



Towards resource consumption within planetary boundaries

The case for binding EU material footprint reduction targets

This policy brief calls for ensuring resource consumption within planetary boundaries via, most notably, binding EU material footprint reduction targets. Section 1 introduces the EU policy context around the EU material footprint reduction targets and reducing resource consumption in general. Section 2 puts forward key arguments for reducing resource consumption and section 3 concludes with a call for action and some initial policy recommendations.

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While the EU has emerged as a global leader with regard to policymaking for the circular economy, the policy agenda to date has focused on material productivity gains, which are susceptible to rebound effects, rather than **achieving absolute material use reductions**.

The 2011 EU Roadmap to a Resource Efficient Europe led to the establishment of a Resource Efficiency Scoreboard with Resource Productivity – defined as GDP divided by DMC – as the lead indicator. The current Circular Economy Monitoring Framework includes a Circular Material Use Rate indicator, measuring the ratio of recycled materials to overall material demand, designed to incentivise a reduction in virgin material use. But in both cases, the indicator can improve even while absolute use of materials increases.

The second **Circular Economy Action Plan** (CEAP) acknowledges the

need to keep the EU's resource consumption within planetary boundaries but stopped short of including new targets for absolute material use reductions.

The new CEAP starts to develop important policy tools for demand-side action – such as the Right to Repair proposal, efforts to address planned obsolescence and aspects of the proposed revision to the Ecodesign Directive. However, while a revision to the **Circular Economy Monitoring Framework** is foreseen for November 2022 – critically due to include consideration of consumption and material footprints – there is no process identified to establish science-based EU reduction targets for such indicators.

The **European Parliament's resolution on the new CEAP** makes a clear call for targets and policies to achieve absolute EU material use and consumption reductions, which should mark a turning point in EU efforts to address sustainable consumption. Notably, the Parliament's resolution calls on the European Commission to propose science-based, binding, near- and long-term targets to reduce the use of primary raw materials and environmental impacts, and to significantly reduce EU material and consumption footprints, building on the experience of Member States.

The Netherlands and Finland are front-runners in this regard with the Netherlands having already established a national target to reduce the use of primary raw materials (minerals, fossil and metals) by 50 percent by 2030¹ and Finland outlining that its total consumption of domestic primary raw materials in 2035 will not exceed the level in 2015². Moreover, in Belgium, **Flanders** set an objective to reduce the material footprint by 30% in 2030 and 75% in 2050 in its Climate and Energy Plan 2021-2030³. A group of countries composed of **Belgium, Denmark, Estonia, Finland, France, Lithuania, Poland, Slovakia and Spain** emphasized in a Joint Non-Paper on the Upcoming Sustainable Product Initiative that the proposal should make it possible to launch '*a process towards material and consumption footprint reduction targets in Europe*' and should be '*completed by principles that prevent overproduction (including overpackaging) and overconsumption*'⁴.

At the EU level, discussions on reducing consumption have been centred around energy in the wake of the war in Ukraine and the energy crisis. On 20 July the **European Commission** put forward a target to reduce gas consumption by 15% between August 2022 and March 2023⁵.

¹ Ministry of Infrastructure and the Environment and the Ministry of Economic Affairs, the Ministry of Foreign Affairs and the Ministry of the Interior and Kingdom Relations of the Netherlands (2016). A Circular Economy in the Netherlands by 2050 [Link](#)

² Ministry of Economic Affairs and Employment and Ministry of the Environment of Finland (2021). Finland's Circular Economy Programme sets targets to curb overconsumption of natural resources [Link](#)

³ Belgium (2019.) Belgian Integrated National Energy and Climate Plan 2021-2030 [Link](#); Climate Chance (2021). Flanders - The development of a comprehensive strategy for the bioeconomy [Link](#)

⁴ Belgium, Denmark, Estonia, Finland, France, Lithuania, Poland, Slovakia and Spain (2021). Joint Non-Paper on The Upcoming Sustainable Product Initiative [Link](#)

⁵ Frédéric Simon and Kira Taylor (2022). Brussels lays out EU gas crisis plan ahead of coming winter [Link](#)

On 14 September, the European Commission proposed two demand reduction targets, namely a non-binding objective to reduce overall electricity demand by at least 10% until 31 March 2023 and a binding electricity consumption reduction target of 5% for at least 10% of high demand hours each week⁶. Although a step in the right direction, these initiatives have concentrated on energy consumption reduction, leaving absolute reduction of resource consumption out of the agenda.

