. Chapter 3, will outline recommendations on sufficiency policy design, emphasizing the key role of identification (3.1), and the need to place the human factor at the centre when developing sufficiency policies (3.2). It will further recommend designing sufficiency policies based on quantitative and qualitative policy evaluations (3.3). Chapter 4, "Sufficiency beyond energy policy," will explore the potential of sufficiency policies to be included in various sectors other than energy demand management, highlighting the focus on multiple benefits of sufficiency (4.2). Chapter 5 gives an overview of the different levels of action. First, the international dimension of sufficiency is discussed (5.1 and 5.2), then, recommendations for sufficiency at the meso level are given (5.3), and finally, concrete examples of existing practices are shared to make sufficiency policies tangible (5.4). Finally, the conclusion (Chapter 6) will summarize the main findings and recommendations presented





in the paper, providing a multi-dimensional approach to sufficiency policymaking that prioritizes democratic processes, multi-sectoral collaboration, and inclusive strategies for sustainability and societal well-being.



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2. The sufficiency concept: beyond individual lifestyle change

FULFILL understands the sufficiency principle as **creating the social, infrastructural, and regulatory conditions for changing individual and collective lifestyles in a way that reduces energy demand and greenhouse gas emissions to an extent that they remain within planetary boundaries, and simultaneously contributes to societal well-being**. In line with social practice theory, this definition assumes that the actions and choices of individuals are shaped by infrastructures, institutions, social norms and resource availability (Welch, 2016). Consequently, to enable sustainable lifestyle changes, supportive social structures, enabling infrastructures, and regulatory frameworks that foster sufficiency are needed. In alignment with Sahakian and Wilhite's taxonomy (2014), the project distinguishes between sufficiency habits (sufficiency measures taken by individuals due to permanent lifestyle changes), which are influenced by sufficiency infrastructures (physical and non-physical supports for sufficiency habits), and sufficiency societal frameworks (institutions, laws, and norms that facilitate sufficiency habits) (Pagliano et al., 2022). Throughout the FULFILL work packages, results have confirmed that sufficiency goes beyond individual lifestyle changes and is a political matter of concern to the public. This includes the work on the definition of the sufficiency concept in WP2 and as well as the investigation of sufficiency lifestyles and initiatives in WP3, 4 and 5, which has shown how individual consumption behaviours are conditioned by collective facets.

In the current framework of unsustainable growth ingrained within our societal systems (Asara et al., 2015), energy wastage is structurally encouraged across different contexts (Kuss and Nicholas, 2022). To illustrate, rail remains more expensive than air for many journeys, city infrastructures often favour cars over other forms of transport and plant-based options are less readily available than meat-based meals in public canteens. Besides these factors incentivizing high-carbon behaviour, individuals may lack options for transitioning away from carbon-intensive practices, such as relying on diesel or petrol vehicles for work and daily life in the absence of attractive and affordable public transport. Research from work packages 3 and 7 confirms that within current structures, sufficiency lifestyles are unaffordable for many people as they require time and financial resources (Flipo & Rabourdin, 2023; Barbas & Breucker, 2024). Quantitative research conducted around the carbon footprint calculator further shows that achieving low-carbon lifestyles without the necessary resources is possible, yet unlike sufficiency it often implies low levels of well-being and is not a chosen lifestyle but stems from deprivation for significant shares of people (Alexander-Haw et al., 2023).

The fact that high-wellbeing, low-carbon-footprint lifestyles are currently not accessible to all is not only highly inefficient for climate change mitigation but also problematic from a social justice perspective. According to the literature review conducted in WP2, individual carbon footprints show a significant correlation with income and carbon inequalities persist between countries as well as individuals within countries. In the EU, the average carbon footprint per person for the top 1% wealthiest was 43 tCO₂, against only 4 tCO₂ for the bottom 50%. The richest 10% of Europeans are responsible for over a quarter (27%) of EU emissions (Ivanova & Wood, 2020). For sufficiency policies to be effective from both a climate and social justice standpoint, their primary focus should be on curbing overconsumption reducing emissions from the biggest consumers such as major corporations, and the wealthiest households. This can be especially effective since individuals with high-emission lifestyles are not only major contributors to climate change but also possess the greatest financial means to lower their emissions by choosing alternative ways of life (Flipo & Rabourdin, 2023). For example, air travel is a high-emission activity which is predominantly engaged in by high-income individuals, yet it is not adequately addressed by current policies (Defard, 2022). This indicates the necessity for policy tools that address resource redistribution (Spangenberg, 2014), such as implementing progressive pricing structures tied to consumption levels through specifically tailored tariffs or carbon pricing (Okushima, 2024). Task 5.3 (T5.3) investigates the potential impact of a frequent flyer



levy (Gabert et al., 2024). Similar tariffs have been investigated in T5.2 and discussed with international stakeholders during one of the policy workshops conducted in WP7. For example, in India, electricity is provided for free for households who limit their consumption to stay under a certain threshold. Such a system incentivises energy saving behaviour and gives households the chance to cover their basic electricity needs for free, thus avoiding energy poverty. Further, the citizen science workshops have confirmed previous research that acceptance of climate policies is enhanced if it is perceived to be socially just (Barbas & Breucker, 2024; Dechezleprêtre et al., 2022). However, unprepared publics tend to react negatively to policy measures strongly enforcing sufficiency (Alexander-Haw et al. 2024) which points to the need of societal debates prior to the implementation of such policies.

Sufficiency policies and supportive infrastructures possess the capability to promote sufficiency as a mainstream concept, instating a lifestyle that is both low-carbon and promotes high well-being as the norm and easily accessible option for everyone (Lage, 2022; Verfuërth et al., 2019). Enabling infrastructures such as bike paths and regulation that incentivizes low carbon lifestyles instead of wasteful energy consumption are required to ensure sufficiency lifestyles don't remain a niche development but can be broadly adopted and are accessible to all. Qualitative interviews led at the micro level in WP3 identified policies as a key condition for the adoption of sufficiency lifestyles (Flipo & Rabourdin, 2023,). T5.2 further highlighted the importance of a coherent policy mix and appropriate financing of sufficiency policy instruments, to avoid conflicting or inconsistent policies such as sufficiency policy combined with tax reductions for non-sufficient behaviour (Breucker & Defard, 2023). T5.1 has further shown that the dissemination of sufficiency lifestyles to larger shares of the population calls for organised action on identified drivers, enablers, and barriers (Flipo et al., 2023). In the following, two 'collective' drivers are laid out, which policies should better apprehend to make sufficiency easy, accessible, and attractive: the offer of infrastructures, and the role of supply-side stakeholders. 2.2 will then dive into citizens role in sufficiency policy, building on our participatory citizen science research conducted in T7.1.

2.1 Making sufficiency easy, accessible and attractive

Offer of infrastructures

Mobility sufficiency scenarios assumptions used in T5.3 provided relevant insights on the lock-in or multiplier effect that the absence or presence of adequate infrastructures have on the adoption of sufficiency lifestyles. For example, investigating biking scenarios, trajectories showed a multiplier effect for biking associated with the development and improvement of bike infrastructure (Gabert et al., 2024). This is in line with findings from WP4, T5.2 and the citizen and stakeholder workshops conducted in WP7, which all confirm the availability of safe bike infrastructure as an important enabler for this sufficient mode of transport (Breucker & Farfaglia, 2023; Breucker & Defard, 2023; Barbas & Breucker, 2024). It follows that **long-term policies supporting and planning the development of sufficiency-related infrastructures are key to the massification of sufficiency lifestyles**. Further examples illustrating this include affordable and efficient rail links and night trains which have been shown to enable more people to switch from planes to trains (Gabert et al., 2024). The importance of more affordable rail options has also been confirmed by WP7's citizen and stakeholder engagement exercises (Barbas & Breucker, 2024).

Targeting supply side stakeholders beyond individuals

Policy work achieved in T5.3 showed the importance of policy targets identification. In this regard, the analysis of existing policy schemes showed a lack of consideration for supply-side stakeholders even though they frequently condition the choices of individual consumers. The car sizing scenario assumption provides a good example: looking into market shares and dynamics in the EU, it becomes evident that companies have an influential role in the definition of the size of cars that circulate on the market. Upstream, car manufacturers have developed a profit model based on the ever-increasing size



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of vehicles, sold at a higher price, and delivering higher margins (Meihlan, 2019). Mid-stream, companies represent major buyers on the new car market, with use ranging from private car fleets to leasing activities. They have a key role in structuring both new and secondary car markets, as their consumption choices will condition the offer on the secondary market for individuals. Knowing that 80% of individuals buy their cars on the secondary market (T&E, 2023) we see that car sizing policies should mainly target companies.

The same applies to multiple further sufficiency scenario assumptions considered in the FULFILL project: in the evolution of diets, agrobusiness has a key role in orienting consumption choices and products. Further, looking at ways to increase the sharing of products, real estate developers were identified as an important driver to provide collective laundry facilities in new buildings (Gabert et al., 2024). Similarly, considering the sharing of spaces in housing has led to the recognition of architects and real estate developers as stakeholders who can provide structural flexibility in building design and layout. This includes features such as adaptable floor plans, flexible room sizes and layouts, and the creation of multiple usable rooms or areas. Such flexibility enables individuals to tailor their housing to their changing needs over time, such as reducing floor space when children leave home.

