FAU

Interreg Alpine Space

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ASTER

WP1 | Mapping Institutional Dynamics in the Alps

MAPPING THE STATE OF ALPINE SOLUTIONS FOR CIRCULAR PRODUCTS

PART 4

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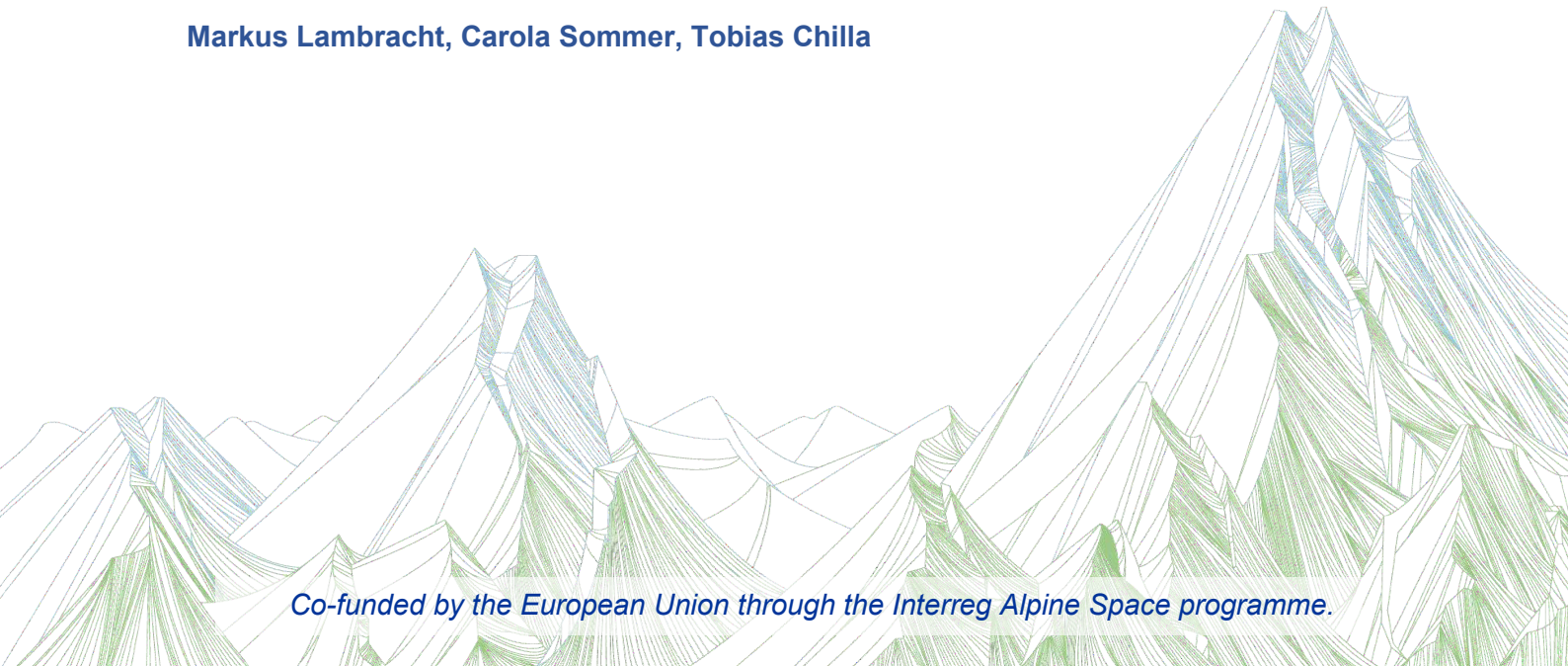

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It provides insights and results from work package 1 (WP1) and structures the understanding in the testing and implementation phases in WP2 and WP3 of the project.

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INTRODUCTION

Institutional complexities

Textile and plastic materials are fundamental to the Alpine economy, supporting key mountain products such as sports and outdoor clothing and equipment, as well as infrastructure (Modica 2022, Šrimpf Vendramin et al. 2024, Lambracht and Chilla 2024). However, this dependence presents significant challenges, as substantial waste is generated in particular at the end of the product's life cycle but also during production. To date, many circular solutions remain economically unviable due to misaligned or fragmented regulatory frameworks, regional gaps in infrastructure and processing capacities, and a limited availability of scalable business models.

