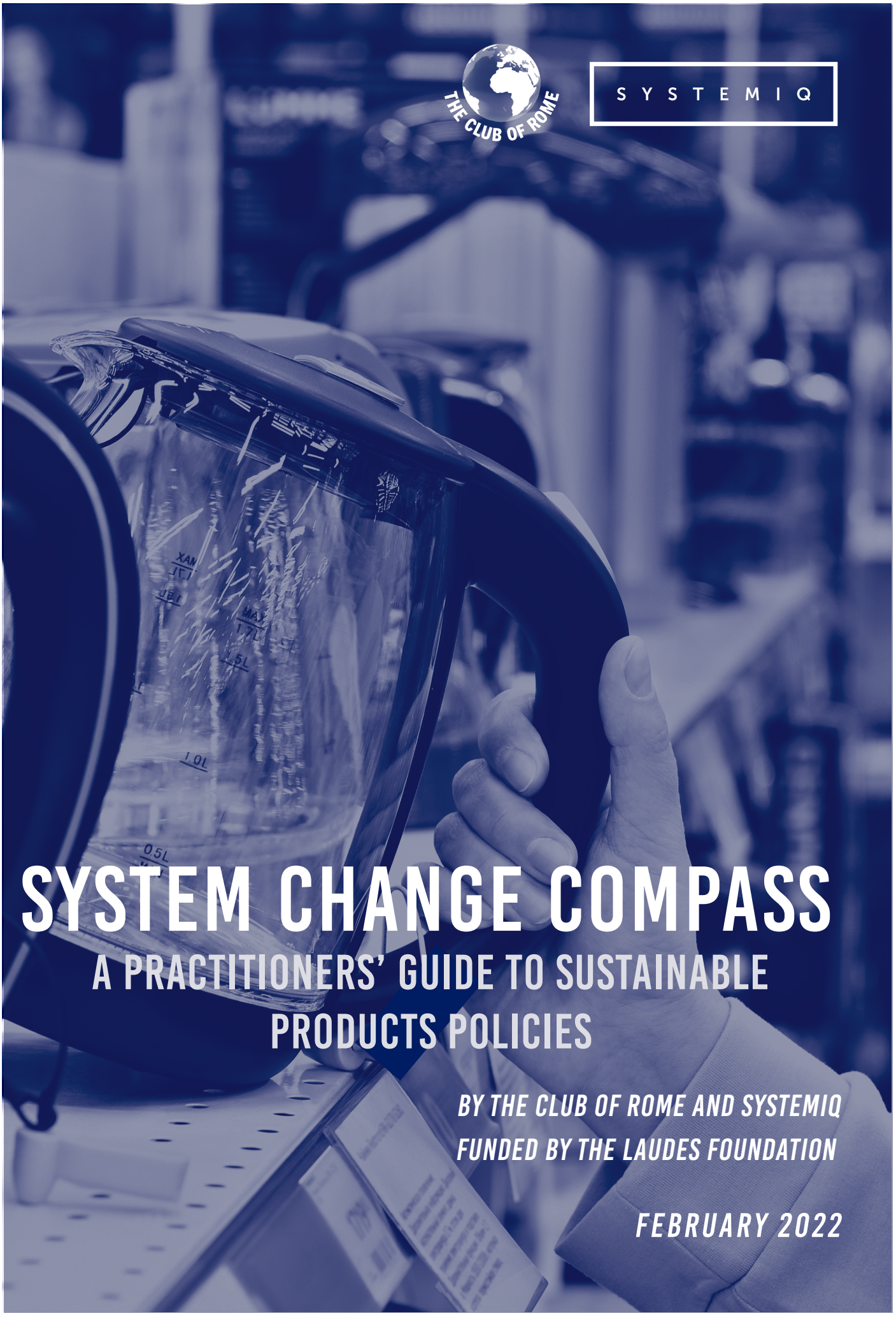

SYSTEM CHANGE COMPASS

A PRACTITIONERS' GUIDE TO SUSTAINABLE PRODUCTS POLICIES

BY THE CLUB OF ROME AND SYSTEMIQ

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System Change Compass: A Practitioners' Guide to Sustainable Products Policies

A SYSTEM CHANGE APPROACH TO PRODUCT AND MATERIAL POLICY: ACHIEVING FULLY SUSTAINABLE AND CIRCULAR PRODUCTS

Key Insights

1. Current modes of extraction and processing of natural resources have negative consequences for local and global wellbeing. Extraction and processing is responsible for 90% of biodiversity loss and water stress, 50% of global GHG emissions and 30% of health impacts from particulate matter. As such, it strongly contributes to the transgression of planetary boundaries for climate change, biosphere integrity, land-system change and biogeochemical flows.