EU action on environmental challenges is strongest where binding, science-based targets are established. EU climate policy has been driven by greenhouse gas emissions reduction targets of at least 55% by 2030 compared to 1990 and climate neutrality by 2050, with a comprehensive package of measures Fit for 55 spanning various sectors.⁷ Binding EU material footprint reduction targets are a powerful policy tool to bring about significant measures to address EU resource overconsumption and its consequences. Reduction targets on resource consumption have a potential to set an **overarching vision for the European Commission** and drive new circular economy policies focused on demand-side measures.⁸

Reducing resource consumption has a potential to significantly contribute to advancing the wider EU environmental and social agenda. In this paper, we illustrate five main reasons why binding EU material footprint reduction targets should be a flagship proposal in the next European Commission's work programme.

1. Reducing material consumption is vital to achieving the EU's objectives to "live well within planetary boundaries"

EU consumption is transgressing several **planetary boundaries** and yet existing policies are likely inadequate to reduce resource consumption to a sustainable level. The EU's Eighth Environment Action Programme (8th EAP) reinforced the commitment to 'live well, within the planetary boundaries'.⁹ In absolute terms, EU consumption alone transgresses the planetary

⁶ Kira Taylor (2022). Brussels tables 5% mandatory energy savings goal ahead of difficult winter. Euractiv [Link](#)

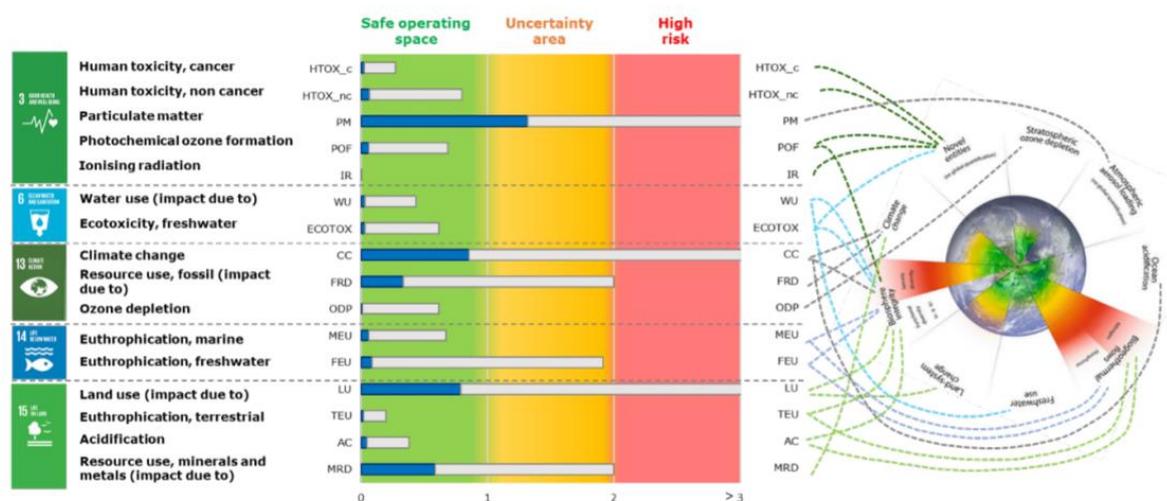
⁷ Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions 'Fit for 55': delivering the EU's 2030 climate target on the way to climate neutrality, com/2021/550 final [Link](#)

⁸ European Environment Agency (2021) growth without

⁹Arnold Tukker, Tanya Bulavskaya, Stefan Giljum, Arjande Koning, Stephan Lutter, MoanaSimas, Konstantin Stadler, Richard Woodd (2016) Environmental and resource footprints in a global context: Europe's structural deficit in resource endowments [Link](#); Richard Wood, Konstantin Stadler, Moana Simas, Tatyana Bulavskaya, Stefan Giljum, Stephan Lutter, Arnold Tukker (2018) Growth in Environmental Footprints and Environmental Impacts Embodied in Trade: Resource Efficiency Indicators from EXIOBASE3 [Link](#); Mo Lia, Thomas Wiedmann, Kai Fang and Michalis Hadjikakou (2021) The role of planetary boundaries in assessing absolute environmental sustainability across scales [Link](#); Sala, L. Benini, A. Beylot, A. Cerutti, S. Corrado, E. Crenna, et al. (2019) Consumption and Consumer Footprint: Methodology and results [Link](#)

boundary for particulate matter and contributes to **90 percent of the planetary boundary for climate change** (see Figure 1). In per capita terms, Sala et al. find EU consumption transgresses the planetary boundaries in several areas, including climate change, particulate matter and land use.¹⁰