This report takes an actor-centered approach to understand what drives – or challenges – the setting as it is today. It asks which and how actors show interlinkages, which functions they are responsible for (and which they neglect), and at what scales they operate (local, regional, national, global, transnational or cross-border). By mapping these roles alongside material flows, waste streams (from Activity 1.1) , and governance contexts, we can identify leverage points for intervention (Sommer et al. 2025).

Our aim is to provide the Alpine Region with an evidence-based foundation for action by clarifying regulatory implications, highlighting infrastructure needs, and surfacing viable business model opportunities that can reduce waste and extend product lifecycles in the outdoor-oriented textile and plastics sectors. Building on the socio-technical transitions lens, we analyze the development toward circular textile and plastic value chains in the Alpine region (Bilali 2019, Fuenfschilling 2019, Geels 2011, Keller et al. 2022). With our contribution, we want to take a focused perspective on the multiple levels and actors with a particular interest in their interactions over time.

The report provides insights into the question: Which institutional, industrial, and societal events or decisions mark economic turning points in the Alpine textile value chains? Concretely, we:

- map **institutional structures** (policies, standards, levels, interlinkages),
- assess **niche innovations** (R-strategies, circular business models, sorting/recycling technologies), and
- examine **actor roles** and power, **network configurations**, and **policy mixes** shaping alignment or lock-in.

This analytical approach guides our institutional and material flow mappings, identification of gaps and leverage points, and the formulation of take-away messages to accelerate circularity in Alpine textile and plastic systems.

This report aims to identify and analyze institutional dynamics in the European Alps. In addition, the first work package includes five further reports that provide complementary information and deeper insights into the ASTER project. An input paper on R-strategies offers definitions and guidance on understanding and applying these strategies to project activities. Other deliverables focus on providing an overview of the current status and developments within the topics of circular economy, textile production, and R-facilitators, mapping key contextual factors in the Alpine region, such as economic flows and gaps, relevant regulations and economic policies for waste prevention and management.

Additionally, one report including two Deliverables analyzes the R-potential, waste generation, and waste management of outdoor products in the Alpine region. These reports provide an important empirical basis for assessing circular economy opportunities within the project.

Circularity as a field of action for different actor groups

Circularity in the Alps involves diverse activates by policymakers, enterprises, associations, and the consumer. Public authorities (EU, national, and regional) establish standards, incentives, and procurement rules that implement the R-strategies logic, which prioritizes refuse and reduce before reuse, repurpose, and recycle (Lambracht et al. 2025). These authorities also finance infrastructure and innovation. Firms and clusters support the development of business models, such as repair, rental, take-back, and material loops, building industrial symbioses, and facilitate the structuration and interconnection of the different parts of sustainable and circular Alpine value chains. Societal actors, including NGOs, consumers, and communities, shape demand through awareness campaigns, promoting a culture of repair, and encouraging responsible purchasing. Together, these groups can create regional opportunities for value creation, resilience, and sustainability by promoting more circular, locally based Alpine supply chains.

Data and Methods

Process tracing, an approach originally introduced by George and Bennett (2005), aims to identify causal chains and mechanisms that link a sequence of events. Although the standard approach is mostly quantitative, using statistical tests and systematic analysis of historical documents (George & Bennett, 2005), we use a qualitative, comparative approach to understand processes in depth (Bengtsson & Ruonavaara, 2017). We look closely at case details to find the key factors behind the results (Bartlett & Vavrus, 2017). We also trace events backward to see how the current situation came about (Harvey & Kou, 2013; Trampusch & Palier, 2016). In our case, these events are called ‘junctures’. Junctures can be understood as points of convergence that are operationalized through various means, including political focal points of institutional intervention, social mechanisms of interaction, the context of norms, structures, or resources, and critical junctures.

