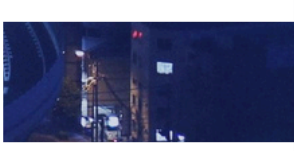
EERA
European Energy Research Alliance
clean Energy tranSition for Sustainable Society (e3s)

White paper

Energy Demand Reduction in the EU: A Policy Analysis and Strategic Outlook



About EERA
The European Energy Research Alliance (EERA) is the association of European public research centres and universities active in low-carbon energy research. EERA pursues the mission of catalysing European energy research for a climate-neutral society by 2050. Bringing together more than 250 organisations from over 30 countries, EERA is Europe's largest energy research community. EERA coordinates its research activities through 18 Joint Programmes and is a key player in the European Union's Strategic Energy Technology (SET) Plan.

About EERA Joint Programme on clean Energy tranSition for Sustainable Society (EERA JP e3s)
The EERA Joint Programme e3s brings together leading European universities and research institutions to advance research and provide knowledge, tools, and evidence on the SSH-E dimensions of the clean energy transition. Its goal is to support decision-makers at all levels—EU, national, local, and international—in shaping effective strategies and policies. The programme emphasizes the role of social innovation, while addressing societal barriers and considering social, environmental, and economic interconnections.

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Table of Contents

1. Setting the scene

Since 2020, the energy sector has experienced significant disruption due to two major crises: the COVID-19 pandemic and the surge in energy prices driven by escalating international oil and gas costs following Russia's invasion of Ukraine. More recently, growing uncertainty surrounding the trajectory of U.S. climate and industrial policies — particularly in light of political polarization and potential rollbacks of the Inflation Reduction Act — has added further instability to global energy markets. These overlapping disruptions have raised substantial concerns regarding energy security and affordability, underscoring the challenges of addressing these issues while maintaining economic stability, social equity, and progress toward the clean energy transition. Among the various mitigating measures adopted by the EU and its Member States, reducing energy demand has emerged as a key strategy to enhance energy security, alleviate market pressures, and lower costs for consumers, all while remaining aligned with EU's climate goals for 2030 and 2050. However, despite its potential, the role of energy demand reduction within EU policies remains largely framed as a short-term intervention — typically referred to as energy conservation (Sorrell et al., 2020) — designed to respond to immediate crises, rather than as a systematic and long-term strategy for reducing overall energy consumption.

In parallel, the EU policy agenda has undergone a notable shift, increasingly prioritizing economic competitiveness in response to global industrial and technological competition. This focus on strengthening Europe's economic position in the global energy transition has been reinforced through policies aimed at boosting industrial productivity, fostering innovation, and safeguarding strategic sectors. More recently, the Draghi Report (September 2024) has further emphasized the need for economic growth and structural reforms to enhance Europe's long-term competitiveness. While this renewed focus is crucial for industrial resilience, it risks further marginalizing discussions on sustainability in general, including also energy demand reduction, as policy priorities increasingly favour technological advancements and supply-side interventions over demand-side strategies. Yet, the role of energy demand reduction becomes even more important in offering a strategic pathway.

Recognizing the need to align its research priorities with this evolving landscape — marked by escalating energy prices, growing geopolitical tensions, and an EU policy shift emphasizing competitiveness and supply-side interventions — the EERA Joint Programme on clean Energy tranSition for Sustainable Society (JP e3s) undertook a revision of its Strategic Research and Innovation Agenda (SRIA). These developments highlighted the limitations of relying solely on technological innovation and energy supply expansion to achieve climate and energy goals. In this context, reducing energy demand has emerged not just as a complementary approach but as a critical lever for ensuring long-term energy security, affordability, and sustainability. The updated SRIA, published in 2023, reflects this strategic pivot: it introduces a renewed research focus structured around five Sub-Programmes (SPs)[1], with Sub-Programme 1 (SP1) specifically dedicated to energy demand reduction (EDR), primarily through the lens of behavioural change. Through SP1, JP e3s is deepening its exploration of demand-side strategies and engaging external stakeholders to broaden the scope and impact of this research. This focus underscores that

[1] The JP e3s Sub-Programmes are:

- SP 1 - Fostering changes in energy consumption: a pathway to demand reduction
- SP 2 - Just Transition and Governance of the Energy Transition
- SP 3 - Sustainability of the Energy Transition
- SP 4 - Market and business models for Energy Transition
- SP 5 - Transition pathway modelling
- SP on SSH in the transversal JP Digitalization for Energy

without reducing overall energy consumption — not just improving efficiency — the EU risks undermining both its climate ambitions and social equity objectives in the face of resource constraints and global competition.

A first key outcome of this research effort was the contribution to the EERA report "*Energy Demand Reduction as part of the Clean Energy Transition in Europe: Research and Policy Strategies*" (October 2023). This report explores strategies to reduce energy demand in households, industry, and transport, supporting Europe's clean energy transition through the adoption of three complementary approaches: behavioural change, energy efficiency, and energy sufficiency. It stresses that energy demand reduction is crucial for achieving the EU's long-term climate goals, as it complements the ongoing efforts to decarbonize the energy supply. Furthermore, the report highlights a significant gap in both research and policy concerning the energy demand side, despite its substantial potential for transforming the energy system. By addressing this gap, Europe could better harness the benefits of demand-side strategies, which alleviate pressure on the energy grid, lower greenhouse gas emissions, and enhance energy security. Moreover, integrating energy demand reduction into EU policy frameworks would ensure that the clean energy transition remains sustainable and socially equitable, preventing increased reliance on raw materials and mitigating geopolitical risks.

Building on this foundation, the ambition of the present White Paper is to take this analysis further by answering the following key questions:

1. To what extent is EDR considered within European policies and initiatives?
2. In cases where it is addressed, from what perspective is it analysed or approached?
3. Are there critical elements that remain overlooked and require attention?
4. What recommendations can be derived from these reflections to inform and shape more effective policies for promoting energy demand reduction?

Differently from the 2023 EERA report, which broadly examined energy demand reduction across multiple sectors, **this White Paper focuses specifically on the household sector,** allowing for a more in-depth and targeted exploration of this critical area.

To address these questions, the White Paper is structured as follows:

- **Chapter 2** provides a comprehensive **overview of the concept of energy demand reduction**, defining its scope and relevance within the broader energy transition.

- **Chapter 3** presents an **in-depth analysis of key EU policies and initiatives** targeting the household sector, introduced since the launch of the **European Green Deal** (December 2019). This analysis follows the same methodological framework outlined in the 2023 EERA report, examining EDR through three complementary lenses: behavioural change, energy efficiency, and energy sufficiency. The findings reveal that while behavioural change and efficiency measures are well integrated into EU policies, energy sufficiency remains largely absent as a structured policy approach.

- **Chapter 4** shifts the focus towards **alternative economic models**, exploring how different paradigms — such as **degrowth, post-growth, and sufficiency-based models** — could provide a structured framework for reducing energy and material demand. This chapter builds upon growing discussions that challenge the assumption of perpetual economic growth as a prerequisite for well-being and sustainability. By examining how these alternative economic models could reshape consumption patterns and reduce systemic energy dependency, the chapter offers valuable insights into how energy and material energy demand reduction can be better integrated into long-term sustainability strategies. It draws extensively

on ongoing research conducted by TNO, VTT, and other partners, including findings from the *MultiFutures* Horizon Europe project and the TNO report *Analysing the Beyond Growth Debate.*

- **Chapter 5** presents a series of **policy recommendations** based on the insights from the preceding chapters. These recommendations aim to inform decision-makers and relevant stakeholders, guiding the integration of energy demand reduction strategies into future energy policies.