Figure 1: Estimated impacts of EU consumption in absolute terms as a share of global impacts in respect of SDGs and planetary boundaries¹¹



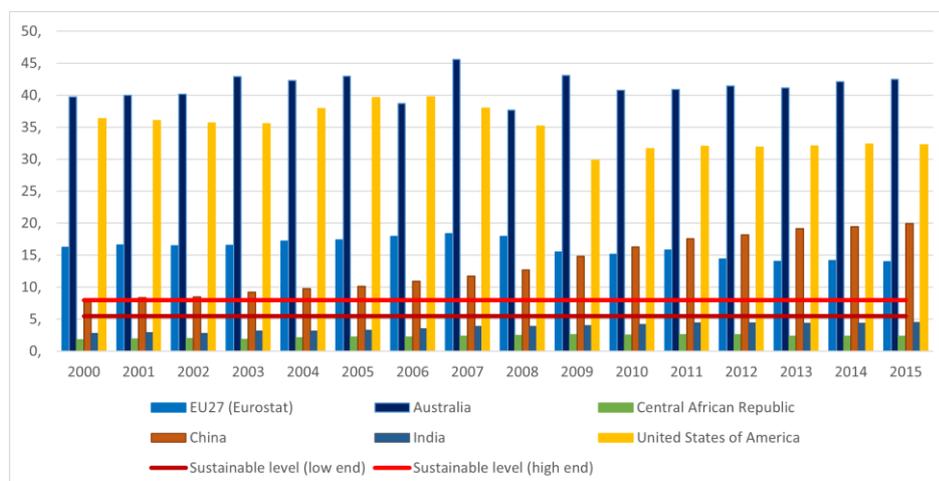
In per capita terms, the EU MF is today substantially higher than much of the rest of the world, and between 40-70% higher than available estimates of a sustainable level that can be considered broadly consistent with limiting environmental pressure within planetary boundaries (see Figure 2). In 2015, the EU MF was approximately 14 tonnes per capita according to Eurostat, compared to less than 4.5 tonnes per capita in India or 2.3 tonnes per capita in the Central African Republic, for example, and to a sustainable global average MF of between 5.5 and 8 tonnes per capita, according to the International Resource Panel¹². Significantly, there is very likely wide variation in the MF among and within EU Member States, based on available Member State data for DMC or consumption-based greenhouse gas emissions, for example.

¹⁰ Sala, L. Benini, A. Beylot, A. Cerutti, S. Corrado, E. Crenna, et al. (2019) Consumption and Consumer Footprint: Methodology and results [Link](#)

¹¹ Reproduced from Sala, L. Benini, A. Beylot, A. Cerutti, S. Corrado, E. Crenna, et al. (2019) Consumption and Consumer Footprint: Methodology and results [Link](#)

¹² International Resource Panel (2019). Global Resources Outlook [Link](#)

Figure 2: EU27 Eurostat Material Footprint estimate in comparison with IRP (2019)¹³ estimates for a selection of other countries, and the IRP (2011)¹⁴ lower and upper bound estimates of a sustainable level