Complementarily, an institutional mapping, including governance analyses, helps to reflect on the setting within the underlying networks and the actors involved. It considers corporate, institutional, and collective actors, examining who holds what kind of power and the reasons behind it, who establishes standards and the methods they use, which actors advocate for particular interests, and how regulatory frameworks influence economic conditions.

Both analyses employ a mixed methods approach, involving Structured Document Analysis, which includes systematically evaluating publicly available written materials such as sector media, sector reports, and scientific articles. This method aligns with systematic document analysis principles (Bowen 2009; Prior 2008).

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INSTITUTIONAL MAPPING

Mapping Description

The spatial scope of the mapping in Figure 1 is the Alpine Perimeter. It involves two dimensions: The Y-axis represents a differentiation by scale based on grey layers, whereas the X-axis describes the area of influence on textile recycling. The relevant actor groups are represented by beige boxes. Their interactions are visualized by arrows of different colors. Black arrows indicate influence through increasing or decreasing consumption dynamics; blue and grey represent institutional mechanisms, with blue signifying regulation and grey denoting financial aspects such as funding. Orange arrows illustrate societal mechanisms, including campaigning and promotion. Green arrows depict B2B linkages, including intra-firm power; and, finally, red arrows illustrate forms of industry cooperation.

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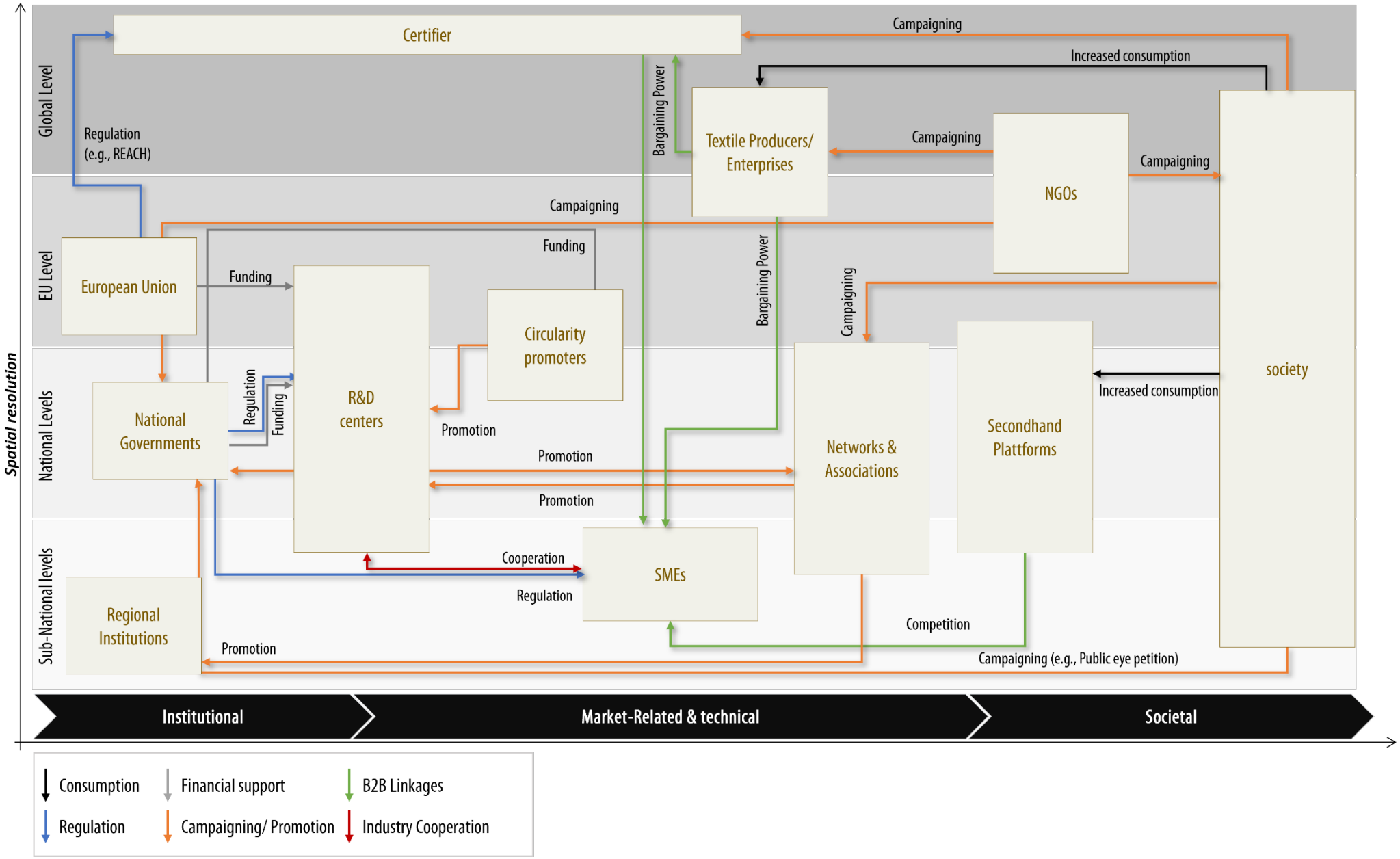