2. To stay within planetary boundaries, the level of decoupling resource consumption from wellbeing must significantly advance. To achieve this, the **economy must be designed such that it centres on societal needs** and provides daily functional needs through optimised systems (see the System Change Compass's suggestion for economic ecosystems), with an **emphasis on** exploring the potential of **product-as-a-service models**, combined with other measures to avoid rebound effects. Where functionality cannot be provided as a material-efficient service, the economic ecosystem will need to provide high-quality, functional, and safe products, which are resource-efficient, last longer and are designed for reuse, repair, and high-quality recycling, purposefully managed across their lifecycle, for example through producer-ownership models.

3. The Circular Economy Action Plan and the announced Sustainable Products Initiative (SPI) include ambitious statements to improve the environmental performance of products and consumption. However, given past rebound effects and global structural production shifts that moved production from more resource efficient countries to less efficient countries, global resource productivity has not increased in the last two decades and is unlikely to do so without system change. The policy measures introduced by the SPI are likely to be insufficient to achieve the required level of absolute decoupling of resource consumption from economic wellbeing. In the announced proposals for the SPI, there seems to be no **mechanism to ensure ultimate compatibility of production and consumption with planetary boundaries**. What is needed is a **long-term strategy to ensure that overall resource use and related impact footprints within the European Union are reduced in absolute terms in an adequate timeframe**.

4. The ambitious targets set out by the wider European Green Deal framework must be combined into a **holistic policy frame** that does not merely incrementally improve the environmental performance of products, but instead **addresses the drivers of continued resource consumption and likely rebound effects** that come with marginally improved environmental performance. The consumption side typically reacts to incrementally improved products with increased demand – thus destroying the environmental gains achieved (see, for example, in the automotive industry where increases in drivetrain efficiency have been offset through heavier vehicles in the last decades).

5. Currently, consumers only have a minor responsibility and opportunity to use materials in an efficient way. Material efficiency improvements through legal requirements like partial EPR systems or eco-design regulations, lead to important but marginal improvements. In order to ensure the whole life-cycle of a product is managed, it needs both full transparency on products – to enable consumers in their choices – as well as regulatory innovation towards producers, requiring and enabling them to take ownership over the whole life-cycle of products

6. Therefore, we suggest 4 approaches to enhance existing proposals for the SPI and accompanying policy measures:

    1) Set a systemic goal consistent with the EGD: **define "EGD-level sustainability**" (climate-neutral, sufficiently decoupling, and full compatibility with planetary boundaries) **for products and materials** and measure progress accordingly. Formulate goals in consumption footprints (including imported products, not only domestic production), and pathways to gradually reach the goals. Invest in **dedicated research to develop the science base for such goal setting**.
    2) Create a coherent and complementary policy (fiscal, financial, regulatory) frame that sends a clear message. The current focus on supply-side innovation (e.g., uptake of sustainable production technologies) leads to an incomplete transition. Policymakers need to stimulate the demand-side (e.g., business model innovation and sustainable circular consumption). **Align incentives across the regulatory spectrum** to enable and reward activities that support the systemic objective.
    3) Empower investors and consumers through **enhanced transparency and clear responsibilities**. Enable consumers and investors to direct their demand towards sustainable solutions, including product-as-service models. A focus should be on developing **Producer Ownership regulation**, going beyond Extended Producer Responsibility approaches towards full responsibility of producers over a product's lifecycle and impacts.
    4) Directly support the resources and infrastructure needed for a new industry practice. Create the backbone of a future circular economy through the required **databases, digital warehouses, and physical logistical infrastructure** for circular products.

To advance the systemic approach, we suggest two concrete next steps to elevate the ongoing SPI and complement updates to eco-design standards with a long-term strategy.

1) Create a body for targeted development of the required science base, to move towards targets for Europe's overall production and consumption systems and their resource use that are fully conducive and sufficient to reaching European Green Deal goals; in combination with a commitment to design such goals in an inclusive manner in the mid-term. Ensure close alignment with similar processes, such as the Bellagio process on the monitoring of circular economy.
2) Create a governance structure, e.g., a hybrid Commissions-Civil Society led body, to explore more systemic policy innovation, for example how to utilise the potential ofProducer Ownership regulation and realise the efficiency potential of "as-a-service" business models, in close cooperation (but still independent from) industry.