2.2 Democratic approaches to sufficiency

It is crucial for citizens to have the opportunity to meaningfully influence decision-making processes, when it comes to decisions on a public good, such as environmental resources (Hernández Guzmán & Hernández García de Velazco, 2024). In Europe, citizens participation in decisions about the environment are a legal right which has been established in 1998 by the Aarhus Convention (European Environmental Agency, 2021). In FULFILL, work packages 5 and 7 confirm the importance of meaningful participation of citizens and all involved stakeholders for sufficiency (Breucker & Defard, 2023; Barbas & Breucker, 2024). In the surveys on sufficiency policies in WP3 (T3.3), participants voiced the preference to involve citizens into policy design (Alexander-Haw et al., 2024). A democratic approach to sufficiency thus requires meaningful citizen participation.

To look at the bigger picture, citizen participation plays a crucial role in guaranteeing the success, sustainability, and social acceptance of the energy transition. By actively involving citizens in the process, policymakers and energy stakeholders can leverage local knowledge, stimulate innovation, and foster trust, thus facilitating a more comprehensive and efficient transition (Wahlund and Palm, 2022). While EU climate policy enjoys significant public support (European Commission, 2023), it is still susceptible to challenges related to legitimacy, particularly concerning transparency and inclusivity in decision-making processes (Von Homeyer, 2021). These challenges must be addressed more effectively to ensure widespread agreement on the path forward. Participatory approaches hold promise in further exploring environmentally friendly policy frameworks that are socially acceptable. When implemented correctly, such approaches can enhance the democratic nature of EU decision-making processes and outcomes (Cengiz, 2023), serving as a valuable complement to representative democracy (Franco-German Working Group on EU Institutional Reform, 2023).

Indeed, citizen assemblies and panels are increasingly utilized by the European Commission, involving randomly selected citizens in discussions on various issues to inform European policy processes (Rosa, 2023). **When given the opportunity to express their views, citizens consistently advocate for more sufficiency policies.** For example, a citizen's panel representative of the EU population organized by the European Commission in 2024 included various sufficiency measures in their final recommendations despite the focus of the panel being energy efficiency (European Citizens' Panel on Energy Efficiency, 2024). In line with that, a comparison between European citizen assemblies and National Energy and Climate Plans (NECPs) reveals that citizen assembly recommendations contain a significantly higher proportion of sufficiency policies (three to six times more), with a stronger emphasis on regulatory measures compared to NECPs. 39% of the mitigation policies brought forward by citizens are sufficiency measures. Consequently, it seems that the current underutilization of sufficiency as a decarbonization tool is not attributable to a deficiency in public legitimacy or acceptance. Instead, it reflects hesitance in the implementation of sufficiency policies, the structure of the policy-making process, and competing interests. These findings indicate that there is citizen-driven demand



for increased sufficiency policies and a regulatory shift in climate mitigation strategies (Lage et al., 2023).

The participatory exercises conducted as part of work package 7, confirm both the potential of sufficiency as a fruitful subject for citizen engagement as well as citizens' readiness for sufficiency policies. Citizens' openness to embracing binding regulations, prohibitions, and financial tools aimed at discouraging high-carbon lifestyles was evident. For instance, citizens expressed strong support for policy proposals such as prohibiting short-haul flights and implementing financial disincentives for luxury items like second homes (Barbas & Breucker, 2024). This indicates that even sufficiency measures that seem restrictive can garner acceptance from citizens when they are viewed as socially equitable, aligning with prior research findings (Dechezleprêtre et al., 2022).

Strengthening democracy is essential for establishing a sustainable society. This also means reducing the impact of business interests and restricting overconsumption to cease favouring the preferences of a privileged few who benefit disproportionately from exploiting common resources (Spangenberg, 2014). For example, in T5.2, big agricultural lobbies and industrial pressure groups including meat product processors, meat-packaging companies and petrochemical companies have been identified as influential and wealthy players with an interest to averting sufficiency policies that reduce animal product consumption despite their potential benefit for both people's and planetary health (Breucker & Defard, 2023). Since sufficiency aims to diminish overall resource consumption while ensuring everyone's well-being, it is directly concerned with questions regarding the fair distribution of limited common environmental resources, which call for a democratic approach that upholds principles of fairness and equity, as well as protecting the most vulnerable. In that regard, restricting overconsumption should not be viewed as a constraint on individual autonomy, but rather as an essential safeguard for collective freedom regarding the public good that is ecosystem health (Eckersley, 2006).



3. Policy Design: Identification is key

The work on sufficiency policies achieved throughout different work packages has shown the importance of understanding the who / what / how and when at play in sufficiency lifestyles, to build adequate policy schemes and programmes.

3.1 Who?

Identifying key stakeholders and understanding the role they play is key to ensure impactful sufficiency policy schemes. Section 2.1 introduced that supply-side actors often condition individual changes and need to be apprehended as a key target for sufficiency policies. On a micro level, understanding the “who” also means having a good overview of the organisational and decision-making processes at play in the implementation of sufficiency actions. In companies, public and local administrations, or even households, organisational aspects are key in the implementation of sufficiency plans. When building sufficiency policies or programmes, a good understanding of who decides, who informs, who supports, who trains, who implements, who evaluates, who communicates etc. is needed (ACTEE, 2023). The comparative analysis of sufficiency policies across five European countries conducted in T5.2 has shown the importance of stakeholder involvement for the successful implementation of sufficiency policies. This includes engaging municipalities and cities early on in the policy implementation process as well as involving citizens, civil society organisations and businesses in the process (Breucker & Defard, 2023).

3.2 What?

Qualitative and quantitative ex-post assessments as well as scenarios modelling the environmental and social potential of sufficiency measures can be important tools to guide decision makers in the process of implementing sufficiency measures (Breucker & Defard, 2023). The challenge in developing sufficiency policies is to identify and prioritise the actions that should be targeted. Qualitative interviews conducted in WP3 show that sufficiency is still not well understood across the countries studied and remains quite conceptual and theoretical (Flipo et al., 2023). The case of France is a good illustration: with the energy crisis in 2022, the government asked local authorities to develop sufficiency plans at their level, but they often lacked methodology and qualitative information to define which actions to prioritise (Plan bâtiment durable et al., 2023). For example, many local authorities lacked data (and thus, information) on their building stock (energy consumption, type of heating system, uses of the building (offices/ sport facility/ school etc.), management operator, building renovations planned or recently achieved etc.) to be able to decide which actions to implement to reduce energy consumption of their building park. The accounting data collected from energy bills did not allow an adequate analysis per building (sometimes buildings were grouped under the same contract), and so it was difficult to exploit this data or aggregate it with other types of energy data (ACTEE, 2023). In line with that, a post evaluation of the implementation of sufficiency plans conducted by the national federation of local authorities FNCCR underlined the importance of data collection and exploitation (ACTEE, 2023).

On top of that, FULFILL results confirm the necessity to develop transparent methodologies and indicators for the social evaluation of sufficiency policies, and more largely of energy and climate policies. T3.2 and T5.1 findings underscore that the social justice dimension of sufficiency frequently remains aspirational within energy and climate policies, rather than being subjected to systematic evaluation as it should (Flipo et al., 2023, Flipo & Rabourdin, 2023). The proposition formulated below in part 3.3 to implement feedback working groups for sufficiency plans could be a first step (Alexander-Haw et al., 2023).

On a micro level, the same conclusion can apply to citizens who feel in need of information on what to do and how to reduce their energy consumptions. Data collecting programs such as the one implemented by the Ademe and Enertech allowed citizens to measure the consumption of their different appliances and thus identified the most energy consuming ones, which enabled them to consequently plan sufficiency actions (Andreau et al., 2022).



Quantifying the impact of sufficiency measures

Making the potential environmental, economic and social impact of various sufficiency measures explicit is important to make them more attractive to policy makers, who often work with quantifiable goals, such as carbon budgets. In FULFILL, work package 6 is dedicated to quantifying the impact of 6 concrete measures on energy consumption, emissions and the economy. This is done by using reference scenarios, sufficiency scenario assumptions studied in T5.3 and input / output analysis considering the single EU countries and beyond. The results are - at the moment of elaboration of the present report - not yet available but will be published in the coming months. Some considerations can already be shared:

- Sufficiency measures aim at lifestyle changes. Although these might be considered to be easily achieved, in many cases their implementation is slower as changes in technological applications. Since sufficiency measures are anticipated to yield significant environmental and social benefits, their successful implementation requires public discussions on the lifestyle changes to be made.
- The development trends over the last years need to be taken into account when quantifying the potential impact of sufficiency measures as well as a reflection on what can be expected for the years to come. In specific countries and sectors behaviour has developed towards less water, land and energy consumption for several years: e.g. the meat consumption per capita in Italy and Germany has reduced from 90 kg/person year towards 70 kg/person year between 2010 and 2020 (Food and Agriculture Organization of the United Nations, 2021). In other sectors and countries, there has been an increase of fossil fuel consumption and emissions: e.g. the number of flights per person and year increased in Latvia from 2 to 4 and in Denmark from 4 to 6 within 2010 and 2020 (Eurostat, 2024).
- The likelihood of success of implementing specific measures needs to be considered for the quantification exercise conducted in WP6. One measure considered within the Fulfill project are smaller cars in order to reduce the need of space, material and the emissions/energy consumption for driving. The analysis of car sales per segment on EU level reveals that the trend points in the opposite direction at the moment: sports car sales increased in every single country in the time frame from 2014 until 2022, the amount of increase varying from 70% to over 1000%. SUVs developed from stable to an increase of 280%. Small car sales developed from -60% to +80% in the same time frame (Statista, 2024).
- Historical trends, distributions over single EU countries, and potential impact of different measures vary greatly across sectors. Policy makers might want to identify those sectors, where relevant output (energy decrease, emissions decrease) can be achieved with minimal input (communication, incentives, rules), possibly connected to additional social benefits (wellbeing, safety, ...).