Figure 1: Institutional mapping of actors at different levels and their interlinkages

Findings

The visualization in Figure 1 illustrates the complex, multi-level governance and innovation system for the circular transformation of the textile industry. Generally, it illustrates the interactions between politics, market, and society and thereby depicts the role of regulation, financing, and campaigns, as well as the importance of networks, cooperation, and consumer behavior for the establishment of more circular practices. It is thus a systemic impact diagram for analyzing influence structures and pathways to a higher degree of circularity in the textile economy. Three key findings can be distilled from this:

A) Dual role of institutional actors:

Institutional actors are relevant to regulation in governance processes in which supranational and national authorities – primarily the European Union and national governments – define the formal regulatory framework within which firms operate. This includes setting binding legal requirements, standards, compliance mechanisms, and strategic policy objectives that shape market conditions and corporate behavior across the textile sector. Through legislation, directives, and national implementation measures, these institutions' structure incentives, constraints, and accountability mechanisms for companies.

Beyond their regulatory function, public institutions also act as enablers of transformation by allocating financial resources to research, development, and innovation. Through targeted funding programs, grants, and public investment schemes, they support technological advancement, pilot projects, and the scaling of circular business models. In this way, the state assumes a dual role: it not only regulates market activity but also promotes innovation capacities and reduces the economic risks associated with systemic transition processes.

B) Vertical and horizontal linkages enable SMEs - economic valorization:

Between companies, vertical power relationships influence strategic decision-making processes. Larger firms or well-established industry networks often possess superior structural power due to their market share, resource endowment, or control over key distribution channels and standards. This asymmetry affects negotiation dynamics, particularly in relation to pricing structures, contractual conditions, compliance requirements, and the adoption of circular solutions. Over the long term, these power constellations determine which actors gain access to economically viable technologies, scalable business models, and profitable market segments.

Small and medium-sized enterprises (SMEs) are embedded in dense business-to-business (B2B) linkages and collaborative research and development networks. These horizontal and vertical interdependencies enable knowledge transfer, joint problem-solving, and resource pooling. Participation in such cooperation structures enhances technological capabilities, facilitates access to innovation ecosystems, and supports the development of competitive circular products and processes. This can lead to economic success despite the implementation of circular production patterns.

C) Societal limits vs. regulatory frameworks:

Across all spatial levels, the overall increase in textile consumption shapes the system in several ways. On the one hand, rising demand directly affects production volumes, resource use, supply chain organization, and waste generation. In this sense, society

shapes consumption patterns, which can be considered a factor shaping product volumes. On the other hand, this rise in consumption is accompanied by the expansion of second-hand platforms and alternative market arrangements, which introduce new modes of exchange and reuse into the system. These platforms can be considered twofold. On the one side, as an expression of a possible societal shift toward sustainable and circular consumption practices, such as reuse, repair, and extended product lifecycles. And at the same time the affordability criteria have to be taken into account, as the success of such platforms can also be an expression of how consumers get products for a lower price, and not to support a decrease of production and consumption Such developments can moderate primary demand and increase pressure for innovation within the network segment. However, empirical studies suggest that the measurable impact of societal pressure on structural transformation remains comparatively limited. While awareness and discourse have increased, their translation into large-scale behavioral change or systemic market restructuring is rather modest relative to the influence exerted by regulatory frameworks and economic incentives (Avrhami 2022).