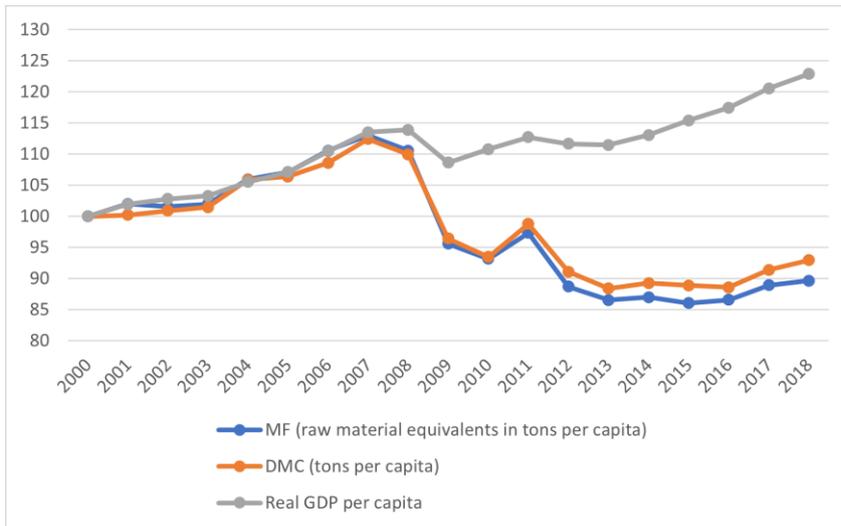


From 2000-2018, EU DMC and MF (which were closely aligned in this period) fell by 7 and 10 percent respectively although this has likely entailed increasing spill-over of environmental impacts beyond the EU's borders. Both EU DMC and MF were rising sharply until the global financial crisis, before falling in absolute terms thereafter, stabilising from 2013-16 and appearing to rise again in recent years (see Figure 3). The decomposition of the DMC shows that the improvement after the financial crisis was driven largely by increased exports from the EU. Notably however, EU domestic extraction of raw materials fell by just 3% from 2009-2018 while EU material imports increased by 17%, suggesting that the EU is increasingly externalising the environmental impacts of European consumption beyond its borders.

¹³ International Resource Panel (2019). Global Resources Outlook [Link](#)

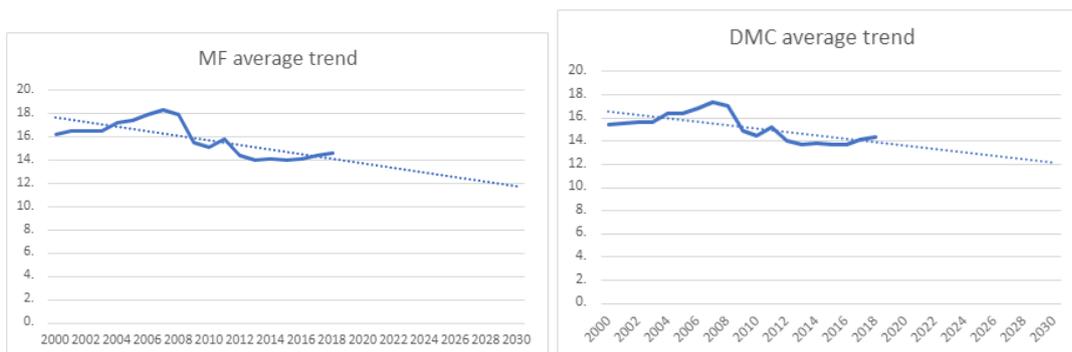
¹⁴ International Resource Panel (2011) Decoupling natural resource use and environmental impacts from economic growth, A Report of the Working Group on Decoupling to the International Resource Panel [Link](#)

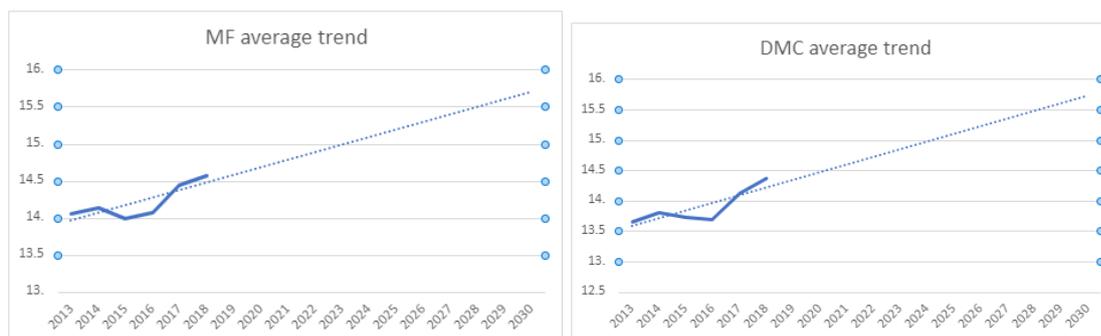
Figure 3: EU Material Footprint (MF), Domestic Material Consumption (DMC) and real GDP per capita 2000-2018



The long-term DMC and MF trend remains unclear, highlighting the need for explicit targets and accompanying policies to achieve substantial near- and long-term reductions in EU material consumption. If we assume the 2000-2018 linear trend continues over the next decade, EU MF and DMC could fall a further nearly 20 percent below 2018 levels, to approximately 12 tonnes per capita by 2030. If that trend then continued, the EU would reach per capita consumption of just over 8 tonnes by 2050, nearly achieving the lower bound of the estimated sustainable consumption level. However, if we assume that the 2013-18 trend continues, the picture is quite different: EU MF would increase a further 8% above 2018 levels by 2030, reaching approximately 15.7 tonnes per capita by 2030 – nearly back to the level in 2000. If that trend further continued out to 2050, EU MF would reach over 17 tonnes per capita – 2-3 times higher than the estimated sustainable level.