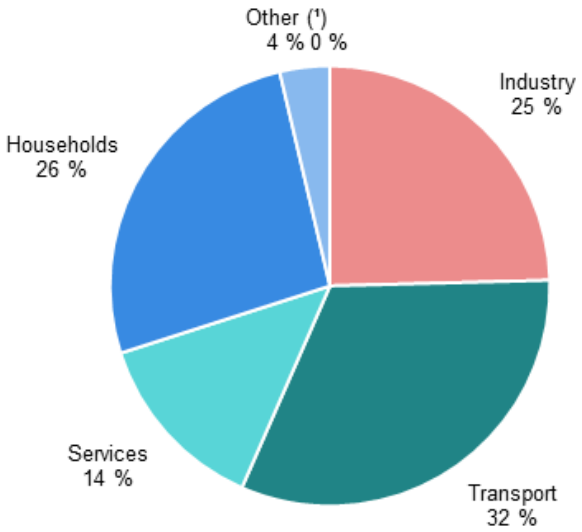
2. An introduction to the concept of energy demand reduction

As highlighted in the EERA report *Energy Demand Reduction as part of the Clean Energy Transition in Europe: Research and Policy Strategies* (2023), energy demand reduction constitutes a foundational pillar of the global clean energy transition. It entails **decreasing the total energy required by various economic sectors while safeguarding, or even enhancing, societal well-being and economic resilience**. By addressing the structural drivers of energy consumption, demand reduction offers a strategic pathway to mitigate environmental impacts, reduce reliance on finite resources, and realign energy systems within planetary boundaries.

The *IRENA World Energy Transitions Outlook 2023* further underscores the critical role of energy demand reduction in achieving net-zero emissions by 2050. According to the report, approximately 25% of the emissions reductions needed by mid-century must come from demand-side measures, encompassing both reduced consumption and efficiency improvements (International Renewable Energy Agency, 2023).

In 2022, the primary sectors responsible for final energy consumption in the European Union were transport (32%), households (26.3%), and industry (24.6%) (Eurostat, 2025) (see Figure 1). While each sector contributes significantly to overall energy consumption, policy discourse has often emphasised households—reflecting both the sector's potential for energy demand reduction and the everyday relevance of household-level interventions (EERA, 2023). This emphasis became particularly evident during the 2022 energy crisis, when emergency measures aimed at curbing energy use were primarily directed at residential consumers. However, it is important to recognize that individual actions, even if widely adopted, can only achieve an estimated 25–45% of the emission reductions required to meet climate goals. The majority of necessary reductions must come from structural and systemic transformations—such as changes in infrastructure, industrial policy, energy systems, and regulatory frameworks (Soyeux, A. et al., 2019).

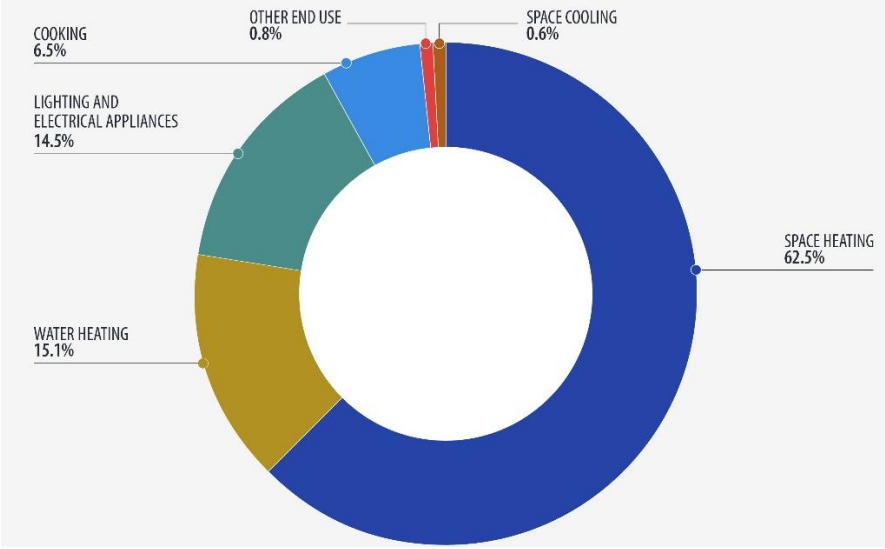
Figure 1: Final energy consumption by sector, EU, 2023 (% of total, based on terajoules)



(1) International aviation and maritime bunkers are excluded from category Final energy consumption for transport
Source: Eurostat 2025 (online data code: nrg_bal_s)

Within the households, space heating accounted for 62.5% of final energy consumption, followed by water heating (15.1%) and lighting and appliances (14.5%) (Eurostat, 2025) (see Figure 2).

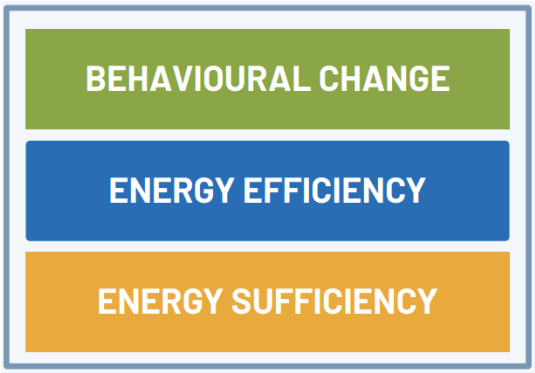
Figure 2: Energy consumption in EU households, 2023 (% of total energy use)



Source: Eurostat 2025 (online data code: nrg_d_hhq)

Given the significant share of household energy use, there is growing interest in how energy demand can be managed more effectively. Rather than focusing solely on expanding energy supply, **demand-side approaches aim to understand and influence how energy is used**. Achieving energy demand reduction requires a multifaceted approach, encompassing behavioural change, energy efficiency, and energy sufficiency (fig. 3).

Figure 3: The three demand-reduction strategies discussed in the EERA 2023 report and in this White Paper



Source: EERA, 2023.

Behavioural change plays a pivotal role, as it directly shapes how individuals and communities consume energy (Lopes at al., 2020). This strategy entails rethinking daily habits and long-standing practices—ranging from household energy use to mobility choices—by fostering a culture of energy consciousness. Actions such as switching off unused appliances, optimizing lighting, and adopting energy-responsible habits can collectively yield significant reductions in demand. Social norms are also influential, as individuals often align their behaviours with those of peers. Comparative feedback—such as benchmarking individual energy use against others—can generate

positive competitive dynamics and promote conservation. However, barriers such as limited awareness and habitual behaviours can hinder progress. Overcoming these obstacles requires sustained educational initiatives, targeted financial incentives, and the provision of accessible, actionable information.

Energy efficiency represents another core strategy to reduce energy demand, aimed at reducing the amount of energy input required to deliver the same output or service. It ensures that essential services such as heating, cooling, and lighting are delivered with minimal energy waste. Technological advancements—ranging from high-efficiency appliances and smart home systems to advanced insulation techniques—have significantly enhanced the potential of this approach. Different policy measures, such as the EU's Energy Efficiency Directive, provide the regulatory framework to set and achieve ambitious energy saving. However, energy efficiency alone presents some limitations. The rebound effect, whereby cost savings from efficiency gains lead to increased energy use elsewhere, can undermine overall reductions (Berkhout et al., 2000). Moreover, addressing the "efficiency gap"—the difference between potential and actual savings—remains critical to unlocking the full potential of energy efficiency measures. Importantly, behavioural changes, often promoted alongside efficiency measures, may also trigger rebound effects by freeing up time, money, or a sense of moral credit that is then re-spent on more energy-intensive activities (Sorrell et al., 2020). Consequently, energy efficiency must be paired with complementary measures like behavioural change and energy sufficiency—while remaining mindful of their own potential unintended consequences—to ensure net reductions in energy consumption.

Energy sufficiency offers a transformative perspective by addressing the very principles underlying energy consumption. Unlike efficiency, which focuses on doing more with less, sufficiency questions the necessity of specific energy uses rather than merely improving their efficiency. It promotes the idea of achieving well-being with minimal energy inputs and calls for structural transformations in society, including infrastructure, culture, and governance (IPCC, 2023). Importantly, sufficiency is grounded in principles of social justice and equity, aiming

to ensure that everyone has access to decent living standards and human well-being within planetary boundaries. For instance, sufficiency-oriented strategies may include designing urban spaces that prioritize walkability and shared mobility, thereby reducing dependence on energy-intensive transportation. Cultural shifts that value quality of life over material consumption are also central to sufficiency. By redefining aspirations to align with sustainable practices, societies can reduce energy demand without compromising well-being. Despite its profound potential, energy sufficiency remains underrepresented in policy frameworks. Elevating its importance within policy—and integrating it with behavioural and efficiency strategies—can unlock its capacity to drive long-term reductions in energy demand.