Furthermore, non-governmental organizations (NGOs) and civil society actors seek to influence both consumer behavior and corporate conduct through campaigning, advocacy, public awareness initiatives, and reputational pressure. These interventions can reshape public discourse and motivate business strategies towards sustainable production practices.

PROCESS TRACING

Mapping Description

The bubble diagram in Figure 2 presents a structured visualization of key junctures identified through systematic document analysis within the Alpine Space Perimeter, while embedding these developments within national, EU, and global governance contexts. Junctures can be defined as convergence points that manifest in various ways, such as political focal points for institutional action, social interaction mechanisms, contexts shaped by norms, structures, or resources, and, in particular, critical junctures. The spatial scope, therefore, combines a territorially defined regional focus with a multi-level analytical perspective, allowing developments within the Alpine area to be interpreted in relation to broader political and economic processes.

Designed as a multi-dimensional bubble plot, the diagram integrates four analytical variables. The X-axis represents time, spanning 1990 to 2025, thereby enabling a longitudinal assessment of developments and the identification of phases of increased activity. The Y-axis differentiates events according to scale – national, EU, or global – making vertical interactions between governance levels visible.

A color-coding scheme distinguishes the type of juncture: orange indicates policy-related developments, green represents industry-driven dynamics, and blue captures societal initiatives or shifts. In addition, the size of each bubble reflects the number of documented events per year, allowing the visualization of intensity and clustering effects. Larger bubbles, therefore, signal periods of heightened transformation or institutional change.

By combining temporal progression, scalar differentiation, categorical classification, and event density within a single visual framework, the diagram enables a compact yet comprehensive interpretation of structural change processes affecting the Alpine region over the past three decades.

The different levels can be described as follows (More concrete descriptions of the junctures can be found in Table 1 in the Annex):

- **Global level:**

  Most junctures at the global level are industrial. This includes technological innovations such as the development and implementation of various waste separation, sorting, and recycling technologies in 2009, 2017, and 2021. Promising examples that are not yet established on the market include near-infrared spectroscopy for waste sorting and depolymerizing PET with enzymes. Market-related junctures, such as the establishment of the FAUME platform in 2020 and the Bluesign certification body in 2000, also fall within this scope. It is important to note, that the listed technologies (or process steps) are not upscaled and available. NIR spectroscopy is established, but not widely spread in automated sorting for example, in most cases in sorting centers (which are vastly manual) there can be a spectrometer to identify the materials, but it's not necessarily an integral and essential part of the process. For enzyme depolymerization of PET: Carbios is still far from having an operational industrial-size factory. For most chemical recycling solutions, companies are expecting production sites between 2028-2029 (with the exception of Aquafil, which has the Econyl produciton since something like 10-15 years).

  Additionally. social events, such as the increase in secondhand textile trade via platforms and apps, as well as the rise of fast fashion and its impact on textile recycling since 2015, are shaping the picture. Although rare, policy events do occur; an example is the OEKO-TEX 100 standard established in 1992, even if it is established by an association of research and technical centers from the textile field.

- **European Union (EU):**

  At the European level, most junctures were policy-related. Since 1999, they have occurred at a high frequency, regulating waste prevention, landfill disposal, cross-border waste shipments, waste management method hierarchies, recycling targets, waste management plans, the polluter-pays principle, extended producer responsibility, the circular economy, the registration, evaluation, authorization, and restriction of chemical substances, textile fiber designation, research funding, product sustainability, and eco-design requirements.

  The European Green Deal (2020) marks an important event, which sets the goal of a climate-neutral EU by 2050. It initiated a sequence of binding regulations and softer action plans, and measures to promote the circular economy. A policy consequence was, for instance, the 2021 Waste Framework Directive (WFD) on waste management, which includes an Extended Producer Responsibility (EPR), which became active in 2025. While the principle was known globally and supported for the packaging context in by the OECD since the early 1990s, it only became relevant for the textiles sector after 2020 (OECD 2024).