3.3 How?

Because sufficiency is still perceived as theoretical, sufficiency policies should pay more attention to implementation conditions. Sufficiency measures should be supported by detailed methodologies on the “how”, for example publishing check lists on different actions (on heating, ventilation, air conditioning, products etc.), for each category of stakeholders, (e.g. local authorities, building managers households etc.). These methodological tables, checklists, know-how tools, could be regularly discussed with feedback groups, so as to support experience and knowledge sharing between peers (ACTEE, 2023). Such feedback processes could also support regular updates and adaptation of policy schemes, with a learning-by-doing approach. This is in line with the findings from T5.2 that emphasize the importance of both successful piloting as well as early and ongoing stakeholder involvement for successful implementation of sufficiency policies (Breucker & Defard, 2023).



Placing the Human Factor at the Center

FULFILL results show that the human factor needs to be further considered when designing sufficiency policies. Psychological approaches adopted in WP3 and T5.1 showed that sufficiency requires major changes in human behaviour, but also profound changes in organisations. Changing these practices requires going through different stages of change: from pre-intention (individual not concerned by the subject) to intention (individual concerned but inactive), from preparation for action (individual planning the action) to the implementation of action, with persistence or relapse (Flipo & Rabourdin, 2023; Flipo et al., 2023). These results teach us that each passage from one stage to the next calls for different tools, messages, and actions.

Group category studies conducted in WP3 also showed that not all individuals have the same perception of the issue at stake nor the same motivation behind engaging in sufficiency actions (Flipo & Rabourdin, 2023). Looking at existing policy schemes in T5.2 and T5.3, it seems regrettable that individuals are often left out of energy saving or sufficiency incentives and programs (Gabert et al., 2024). This can result in counterproductive effects such as stifling, rejection and resistance, undermining the efficiency of the scheme.

Individuals, in their role as consumers or professionals, should also be involved more proactively in the elaboration of sufficiency plans. An interesting example comes from the city of Grenoble in France (Ville de Grenoble, March 2023). The city's sufficiency plan was built from the start with the participation of employees, so as to understand and listen to their needs, motivations and actions proposals. An important information campaign, as well as continuous support (training sessions, measurement campaign, feedback questionnaires etc.), was implemented and facilitated the adoption of lifestyle changes in the different administrations (Ville de Grenoble, March 2023).

Results from WP3 and 5 also show that policies should better consider societal frameworks at play (Flipo & Rabourdin, 2023, Gabert et al., 2024). Gender seems to be a constant variable in all WPs yet remains poorly understood nor considered in policy schemes' designs. Micro, meso and macro-level analyses showed a tendency for women to adopt more sufficient lifestyles than men. Field evaluations are also striking: the assessment of Grenoble's sufficiency plan in France showed that female employees were much more proactive and involved in the elaboration and implementation of the sufficiency plan (Fristot, 2023). However, the city was not able to provide explanations as to why and did not investigate the topic further. It is also a key limit that we have identified throughout the project and in the literature review, that gender-based narratives or societal frameworks are poorly explored and analysed. Regarding policies, this variable is mostly left out (if we look at national and local sufficiency plans in France, this variable has not been investigated).

3.4 When?

Exploring policy narratives that support the modelling of sufficiency trajectories has revealed the need to incorporate policies with different time horizons. Sufficiency has to be sustained by both short- and long-term policies and these actions need to be well coordinated. Combining different time horizons policies also facilitates the understanding and thus the political acceptance and support for progressive change from citizens. Understanding the political direction (climate or energy targets) and the association of progressive measures is necessary to take citizens on board towards sufficient lifestyle changes.

The French example is interesting in this sense: a pool of short-term measures have been implemented in the national sufficiency plan as a way to quickly react to the energy crisis in 2022. They had to be articulated with existing 'long-term' programs such as building renovation programs (how to make sure that quick savings do not block coherent efficiency gains later) (Plan bâtiment durable et al., 2023). The example of car sizing also showed an interaction of different time horizons between actions at EU level, national and local level. The mobilisation of different policy scales and time can induce a 'multiplier effect' to targeted consumers. It also allows to investigate different policy tools such as market regulation (market access, targeting the supply-side), national market rules, fiscal incentives at both national and local levels, parking rates, etc. (Gabert et al., 2024).



4. Sufficiency beyond energy policy

One of the strengths of the sufficiency concept, lies in the potential of sufficiency policy to bring about positive change in various fields not only in the field of energy demand reduction. At EU level, besides rendering reaching the EU's climate goals more cost-effectively and increasingly likely, sufficiency holds the potential to decrease the EU's energy and other critical resource dependencies. By decreasing demand and employing resources prudently within its borders, Europe can diminish its reliance on essential imports, minimize susceptibility to shortages, and enhance resilience against shocks. Sufficiency can further reduce energy system costs as it avoids unnecessary investments in infrastructures and wasteful resource consumption. In various modelling exercises featuring multiple scenarios, the ones with the most ambitious sufficiency assumptions demonstrated the lowest total energy system costs (European Environmental Bureau (EEB) et al., 2024).

On top of that, the dual focus of sufficiency on reducing resource use while increasing well-being for all, makes sufficiency a powerful lever to address further societal challenges such as rising levels of inequality, loneliness and improve people's health and well-being. **Based on the FULFILL research we recommend making use of these narratives that go beyond energy to advocate for sufficiency on all levels (EU, national, municipal, individual).** In the following, we give concrete examples of how sufficiency policies could look like beyond the energy sector (4.1), before zooming in on sufficiency's potential to provide well-being for all (4.2).

4.1 Sufficiency policy beyond the energy sector

Investigating key policies and narratives at play in each sufficiency scenario assumption considered in T5.3 showed deep interconnexions between the investigated sufficiency scenario assumptions as well as with other environmental, health, social, and industrial policies. A critical recommendation arises from this analysis: **sufficiency policies should not be developed in isolation; instead, they should actively explore and incorporate influential connections with other sectoral policies.** Findings from T5.1 indicated that narratives beyond energy often have a more significant impact or serve as stronger motivators for adopting sufficient lifestyle changes (Flipo et al., 2023).

Each of the eight sufficiency scenario assumptions investigated in T5.3 demonstrated that the adoption of targeted lifestyle changes could be achieved through policies beyond climate and energy policy, emphasizing the potential of sufficiency policies to be included across sectors (Gabert et al., 2024):

- Reducing car sizes could be approached through road safety, industry development, health policies, geopolitical issues, fiscal and budget policies, urban policies etc.
- Incentivising more climate friendly diets could be considered through health policies, agricultural production and economic models, social policies (access to healthy diets), animal welfare etc.
- Incentives to share space could also be achieved through social policies (fighting social isolation, services to elderly, cost of housing, etc.)
- Modal shift to soft transport modes such as biking can also come across a diverse range of policies beyond climate: urban planning, road safety, health policies, environmental policies (noise pollution) etc.
- Working time reduction policies were connected to all other policies implemented in the seven other sufficiency scenario assumptions. This connexion is necessary to control rebound effect, direct what consumers do with the additional free time, or to reduce gender and social inequalities in the mobilisation of work time reductions schemes.

Sufficiency as a Social Policy: Reducing inequalities through sufficiency policies

The concept of energy sufficiency entails multiple policy objectives. Some perceive sufficiency as the sole reduction of energy consumptions, but it is important to remember that sufficiency is also about



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guaranteeing a fair access to what are considered essential or basic energy services (heating, transportation, food etc.). It is pivotal that sufficiency policies convey both aspects in their design. WP3 has shown that energy and social policies are still thought separately when it would be important to use sufficiency policies as a way to reduce inequalities. Results from T5.3 provide interesting illustrations (Gabert et al., 2024):

- The work on moderating the size of cars has shown that car sizing reduction policies could make electric vehicles more affordable for all.
- Sharing spaces or appliances as a way to make housing more affordable.
- Working time reductions as a way to limit gender inequalities and income inequalities.
- Diets as a way to improve production conditions for farmers.