For further information please contact Bertram Kloss and Julia Okatz.

Reference as: System Change Compass: A Practitioners' Guide to Sustainable Mobility. SYSTEMIQ and Club of Rome (hrsg.), Munich and Brussels

FUTURE VISION: MEETING DAILY FUNCTIONAL NEEDS THROUGH A LOW-CARBON, RESOURCE EFFICIENT PRODUCT POLICY

Primary resource extraction has tripled over the last 50 years and is expected to double to meet the demand of the increasing population until 2050[1]. Our current resource consumption per capita would fill the planet six times over by 2050. **The extraction and processing of natural resources has disastrous consequences for local and global wellbeing. It is responsible for 90% of biodiversity loss and water stress, 50% of global GHG emissions and 30% of health impacts from particulate matter.[2] As such, it strongly contributes to the transgression of planetary boundaries for climate change, biosphere integrity, land-system change and biogeochemical flows.**

To sustain a healthy life for all on our finite planet, resource use needs to transition from a carbon and energy intensive and wasteful system, to one that is low-carbon, toxic-free and resource effective. A system that meets societal needs without being dependent on natural resources. In taking a first step towards a resilient future society, the European Green Deal (EGD) sets clear quantitative targets of net-zero emissions and resource decoupling by 2050. At the start of 2021, the EU Parliament called for an absolute decoupling of economic growth and resource consumption, in line with the EGD ambition from the Commission.[3] Circular materials strategies are the most effective way to achieve this decoupling, along with reduction strategies that improve systems to decrease materials demand from the outset.

Global resource productivity, meaning the GDP produced per ton of resource, has not improved since the year 2000. According to the International Resource Panel, if transformative measures are not taken, resource needs will double by 2060.[4] In Europe, despite past improvements in resource productivity, resource use is still primarily linear. Out of 8.08 Gigatons of processed material, only 0.98 Gigatons (12%) come from looped material.[5] 50% of used materials are lost in landfills, where 90% of the value of material and energy inputs are wasted after the first product life cycle.[6] Moreover, the absolute consumption of products is still very high, due to inefficient utilisation of products and systems, and therefore Europe's Domestic Material Consumption (defined as the weight of imported and domestically produced products minus weight of exported products) was 5.96 million tonnes per capita in 2020, a slight decrease from 6.66 million tonnes in 2011[7]. Europe's material footprint (defined as the Domestic Material Consumption plus the additional materials required to produce the products) is a staggering 14.46 million tonnes per capita[8] in 2020, which is significantly higher than the world average of ca. 12 million tonnes per capita – but, on the positive side, also significantly lower than the average of high-income countries with 27 million tonnes per capita[9]. In sum, current legal and economic mechanisms are only achieving incremental changes; but Europe is in a good starting position to assume a global frontrunner position with a system change approach.

[1] UNEP & IPR, 2018
[2] Ibid, *Global Resources Outlook.*
[3] European Parliament resolution of 10 February 2021 on the New Circular Economy Action Plan (2020/2077(INI))
[4] International Resource Panel. 2019. *Global Resources Outlook 2019*
[5] https://ec.europa.eu/eurostat/web/circular-economy/material-flow-diagram
[6] Eurostat. (2020). *Waste statistics*. https://ec.europa.eu/eurostat/statistics-explained/index.php/Waste_statisticsEllen MacArthur
[7] Eurostat. (2021). Europe's Domestic Material Consumption https://ec.europa.eu/eurostat/databrowser/view/ENV_AC_MFA__custom_1531650/default/line?lang=en
[8] Eurostat. (2021). Material Flow Accounts in raw material equivalents. https://ec.europa.eu/eurostat/databrowser/view/env_ac_rme/default/line?lang=en
[9] International Resource Panel. 2019. *Global Resources Outlook 2019*

To stay within planetary boundaries, the level of decoupling resource consumption from wellbeing must significantly increase. To achieve this, the economy must be designed such that it centres on societal needs and provides daily functional needs through function-as-a-service models, which avoid planned underutilisation, planned obsolescence, and inadequacy for repairability and recyclability. Where functionality cannot be provided as a service, the economic ecosystem will need to provide high-quality, functional, and safe products, which are resource-efficient, , last longer and are designed for reuse, repair, and high-quality recycling.