  Since 2016, industrial junctures have also gained importance in the EU. Most of these innovations are based on R&D projects in the field of the circular economy and recycling technologies. Examples include NewRetexor the ReHub project, which specialize in

sorting, CISUTAC, INCIRCULAR, and PLASTICE, which focus on the circular economy, “White Cycle” and “Bio Fibre Loop”, which specialize in recycling; “tExtended”, which focuses on information flow.

- **National level:**

  a) Austria:

  In Austria, almost all junctures were policy-related. In 2002 and 2011, there were laws on waste management and waste collection throughout Austria. In recent years, there have been discussions about the higher taxation of primary fibers and EU emissions trading. The Willhaben platform, Austria's largest online marketplace, was founded in 2006.

  b) Germany:

  In Germany, there is a stronger relevance of industrial events. The founding of the secondhand sales platforms Kleiderkreisel and Mamikreisel in 2009 and Rebelle in 2013 are examples of the founding of C2C plattforms. The increase in collection volumes in 2015 can be considered an outcome of these earlier junctures.

  However, most industrial junctures have only emerged since 2023 and are innovations in equivalent recycling and increased research activities. Examples include AUNDE and PreZero companies and the Landbell Goup’s cooperation with the French company CARIBOS's for biorecycling technology.

  Policy junctures occurred nationally and regionally in 2012, 2014, and 2025, regulating waste management and the separate collection of textiles.

  c) France:

  In France, most junctures were industrial. However, this does not mean that industrial junctures are corresponding to the availability of industrial-size solutions – often they are in the stage of development. Nevertheless, they include technological innovations in recycling and sorting in 2021 and 2023. Examples include terahertz technology for identifying disruptive factors and innovations in chemical recycling. Other industrial junctures include market-related events, such as the creation of the secondhand platform Le Bon Coin in 2006, the Re:Fashion initiative in 2008, the Eclaira network, and the secondhand trading startup Crush On in 2018. Another good example is the Vestiaire Collective for clothing and accessories.

  Since 2020, policies have also been shaping the landscape in France. These include regulations to inform the population through Info-Tri and the French Eco-Score, regulations on fast fashion, minimum values for recycled material content, and extended producer responsibility. One social juncture is the 7.4% share of secondhand goods in textile consumption in 2024. In addition, there are recent examples such as the PFAS ban for textile products, which excludes specific technical and professional textiles (e.g., for firefighters). The 9-stream decree adds professional textiles to the mandatory sorting and valorization of end-of-life textile products. This is not limited to regular clothing, shoes, and home textiles. This includes identification, qualification, sorting, collection, and management.

  a) Italy:

In Italy, two policy junctures occurred at the regional and national levels regarding waste management: one in 2006 and one in 2021. An industrial juncture also occurred in 2017 with the founding of ASTRI, an organization active in the field of recycling.

b) Slovenia:

In Slovenia, two policy junctures occurred in 1999 and 2004 regarding environmental protection, as well as an industrial event in 2024 with the TEX-DAN project. In this project, SMEs in the Danube region are collaborating to enhance the circular economy within the textile and fashion industries' value chains.

c) Switzerland:

In Switzerland, most of the developments have been industrial. Most of these events occurred within the last four years and involve innovations and practical implementations of textile recycling and the circular economy. Tell-Tex AG is developing a fully automated sorting and recycling plant, and the Fabric Loop association is creating an industry-wide solution for organizing and financing the R-principles in Switzerland. Säntis Textiles, founded in 2005, is also an industrial juncture due to its innovations in cotton recycling.

A petition from Public Eye calls upon the Federal Council to establish a fashion fund and take action against fast fashion by 2025. This is a social juncture.