The synergistic integration of behavioural change, energy efficiency, and energy sufficiency maximizes the effectiveness of demand-side strategies. Behavioural change complements energy efficiency by ensuring technologies are adopted and utilized optimally and in alignment with sustainable practices. Efficiency improvements provide the foundation for enabling low-energy lifestyles, while sufficiency reframes societal aspirations to align with ecological limits. Together, these approaches transition energy demand reduction from a conceptual objective into a concrete pathway toward a low-carbon, sustainable future. Embedding this integrated framework into policy and societal structures not only addresses immediate energy challenges but also redefines the role of energy in promoting long-term environmental stewardship and human wellbeing.

3. Energy Demand Reduction in EU energy policies

3.1 General context

In December 2019 the European Commission launched the **European Green Deal**, an ambitious growth strategy aimed at establishing the EU as the world's first climate-neutral region by achieving net-zero greenhouse gas (GHG) emissions by 2050. Serving as a comprehensive roadmap, the Green Deal addresses pressing environmental and climate challenges while fostering economic growth and social inclusion, and sets an intermediate target to reduce net GHG emissions by 55% by 2030 compared to 1990 levels. These goals, for both 2030 and 2050, were made legally binding through the **European Climate Law**, adopted in July 2021. In accordance with the provisions of the Climate Law, the European Commission further proposed, in February 2024, an additional intermediate target of a 90% emissions reduction by 2040.

To achieve the objectives of the Green Deal and ensure its effective implementation, the EU has deployed a combination of strategies, policy instruments and financial mechanisms, incorporating both new measures and revisions of existing legislation. Notably, the Fit for 55 package, introduced in July 2021, have been specifically designed to align the EU legislation with the 2030 target of reducing GHG emissions by 55%.

In particular, concerning the household sector, building renovation has been identified in the Green Deal as a key initiative to enhance energy efficiency and achieve the Union's broader climate objectives. In this context, the Fit for 55 package serves as one of the principal legislative instruments supporting the implementation of the **Renovation Wave Strategy**, launched in 2020. The Renovation Wave aims to at least double the annual energy renovation rate of buildings by 2030, thereby delivering substantial energy savings while also contributing to economic recovery and job creation, particularly in response to the downturn caused by the COVID-19 pandemic. It has been flanked by the **New European Bauhaus (NEB) Initiative** which aims to integrate aesthetic, cultural, and social dimensions into the built environment transformation, including urban regeneration, building renovation and heritage-related projects.

Indeed, shortly after the launch of the European Green Deal, the EU started to face a succession of crises that significantly shaped its economic and energy landscape. The COVID-19 pandemic, starting in early 2020, triggered a severe economic downturn, straining public finances and disrupting global supply chains. Shortly afterward, the Russian invasion of Ukraine in February 2022 heavily destabilized the energy sector, exposing the EU's dependency on Russian gas imports and driving energy prices to unprecedented levels. At the same time, mounting competitiveness challenges, due to the U.S. Inflation Reduction Act (IRA) and China's rapid clean energy expansion, have intensified global competition in the clean technology sector, putting EU industrial and clean tech sector under further pressure.

In response to these evolving challenges, and while remaining committed to the climate and energy objectives of the Green Deal, the EU has adopted two major policy initiatives. First, the REPowerEU Plan was introduced to reduce dependency on Russian fossil fuels, strengthen energy security, and enhance the deployment of renewable energy and energy efficiency measures. Second, the Green Deal Industrial Plan was launched to address the economic competitiveness challenges posed by the U.S. Inflation Reduction Act (IRA) and China's expanding clean energy sector. This initiative provides a structured framework to increase investment, simplify regulations, and enhance state aid flexibility in the EU, thereby fostering the growth of European industries in the net-zero transition.

In short, the mentioned measures can be associated to three primary policy domains:

1. **Climate legislation:** the Fit for 55 Package (2021-2023) establishes the legal framework to achieve the EU's target of reducing emissions by 55% by 2030 and reaching climate neutrality by 2050.
2. **Energy security**: the REPowerEU Plan (2022) focuses on strengthening the EU's energy security by reducing reliance on Russian fossil fuels and accelerating the deployment of renewable energy sources.
3. **Industrial competitiveness**: the Green Deal Industrial Plan (2023) aims to enhance the EU's industrial competitiveness and security of supply, mitigating the risk of deindustrialization in response to U.S. and Chinese policies while advancing the objectives of the European Green Deal.

3.2 EU energy policies in the household sector addressing energy demand reduction

Building on this legislative and policy framework, what follows evaluates whether these initiatives incorporate **energy demand reduction within the households sector** and, if so, through which strategic approaches it is pursued: energy efficiency, energy sufficiency, or behavioural change. By examining the extent to which these concepts are integrated into the EU's recent energy policies, the analysis will provide insights into the role of demand-side strategies in shaping Europe's clean energy transition.

The tables below provide an initial schematic overview of the policy analysis, which is further elaborated in the subsequent sub-chapters. They offer a clear visual representation of the policies examined and the key details relevant to our analysis of the Fit for 55 package, the REPowerEU Plan, and the Green Deal Industrial Plan

Table 1: Analysis of EU energy policies from the "Fit for 55" legislative package that address the household sector

Fit for 55 legislative package							
Name of the policy	**Adoption**	**Timespan**	**Type of policy**	**Goal**	**Target**	**Societal engagement foreseen?**	**Directly or indirectly addresses energy demand reduction?**
EU Emissions Trading System (ETS2) for Buildings, road transport and additional sectors	10 May 2023	2027 onward[2]	Directive	Reduce GHG emissions from the covered sectors by 42% by 2030, compared to 2005 levels by introducing a cap-and-trade system	Buildings heating and cooling sector, road transport and additional sectors (mainly small industries not covered by the existing EU ETS)	Yes, through the establishment of the Social Climate Fund. This fund aims to support vulnerable households, micro-enterprises, and transport users	Indirectly, by placing a price on carbon emissions, ETS2 incentivizes both investments in energy efficiency (encouraging building renovations and the adoption of energy-saving technologies) and shift to low-emission mobility
Social Climate Fund	10 May 2023	2026-2032	Regulation	Support vulnerable households, micro-enterprises, and transport users affected by ETS2	Vulnerable households, micro-enterprises, and transport users	Yes, Member States are required to develop Social Climate Plans (by June 2025) in consultation with relevant stakeholders to outline how the funds will be used to support of the targeted groups.	Yes, by financing: Energy Efficiency Improvements (investments in home renovations and energy-efficient appliances) and clean mobility solutions.
Energy Efficiency Directive (EED)	13 September 2023	2023-2050	Directive	Promote energy efficiency across the EU with a binding target of 11.7% reduction in final energy consumption by 2030	All sectors, focusing on buildings, industry, and transport.	Yes, mandates stakeholder engagement in national energy efficiency strategies.	Directly, it targets energy efficiency and includes measures enabling behavioural change

[2] In 2028 in the event of exceptionally high energy prices.

Renewable Energy Directive (RED III)	18 October 2023	2023-2030	Directive	Achieve at least a 42,5% share of renewable energy in the EU's gross final energy consumption by 2030.	Energy producers, industries, and consumers across all sectors.	Yes, encourages public participation and acceptance of renewable energy projects.	Indirectly, promotes efficient energy systems.
Energy Performance of Buildings Directive (EPBD)	24 April 2024	2024 - 2050	Directive	Ensure all new buildings are zero-emission by 2030 and all existing buildings reach zero emissions by 2050.	New and existing buildings, public and private sector, households, and businesses	Yes, mandates national renovation strategies with public and private sector involvement	Directly, by setting efficiency standards

Table 2: Analysis of EU energy policies from the REPowerEU Plan that address the household sector

REPower EU Plan							
Name of the Policy	**Adoption Date**	**Timespan**	**Type of Policy**	**Goal**	**Target**	**Societal Engagement Foreseen?**	**Directly or Indirectly Addresses Energy Demand Reduction?**
EU 'Save Energy' Plan	18 May 2022	2022-2030	Communication	Encourage immediate energy savings to reduce dependence on Russian fossil fuels and address the energy crisis.	Member States, industries across all sectors, and consumers.	Yes, provides recommendations for how citizens and businesses can save energy, promoting widespread engagement.	Yes, focuses on immediate energy-saving measures to lower overall consumption.
EU "Save gas for a safe winter" Plan	20 July 2022	August 2022–March 2023	Communication	Member States to voluntarily reduce gas demand by 15%[3] to enhance energy security during winter.	Member States, industries, and consumers.	Yes, encourages public awareness and participation in energy-saving measures.	Yes, directly targets a reduction in gas demand through coordinated efforts.