A SYSTEMIC POLICY APPROACH BEYOND INCREMENTAL CHANGES

The Circular Economy Action Plan and the announced Sustainable Products Initiative make science-based statements seeking to improve the environmental performance of production and consumption. The measures announced in the inception impact assessment for the SPI in particular, seeks to address three concerns relating to current production and consumption patterns:[10]

1.) Product-related externalities are not fully internalised:
   a. There are insufficient incentives for producers to make products more sustainable
   b. The average lifespan of many products has become shorter over the last decades
   c. Many products break quickly and cannot easily be repaired.
   d. There are increasing concerns about working conditions in the supply chain for products.
2.) Existing EU initiatives and legislation only partially address sustainability aspects of products (e.g., focussing on energy performance only). There is no comprehensive set of requirements to ensure that all products placed on the EU market become increasingly sustainable.
3.) There is a lack of reliable information on sustainability along value chains.

The policy objectives indicated in the impact assessment for the SPI and in previous EGD documents set out ambitious goals, such as making "sustainable goods, services and business models the norm and consumption patterns more sustainable."[11] A good proxy for the sustainability of consumptions patterns in Europe are its material footprint and related impacts. Europe's material footprint has barely improved in the last decade, and its import dependency has grown by 0.6 percentage points in the same time frame, with 22.6% of its material consumption being dependent on imports[12]**. Policy measures to be introduced in the new SPI must sufficiently improve the level of decoupling of resource consumption from prosperity. A mere expansion of the Ecodesign Directive to more products (as announced) will be an important step, but cannot ensure alone that the absolute resource use within the European Union is reduced over time.** The focus on expanding the range of products covered by the policy and increasing sustainability requirements, without a clear pathway to improve the total, overarching utilisation of products and materials (and thus reduce overall resource use across production and consumption systems), will likely result in rebound effects that will eat up most, if not all, of the environmental benefits created through the Initiative. Ultimately, "less bad" is not the same as "good".

[10] Based on the measures announced in the inception impact assessment ((2020)4754440 - 11/09/2020)
[11] Inception impact assessment ((2020)4754440 - 11/09/2020)
[12] Eurostat (2021). Material Import Dependency.
https://ec.europa.eu/eurostat/databrowser/view/env_ac_mid/default/table?lang=en

Thus, in addition to building on the current environmental standards as the SPI impact assessment suggests, **new ways of production and consumption, and business models to provide societal function instead of mass sales, are necessary** to achieve the European Green Deal goals. Focus must be not only on what produced, but also on how it is consumed and used in the economy.

NEXT STEPS: FOUR POLICY INTERVENTIONS FOR SYSTEM CHANGE

To make the good statements included in the SPI drafts and impact assessments credible, systemic policy action needs to move the current system beyond incremental improvements and transition towards a low-carbon, toxic-free, resource efficient materials *system* – instead of just marginally better products. **We suggest 4 approaches to complement existing proposals for the SPI, to be pursued with a mid-term plan over the next few years:**

1. **Systemic goal: Define "EGD-level sustainability" (OR 'full compatibility with a safe operating space') for the total of European products and materials and measure progress accordingly.**

The European Green Deal sets clear quantitative targets of net-zero emissions and resource decoupling by 2050. Product and material policy must follow suit and define specific mid-term ambitions to credibly achieve the EGD goals of net-zero (scope 3) emissions and decoupling. Instead of incrementally improving traditional product categories without a science-based long-term target, comprehensive transformation pathways must put European product systems in line with the EGD goals and the Fit-for-55 targets, particularly the Energy Efficiency Directive's requirement of an over 37% reduction in total European energy demand.

Specifically, the Commission must resolve the questions of **"what are sustainable levels of resource use, and what does that mean for a fully sustainable product, or product service?"** To do this, the Commission can learn from initiatives coming from the Member States, such as Finland or the Netherlands, who have already set specific domestic resource consumption limits. The Commission should translate overall resource consumption targets into specific resource efficiency targets for different product systems and services. Just as with GHG emissions, it should introduce price signals and environmental penalties that result in a reduction of overall resource consumption.

EU targets for resource consumption (and corresponding price signals) would be the credible step to achieving the EGD's objectives. It would also increase planning certainty and clearly signal to innovators, entrepreneurs, and financiers to develop and scale dematerialised solutions. Over time, a shift towards a performance economy, carefully designed and regulated product-as-a-service business models and new metrics of success would create the mindset shift that the System Change Compass describes with its principle "Redefining Consumption": moving away from defining economic success in quantities of product sales, towards the aim of creating a *function* for the customer, for example through "as-a-service" circular business models.

