Why upstream policy is the missing link in the circular economy, and what to do about it

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How to stimulate industrial innovation within planetary boundaries

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The circular economy is needed to resolve the world's most pressing issues. But current legislation impact is insufficient.

Despite a decade of EU policy on circular economy, Europe's material footprint has not decreased. The problem is not ambition but where in the value chain the policy pressure is applied. This report argues the missing link is upstream, at the point where materials enter the economy.

Human activities and consumption are pushing the planet beyond its safe operating limits, as shown in the Planetary Boundary framework. In 2025 seven of the nine planetary boundaries had already been surpassed, driven by our economy's unceasing and increasing demand for natural resources.

Over the past 50 years, resource extraction has grown threefold, accounting for more than 55% of global greenhouse gas emissions (or over 60% if land-use change is considered). Overall, according to UNEP, the built environment, mobility, food, and energy systems account for:

- 90% of material demand
- 70% of climate impacts
- >80% of biodiversity loss and water stress

Maintaining the status quo endangers both the economy and the integrity of the biosphere. Therefore, the shift towards sustainable resource management appears imperative for prosperity and resilience.

Policy action without any significant impact

The Circular Economy (CE) has been promoted as a method for decoupling resource usage and economic growth, with the EU implementing initiatives such as the Green Deal and the Circular Economy Action Plan, and the coming Circular Economy Act. However, these initiatives focus primarily on efficiency and waste rather than absolute environmental benefits, which would need reducing total resource use and extraction. Not surprisingly the EEA (2025) reported that in the period 2010–2023 the EU footprint has hoovered around 14 tons per capita, demonstrating that policies and legislation as yet have not been successful in reducing Europe's material footprint, partly due to the limited focus on recycling and waste management.

To reduce the gap between the CE vision - which is often criticised for being too "vague" - and its implementation, defined resource use targets are required. Targets and limits set strategic direction, remove ambiguity, and foster collaboration between politicians and industry.

What follows sets out where current policy falls short, what an upstream-led alternative with binding targets looks like, and three things that need to happen for it to work. It is based on perspectives of a number of actors, representing authorities, NGOs and independent sustainability experts on the need and potential of such targets.

The leverage point is upstream, where materials enter the economy, rather than downstream where they exit

The transition to a society within planetary boundaries is a complex challenge that needs to be addressed from many different perspectives, including production, business, consumers and policy. In this report we focus on the role of policymaking in steering companies and businesses in the right direction with the help of setting binding targets and other policy instruments.

Through 16 interviews with industry representatives (presented in detail in a separate report) and six interviews with representatives from NGO:s, authorities and policy influencers, we explored different targets and policy options. Through questions on challenges and advantages – with special focus on binding targets – we could from the answers outline a list of possible targets, policies and regulations. In two workshops with representatives from the full value chain of the automotive industry, we continued to explore different targets and policy instruments and made in-depth explorations of pros and cons of a potential trading system for resources (based on the principles of EU-ETS for CO2 emissions).

We have focused on public policy for companies and industry, and have excluded regulation or policy aiming for other parts of society, such as consumers. We also do not include industry or company internal policy or targets, although we give some examples of policy that could be implemented both mandatory and voluntary. We do not explicitly exclude any geographic level in our analysis, but in practice the work has focused on national and EU-level policy.

The presumption of our work was that most goal setting and policy intervention have happened downstream in a generic value chain, while there is an untapped potential for stronger incentives and more transformation when moving upstream in the value chain. Figure 1 show where in the value public policy currently is focused. In Figure 2, we outline where in the value chain our suggested goals and policy interventions would be active (next page).

What we mean by binding targets:

Defining a "material quota" i. e. a limit for material use on societal level, and then broken down and assigned per industry.

This is still mostly a theoretical concept, but for example the global plastic treaty has suggested a target of a 40% reduction of plastic production from a 2025 baseline, which would mean a de facto limit on virgin plastic production and use.