[3] Compared to the average consumption in the period from 1 April 2017 to 31 March 2022.

Council Regulation (EU) 2022/1369 on Coordinated Demand-Reduction Measures for Gas	05 August 2022	August 2022–March 2023	Regulation	Member States to voluntarily reduce gas demand by 15% to enhance energy security during winter.	Member States, industries across all sectors, and consumers.	Yes, involves public awareness campaigns and encourages behavioural changes.	Yes, aims to reduce gas consumption through coordinated demand reduction measures.
Council Regulation on an Emergency Intervention to Address High Energy Prices	6 October 2022	October 2022–June 2023	Regulation	Implement emergency measures to mitigate high energy prices, including revenue caps and energy demand reduction.	Energy producers, fossil fuel companies, Member States, and consumers.	Yes, involves Member States in designing measures and redistributing revenues to consumers and businesses.	Yes, as part of efforts to bring down electricity prices. The call for demand-reduction is mainly related to the goal of reducing energy prices rather than to energy supply concerns.
Council Regulation (EU) 2023/706 Amending Regulation (EU) 2022/1369	30 March 2023	April 2023–March 2024	Regulation	Extend the voluntary gas demand reduction measures by 15% for an additional year and reinforce reporting mechanisms.	Member States, industries across all sectors, and consumers.	Yes, continues to involve public awareness campaigns and encourages behavioural changes.	Yes, extends the reduction in gas consumption through coordinated demand reduction measures.
Council Recommendation on Continuing Coordinated Demand-Reduction Measures for Gas	25 March 2024	April 2024–March 2025	Recommendation	Encourage Member States to continue implementing measures to achieve a 15% gas demand reduction.	Member States, industries across all sectors, and consumers.	Yes, recommends ongoing public engagement and reporting to Eurostat.	Yes, promotes sustained reduction in gas consumption through coordinated measures.

Table 3: Analysis of EU energy policies from the Green Deal Industrial Plan that address the household sector

Green Deal Industrial Plan							
Name of the Policy	Adoption Date	Timespan	Type of Policy	Goal	Target	Societal Engagement Foreseen?	Directly or Indirectly Addresses Energy Demand Reduction?
Electricity Market Reform	13 June 2024	2024-2030	Regulation and directive	Enhance consumer rights and protections in the electricity market, ensuring affordability and transparency.	Electricity consumers and utility providers.	Yes, includes public consultations and aims to empower consumers in the energy market.	Indirectly, through demand-side flexibility, real-time data access, and behavioural adaptation, it can influence consumption patterns.

3.2.1 Energy Demand Reduction in the Fit for 55% legislative package

The *Fit for 55%* legislative package comprises multiple policies targeting energy consumption in the household sector, incorporating measures that directly or indirectly contribute to reducing energy demand. Among these, the revised **Energy Efficiency Directive (EED)** (Directive EU/2023/1791) and the revised **Energy Performance of Buildings Directive (EPBD)** (Directive EU/2024/1275) establish the core legislative framework aimed at enhancing the energy performance of buildings across the European Union.

The **EED**, in particular, is a cornerstone of EU energy policy, encompassing multiple sectors, including households. It explicitly mandates reductions in energy demand by setting legally binding consumption targets, primarily achieved through efficiency measures. The latest revision, adopted in September 2023, introduces a **mandatory reduction of 11.7% in primary and final energy consumption by 2030**, based on the 2020 EU Reference Scenario. This translates into a binding cap of 763 million tonnes of oil equivalent (Mtoe) for final energy consumption and an indicative ceiling of 992.5 Mtoe for primary energy consumption by 2030.

Although the directive does not place a strong emphasis on absolute energy demand reduction, it strengthens the legal framework for implementing the **"energy efficiency first"** principle, by requiring Member States to integrate efficiency considerations into planning, policy design, and investment decisions across both energy and non-energy sectors. By prioritizing efficiency, the directive ensures that only the necessary energy is produced, minimize stranded asset investments, and enhance cost-effective energy demand management. Furthermore, it mandates the adoption of measures that promote efficient energy use among end-users, employing a range of instruments and policies to facilitate behavioral change.

While the EED predominantly focuses on efficiency, some of its provisions indirectly contribute to energy sufficiency. Indeed, measures promoting demand-side flexibility, energy savings obligations, and consumer empowerment through digital tools contribute to a reduction in overall energy consumption rather than merely improving efficiency. Importantly, the directive's emphasis on alleviating energy poverty—by ensuring access to essential energy services and supporting decent living standards—also aligns with the social equity dimension of energy sufficiency. However, the directive does not explicitly recognize energy sufficiency as a distinct strategy, limiting its potential to drive deeper reductions in energy demand.

The **EPBD**, on the other hand, is primarily focused on the **decarbonization of the EU's building stock** by 2050, with intermediate targets set for 2030 and 2040. It mandates that **all newly constructed buildings from 2030 onward must be zero-emission**, while existing residential buildings must progressively reduce primary energy consumption according to national trajectories established by each Member State. Additionally, the directive introduces **minimum energy performance standards** for existing buildings, requiring compliance at key stages such as sale, rental, or major renovations.

A key aspect of the EPBD is its promotion of advanced technologies such as **smart meters, automation, and control systems**, which allow consumers to monitor and optimize their energy use. While these technologies create the potential for behaviour-informed efficiency, their integration is primarily motivated by the efficiency gains achievable through automation, rather than a direct emphasis on behavioural change. Moreover, although the directive prioritizes reducing energy consumption—such as through the phase-out of fossil fuel heating systems and the promotion of renewable energy—it still lacks a comprehensive energy sufficiency strategy that would address overall reductions in energy demand beyond efficiency improvements.

Similarly, the **Renewable Energy Directive (RED III)** (Directive EU/2023/2413) indirectly addresses energy demand reduction through efficiency measures. In addition to establishing a binding **EU-wide renewable energy target of**

at least 42.5%[4] **by 2030**, the directive reinforces the "energy efficiency first" principle by requiring Member States to assess their potential for energy generation from renewable sources, and waste heat and cooling while ensuring that efficiency remains a priority. Additionally, it promotes the development of efficient district heating and cooling systems to improve overall energy system performance and reduce energy consumption.

Finally, the **revised EU Emissions Trading System (ETS)** (Directive EU/2023/959) and the **Social Climate Fund** (SCF) (Regulation EU/2023/955) introduce a **carbon pricing mechanism for buildings and road transport** to drive emission reductions. By increasing the cost of carbon-intensive fuels, the ETS creates a direct financial signal that encourages consumers and businesses to modify their behaviour—such as reducing energy consumption, shifting to cleaner technologies, or altering mobility patterns—to avoid higher costs. This price signal incentivizes behavioural change and promotes investments in energy efficiency measures, including building insulation, renewable heating solutions, and electric mobility. However, the effectiveness of this approach depends on the availability of accessible and affordable alternatives, as well as the extent to which vulnerable consumers receive adequate support to mitigate the risk of energy poverty.

To address socio-economic disparities, the **SCF** serves as a **compensatory mechanism, providing financial assistance to vulnerable households and businesses**. It facilitates efficiency upgrades, renewable energy adoption, and low-emission transport solutions, ensuring that the carbon pricing mechanism does not disproportionately impact disadvantaged consumers. While these measures contribute to overall reductions in energy demand, they do not explicitly integrate an energy sufficiency framework. Nonetheless, by targeting support toward those most affected by the transition, the SCF reflects the social justice dimension of sufficiency—ensuring equitable access to essential energy services and supporting decent living standards within planetary boundaries. Its focus remains primarily on market-based incentives and efficiency improvements, rather than a comprehensive sufficiency-oriented strategy.

3.2.2 Energy Demand Reduction in the REPowerEU plan

In response to the geopolitical and energy crisis triggered by Russia's invasion of Ukraine, the European Commission introduced the REPower EU plan in May 2022 to accelerate the transition away from fossil fuel dependence and bolster energy security. Several key policies under REPowerEU directly target energy demand reduction.