The Commission can facilitate:

- **Resource use targets**: Commit to finding science-based targets for sustainable resource use.
- **Definition of a fully sustainable product or product services**: Discuss and describe key principles for fully sustainable products and their utility. Defining sustainability within isolated product categories is likely to lead to rebound effects or burden-shifting. Therefore, minimum standards per product must be combined with a view a total consumption limit, and incentives for products and services that are more efficient in their function per capita (e.g. trains over individual cars)
- **Progress monitoring**: Monitor performance of European consumption, in integrated productivity indicators such as resource footprints per service provided. Regulate (recommendation 2 below) and directly support (recommendation 4 below) the availability of the necessary data.

2. Coherent & complementary policy (fiscal, financial, regulatory) frame that sends a clear message

Even with clear targets and standards for sustainable products, translating them into the practice of production and consumption is complicated. The current focus on supply-side innovation (e.g., uptake of sustainable production technologies with eco-design standards) leads to an incomplete transition. Policymakers need to stimulate the demand-side (e.g., business model innovation and sustainable circular consumption).[13] Creating a holistic policy frame that incentivises circular and efficient product-as-a-service models, limits resource consumption while providing same or better function, and thus avoids rebound effects requires bridging policy domains. Policies across regulatory law, tax law and public procurement must be coherent and complementary to each other to jointly support sustainable production and consumption. For example, the Netherlands have identified tax and liability provisions as a major barrier for "as-a-service" business models already in 2016 and are taking steps to remove these regulatory barriers.[14]

As-a-service business models, when combined with carefully crafted producer ownership legislation, could ensure that producers are kept responsible for keeping their materials and products in use and that value in products is retained at maximum levels. Catalysing such models would lead to better design and improved usability of products that place societal benefit/outcomes and high material efficiency at the centre.

[13] "Everything-as-a-Service – How businesses can thrive in the age of climate change and digitalization", SYSTEMIQ (2021)

[14] Government of the Netherlands. (2016). A Circular Economy in the Netherlands by 2050. https://www.government.nl/topics/circular-economy/documents/policy-notes/2016/09/14/a-circular-economy-in-the-netherlands-by-2050

The Commission can facilitate:

- **Coherence with economic and market instruments:** Encourage Member States to shift taxation from labour to resource use. Shift subsidies from resource production towards product refurbishment and reuse models. Encourage Member States to extend EPR schemes and include eco-modulation fees in EPR schemes to encourage circular design.
- **Comprehensiveness**: The planned expansion of the product categories covered in the SPI is promising. However, to achieve the objectives of the European Green Deal, it will be important to include *all* products produced and consumed in Europe in a comprehensive consumption policy framework – not for a detailed eco-design regulation (which might not be possible for all products given their fast innovation and complexity), but for a long-term strategy of making all products compatible with the Green Deal
- **Rising minimum standards to keep pace of innovation**: It is important to not only regulate for current levels of feasible efficiency and circularity, but to encourage future levels and innovation towards it. A product directive should set long-term performance targets towards full sustainability, aided by more specific eco-design targets where necessary

3. Empowering investors and consumers through enhanced transparency

Complementary to regulating and incentivising producers to consistently choose circular, resource efficient and low-carbon processes or services, policymakers can play an important role in enabling the demand from investors and commercial and private consumers. An essential mechanism is transparency. As became clear in the discussions on the EU taxonomy, clear criteria and visibility of sustainability are essential for scaling investments. **Clear labelling, certificates and standards for transparency will help producers and investors innovate even faster and more ambitiously as direct product design policies.**[15] Credible transparency across products and services, facilitated through certificates or dynamic databases (see recommendation 4 below), gives a real incentive to innovators to exceed minimum requirements and use 'sustainability' as a differentiating criterion towards investors and consumers, who are thus empowered to co-create a sustainable consumptions and production shift.

The Commission can facilitate:

- **Support a change in international accounting standards:** Collaborate with the International Accounting Standards Board (IASB)/ International Sustainability Standards Board (ISSB) about 'Product as a service' models to remove accounting barriers (i.e., adjust current depreciation rules of valuation and depreciation of retained assets).
- **Ensure consumer-facing transparency, building on ongoing EC efforts in Environmental Footprint profiling of products:** Change labelling requirements to make embedded emissions and consumed resources transparent on all products sold in the EU, perhaps based on voluntary initiatives like the Eco-Score for food products. Product labels should also include information on toxic contents, recycled content, repairability and recyclability.