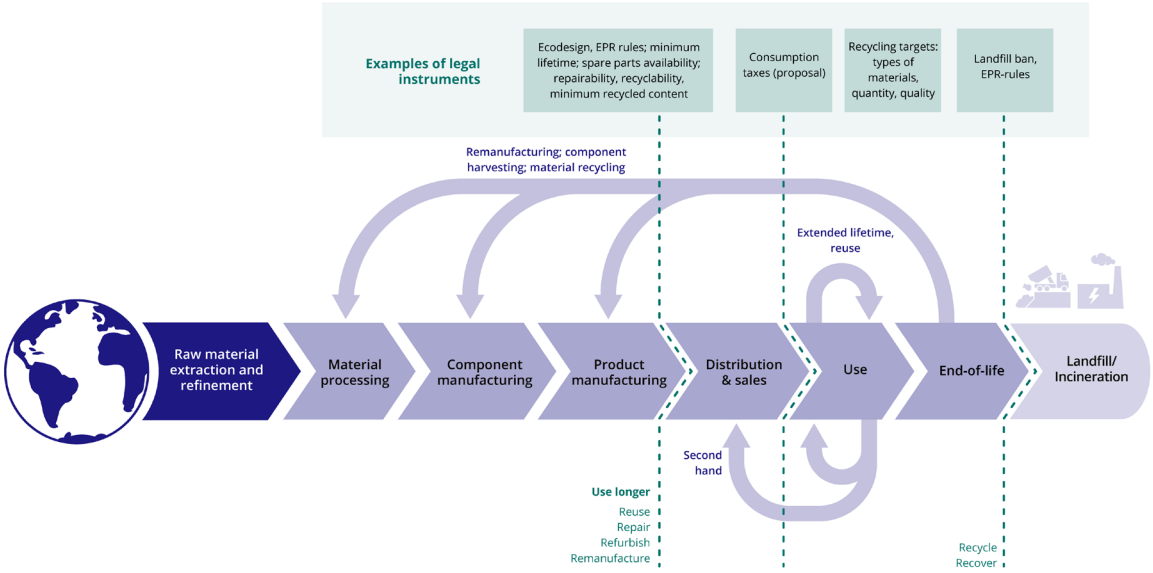

Figure 1. Current focus of public policy is on the downstream part of the value chain, for example through ecodesign and waste legislation.