4.2 Well-being for all: focus on multiple benefits of sufficiency

Given sufficiency's dual focus on well-being and the reduction of resource use, sufficiency policies have the potential to facilitate positive change in various fields beyond energy. The citizen and policy workshops conducted in WP7, as well as the comparative analysis of 16 sufficiency policies in 5 EU countries and further analyses on the macro level conducted in WP5 suggest that messages focusing on well-being instead of the environment only can lead to increased motivation to adopt sufficiency habits in individuals (Barbas & Breucker, 2024; Flipo et al., 2023) and reduce reluctance to adopt sufficiency measures by organisations or policy makers (Breucker & Defard, 2023). Benefits for personal health and mental well-being, such as less pollution, decreased loneliness, increased sense of belonging and community, healthier diets as well as more appealing urban environments seemed to be important drivers for sufficiency on both the individual level and the level of sufficiency initiatives investigated in work package 4 (Barbas & Breucker, 2024; Breucker & Farfaglia, 2023). **Sufficiency policies can thus function as lever to address both environmental and societal challenges by reducing health system costs, decreasing loneliness, providing more attractive urban environments, and increasing citizen's physical and mental well-being.**

As by our analyses of current lifestyles conducted in WP3, we find important differences between groups who have a low carbon lifestyle: Those combining it with a high well-being usually also report environmental awareness and are not economically or socially deprived. Some of them also have higher incomes. Another population group with low emissions is, however, characterised by social and economic deprivation including unstable employment. In this group the low carbon lifestyle coincides with low levels of well-being. On top of that, there are gender differences. In general, women are more likely to pursue a low carbon lifestyle. This points once more to the high relevance of the gender dimension in relation to sufficiency and sufficiency policies. It is an important caveat to make sure that sufficiency measures increase well-being and do not put the burden on the deprived or disadvantaged. These burdens could include higher levels of unpaid care work (e.g. time needed for washing and drying or shopping) or mobility restrictions that challenge to pursue the already unstable employment. At the same time, our findings corroborate, that for some it is already possible today to live a low carbon lifestyle without suffering. Country-level analysis pointed to differentiated finding between countries, e.g. correlations with type of dwelling, education, or values (Alexander-Haw et al., 2023).



5. Articulating different scales of action: from the global context to local practices

5.1 Sufficiency as a matter of Global Justice

Hickel (2020) calculates every country's responsibility in generating excessive emissions, namely the emissions that exceed the safe planetary boundary of 350ppm atmospheric CO₂. He finds that the Global North has exceeded its fair share of the carbon budget by 121%, while overall the Global South is still below its fair-share by 12%. Looking beyond GHG emissions, we observe that the ecological debt that the Global North owes to the Global South extends also to other dimensions of biophysical throughput. Hickel et al. (2022) propose a novel method for quantifying national responsibility for ecological breakdown by assessing nations' cumulative material use in excess of equitable and sustainable boundaries. They derived national fair shares of a sustainable resource corridor. These fair shares were then subtracted from countries' actual resource use to determine the extent to which each country has overshoot its fair share over the period 1970–2017. Through this approach, each country's share of responsibility for global excess resource use was calculated. The Global North is responsible for 74% of global excess material use. For instance, in the period between 1990 and 2015, countries of the Global North appropriated 200 billion tons of raw materials, 550 exajoules of energy, and 30 billion hectares of agricultural land through trade flows from the Global South (Dorninger et al., 2021). Overall, high-income countries are responsible for the majority of excess global resource use, with an average material footprint of 28 tons per capita per year—four times over the sustainable level (Bringezu, 2015). Global trade, therefore, allows countries of the Global North to ensure to their citizens a lifestyle that would be unsustainable for their national ecosystems. Hence, instead of speaking of the “Western lifestyle”, Brand and Wissen (2013) suggest that we speak of “imperial lifestyle”. The lifestyle of the majority of citizens of the global North depends on the hoarding of resources that belong to other peoples. The social movement *Accion Ecologica* (1999) defines ecological debt as “the debt accumulated by northern industrial countries towards third world countries on account of resource plundering and use of environmental space to deposit wastes.” In other words, economic growth in the North relies on patterns of colonization: the appropriation of atmospheric commons, and the appropriation of Southern resources and labour. In terms of both emissions and resource use, the global ecological crisis is playing out along colonial lines. Continued growth in the North means rising final energy demand, which will in turn require rising levels of extractivism. Complicating matters further, decarbonization cannot be accomplished fast enough to respect Paris targets as long as energy use in the global North remains so high (Hickel & Kallis, 2020). According to this perspective, sufficiency requires for rich nations to scale down throughput to sustainable levels, reducing aggregate energy use to enable a sufficiently rapid transition to renewables, and reducing aggregate resource use to reverse ecological breakdown. This demand is not just about ecology; rather, it is rooted in anti-colonial principles. Southern countries should be free to organize their resources and labor around meeting human needs rather than around servicing Northern growth (Hickel, 2021).

While in the sufficiency literature global ecological inequalities and neo-colonial dependencies are often taken into account, this is less the case when it comes to the normative prognosis for an alternative society. The key question here is: How could sufficiency be implemented in a way that overcomes global inequalities and does not deepen dependency, while also addressing centuries of colonial and ecological debt on the part of industrialized countries? As argued by Schmelzer & Nowshin (2023), sufficiency in the wealthier world, which would reduce its material impact on the remainder of the planet, is the most effective internationalism, leaving more space for others to live. However, the common argument that sufficiency is a policy approach only ‘for the North’ misses an opportunity to, first, challenge the indisputably global desire for an imperial mode of living, and second, to challenge the growth imperatives imposed on the Global South through, for example, structural adjustment, odious debt, or sanctions on countries that seek another path to development. If we take into account the full implications of how processes of economic growth have fundamentally shaped the entire world—creating the highly unequal distribution of accumulated advantages and disadvantages, of resources,



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access to goods and services, and related environmental repercussions—we propose that sufficiency—in addition to focusing on the social-ecological transformation in the Global North and in close alliance with social movements and allies from the Global South—also develops an explicit engagement with a global justice agenda.

While discussing environmental inequalities at the level of nations has merits given the dynamics of ecologically unequal exchange (Hornborg & Martinez-Alier, 2016), national statistics conceal differences among social classes. Focusing on carbon inequalities, Chancel (2022) finds that inequality between countries has decreased over the last three decades, meaning that the average carbon footprint of developing countries has grown faster than in rich countries since 1990. This is the direct consequence of the rise of the middle class in BRICS countries. However, in the same period, carbon inequalities among social classes have increased, meaning that the gap in the average carbon footprint of a citizen in the top 10 % and one in the bottom 10 % of the global distribution of wealth has widened. In the period 1990-2015, the richest 10 % at the global level (i.e. circa 600 million individuals) cumulatively generated 52 % of emissions, the middle 40% was responsible for 41%, and the poorest 50 % (i.e. circa 3 billion individuals) for just 7 % (Gore, 2020). Currently, the average carbon footprint of an individual belonging to the richest 1 % at the global level can be up to 175 times bigger than the one of an individual belonging to the poorest 10 % (Otto et al., 2019). But even more striking from an environmental justice perspective is the fact that in recent decades the rich have increased their emissions more than the poor have. In the period 1990-2015, the richest 10 % posted emissions growth of 46 %, while the poorest 50 % of just 6 % (Gore, 2020). The dynamics of unequal appropriation of the remaining carbon budget for 1.5 °C previously discussed at the level of nations can be observed also at the level of social classes at the global level. In the period 1990-2015, the richest 10 % appropriated 31 % of the remaining carbon budget, while the middle 40 % appropriated 25 %, and the poorest 50 % only 4 % (Gore, 2020). The exorbitant emission levels of the rich make it also difficult for them to achieve the 2030 climate target proposed by the IPCC (2018) amounting to 2.1 tCO₂/year. The average per capita carbon footprint of the richest 1 % is currently around 35 times higher than the target for 2030 and the one of the richest 10 % is 10 times higher (Gore, 2020). To add insult to injury, the carbon footprint of the global poorest 50% is already today below the 2.1 tCO₂/year target. Thus, when policymakers and commentators state that humanity is far from achieving the necessary carbon emission reductions, it would be wise to specify which social class they are referring to. While wealthy individuals (i.e. the richest 10 % at the global level) make up a higher share of the population of countries in the Global North than of countries in the Global South, it should be borne in mind that a sizable number of them live in the latter. It is estimated (Milanovic, 2016) that half of the richest 10% at the global level live in Europe and North America, while 20 % of them live in India and China. However, if we analyse the richest 1 % at the global level, we discover that 1/3 of them live respectively in North America, China, and in the MENA region (Milanovic, 2016). Hence, there are more super-rich individuals in China than there are in Europe. This consideration makes us better understand that the problem of the carbon footprint of the rich and super-rich is transnational: the data from the above literature show that it is not European citizens as a whole who must reduce their emissions, just as it is not Indian citizens as a whole who must increase their emissions to achieve a decent lifestyle. Rather, it is the rich and the super-rich in every country who appear to be responsible for excessive emissions. Chakravarty & Ramana (2011) conclude therefore that it is time for the rich and super-rich in the Global South to stop "hiding behind their poor". In the pursuit of fair climate policymaking, it would make more sense to overcome the dichotomy between Global North and South—that has often led to an impasse in international climate negotiations—and focus instead on citizens and companies who have a high carbon footprint regardless of the country they live or operate in. In conclusion, a growing literature and data availability suggest that sufficiency strategies must be premised upon the principles of environmental justice and, in doing so, they must take into consideration the various dimensions of environmental inequalities (both among countries and social classes) to ensure the social acceptability of the green transition.