A foundational measure within this framework is the **EU 'Save Energy' Plan** (COM/2022/240), which represents the **first EU policy document to explicitly and substantively address energy demand reduction**. By adopting a demand-centred approach, it complements existing supply-side strategies aimed at reducing fossil fuel imports and mitigating the risks of abrupt energy shortages. The plan underscores the significance of short-term behavioural changes and structural efficiency improvements, encouraging voluntary energy reductions through behavioural changes such as lowering heating temperatures, optimizing appliance usage, and shifting toward public and active mobility. In parallel, it accelerates the deployment of energy efficiency measures, reinforcing the commitments established under the Fit for 55% package, including improved building insulation, optimized industrial processes, and stricter eco-design regulations.

[4] but aiming for 45%.

Complementing this initiative, the **'Save Gas for a Safe Winter' Plan** (COM/2022/360) and its accompanying **Council Regulation EU/2022/1369** introduced a **coordinated demand reduction framework** targeting gas consumption. This initiative initially proposed a **voluntary 15% reduction in gas demand** across all Member States, which could become mandatory under specific crisis scenarios. In addition to mitigating immediate risks of gas shortages, the regulation promoted fuel switching in industry and heating system optimizations in residential buildings.
The EU also enacted emergency market interventions to address energy price volatility and affordability concerns, as seen in **Council Regulation EU/2022/1854**, which mandated a **5% reduction in electricity consumption during peak hours**. It also introduced revenue caps on inframarginal electricity producers, using surplus revenues to support vulnerable consumers and facilitate further energy-saving investments.

Another critical measure, the **Council Regulation EU/2023/706**, extended gas demand-reduction obligations into 2023 and 2024, acknowledging the persistent risks to supply security. Similarly, the **Council Recommendation of 25 March 2024** (C/2024/2476) urged continued coordination in demand reduction efforts to sustain energy security and resilience against potential market disruptions.

Together, these policies reflect the EU's strategic approach to energy demand reduction under REPowerEU, combining voluntary measures with binding commitments where necessary. They reinforce the role of efficiency improvements, behavioural shifts, and market-based interventions in mitigating energy security risks while aligning with long-term climate objectives. Although energy sufficiency is not explicitly recognized as a distinct principle, several measures indirectly contribute to sufficiency-related outcomes by enforcing consumption reductions while preventing energy poverty, and promoting systemic changes that align with sufficiency principles.

3.2.3 Energy Demand Reduction in the Green Deal Industrial Plan

The **Electricity Market Reform** (Regulation EU/2024/1747), adopted as part of the Green Deal Industrial Plan, introduces structural changes to **improve market stability, consumer protection, and energy efficiency**. One of its key measures is the promotion of demand response mechanisms, incentivizing consumers to adjust electricity usage in response to price signals. By fostering flexibility services, such as peak-shaving programs and real-time electricity pricing, the reform seeks to mitigate demand spikes and reduce reliance on fossil-fuel-based generation during high-consumption periods.

Additionally, a central component of the reform is the expansion of smart metering infrastructure and the integration of digital tools to facilitate consumer engagement. By improving access to real-time energy consumption data, consumers can better manage their electricity use, aligning with behavioural changes that reduce overall demand. The regulation also prioritizes non-fossil flexibility solutions, such as energy storage and demand-side response, ensuring that electricity demand is managed more efficiently and sustainably.

Although the primary objective of the reform is market stability and affordability, its structural emphasis on demand-side flexibility indirectly contributes to energy sufficiency. Indeed, measures like capacity mechanisms for demand reduction, peak-hour electricity price adjustments, and enhanced cross-border grid integration foster a shift towards optimized electricity consumption rather than increasing supply. However, like other policies under REPowerEU, while these measures align with sufficiency principles to some extent, the focus remains on short-term market adjustments, rather than establishing a dedicated sufficiency-driven strategy.

Table 4: EU energy policies and their approaches to Energy Efficiency, Behavioural Change, and Sufficiency

Legislative package	Policy	Energy Efficiency	Behavioural Change	Energy Sufficiency
Fit for 55	Energy Efficiency Directive (EED)	Establishes binding energy consumption reduction targets and mandates efficiency improvements across sectors.	Encourages behavioural shifts through efficiency policies and digital tools for consumer engagement.	Includes provisions for demand-side flexibility but lacks an explicit sufficiency strategy.
	Energy Performance of Buildings Directive (EPBD)	Sets minimum energy performance standards and promotes smart technologies for energy management.	Promotes the adoption of smart meters and automation to enable consumer-driven energy optimization.	Focuses on efficiency but does not incorporate an overarching energy sufficiency framework.
	Renewable Energy Directive (RED III)	Prioritizes efficient district heating and cooling systems and renewable integration to optimize energy use.	Does not explicitly target behavioural change but supports efficiency-driven decision-making.	Indirectly contributes to sufficiency by promoting system-wide efficiency improvements.
	EU Emissions Trading System (ETS)	Encourages investments in energy efficiency through carbon pricing but depends on alternative solutions.	Incentivizes behavioural change through higher carbon prices and promotes investment in cleaner alternatives.	Does not explicitly integrate sufficiency but discourages excessive consumption through pricing.
	Social Climate Fund (SCF)	Funds efficiency upgrades and renewable adoption to prevent the disproportionate impact of carbon pricing.	Supports behavioural change indirectly by enabling access to efficient solutions for low-income groups.	Supports sufficiency in low-income groups by facilitating access to low-energy solutions.
REPower EU Plan	EU 'Save Energy' Plan	Accelerates efficiency measures such as building insulation and industrial optimization.	Encourages voluntary behavioural changes such as adjusting heating and transport habits.	Encourages reduced consumption but does not formalize sufficiency as a strategic approach.
	Save Gas for a Safe Winter Plan & Council Regulation EU/2022/1369	Encourages fuel switching and efficiency improvements in industrial and residential heating.	Promotes behavioural shifts towards more efficient heating solutions and fuel choices.	Reduces gas demand but primarily as a crisis response rather than a sufficiency strategy.
	Council Regulation on Electricity Consumption Reduction	Mandates a 5% reduction in electricity consumption during peak hours to optimize grid use.	Encourages consumer adaptation by aligning electricity use with demand response incentives.	Aligns with sufficiency principles by capping peak-hour consumption but lacks systemic integration.

	Council Regulation EU/2023/706	Extends gas demand reduction obligations, reinforcing efficiency in gas consumption.	Reinforces the need for demand-side management but focuses on regulatory enforcement.	Mandates reductions in gas use, indirectly supporting sufficiency but not explicitly prioritizing it.
Green Deal Industrial Plan	**Electricity Market Reform**	Promotes demand response mechanisms and smart metering for efficient electricity use.	Encourages consumer flexibility in electricity consumption through price signals and digital tools.	Fosters optimized electricity use but remains focused on market efficiency rather than sufficiency.

3.3 Final reflections on Energy Demand Reduction in EU policy

Energy demand reduction is increasingly recognized within European energy policies and initiatives addressing the energy in the household sector, particularly in response to the twin challenges of energy security and climate change. However, its implementation remains largely fragmented and efficiency-driven, rather than being approached as a comprehensive, standalone strategy. The Fit for 55% package and REPowerEU integrate EDR measures predominantly through an energy efficiency lens, prioritizing technical and regulatory interventions aimed at improving energy performance rather than explicitly curbing overall energy consumption. Instruments such as the EED, EPBD, and RED III reinforce efficiency gains, while mechanisms like the ETS and SCF introduce market-based incentives that encourage behavioural shifts, albeit with varying levels of effectiveness and accessibility.

Where EDR is explicitly addressed, policies tend to frame it as a means to enhance energy efficiency, stabilize markets, or mitigate supply-side crises rather than as a fundamental approach to reducing absolute energy demand. The emphasis on behavioural change, as seen in the EPBD and Save Energy Plan, demonstrates a growing awareness of the role of consumer engagement in energy reduction. However, such measures often remain voluntary or incentive-based, limiting their broader impact on consumption patterns.