A new focus for public policy

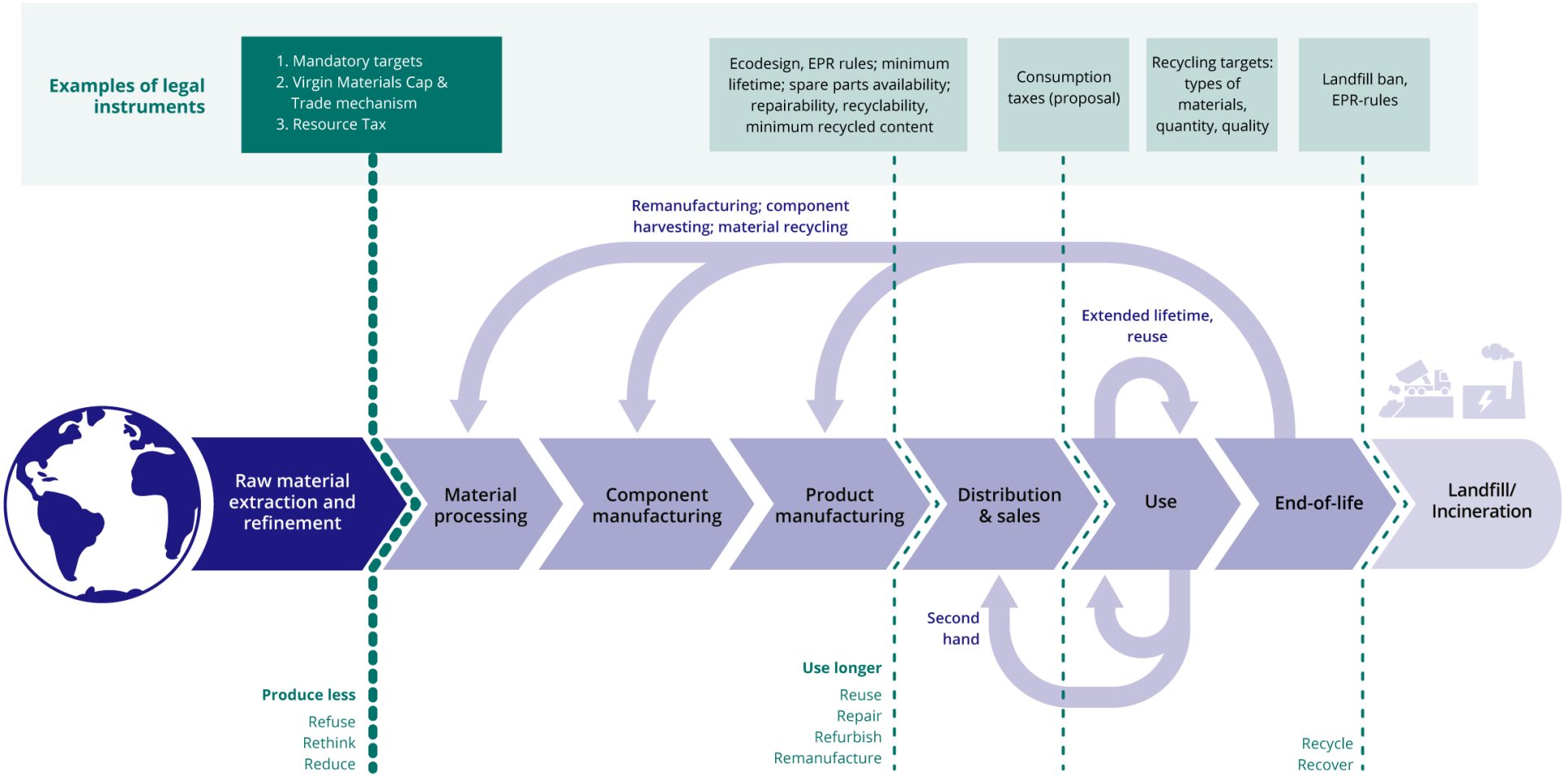

Figure 2. Adding policy instruments upstream the value chain would mean an efficient reduction of virgin resource extraction and create a strong driver for innovation and a circular economy.

Science-based material targets and a trading system for resources will shift the logic

Just as CO_2 budgets have given climate policy a quantifiable backbone, material budgets can do the same for resource efficiency. Combined with a trading system modelled on the EU Emissions Trading System (EU ETS), these instruments would for the first time put a real price on virgin material use.

There are some general types of targets with the purpose and potential of affecting the whole value chain, from raw material extraction to end-of-life. These can come in the shape of targets directly towards material use or indirectly towards the impact of material use. Direct material use targets include:

- Science-based material targets, setting upper limits of material use for the society as a whole and/or per industrial sector and company (in the same way as science-based CO_2 emission targets). This is sometimes also referred to as a material budget that could be applied to sectors, material and even persons.
- Binding material targets could also come in the shape of company-specific Material footprint targets or Land-use targets.

Impact goals point at the importance of measuring impact on emissions and nature. They are important to ensure the realization of the intended environmental impact of any material extraction, treatment or use decision along the value chain, and to try to avoid rebound effects as much as possible. Example of impact goals:

- Net zero targets, in terms of CO_2 emissions, which is likely to drive down material use.
- Targets aligned with planetary boundaries, integrating also Science-based targets for nature (biodiversity, water etc.) into a more overarching environmental target setting.
- Targets connected to the different goals of Agenda2030. Although more qualitative than the planetary boundaries, they represent important overarching aspects.
- Positive impact targets, measuring not only the reduction of negative environmental effects, but also potential positive effects.

In addition, reporting requirements act as a foundational requirement, although not directly in the shape of a target.

- Reporting requirements, mandating corporates and businesses to report on material use. The EU regulations involving Corporate Sustainability Reporting Directive (CSRD) and the standard ESRS5 are examples of this.