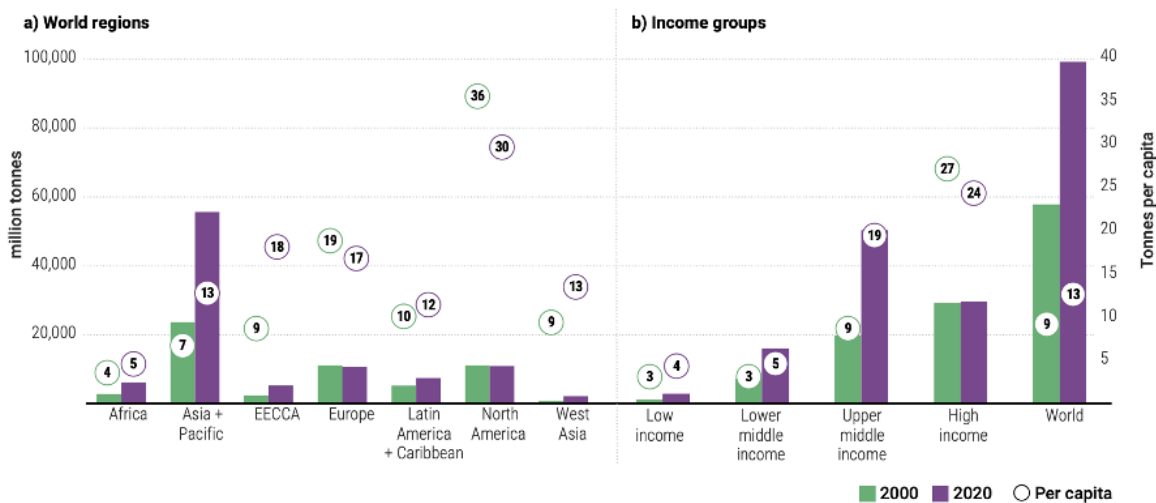


5.2 Sufficiency in growth-oriented systems across the world

Mainstream economic theory and practice is characterized by a remarkable paradox: the more economies became dependent on the exploitation of natural resource, the more they faded out nature as a primary source of productivity (Immler 1985, 1990, 2014). This proliferated “unnatural” system rationalities which established productivity, growth, and expansion as end in itself and thus as indication of economic success. Even though this theoretical construct makes no sense in a physically limited world, it prevailed as a hegemonic dogma of mainstream economic theory repressing notions of sufficiency, human scale or meaning. As the economic growth rationality progressively colonized human life and interactions (Habermas, 1987) it had been contested by various authors (Polanyi 1975, Schumacher 1974, Bahro 1977). Especially the underlying assumption of economic affluence that an accelerated production of a growing amount of goods and services measured by the GDP metric would increase quality of life had been challenged (Fromm, 1976; Illich, 1973) and gave rise to the modern conceptualization of sufficiency (Princen, 2005; Sachs, 1993).

The International Resource Panel (IRP) identifies affluence (expressed as GDP per capita) as the main driver behind the transgression of planetary boundaries. This systemic relationship and how it can be measured is not easy to understand. This is why we will briefly summarize the state of the art in the following.

High resource consumption results in transgressing planetary boundaries, while resource use is driven by the factors: population, affluence, and technology (Ehrlich and Holdren 1971, Holdren 2018, UNEP/IRP 2024). Among these three factors “affluence is the main driver of environmental impacts” (UNEP/IRP 2024, 63). However, affluence is not equivalent to high-income consumption. “In 2000, high-income countries accounted for 51% of the global footprint and upper middle-income countries for 34%. By 2020, these numbers had practically reversed” (UNEP/IRP 2024, 33). It is not only consumption in countries with high per capita incomes that has contributed to unsustainable levels of resource use. The growing affluence and technological development of emerging economies, particularly in the highly populated Asia and Pacific region, has resulted in a material footprint that exceeds that of established industrialized countries with much higher per capita income but smaller populations.



Source: Global Material Flows Database (UNEP 2023a).

Figure 1: Material footprint¹ by (a) seven world regions and (b) income groups, (IRP 2024, p.34)

¹ “The material footprint is a demand-based, rather than a territorially based indicator reflecting the material requirements of a country’s household and government consumption and capital investment, independently of where the materials come from. In short, it attributes all the material resources mobilized globally to the final consumer, and so it traces embodied or virtual flows of materials associated with value, rather than simply territorially delineated physical flows” (IRP 2024, 33).



The analysis of the International Resource Panel indicates a rapid marginalization of the material footprint of high-income economies in Europe and North America. This trend is less visible in cumulative resource accounting in which current consumption is added to historical resource use (Hickel 2022) and therefore leads to different conclusions that have been discussed above. In a forward-looking perspective, which also takes further growth in population and affluence into account, the physical marginalization of high-income economies will be even more distinct. What this trend means for the design of international sufficiency policies is still controversial. At this point, we may conclude that current and future trends indicate that sufficiency is not only relevant for high-income industrialized countries despite their historical responsibility to act decisively. It would have a much greater impact if sufficiency were also integrated into leapfrogging strategies in emerging economies. However, in both high- and low-income countries, economic policies are locked-in growth-oriented rationales aimed at increasing affluence (GDP per capita) (Binswanger 2019, Lepenies 2016). Economic theory, as well as institutions and practices at all levels of governance, are dominated by strategies aimed at avoiding a steady state or degrowth of population and GDP. This leaves only technology (the T factor in the IPAT equation) as a possible factor that can be influenced. Consequently, mainstream policy tends to promote technology-oriented green growth strategies. Since these strategies do not address affluence as main driver of environmental impact they are unlikely to create the social, infrastructural and regulatory conditions that would allow to stay within planetary boundaries while contributing to societal well-being.

The FULFILL research conducted in WP4 suggest that actors are attracted to sufficient lifestyles because they seem to anticipate physical limits to growth, which their growth-oriented environment is unable to realize, because it is locked in exploitive system rationalities. In many cases, sufficiency is a manifestation of resistance against these dominating rationalities offering recessive alternatives development options. They might be referred to as frontrunners of a “new enlightenment” (Weizsäcker 2017) enabling an emancipation from hegemonic exploitive urban systems. In patchy pluralistic societies they establish pockets of alternative futures with less resource-intensive consumption. They have systemic potential, because the resilience of societies may rely on their skills, when eventually limits to growth can no longer be denied, restricting framework conditions will kick-in and exploitive strategies will become dysfunctional. Under the condition of physical limits to growth, the future of modern societies might depend on knowledge generated by the multitude of intentional communities, eco-villages and sufficiency initiatives where alternatives to dominant production and consumption patterns, lifestyles and social practices are developed and tested as has been researched in WP 4 which will be discussed in more detail below (Schepelmann, 2023).

5.3 Action at the municipal level

Disclaimer: The recommendations laid out in this section have already been published in the policy brief that summarises the findings of WP4 (Schepelmann, 2023).

Urban sufficiency initiatives have an antagonistic relation towards dominant unsustainable rationalities and practice, offering recessive alternative development options. They are always endangered because they work against the prevailing rationalities and selection pressures of industrial societies. However, these pockets of alternative futures should be preserved because they could become pivotal when ecological limitations begin to shape the development of urban systems.

Based on the work conducted in WP 4, we have structured our policy recommendations for the municipal level along **three phases**, with a subsequent short-term, medium-term, and long-term perspective:

1. In a **short-term** perspective **strategic, niche management** (SNM) could offer niches, in which sufficiency initiatives would be temporarily protected from the full force of prevailing selection pressures within unsustainable urban systems (Kemp, et al 2000).



2. In a **medium-term** perspective **metrics and indicators** for the climate-neutral satisfaction of human needs could inform an evidence-based development of sufficiency governance.
3. In a **long-term** perspective only a **change of framework conditions** would eventually allow the emergence and stabilization sustainable urban structures and practice.

Short-term: Strategic Niche Management

Our research and interactions with local sufficiency initiatives in five EU-Member States has confirmed findings of Moser et al. (2018) analysing options for supporting sufficiency initiatives in Switzerland and identified four areas of strategic niche management where municipalities can support local sufficiency initiatives:

Resources and competences

Local sufficiency initiatives rely on voluntary work. Cities can offer financial support and training especially in financial, administrative, and legal matters, which are usually not a core competence of local sufficiency initiatives.

Infrastructure and legal conditions

Physical infrastructures, economic and legal frameworks usually promote material and energy-intensive production and consumption patterns (e.g. roads for cars, regulations on food hygiene, expansive land-use planning). Municipalities can adapt urban transport infrastructures and sometimes have scope for developing flexible responses to sufficiency objectives in other areas such as food processing and end-of-life use, planning of the built environment or land-use.

Formal support, venues, and networking

Sufficiency initiatives are usually valuable organizations of benefit for the public and should be officially recognized and treated as such, offering local repair, reuse, vehicles (cars and cargo-bikes) for people without cars, environmental housing, and more. They should have central contact persons and guidance when dealing with local administrations. Ideally, local networking and mutual learning among the initiatives also in cooperation with municipal staff could be encouraged, e.g., by offering venues, communication, and training facilities. Furthermore, municipalities can offer space and venues for meetings and public engagement, including collaborations with local housing cooperatives and neighbourhood associations.

Political legitimization and communicative support

Many sufficiency initiatives struggle to survive. A continuous challenge is the recruiting of a voluntary and active membership. During our interactions with the initiatives, they often indicated difficulties reaching the general public. In that context, they would welcome public recognition and support. Municipalities could directly inform citizens about existing initiatives in their community, but they could also be a mediator between sufficiency initiatives and potential donors. For example, they could mediate public private partnerships, networking, and association. Eventually, sufficiency initiatives could become partners in the planning and development of cities and towns. Sufficiency principles could be integrated in municipal strategies and planning. There is evidence that especially, the introduction of concrete targets and timetables seem to motivate cooperation, e.g., with the introduction of carbon budgets at municipal level. Regional food cooperatives as well as repair and sharing initiatives could make valuable contributions not only to meeting climate change mitigation targets, but also to improving neighbourhoods, citizenship and social cohesion.