Notably, as observed in past energy crises such as the 1970s oil price shocks, a direct and explicit call for reducing energy demand emerged only in response to significant energy security concerns. Similarly, in 2022, the urgency of energy shortages following geopolitical tensions prompted the European Commission to emphasize immediate demand-reduction measures. However, the strategies explicitly mentioned under REPowerEU have been limited in time and scope, designed primarily as short-term responses to mitigate supply disruptions rather than as components of a long-term structural strategy for energy demand reduction.

Crucially, energy sufficiency remains an underdeveloped concept in EU energy policies. While some policies, such as the EED and Electricity Market Reform, incorporate elements that indirectly align with sufficiency principles—such as demand-side flexibility and peak-hour consumption reduction—they do not explicitly frame sufficiency as a strategic objective. The lack of a clear sufficiency framework means that systemic shifts toward reducing energy dependency and modifying consumption behaviours are not fully realized.

To address these gaps, future policy efforts should expand the role of energy sufficiency beyond indirect considerations and establish explicit sufficiency targets alongside efficiency measures. Additionally, greater integration of demand-reduction policies within long-term energy planning is needed to ensure that reductions in energy consumption contribute meaningfully to climate neutrality goals. Without a shift towards a more holistic

and binding approach to EDR, the EU risks missing opportunities to fully leverage demand-side interventions in achieving sustainable energy transitions.

These findings highlight the need for a broader perspective on energy demand reduction, extending beyond efficiency and behavioural changes to explicitly include energy sufficiency and a structural reconsideration of energy use. Chapter 4 builds upon this discussion by exploring alternative societal futures beyond economic growth and their implications for energy demand. By examining how different economic paradigms—such as degrowth, post-growth, and sufficiency-based models—can reshape consumption patterns, the next chapter provides insights into how energy demand reduction can be more effectively integrated into long-term sustainability strategies. The transition towards a low-energy society requires not only regulatory and market-based mechanisms but also a deeper reflection on the societal values and systemic transformations needed to sustain such a shift.

4. Alternative societal futures beyond growth and their impacts on energy and materials demand

4.1 Moving beyond incremental change

As already mentioned, the world is experiencing rising geopolitical tensions and conflict. Defence budgets are growing and economic competition between the main global markets is increasing. More than ever, energy security seems a point of concern. In this context, in 2024 the Draghi report was launched, stating that the European Union is lagging in innovation and should invest in economic growth to catch up with the main economic power blocks the United States and China (Draghi et al., 2024).

At the same time, internationally agreed climate, biodiversity and sustainable development goals are not met with currently planned policies (e.g. IPCC 2022; IPBES, 2019; UN, 2023). Also, most scientifically advocated planetary boundaries are not likely to be safeguarded (Richardson et al., 2023). According to the International Energy Agency, rising global energy demand might be compensated by a fast-growing international renewables market, which could lead to an overall peak in fossil fuels demand before 2030. However, it also states that emissions would still have to decrease very quickly after reaching that plateau, and "despite gathering momentum behind transitions, the world is still a long way from a trajectory aligned with its climate goals" (IEA, 2024).

Realising this urgency of the existing and ensuing global environmental and socio-economic challenges, an international scientific and public debate has emerged about the possibilities for societal system adaptations beyond incremental change. The basis of this debate is whether our present interpretation of 'societal welfare' is intrinsically linked to economic growth, or needs to be revisited to fundamentally reduce global energy and materials demand and to stay within climate and planetary boundaries (e.g., Spash, 2020; Widuto et al., 2023).

In this debate, many alternative economic concepts have been proposed. However, so far, the discussion about alternative economic concepts is still very blurred and contested. While proponents stress the need for fundamental changes, opponents doubt the feasibility of such alternative proposals and criticize their contents in many ways. Recent research by TNO, VTT and other partners therefore intends to shed a light on the most debated alternatives and their potential impacts on energy and materials demand and on 'societal welfare' in general. The research also highlights what might be expected from demand reduction and sufficiency policies linked to the different concepts that can be identified in the debate.

4.2 Alternative societal futures in the Beyond Growth debate

The TNO report 'Analysing the Beyond Growth Debate' (Slingerland et al., 2024a), qualitatively assessed seven international and four Dutch alternative economic concepts for their potential impacts on the Netherlands. An even more extensive analysis of twelve alternative societal concepts, also involving a quantitative AI analysis, was carried out by TNO & VTT in the study 'Mapping and analysis of alternative growth paradigms', part of the Horizon Europe project Multifutures (Slingerland et al., 2024b). Table 1 outlines the selected concepts that were analysed in both studies. While these concepts largely overlap, in the Multifutures study it was chosen to focus on international concepts only and to exclude non-normative 'dashboard' concepts such as Broad Welfare.

Table 5: Alternative economic concepts analysed

TNO – international concepts (qualitative)	TNO – Dutch concepts (qualitative)	MultiFutures (TNO & VTT) – international concepts (qualitative + quantitative)
1. Broader welfare 2. Green Growth 3. Mission Economy 4. Doughnut Economy 5. Degrowth 6. Great Mindshift 7. Buen Vivir	1. Broad Welfare_NL 2. Green Growth_NL 3. Post Growth_NL 4. Purpose Economy_NL	1. Green Growth 2. Mission Economy 3. Post Growth 4. A-Growth 5. Doughnut Economy 6. Transition Theory / Great Mindshift 7. Buen Vivir/ Sumak Kawsay 8. Ubuntu Economy 9. Wellbeing Economy 10. Steady State/ Zero Growth 11. Sufficiency Economy 12. Degrowth

Both studies made use of an ex-ante policy evaluation methodology, in which:

- the first objective was to construct a detailed policy impact chain for each concept (e.g., Rogers, 2014; FBK, 2023). This involved establishing inputs, policies and activities, outputs, outcomes, and wider societal impacts of each concept, next to underlying (implicit) hypotheses and potential risks of each approach. In this way, it was examined what picture of a future society is favoured by each concept and how it envisages to arrive there.
- A second objective of the studies was to establish a taxonomy of the concepts, in which the concepts are graphically related to each other. For that purpose, the position of each concept towards GDP growth, redistribution, technological innovation and change of norms, values and behaviours were analysed. It was also examined which actors were primarily involved in scaling up the concept from cradle to fully integrated societal concept.

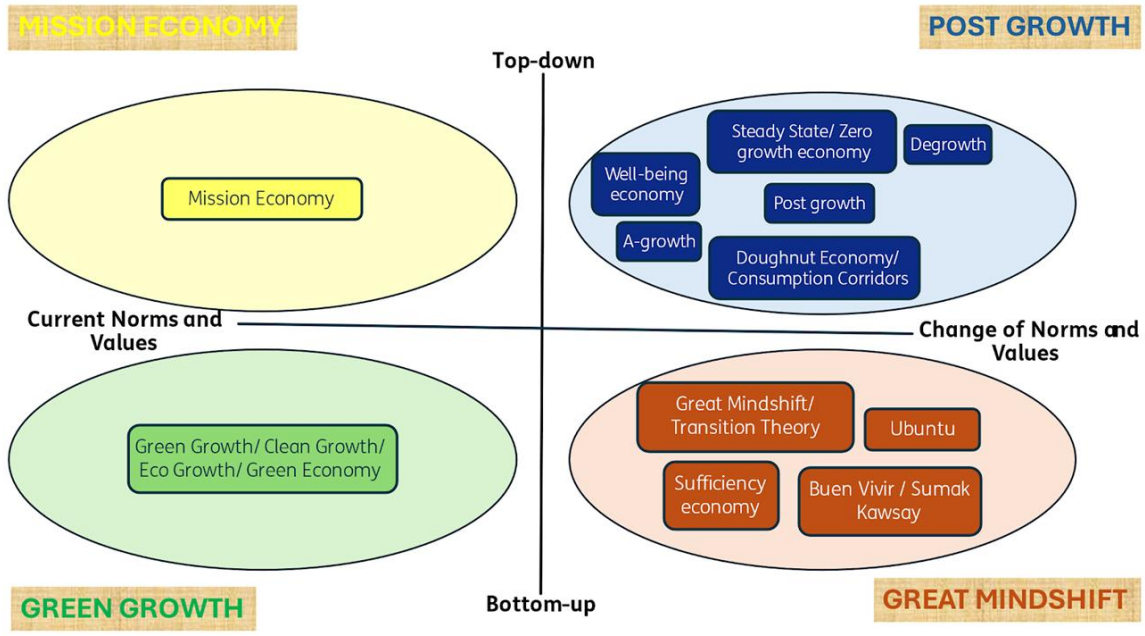
4.3 A taxonomy of alternative concepts

In Figure 2, the twelve alternative economic concepts examined in the Multifutures study are placed relative to each other in a taxonomy. Some concepts and key words in the figure have been joined as one, as, in practice, their contents in literature were found to be very similar. That holds e.g. for Green Growth, Clean Growth, Eco Growth and Green Economy, but also for Steady State and Zero Growth Economy, as well as for Great Mindshift and Transition Theory.