4. Direct support: Ensure resources (e.g., databases) and infrastructure (e.g., digital connections, reverse logistics) for new industry practice

The EU should build tools and infrastructure to support the transition towards sustainable and circular production. There are both data gaps and a lack of physical infrastructure needed to support this transition. Ultimately, the combination of digital transparency and physical infrastructure can enable "Material Stewardship" in Europe, creating a live perspective on the

[15] See, for example, the voluntary Eco Score initiative that makes the environmental impact of food products transparent: https://fr.openfoodfacts.org/eco-score-l-impact-environnemental-des-produits-alimentaires

stocks and flows of materials in Europe, and giving the EU the required steering capabilities to ensure global sustainability competitiveness of EU circular economy. This European data transparency could become a major use case for the sovereign GAIA-X cloud.

The Commission can facilitate:

- **Create a European database of stocks and flows of materials:** This database would build on the existing digital product passports (such as the battery passport) and supply chain transparency initiatives. It would enable better monitoring and steering of material flows across the economy. It would also enable a closing of the loop through higher information availability and transparency among stakeholders for proper post-use treatment. The Commission could build on the piloted BAMB platform for building materials funded by Horizon 2020[1] and/or use the new GAIA-X infrastructure. Common standards will ensure reliable and standardized information which allows general transparency, comparability, and effective material stewardship.
- **Circular (physical and digital) infrastructure:** Reverse logistics for end-of-use product returns, sorting, disassembly, and high value of recycling, reuse and repair is vital for an effective circular economy. Currently, individual reverse supply chains suffer from unpredictable return volumes and thus higher transportation costs due to lack of freight discount opportunities. Aggregating returned products into larger batches increases inventory carrying costs. For end of use products, the Commission can encourage increased pre-sorting at source (through R&D and regulation) so reverse logistics is reserved for higher value products. Responding to the different products, materials and their end of life value and role within society, the Commission can push for products being categorized into different archetypes entailing different reverse logistics schemes[1]. That would provide suitable solutions for all product systems.

Conclusion: A fully circular product system for better consumer function and jobs
Taken together, a successful transition of European consumption and production would enable better customer function, as well as a range of new industrial champions and jobs. Some of these industrial activities would be:

- Product-as-a-service and materials-as-a-service businesses
- Services for maintenance and value retention in products
- Peer-to-peer product sharing platforms
- Localised and distributed value chain systems
- Asset recovery systems and reverse logistics
- Markets for secondary materials
- High-value material recycling businesses
- New materials and high-performing substitutes
- Additive manufacturing technology

The ambitious statements set out by the draft documents for the SPI and the wider European Green Deal framework must be combined into a holistic policy frame, which does not merely incrementally improve the environmental performance of products, but instead addresses the drivers of continued resource consumption and likely rebound effects that come with marginally improved environmental performance. The above systemic approach intends to support this necessary transition by adding much needed elements for a more economically viable, ecologically sensible, and socially supportable system change.

We suggest two priority actions to elevate the ongoing SPI and complement updates to eco-design standards with a long-term strategy.

1) Create a body for targeted development of the required science base, to move towards targets for Europe's overall production and consumption systems and their resource use that are fully conducive and sufficient to reaching European Green Deal goals; in combination with a commitment to design such goals in an inclusive manner

in the mid-term. Ensure close alignment with similar processes, such as the Bellagio process on the monitoring of circular economy.

2) Create a governance structure, e.g., a hybrid Commissions-Civil Society led body, to explore more systemic policy innovation, for example how to utilise the potential of Producer Ownership regulation and realise the efficiency potential of "as-a-service" business models, in close cooperation (but still independent from) industry.

We are looking forward to engaging with decisionmakers from policy, industry, civil society, and science alike to bring about such a systemic shift towards a joint prosperous future.

Further resources (selected publications):

- Think2030: 30x30 Actions for a Sustainable Europe, November 2018, Convened by the Institute for European Environmental Policy (IEEP)
- SYSTEMIQ: Everything-as-a-Service / XAAS, How businesses can thrive in the age of climate change and digitalization, September 2021
- SYSTEMIQ and The Pew Charitable Trusts: Breaking the plastic wave: A comprehensive assessment of pathways towards stopping ocean plastic pollution, July 2020
- Ellen MacArthur Foundation: Universal circular economy policy goals: Enabling the transition to scale, January 2021
- Chatham House: A Global Redesign? Shaping the Circular Economy, Briefing by Felix Preston, March 2012
- European Environmental Bureau: Making sustainable products the norm, Position, June 2021

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