Medium-term: You can't manage what you can't measure

The sufficiency debate has inherited from the broader societal sustainability discourse substantial **conceptual deficits concerning the operationalisation in terms of metrics and indicators**. In the medium-term this will inhibit the development of evidence-based policies because this would require the ability to measure their effectiveness. So far, **the state of the art of the scientific literature defines sufficiency as the ability to satisfy human needs within planetary boundaries**,



however, neither the satisfaction of human needs nor planetary boundaries (beyond climate change and a few other indicators) are sufficiently defined to allow measurement to a degree that would be needed for making informed decisions in the multi-level governance system within the European Union and beyond. Thus, the relations between planetary boundaries and local activities need to be better understood and better defined in ways that allow operationalisation in policies. Where the relations are reasonably well understood, as for example, in the case of climate change mitigation, they need to inform multi-level policies. Climate change mitigation could be a frontrunner of evidence-based policy designs aiming at the limitation of environmental impacts within planetary boundaries in partnership with the rich diversity of local sufficiency initiatives.

Long-term: System dynamics

In general, the analysis of sufficiency literature has revealed large differences in the conceptualization of societal change. Generally accepted theories of change for sufficiency policies and metrics for testing these theories would be desirable. However, so far only anecdotal evidence is available. This limits the ability of a realistic assessment of the potential of sufficiency initiatives and policies.

In the long term, it would be desirable to shift the prevailing dynamics of exploration, exploitation, and expansion of urban systems. Ideally, **the evolutionary process of variation, selection and stabilization within urban societies should favour the development of sufficient solutions rather than goods and services which require increasing amounts of energy and material.** In the long term these systems dynamics might only be realized by a smart policy-mix consisting of the right price signals and infrastructures in combination with adequate legal and social norms. However, this would require a considerable acceleration of evidence-based policy-learning. So far, policymaking lacks the necessary operational concepts, metrics and institutions which would allow a broad change of urban system dynamics towards sufficiency. **More implementation-oriented research and development would be desirable for taking advantage of the rich potential which the multitude of local sufficiency initiatives offer at local level.**

5.4 Identify and capitalise on existing practices: making sufficiency policies tangible

In the FULFILL project, a number of sufficiency measures that are practiced on a small scale have been analysed. They have a substantial potential to be scaled up if they are supported by municipal and national policies. While this is explained in general above, including some of the barriers that hold back the more widespread development of the practices, in this chapter, we present some of the existing practices analysed in the FUFILL project by way of example. In the analysis we focus on how municipal and national policies both can enable the developments or establish and maintain barriers that stop or limit the developments. In the examples analysed, we see both enablers and barriers.

Eco-villages and co-housing

There is an increasing interest in living in eco-villages and other co-housing spaces, where families share facilities, engage in more sustainable lifestyles, and organise a number of cooperation activities. In T4.4 we analysed a recent Danish eco-village development, Permatopia, where 90 families have lived in an eco-housing development near an existing village some 60 km from the center of Copenhagen since 2018 (Breucker & Farfoggia, 2023). The project was realised with a combination of a group of enthusiastic people that now live in the development, a landowner interested in that kind of development, loans from an ethical bank, and a supportive municipality.

The support from the municipality included:

- support for a local plan for the eco-development including local waste-water treatment with willow trees, local heat supply and a windmill that supplies the heat pumps in a heating station that supplies heat via district heating pipes to the dwellings. Local plans must be approved by the municipality, so without support for the local plans, the eco-



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development would not have been possible. This was not a large barrier, as the municipal council welcomed the influx of committed people with a variety of special skills that enriched the local area.

- support for social housing, allowing half the dwellings to be rented, owned by a non-profit housing association and with low-interest loans with a loan guarantee by the municipality. The rest of the dwellings are privately owned by the inhabitants. Each municipality can only give a certain volume of guarantees each year for social housing projects. Thus, it was an enabler that the municipality gave priority to the eco-development. This was not a large barrier as there was no other social housing project competing for the loan guarantee in the year when it was given. Many of the citizens that are now living in the development could not have joined without the non-profit rentals and the municipal loan guarantee behind it.

There were also some barriers to realise the environmental ambitions of the development, including:

- According to national rules, it is not allowed to share the power production from the wind turbine among the dwellings in the development, only to supply the facilities outside dwellings that are owned by the eco-village community, like the heat pumps in the heating station and a common kitchen, a cold store etc.
- The urine from separated toilets cannot be used for fertilizing organic farmed land according to EU rules incorporated in Danish rules for organic agriculture.
- Tendering rules: Other eco-communities are buying land from municipalities and in this case, national and EU legislation require that the selling of public land is via a tender, where the land is sold to the highest bid. There is no rule/ law giving advantage to an environmentally friendly development in this case. In this case, the development was built on private land.

Tiny-houses

There is an increasing interest to live in small houses, as Tiny-houses, partly to have a simpler life with low consumption, partly to have low cost of living. In T5.2 of the FULFILL project, we have analysed a project in one of the few Danish municipalities that have decided to make a development for Tiny-houses with small plots for small houses (Breucker & Defard, 2023). The Tiny house development Tiny Rosborg in the Danish Vejle municipality is being realised in a cooperation between enthusiastic people and the municipality, aiming at 28 small dwellings in the first development, each dwelling being 50 m² or less. The municipality is leading the development and have invited interested citizens to dialogues on the development, reaching 300 interested citizens. The municipality have also developed the local plan and have solved problems with planning laws and other barriers. Without the pro-active municipality, the project would not have been realised. In general, when considering tiny houses as sufficiency examples, the tradeoff between better usage of land and minimizing the size of the apartments needs to be taken into account, since tiny houses are often built in green areas.

The main barriers are:

- Limitations in planning laws and building regulations, that have been overcome by the municipality in this case. Normal housing developments have large plots made for much larger houses and much higher land costs than needed for Tiny-houses
- Final cost of building houses – including purchasing land, land development, and building construction of a house. Many costs are similar for smaller and larger houses, including (but not limited to) project development to obtain planning permission and connection fees to utilities.

Bicycle infrastructure

Many countries and local authorities support bicycle infrastructure for various reasons including reducing cars congesting cities, health benefits (physical activity and decreased pollution), as well as for



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environmental and climate reasons. In T5.2 of FULFILL, Danish bicycle policy has been analysed (Breucker & Defard, 2023). The majority of Danish roads are managed by municipalities, so bicycle paths are primarily a municipal task. The state supports the development with subsidies and with a knowledge center. The policies have had some success with increasing cycling on the routes, where bicycle infrastructure got improved with state support. There was increased cycling of 5-23% for different programs, including a successful program for dedicated “super bicycle paths” connecting Copenhagen with neighboring municipalities. On a national level, the policies were a failure with 20% reduction in cycling between 2014, when a bicycle strategy was adopted until 2019. Recently, however, there has been an increase in cycling between 2019-2022 (2020 and 2021 are not considered because of large effect in transport of Covid).

Main enablers are:

- Municipal bicycle plans and priorities, including budget allocations
- State subsidy paying 40-50% of costs for selected projects
- Advocacy from local groups and national bicycle association

Main barriers are:

- Limits of state subsidies, the municipalities are ready to finance around 5 times as many projects with 50-60% of costs than the state is willing to co-finance
- The national bicycle policy is missing important supplementary measures such as tax benefits, lower speed on roads without bicycle paths, and better urban planning to reduce daily travel distances, in which case more daily travel could be made by bicycle.



6. Conclusion

In conclusion, this working paper presents policy recommendations synthesized from research findings across FULFILL project's Work Packages 2-6, incorporating inputs from citizen engagement exercises and policy workshops. The recommendations advocate for democratizing sufficiency policy-making processes, enhancing infrastructural support, and adopting a comprehensive policy design approach centered around sufficiency. By addressing barriers and promoting inclusivity, these recommendations seek to facilitate the adoption of low-carbon practices and enhance societal well-being. Furthermore, they underscore the importance of extending sufficiency policies beyond the energy sector, leveraging co-benefits, and promoting a multi-sectoral, inclusive, and democratic approach to policymaking. Overall, the recommendations aim to place sufficiency at the forefront of policy agendas at European, national, and local levels. In short, the FULFILL project recommends:

- There is a need to democratize (sufficiency) policymaking processes. Inclusive decision-making mechanisms that involve diverse perspectives and prioritize the allocation of resources based on societal needs and priorities should be developed. A democratic approach to sufficiency includes reducing the influence of certain lobby groups and involving citizens as well as business stakeholders and all levels of government in the policy making process. It further means focusing sufficiency policies on reducing excess consumption, while guaranteeing everyone to cover their basic energy needs. This could for example be achieved through progressive pricing structures that includes adequate support for vulnerable households to incentivize energy-saving behaviours.
- To make low-carbon behaviour more accessible and attractive, there is a necessity to offer alternatives to high-carbon emitting behaviour and make these the mainstream option for all. This includes developing supportive infrastructures, such as bike paths, accessible public transport options, and regulations that promote low-carbon lifestyles such as an attractive offer of plant-based meals in public buildings. It further requires revising regulation and structures that currently incentivise high-carbon emitting behaviour such as a missing tax on kerosene or missing speed limits and urban structures that favour cars over softer forms of transport.
- A comprehensive approach to policy design should be taken that prioritizes identification, considers societal frameworks, places the human factor at the center, coordinates actions across different time horizons and scales, and ensures a coherent policy mix with appropriate financing mechanisms. Importantly, instead of focusing on individuals only, interventions should focus on the supply-side rendering the offer for individuals and businesses more sustainable.
- Sufficiency policies should capitalize on their co-benefits across various domains such as health, economy, and social inclusion. By focusing on the broader societal impacts of sufficiency measures, policymakers can garner broader support and enhance the effectiveness of interventions. This includes the recommendation for those advertising for sufficiency to focus their communication around sufficiency on its multiple positive effects beyond environmental benefits such as potential economic gains, increased competitiveness, security of supply, reduced health care costs, reduced inequalities and loneliness, more attractive cities and increased well-being for all.
- Sufficiency policies should be designed with a focus on inclusivity as they offer the potential to reduce inequalities. They should be carefully designed not to increase existing disparities such as gender inequalities.
- Sufficiency holds the potential for a more just distribution of resources around the globe. Wealthier countries have a responsibility to reduce their overall resource consumption and support less wealthy nations that suffer the consequences of the historic overconsumption of the Global North. At the same time, sufficiency challenges the global growth



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imperative which has created the highly unequal distribution of accumulated advantages and disadvantages, of resources, access to goods and services, and related environmental repercussions. As a way of overcoming purely growth-oriented rationales, sufficiency can not only find application in the Global North but could also be used as a leapfrogging strategy in emerging economies. Importantly, sufficiency policies should target citizens and companies with the highest carbon footprints who are usually the wealthiest ones first regardless of the country they live or operate in.

- Beyond conceptual discussions, tangible sufficiency practices exist around Europe and have the potential to be upscaled through supportive municipalities and national or EU policies. This includes identifying and capitalizing on existing best practices, supporting piloting and exchange groups, and implementing rigorous evaluations of existing and potential policies.



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References

- ACTEE. (2023). *Guide - Retour d'expérience sur les plans de sobriété de l'hiver 2022-2023 des lauréats ACTEE*. FNCCR. <https://programme-cee-actee.fr/wp-content/uploads/2023/12/ACTEE-Guide-Plans-de-sobriete-des-collectivites.pdf>
- Alexander-Haw, A., Dütschke, E., Helferich, M., Preuß, S., & Schleich, J. (2023). *Report on the first survey and identification of the sufficiency groups* (Deliverable D 3.1). FULFILL Project. <https://fulfill-sufficiency.eu/wp-content/uploads/2023/10/D3.1-Report-on-the-first-survey-and-identification-of-the-sufficiency-groups.pdf>
- Alexander-Haw, A., Dütschke, E., Janßen, H., Schleich, J., Tröger, J., & Tschaut, M. (2024). *Report on long term effects of sufficiency lifestyles and governance approaches for diffusion* (Deliverable D 3.3 - preliminary version). FULFILL Project. <https://fulfill-sufficiency.eu/wp-content/uploads/2024/01/D3.3-preliminary-incl-Annex.pdf>
- Andreau, N., Litvine, D., & Spilemon, J. (2022). *Le projet ECSpect - Pratiques et consommation d'eau chaude sanitaire : enseignements d'une expérimentation sociotechnique dans le secteur domestique*. ADEME. <https://www.enertech.fr/pratiques-et-consommation-deau-chaude-sanitaire-accompagner-le-changement/>
- Asara, V., Otero, I., Demaria, F., & Corbera, E. (2015). Socially sustainable degrowth as a social-ecological transformation: Repoliticizing sustainability. *Sustainability Science*, 10, 375–384. <https://doi.org/10.1007/s11625-015-0321-9>
- Bahro, Rudolf. 1977. *Die Alternative: Zur Kritik Des Real Existierenden Sozialismus*. Köln: Europäische Verlagsanstalt.
- Barbas, A., & Breucker, F. (2024). *Report on citizen engagement activities* (Deliverable D 7.1). FULFILL Project. <https://fulfill-sufficiency.eu/wp-content/uploads/2024/03/D7.1-Report-on-citizen-engagement-activities.pdf>
- Binswanger, Mathias. 2019. *Der Wachstumzwang: Warum die Volkswirtschaft immer weiterwachsen muss, selbst wenn wir genug haben*. John Wiley & Sons.
- Brand, U., Wissen, M. (2013). Crisis and continuity of capitalist society-nature relationships: The imperial mode of living and the limits to environmental governance. *Review of International Political Economy*, 20(4), 687-711.
- Breucker, F., & Defard, C. (2023). *Report on the comparative analysis of sufficiency policies* (Deliverable D5.2). FULFILL Project. <https://fulfill-sufficiency.eu/wp-content/uploads/2023/10/D5.2-Report-on-the-comparative-analysis-of-sufficiency-policies-0923-1.pdf>
- Breucker, F., & Farfaglia, R. (2023). *Report on vertical horizontal multilevel governance* (Deliverable D 4.4). FULFILL Project. <https://fulfill-sufficiency.eu/wp-content/uploads/2023/10/D.4.4-Report-on-vertical-and-horizontal-multilevel-governance-FINAL.pdf>
- Bringezu, S. (2015). Possible target corridor for sustainable use of global material resources. *Resources*, 4(1), 25–54.
- Cengiz, F. (2023). Dilemmas of Deliberative Democracy in the European Union: Why (Not) and How (Not)? In *Dilemmas of European Democracy: New Perspectives on Democratic Politics in the European Union* (pp. 76-99). EUP. <https://livrepository.liverpool.ac.uk/id/eprint/3172436>
- Chancel, L. (2022). Global carbon inequality over 1990–2019. *Nature Sustainability*. <https://doi.org/10.1038/s41893-022-00955-z>
- Chakravarty, S., & Ramana, M. V. (2012). The hiding behind the poor debate: A synthetic overview. *Handbook of climate change and India*, 218-229.
- Dechezleprêtre, A., Fabre, A., Kruse, T., Planterose, B., Chico, A. S., & Stantcheva, S. (2022). *Fighting climate change: International attitudes toward climate policies* (Documents de travail du Département des Affaires économiques de l'OCDE, No. 1714). Éditions OCDE. <https://doi.org/10.1787/3406f29a-en>
- Defard, C. (2022). *The need for a socially just European Green Deal: Lessons from the Yellow Vests movement* (Policy Paper No. 277). Jacques Delors Institute. <https://institutdelors.eu/wp-content/uploads/2022/07/PP277-The-need-for-a-socially-just-European-Green-Deal-Lessons-from-the-Yellow-Vests-movement.pdf>



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[content/uploads/2022/06/PP277_The-need-for-a-socially-just-European-Green-Deal_De-fard_EN.pdf](#)

- Dorninger, C., Hornborg, A., Abson, D. J., Von Wehrden, H., Schaffartzik, A., Giljum, S., & Wieland, H. (2021). Global patterns of ecologically unequal exchange: Implications for sustainability in the 21st century. *Ecological economics*, 179, 106824.
- Eckersley, R. (2006). From the liberal to the green democratic state: upholding autonomy and sustainability. *International Journal of Innovation and Sustainable Development*, 1(4), 266-283. <https://doi.org/10.1504/IJISD.2006.013731>
- Ehrlich, Paul, and John P. Holdren. 1972. 'Impact of Population Growth'. Pp. 365–77 in *Population, Resources, and the Environment*, edited by Riker. Washington D.C.: U.S. Government Printing Office.
- European Commission. (2023, July 20). *Eurobarometer: Majority of Europeans consider that the green transition should go faster* [Press release]. Brussels. https://ec.europa.eu/commission/presscorner/api/files/document/print/en/ip_23_3934/IP_23_3934_EN.pdf
- European Environment Agency (EEA). (2021). *The case for public participation in sustainability transitions*. [Report] <https://www.eea.europa.eu/publications/the-case-for-public-participation>
- European Environmental Bureau (EEB), Negawatt, Energy Cities, Association of Cities and Regions for Sustainable Resource Management (ACR+), Client Earth, “Die Rolle von Energiesuffizienz in Energiewende und Gesellschaft” (EnSu), Rescoop.eu, & Jacques Delors Energy Centre. (2024). *Manifesto: A Resilient and Resource-wise Europe: Sufficiency at the Heart of the EU's Future*. https://www.negawatt.org/IMG/pdf/sufficiency_manifesto.pdf
- European Citizens' Panel on Energy Efficiency. (2024). *Report and Recommendations*. European Commission. https://citizens.ec.europa.eu/document/download/52a3608d-662c-4b0e-b463-684a9dbef302_en?filename=Final%20recommendations%20European%20Citizens%60%20Panel%20on%20Energy%20Efficiency.pdf
- Eurostat. (2024). *Data Browser: Air passenger transport by reporting country*. https://ec.europa.eu/eurostat/databrowser/view/avia_paoc_custom_9320409/default/table?lang=en
- Flipo, A., & Roubardin, S. (2023). *In-depth analysis of highly sufficient lifestyles* (Deliverable D 3.2). FULFILL Project. https://fulfill-sufficiency.eu/wp-content/uploads/2023/07/D3.2_interviews-micro.pdf
- Flipo, A., Roubardin, S., & Alexander-Haw, A. (2023). *From pioneering sufficiency lifestyles to a sufficiency society* (Deliverable D 5.1). FULFILL Project. https://fulfill-sufficiency.eu/wp-content/uploads/2023/07/D5.1_Lifestyles-macro-dynamics-2.pdf
- Food and Agriculture Organization of the United Nations. (2021). *FAOSTAT: Food supply data for the EU-countries (kg/Capita) 2021*. <https://www.fao.org/faostat/en/#data>
- Franco-German Working Group on EU Institutional Reform. (2023, September 18). *Sailing on High Seas: Reforming and Enlarging the EU for the 21st Century* [Report]. <https://www.politico.eu/wp-content/uploads/2023/09/19/Paper-EU-reform.pdf>
- Fristot, V. (2023). *Premier bilan d'actions de sobriété énergétique fin 2022-2023*. Ville de Grenoble, negawatt university. https://negawatt.org/IMG/pdf/unw2023_rex-grenoble.pdf
- Fromm, E. (1976). *To Have or to Be?* Harper & Row.
- Gabert, A., Marignac, Y., Djelali, M., Dufournet, C., & Flipo, A. (2024). Integration of SSH findings in quantified sufficiency assumptions for decarbonisation pathways (Deliverable D5.3). FULFILL Project.
- Gore, T. (2020). *Confronting Carbon Inequality: Putting climate justice at the heart of the COVID-19 recovery*. <https://oxfamlibrary.openrepository.com/handle/10546/621052>
- Habermas, J. (1987). *Handlungsrationalität und gesellschaftliche Rationalisierung*. Frankfurt am Main: Suhrkamp.
- Hernández Guzmán, D., & Hernández García de Velazco, J. (2024). Global Citizenship: Towards a Concept for Participatory Environmental Protection. *Global Society*, 38 (2), 269-296. <https://doi.org/10.1080/13600826.2023.2284150>