Figure 4: Average trend projections for MF (left hand) and DMC (right hand) based on 2000-2018 trend (upper) and 2013-18 trend (lower)





2. Reducing material consumption can help the EU to reduce its energy demand and achieve its decarbonisation and biodiversity objectives

Reducing material throughput in the EU will contribute to the **achievement of EU's climate change and biodiversity targets**. Cutting material use can help accelerate the EU's decarbonisation in two main ways. Firstly, material efficiency measures can reduce hard-to-abate process emissions in EU production of raw materials like steel, cement, aluminium and plastic, by over 50% by 2050 according to one estimate.¹⁵ Secondly, material use reduction contributes to lower overall energy demand in the economy, reducing the amount of renewable energy that is needed and thereby greatly facilitating a much faster low carbon transition.¹⁶ Notably, the European Commission's climate and energy models are not, however, currently equipped to capture these benefits.

It is worth noting however that not all decarbonisation policies may bring dematerialisation benefits, as some might entail significant greenhouse gas emissions reduction but result in increased demand for resources. For example, to fully electrify the current passenger car fleet more than 227 megatonnes of key materials, that is 3.5% of EU's total raw material consumption, would be necessary.¹⁷ Therefore, it is crucial to ensure coherence between dematerialisation and decarbonisation policies and ensure that they are mutually beneficial.

Moreover, addressing resource overconsumption is closely linked to biodiversity as it addresses the root causes of biodiversity loss. Indeed, extraction and processing of natural

¹⁵ Material Economics (2018) The Circular Economy a Powerful Force for Climate Mitigation: Transformative innovation for prosperous and low-carbon industry [Link](#)

¹⁶ Arnulf Grubler, Charlie Wilson, Nuno Bento, Benigna Boza-Kiss, Volker Krey, David L. McCollum, Narasimha D. Rao, Keywan Riahi, Joeri Rogelj, Simon De Stercke, Jonathan Cullen, Stefan Frank, Oliver Fricko, Fei Guo, Matt Gidden, Petr Havlík, Daniel Huppmann, Gregor Kiesewetter, Peter Rafaj, Wolfgang Schoepp and Hugo Valin (2018) A low energy demand scenario for meeting the 1.5 °C target and sustainable development goals without negative emission technologies [Link](#)

¹⁷ Eline Blot and Thorfinn Stainforth (2022) Net-zero, circular transition in road transport: Addressing social and environmental spillovers of materials demand changes in the road transport sector [Link](#)

resources causes 90% of biodiversity loss.¹⁸ Reducing the material consumption therefore has a potential to decrease the pressures on ecosystems from resource extraction and tackles the key drivers of biodiversity loss in particular in high-impact industries, such as construction and agriculture.¹⁹

3. Reducing material consumption is critical to achieving EU strategic autonomy

Security of supply has been central in the EU debates on the energy crisis, yet it is just as acute a concern with regard to energy and it is for critical raw materials. Reducing EU's dependence on imports of critical raw materials would help it to **preserve its independence and strengthen EU's resilience** to potential future conflicts.

Extraction and use of primary materials is expected to increase from the current level of 79 gigatonnes to 167 gigatonnes at the global level. Although the EU produces certain critical raw materials within its borders, it heavily relies on the imports from non-EU countries. Supplies of materials for the EU is focused on just a few countries, with many of them governed by authoritarian regimes, experiencing high levels of corruption or in highly unstable positions.²⁰

98% of the EU's supply of rare earth elements comes from China, 98% of EU's supply of borate comes from Turkey and 71% of the EU's supply of platinum comes from South Africa.²¹ Top suppliers of steel to meet EU's demand are Turkey, Russia and Ukraine.²² In 2019 42% of EU's imports of crude oil were conducted with only three countries – Russia, Saudi Arabia and Kazakhstan – and almost half of imports of solid fuel came from Russia.