When targets are properly set to ensure that the overall visions and directions of any company is in place, there is also room for other types of policy instruments to help steer towards decreased use of virgin materials.

Upstream goals and policy instruments

Our work has clearly confirmed the lack of upstream instruments to steer towards decreased virgin material use. Policy instruments that specifically target the first part of the value chain, including extraction and processing of raw materials are key to achieving the targets. These policy instruments are meant to directly affect the amount of [virgin] resources and materials that companies purchase and use. They include:

> “
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- A cap on virgin material use
- A trading system for materials involving a certain level of free plus auctioned quotas (up to the cap) and successively increasing prices – similar to EU-ETS for CO_2 emissions. Preferably in combination with a “Virgin Material Border Adjustment Mechanism” (VBAM) to avoid competitive disadvantages for the geographic area that implements this policy. This would directly affect the upstream decisions on material purchases.

Another way to decrease upstream material use is the introduction (or increase) of taxes on virgin resources and materials, possibly while at the same time reducing taxes on labour. The tax reduction is an old idea that could theoretically drive material efficiency and have positive employment effects. To avoid competitive disadvantage and export of material intensive operations, this tax swap needs to be combined either with an VBAM mechanism or be applied as a consumption - rather than an extraction - tax.

With upstream material regulation in place, downstream regulation still have a role to fill

Ecodesign regulation, deposit schemes, and circular quotas can reinforce a systemic shift, but they cannot create one. Their effectiveness depends on foundational upstream targets already being in force.

Middle- and downstream policy instruments

Instruments targeting the middle and downstream part of the value chain are already more available but have proved less efficient. With this caveat, we still believe they are important as a complement to foundational goals and upstream instruments. These are the goals and policy instruments that target the steps in the value chain that include component and goods design, manufacturing and distribution – everything between material processing to the use phase. Examples of these are:

- Investment support, for example for building material stocks or for new recycling plants.
- Direct subsidies/investment support for businesses that aim to run circular business models and/or for those that can prove certain impact level. This could also take the form of organisational growth limitations depending on circularity level of the organisation. One challenge for more circular solutions is the potential investment needs and overall the challenge in replacing existing and established less resource-efficient models.
- Eco-design regulation [for (sustainable) products], which could include circular product design and/or lifespan mandates.
- Producer responsibility and traceability requirements, such as product passports. The purpose here is to create competitive advantage for actors who can use the information
- Work with standards and harmonisations. This involves both removing current standards that are deemed too rigid to allow for circular replacements and to develop new standards for reuse markets. Standards can be applied voluntary or mandatory.
- Deposit schemes, enabling reduction in raw material demand when returning products or packaging to suppliers.
- Business- or industrial-internal pricing of natural resources. This instrument can be set up voluntary within one or more organisations but could also be made mandatory. Could also be a tool to help a company to fulfil legally set limits or targets.
- Banning non-desirable products or actions. This could include for example banning products with certain (too low) lifespans and/or complete product groups that are considered “unnecessary” (the typical example being one-off disposable table wear). Bans could also be applied to toxic materials (that will hinder recirculation) and to extraction-oriented activities, such as deforestation and the opening of new mines.
- In certain cases, permission processes can be a hindrance and interviewees point at the need to fast-track these processes when the intended action is in line with circular targets.
- Mandatory circular quotas, such as recycling quotas or quotas of reuse or remanufacturing. This is expected to drive market demand for circular materials, but has proven difficult to implement due to the static focus on one of the R strategies. It also carries the risk of incentivizing fake recycling or reuse.
- Differentiated producer responsibility fees within the Extended Producer Responsibility (EPR) to finance end-of-life solutions. The intention is that it will push design for recyclability.

Moreover, when discussing and assessing different new or developing policy instruments, it is important to also consider what existing policies and regulations that need to be phased out. Here one area which is emphasized by many of the interviewees is the need to remove or change current waste regulations. Instead of waste regulation, society should move towards material regulation.

No one wants to move first in an unstable policy landscape

Competitiveness risks, data gaps, and political short-termism are the most cited barriers.