The analysis suggests that the concepts are not only different in their relative position towards economic growth (seen respectively as a 'precondition' or 'subordinate' to social and environmental sustainability targets), but also regarding their views on behaviour, norms and values. Where concepts like Green Growth and Mission Economy take these largely as a given, Post Growth and Great Mindshift on the contrary take change of norms and values as a prerequisite for a successful transition towards social and environmental sustainability. The analysis furthermore finds that concepts strongly differ in their view towards the role of government. Some concepts

(Mission Economy and Post Growth) see direct 'top-down' steering by government as essential, others see market actors or enlightened individuals and companies as the ones that should lead change for sustainability from 'bottom up'.

Figure 4: A taxonomy of alternative economic concepts in the Beyond Growth debate.



4.4 Key storylines in Beyond Growth debate

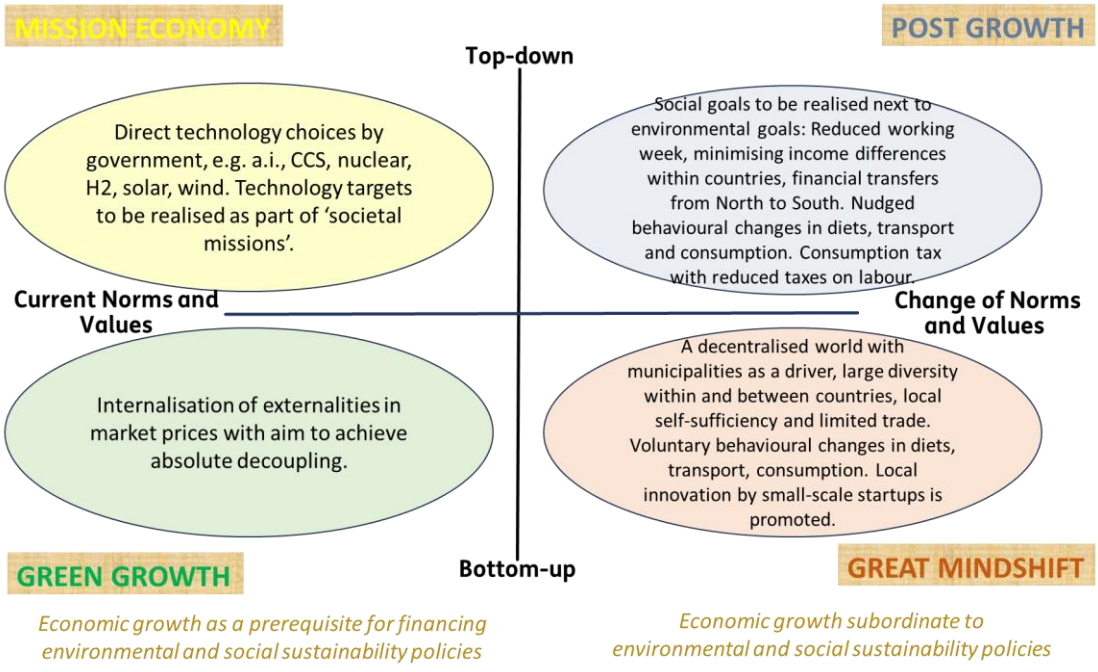
With norms and values change and the role of government, next to views on economic growth, as main divides between alternative economic concepts, four main positions in the Beyond Growth debate emerge (Figure 3).

- **Green Growth-type** concepts tend to stress the role of markets on the route towards sustainable societies. Economic growth is a means to finance environmental and social sustainability policies. The government sets borders to the market by internalising environmental externalities in market prices. In this way, companies are supposed to make their own choices that collectively will lead to sustainable societies and to decoupling economic growth from increasing environmental pressures. Current preferences of consumers and existing organisational structures in society are seen as the basis for reform, that can only be influenced in a limited way by behavioural policies. Social sustainability policies such as national and international wealth and income redistribution policies can be pursued, but are generally not a priority. Technological innovation is a key to change and is stimulated by general market-based support. Key value in a future sustainable society is individual freedom.
- **Mission Economy-type** concepts are similar to the Green Growth type in the importance given to technological innovation, economic growth and taking current preferences of consumers as the outset for societal transition towards sustainability. However, they are profoundly different in their view of the role of government in change. In a Mission Economy, the government is the leading party that defines a set of overall 'missions' for society to achieve. Originally derived from the US 'man-on-the-moon' mission in the 1960s, related to sustainability these can now for instance comprise 'zero emissions by 2050'. Part of these missions is generally a direct choice of technologies to be stimulated, and a plan of action to implement and monitor achievement of the goals set. Depending on the exact formulation, a societal mission can also comprise social sustainability goals like redistribution policies, but these seem currently

not a priority. As in the Green Growth type of concepts, individual freedom seems an important value for future sustainable societies.

- **Post Growth-type** concepts comprise a wide range of proposals with the common denominator that change of current norms, values and behaviours is seen as a precondition for a transformation to sustainable societies. They also coincide in their view that social and environmental sustainability goals should be key to policy making, with economic growth, or not, as a resulting and subordinate outcome of such policies. However, they differ in particular in the degree to which negative economic growth ('Degrowth' concepts) should be a policy goal or not ('A-growth' concepts). In general, Post Growth concepts see redistribution of wealth and income on national and international levels (North-South) as an important part of social sustainability policies to be pursued. Technological innovation is important, but should be stimulated with a focus on open access, privacy protection and democratic control. While public participation is a further notable aspect of Post Growth concepts, social sustainability policies such as reduced working weeks, consumption taxes and universal basic incomes require direct governmental intervention. Community and eco-centricity are key values of sustainable societies.
- **Great Mindshift-type** concepts similar to Post Growth concepts see economic growth as an outcome of steering towards environmental and social sustainability goals. Even more than Post Growth concepts, they focus on the need for different norms, values and behaviours of citizens towards sustainable societies. However, rather than by direct governmental intervention, such a transformation should in its core arise from bottom-up transformation by frontrunner citizens and enlightened companies, whose example will be the key germ of change. Great Mindshift-type concepts often focus on local communities and on self-sufficiency on a smaller scale. Redistribution and democratic participation in such communities are important, as well as harmony with nature. Regarding technology, small-scale niche innovation should be stimulated. Like in Post Growth, ecocentrism and (local) community are important values in the Great Mindshift-type of sustainable societies.

Figure 5: Key storylines in the Beyond Growth debate



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4.5 Impacts on demand reduction and sufficiency

The research performed on alternative economic concepts shows that all four main directions in the Beyond Growth debate identified still show significant gaps in their views how a future sustainable society should look like in more detail, as well as in their proposed policy routes. Underlying assumptions and assessments of potential risks and trade-offs are also incomplete. For instance, Green Growth-type concepts are based on the implicit assumption that a long-term global decoupling of economic growth and detrimental environmental impacts is possible. While there is some empirical evidence suggesting that decoupling regarding climate change for some time in some countries is possible, on a larger scale this assumption is still unproven. Post Growth concepts on the other hand assume that there is sufficient public support for behavioural change policies, which also remains to be seen on a larger scale. Neither are there detailed geopolitical and political economy analyses found of how interests of incumbent parties, countries and companies, should be aligned with those of new stakeholders for a step-by-step implementation of the concepts.

In this context, several observations can be made when relating the analysis of alternative economic concepts more specifically to energy and materials demand reduction and sufficiency policies. First, all concepts in theory could incorporate demand reduction initiatives, but the acknowledged need for intensified policy action might differ. Whereas in Green Growth and Mission Economy worlds the current objective of reducing carbon emissions to zero might prevail, in Post Growth and Great Mindshift-type of scenarios policy makers could be more inclined towards expanding environmental sustainability objectives to all planetary boundaries.