The high and growing dependency of the EU economy for materials is likely to contribute to conflicts and human rights violations, particularly in the Global South. Reducing material consumption would facilitate the development of the EU's strategic autonomy and decrease its dependence on external sources of materials.²³

4. Reducing material consumption will support EU efforts to ensure respect for human rights in EU value chains

Several EU initiatives addressing **adverse human rights and environmental impacts**, most notably the Corporate Sustainability Reporting Directive, Corporate Sustainability Due Diligence, Regulation on deforestation-free products proposal and EU Battery Regulation all

¹⁸ International Resource Panel (2019). Global Resources Outlook [Link](#)

¹⁹ Sitra (2022). Tackling root causes: Halting biodiversity loss through the circular economy [Link](#)

²⁰ Céline Charveriat and Tim Gore (2022). The case for green strategic autonomy [Link](#)

²¹ European Commission (2020). Critical Raw Materials [Link](#)

²² International Trade Administration (2019). Steel Imports Report: European Union [Link](#)

²³ Céline Charveriat and Tim Gore (2022). The case for green strategic autonomy [Link](#)

require significant new due diligence processes by companies. Extraction of raw materials is associated with a number of human rights violations, with 304 human rights abuse allegations recorded between 2010 and 2021.²⁴

Mining has been linked with various human rights impacts, such as poor or illegal labour conditions leading to injury, illnesses, disability and death; use of violence against local communities protesting on the ground; forced displacement of indigenous and local communities and many more.²⁵ Measures to reduce material demand will complement efforts to ensure robust due diligence processes for remaining supply chains.

5. Reducing material consumption is likely to support the wellbeing of EU citizens

Reducing material consumption is at the core of moving toward a **different model of economy that prioritises planetary and human wellbeing**. There is a growing support for stepping beyond growth as an indicator of progress and recognising the importance of reducing resource consumption to facilitate wellbeing and address inequalities.

Several studies have debunked the ‘happiness-consumption myth’ putting forward evidence that increased material consumption does not lead to increased wellbeing and happiness, beyond a point of basic human needs²⁶. Consuming less and prioritising non-material values therefore does not reduce the quality of life, including various aspects of subjective and psychological wellbeing, be it emotions, life satisfaction or life purpose.²⁷

Reducing material consumption is also closely associated with the distribution of and access to resources among and within countries. The EU uses between 70% and 97% of the ‘safe operating space’ related to resource extraction impacts, leaving between 30% and 3% for the rest of the world.²⁸ The 1.2 billion poorest people account for just 1% of the world’s consumption, while the one billion richest consume 72%.²⁹ Reducing consumption and

²⁴ Green Alliance (2021) As demand for critical raw materials rises we need a better plan to manage them [Link](#)

²⁵ Friends of the Earth Europe and European Environmental Bureau (2021) ‘Green mining’ is a myth [Link](#)

²⁶ Mònica Guillen-Royo (2019) Sustainable consumption and wellbeing: Does on-line shopping matter? [Link](#); David Andersson, Jonas Nässén, Jörgen Larsson & John Holmberg (2019) Greenhouse gas emissions and subjective well-being: an analysis of Swedish households [Link](#); Martin Binder and Ann-Kathrin Blankenberg (2017) Green lifestyles and subjective well-being: More about self-image than actual behavior? [Link](#);

²⁷ Antonella Delle Fave, Ingrid Brdar, Teresa Freire, Dianne Vella-Brodrick and Marié P. Wissing (2011) The Eudaimonic and Hedonic Components of Happiness: Qualitative and Quantitative Findings [Link](#)

²⁸ Friends of the Earth Europe and European Environmental Bureau (2021) ‘Green mining’ is a myth [Link](#)

²⁹ United Nations (2013) A New Global Partnership: Eradicate Poverty And Transform Economies Through Sustainable Development [Link](#)

emissions associated with levels of consumption is therefore crucial for addressing inequalities and supporting a fair distribution of resources.

Conclusion

EU resource consumption is more than double the sustainable level and is transgressing several planetary boundaries and yet existing policies are likely inadequate to reduce resource consumption to the sustainable level. EU action on environmental challenges is strongest where binding, science-based targets are established. Reduction targets on resource consumption have a potential to set an overarching vision for the European Commission and drive new circular economy policies focused on demand-side measures.

Reducing resource consumption has a potential to significantly contribute to advancing the wider EU environmental and social agenda, by keeping EU consumption within planetary boundaries, facilitating the reduction in energy demand, decarbonisation and biodiversity action in the EU as well as achievement of EU strategic autonomy. Moreover, it would contribute to ensuring respect for human rights in EU value chains and supporting the wellbeing of EU citizens. Now is the time for the European Commission to start preparing the groundwork to make EU mandatory material footprint reduction targets a centre piece of the post-2024 work programme for an EU sustainable wellbeing economy.

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