In general terms, the implementation of all suggested targets and policy instruments are made more complicated through a number of implementation challenges. These are related to, for example:

- The difficulty of doing something before others (whether company, country or other geographic area), since it risks loss of competitiveness and the export of undesirable operations outside the targeted area.
- Distribution effects and the risk of creating an even more unlevel playing field for businesses and/or inequality for consumers.
- The challenge of data and information, both in terms of availability and sharing and distribution.
- Technology challenges in relation to new materials and product specifications – often in combination with lack of or dysfunctional standards.
- Lack of trust in long-term perseverance by politicians and society as a whole. This undermines the interest for investing in necessary future technologies since it enhances the risk of "stranded assets".
- Too big gaps between supply and demand in a changing market, making it difficult to deliver on promises.

What good policy looks like: durable, fair, and driving innovation

The evidence suggests the challenges listed on the previous page can be mitigated through a border adjustment mechanisms, long-term policy commitments, and technology-neutral target design.

Some key findings emerged regarding how to overcome these challenges and how to enable efficient and impactful target setting and policy instrument implementation.

The most important suggested enablers are:

- They should be long-term and reliable, i. e. be expected to last over election periods and different political majorities.
- They should have a focus on driving innovation, rather than on regulating or steering industrial action in a too detailed manner.
- They should target to set a level playing field for industrial actors and not deteriorate the competitiveness of industry towards for example other parts of the world.

Key target characteristics

Credible

- Science based – legitimate and based in reality
- Tangible and clear – for the target users
- Monitorable and transparent – for companies, investors and public organisations

Innovation friendly

- Technology neutral – not explicitly favouring certain industries or solutions
- Result driven – stating the desired results rather than the method
- Positively stated – e.g. use less primary material versus use more secondary material opens up for more solutions

Enforceable

- Fair – including supervision with rewards and sanctions
- Longterm commitment (to the targets)

Systemic

- Incentivising as many stakeholders as possible - to close “the loop” in the business ecosystem
- Adaptable and scalable to purpose and context

Three things that need to happen, and why upstream targets come first

Binding upstream targets. A material trading system. Complementary downstream policy intervention. Of these, the first is the prerequisite for the rest. Without mandatory resource targets, the circular economy will remain a vision rather than a transition.

There is an urgent need to reduce natural resource use globally. This is a prerequisite for not transgressing more planetary boundaries and for stopping or slowing down the ongoing degradation. Despite different attempts to steer towards more resource efficiency and circularity both at a national and an EU level, there is not a clear sign that the intended change is happening. Therefore, today's targets and policy frameworks are not enough. Our work sought to address this specific issue.

The following represent our main findings and conclusions:

- A circular transition is a hugely complex task. There is no one solution that solves it all and therefore there is a need to work with several goals, targets and policy and regulatory mechanisms in parallel.
- The basis for steering companies towards more circular operations and business should be clear and mandatory targets. These targets should be both binding targets (in terms of resource use, CO2 emissions and other) and impact targets.
- Our work has confirmed the assumption that most goal setting and policy intervention have happened downstream in the value chain, and that there is an untapped potential for stronger incentives and more transformation when moving upstream in the value chain. Therefore, our key proposal is to define a limit on the use of virgin resources. The main proposed policy instrument is a cap and trade system for materials, similar to EU-ETS. This should be complemented with VBAM, an extended version of the existing Carbon Border Adjustment Mechanism (CBAM), covering also virgin material imports.

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- Beyond target setting and upstream policy intervention, there is also an important potential to steer markets and company action via middle and downstream policy interventions. These could take the form of subsidies, quotas, circular design or lifespan mandates, report requirements, bans, etc.
- To be successful, it is suggested that any targets and policy interventions adhere to the following principles:
  - » They should be long-term and reliable, i. e. to be expected to last over election periods and different political majorities.
  - » They should have a focus on driving innovation, rather than on regulating or steering industrial action in a too detailed manner. Setting clear boundary conditions (targets) would allow for less detailed regulation and open up for more innovation.
  - » They should secure a level playing field for EU industrial actors and make sure that the competitiveness of the industry is at least maintained towards other parts of the world.

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