Second, the preferred routes towards demand reduction in the four storylines will be different. In a Green Growth and Mission Economy world, most likely demand reduction would be primarily sought by way of technological innovation. Strong energy efficiency policies therefore would likely be prioritised over actions directed at sufficiency by behavioural change. Sufficiency actions on the other hand would fit seamlessly in Post Growth and Great Mindshift type of worlds, and are in fact also directly promoted within these concepts.

Third, the resulting societal structures and social sustainability in all four cases are likely to be very different. Due to its stated preference to redistribution, strong policies on combatting energy poverty are more likely to be part of demand reduction policy packages in Post Growth and Great Mindshift scenarios than in Green Growth and Mission Economy worlds. Equally, demand reduction by progressive taxing and nudging high-end consumers would fit perfectly in the former, but much less so in the latter scenarios. And while new business models, sharing initiatives, small-scale sustainable business, citizen and cooperative ownership as well as local sufficiency in theory could develop in all storylines, their specific attention and embedding seems to fit more with Post Growth and Great Mindshift contexts than with Green Growth and Mission Economy.

With that being said, recent policy changes in many countries suggest that worldwide attention to sustainability as an important policy objective, is further declining. The European Union nevertheless is still upholding sustainability as one of the pillars of its policies. With the recently published Draghi report, the Commission is also taking a clear stance in the Beyond Growth debate. Economic growth is embraced as a necessary means to finance the European social model and to protect its fundamental values of 'prosperity, equity, freedom, peace and democracy in a sustainable environment' (Draghi et al., 2024, p.5). Stimulating digitalisation, decarbonisation and strengthening the defence industry are proclaimed as the main missions of the European economy, while a more integrated European market with less bureaucratic hurdles should be developed.

Projecting this approach on the analytical framework developed, the Draghi approach seems to fit very closely in the Mission Economy, with some aspects of Green Growth. It is based on the presumption that with a declining European population increasing demand is the way to finance social and environmental sustainability. Mirroring

the Draghi report on the framework of alternative economic concepts also allows to identify potential gaps in the approach chosen. Following the Green Growth concept in more detail, for instance, reflecting externalities in market prices could be used more extensively in order to stimulate demand for low-carbon options and other sustainability targets. This could also help to increase focus on EU-internal redesign and re-use options, which could reduce external dependencies on critical raw materials. Stimulation of local self-sufficiency as in Great Mindshift could additionally contribute to reducing vulnerabilities.

Further, next to preparing for a conflictive world by investing in defence industries also a strategy for global cooperation could be developed. Borrowing from Post Growth ideas, this could be done by investing in developing markets for EU low-carbon technologies and in social innovation approaches in the global South. Finally, and perhaps most importantly, building jointly on ideas and policy proposals from Post Growth and Great Mindshift, sufficiency approaches could help to redirect demand towards more sustainable products and services next to increasing energy efficiency. In this way, a strategy could be developed that is not only more resilient to conflict, but that also helps to stimulate international cooperation, as well as a sustainable production and demand that fit within planetary boundaries.

5. Recommendations

Building on the analysis presented in the preceding chapters, this section provides a set of policy recommendations to enhance the role of energy demand reduction in the European Union's energy and climate strategies. Despite the growing recognition of EDR as a key component of the clean energy transition, existing policies primarily focus on energy efficiency and behavioural change, while the concept of energy sufficiency remains underdeveloped in the legislative and regulatory landscape. This chapter highlights key policy gaps and offers recommendations to strengthen the integration of EDR within EU energy legislative frameworks.

Strengthening the policy framework for energy demand reduction

- **Integrating energy sufficiency as a core principle in EU energy policy:** while the Fit for 55 Package and the REPowerEU Plan incorporate various mechanisms to enhance energy efficiency, there is no dedicated strategy for energy sufficiency, which seeks to reduce absolute energy consumption rather than merely improving efficiency. Addressing this gap requires the development of sufficiency-oriented regulations that encourage lower overall energy consumption, such as progressive electricity tariffs, restrictions on excessive energy use, and incentives for low-energy lifestyles. Additionally, expanding research funding for sufficiency measures, particularly in areas such as sustainable urban planning, low-energy mobility, and minimal-impact housing solutions, is essential to advancing the role of sufficiency in EU energy policies.
- **Expanding demand-side flexibility mechanisms:** demand-side flexibility is crucial for optimizing energy consumption and reducing peak loads on the grid. However, current EU policies primarily focus on large-scale industrial demand response programs, with limited incentives for household-level engagement. To address this, incentives for dynamic pricing models should be increased, rewarding consumers for adjusting their energy use based on grid demand. Enhancing digitalization in energy management by integrating smart meters and AI-driven energy optimization tools can further encourage active consumer participation. Additionally, decentralized energy systems should be promoted, empowering local communities to engage in peer-to-peer energy trading, collective self-consumption, and prosumer models, thereby fostering greater demand-side flexibility.
- **Aligning energy demand reduction with social equity goals:** many EDR policies risk disproportionately impacting low-income households, particularly when driven by market-based mechanisms such as carbon pricing. To ensure that energy demand reduction measures are equitable, strengthening the Social Climate Fund (SCF) by expanding financial support for vulnerable consumers investing in energy-efficient solutions is critical. Integrating energy sufficiency measures into social housing policies would ensure that public housing projects adopt low-energy design principles. Furthermore, introducing behavioural change programs that are culturally and socio-economically inclusive would help ensure that energy-saving habits are accessible and effective across diverse demographic groups.

Enhancing the role of behavioural change in energy demand reduction

- **Scaling up and better integrating awareness campaigns and educational initiatives in EU energy policies:** although behavioural change plays a critical role in reducing energy demand, existing EU initiatives remain fragmented and short-term in nature. Establishing long-term behavioural awareness programs at the EU level is necessary to integrate energy-saving behaviours into school curricula, workplace training, and public awareness campaigns. Utilizing behavioural economics to design nudging policies, such as default energy-saving settings on appliances, feedback mechanisms on energy bills, culture-heritage based actions and gamified reward systems for energy-use reduction, can further encourage behavioural shifts. Additionally, expanding participatory decision-making mechanisms to engage citizens in co-developing local energy reduction strategies will foster stronger societal engagement in demand-side measures.

- **Encouraging sustainable consumption patterns:** energy demand reduction cannot be achieved solely through efficiency measures; consumption patterns must shift toward low-energy lifestyles. This includes encouraging the uptake of low-energy alternatives and phasing out the least efficient, high-consumption products by introducing minimum sufficiency and efficiency standards for household appliances. Incentivizing sustainable design and discouraging excessive energy use in consumer goods can support this shift without restricting choice. Promoting shared economy models—such as car-sharing, community-owned appliances, and cooperative housing solutions—can further reduce unnecessary energy consumption. Strengthening public transportation systems and non-motorized mobility infrastructure would also help make low-energy transportation the default option for urban populations, reducing reliance on private vehicles and high-energy mobility solutions.

Policy synergies and institutional coordination

- **Integrating energy demand reduction across EU climate and energy policies:** currently, EDR measures are dispersed across multiple policy frameworks. To improve policy coherence, a dedicated Energy Demand Reduction Strategy should be established at EU level, providing a long-term, structured approach to sufficiency measures. Creating an inter-agency task force to ensure coordination between DG Energy, DG Climate Action, and DG Environment on demand-side strategies is crucial for ensuring that policies are effectively aligned. Developing mandatory energy demand reduction impact assessments for all new energy policies will further ensure that energy-saving potential is prioritized across regulatory frameworks.
- **Leveraging EU funding mechanisms for demand reduction:** many EU funding instruments, such as the Recovery and Resilience Facility (RRF) and Horizon Europe, currently prioritize renewable energy deployment and industrial decarbonization, with limited emphasis on demand-side interventions. To redirect financial support toward EDR, funding for local energy sufficiency projects should be increased through the European Regional Development Fund (ERDF) and the Just Transition Fund (JTF). Additionally, EDR-focused funding streams should be introduced within Horizon Europe to support research on low-energy urban planning, behavioural change models, and circular economy initiatives. Expanding tax incentives for households and businesses that adopt energy sufficiency measures, rather than solely focusing on energy efficiency improvements, would further support the broader adoption of demand-reduction strategies.

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