FULFILL has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101003656.

- Hickel, J. (2020). Quantifying national responsibility for climate breakdown: an equality-based attribution approach for carbon dioxide emissions in excess of the planetary boundary. *The Lancet Planetary Health*, 4(9), e399-e404.
- Hickel, J. (2021). The anti-colonial politics of degrowth. *Political Geography*, 88.
- Hickel, J., & Kallis, G. (2020). Is green growth possible? *New Political Economy*, 25(4), 469–486.
- Hickel, J., Dorninger, C., Wieland, H., & Suwandi, I. (2022). Imperialist appropriation in the world economy: Drain from the global South through unequal exchange, 1990–2015. *Global Environmental Change*, 73, 102467.
- Hornborg, A., & Martinez-Alier, J. (2016). Ecologically unequal exchange and ecological debt. *Journal of Political Ecology*, 23(1), 328–333. <https://doi.org/10.2458/v23i1.20220>
- Immler, H. (1985). *Natur in der ökonomischen Theorie*. Opladen: Westdeutscher Verlag.
- Immler, H. (1990). *Vom Wert der Natur Zur ökologischen Reform von Wirtschaft und Gesellschaft. Natur in der Ökonomischen Theorie Teil 3*. Opladen: Westdeutscher Verlag
- Immler, H. (2014). *Nur die Natur produziert: die Wirtschaft der Zukunft, die Zukunft der Wirtschaft*. Kassel: NaturUni-Verl.
- Ivanova, D., & Wood, R. (2020). The unequal distribution of household carbon footprints in Europe and its link to sustainability. *Global Sustainability*, 3. <https://doi.org/10.1017/sus.2020.12>
- Kuss, P., & Nicholas, K. A. (2022). A dozen effective interventions to reduce car use in European cities: Lessons learned from a meta-analysis and transition management. *Case studies on transport policy*, 10(3), 1494-1513. <https://doi.org/10.1016/j.cstp.2022.02.001>
- Lage, J. (2022). Sufficiency and transformation—A semi-systematic literature review of notions of social change in different concepts of sufficiency. *Frontiers in Sustainability*, 3. <https://doi.org/10.3389/frsus.2022.954660>
- Lage, J., Thema, J., Zell-Ziegler, C., Best, B., Cordroch, L., & Wiese, F. (2023). Citizens call for sufficiency and regulation—A comparison of European citizen assemblies and National Energy and Climate Plans. *Energy Research & Social Science*, 104, 103254. <https://doi.org/10.1016/j.erss.2023.103254>
- Lepenies, Philipp. 2016. *The power of a single number: a political history of GDP*. Columbia University Press.
- Meihlan, N. (2019). *Comment faire enfin baisser les émissions de CO2 des voitures*. (La note d'analyse 78, 5). France Stratégie. <https://www.strategie.gouv.fr/publications/faire-enfin-baisser-emissions-de-co2-voitures>
- Milanovic, B. (2016). *Global Inequality: A New Approach for the Age of Globalization*. Harvard University Press.
- Okushima, S., (2024). Measuring energy sufficiency: A state of being neither in energy poverty nor energy extravagance. *Applied Energy*, 354, 122161. <https://doi.org/10.1016/j.apenergy.2023.122161>
- Otto, I. M., Kim, K. M., Dubrovsky, N., & Lucht, W. (2019). Shift the focus from the super-poor to the super-rich. *Nature Climate Change*, 9(2), 82–84. <https://doi.org/10.1038/s41558-019-0402-3>
- Pagliano, L., Brunetti, G., Clementi, M., Erba, S., & Rogora, A. (2022). *Literature review for analysis of lifestyle change* (Deliverable 2.1). FULFILL Project. <https://fulfill-sufficiency.eu/wp-content/uploads/2023/10/D2.1-Literature-review-revised-version.pdf>
- Polanyi, Karl. 1975. *The Great Transformation*. New York: Octagon Books.
- Plan bâtiment durable & Ademe & IFPEB & OID. (2023). *Accélérer et pérenniser la sobriété énergétique des bâtiments tertiaires*. Direction générale de l'aménagement, du logement et de la nature. <https://www.planbatimentdurable.developpement-durable.gouv.fr/accelerer-et-perenniser-la-sobriete-energetique-a1661.html>
- Princen, Thomas. 2005. *The Logic of Sufficiency*. Cambridge, MA: MIT Press.



- Rosa, P. (2023, January 5). New generation of Citizens' Panels. Community of Practice of the Competence Centre on Participatory and Deliberative Democracy. Retrieved from <https://cop-demos.jrc.ec.europa.eu/blog/new-generation-citizens-panels>
- Sahakian, M., & Wilhite, H. (2014). Making practice theory practicable: Towards more sustainable forms of consumption. *Journal of Consumer Culture*, 14(1), 25–44. <https://doi.org/10.1177/1469540513505607>
- Schepelmann, P. (2023). *Policy brief on findings from WP4 (Deliverable D4.5)*. FULFILL Project. https://fulfill-sufficiency.eu/wp-content/uploads/2023/10/D4.5_policy-brief.pdf
- Schumacher, E. F. (1974). *Small Is Beautiful: A Study of Economics as If People Mattered*. 1. Aufl. London: ABACUS.
- Schmelzer, M., & Nowshin, T. (2023). Ecological Reparations and Degrowth: Towards a Convergence of Alternatives Around World-making After Growth. *Development*, 66(1), 15-22.
- Spangenberg, J. H. (2014). Institutional change for strong sustainable consumption: sustainable consumption and the degrowth economy. *Sustainability: Science, Practice and Policy*, 10(1), 62-77. <https://doi.org/10.1080/15487733.2014.11908125>
- Statista. (2024). *Passenger Cars – France: Statista Market Forecast*. <https://www.statista.com/outlook/mmo/passenger-cars/france>
- T&E. (2023). *How leasing companies can become a key driver of affordable electric cars in the EU*. <https://www.transportenvironment.org/wp-content/uploads/2023/11/How-leasing-companies-can-become-a-key-driver-of-affordable-electric-cars-in-the-EU.pdf>
- United Nations Environment Programme, & International Resource Panel (2024). *Global Resources Outlook 2024 - Bend the trend: Pathways to a Liveable Planet as Resource Use Spikes*. <https://wedocs.unep.org/20.500.11822/44901>.
- Verfuërth, C., Henn, L., & Becker, S. (2019). Is it up to them? Individual leverages for sufficiency. *Gaia (Heidelberg)*, 28(4), 374–380. <https://doi.org/10.14512/gaia.28.4.9>
- Ville de Grenoble. (2023). *Plan de sobriété énergétique 2022, premier bilan des mesures*. (Press release). https://www.grenoble.fr/uploads/Externe/1e/1647_244_DP-Bilan-des-mesures-de-sobriete.pdf
- Von Homeyer, I., Oberthür, S., & Jordan, A. J. (2021). EU climate and energy governance in times of crisis: Towards a new agenda. *Journal of European Public Policy*, 28(7), 959–979. <https://doi.org/10.1080/13501763.2021.1918221>
- Wahlund, M., & Palm, J. (2022). The role of energy democracy and energy citizenship for participatory energy transitions: A comprehensive review. *Energy Research & Social Science*, 87, 102482. <https://doi.org/10.1016/j.erss.2021.102482>
- Weizsäcker, Ernst U. von 2017. *Come on! Capitalism, Short-Termism, Population and the Destruction of the Planet*. New York, NY: Springer Science+Business Media.
- Welch, D. (2016). Social practices and behaviour change. In F. Spotswood (Ed.). *Beyond Behaviour Change: Key Issues, Interdisciplinary Approaches and Future Directions*. (pp. 237-256). Policy Press. <https://doi.org/10.1332/policypress/9781447317555.003.0012>