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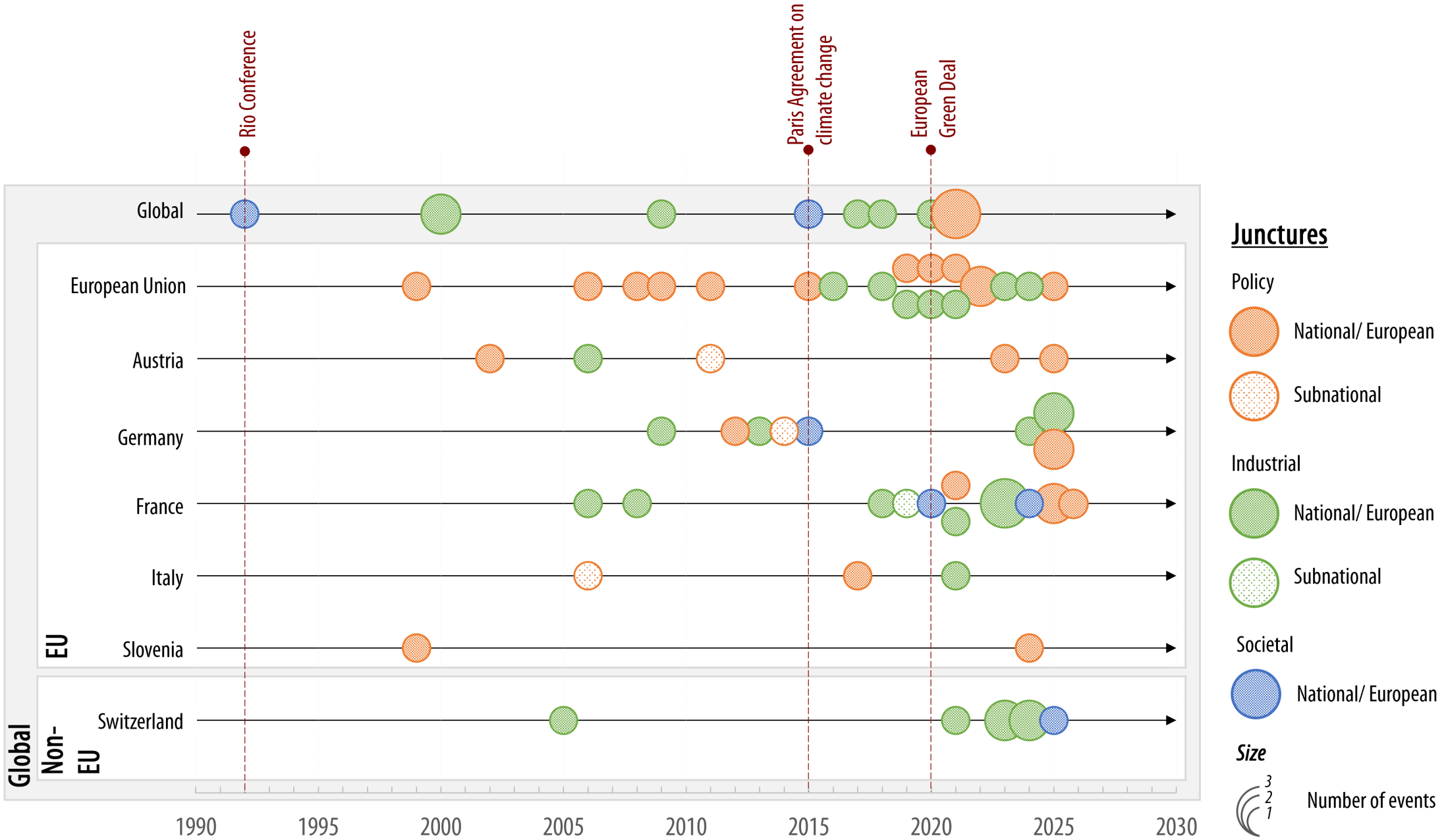

Figure 2: Process tracing of Policy, Industrial, and Societal junctures

Findings

The visualization in Figure 2 maps events impacting the Alpine textile system within a multi-level governance and innovation landscape. It highlights how regulatory impulses, market innovations, and societal shifts interact across levels, revealing periods of acceleration, cross-scale feedback, and emerging coordination gaps. Thus, it functions as a systemic impact map that can be used to analyze influence structures and pathways to a higher degree of circularity in the Alpine region.

Three key findings can be summarized from this visualization:

A) Increasing number of activities:

Since 2005, and even more so since 2015 (Paris agreement) the density of junctures increased. Likewise, 2020 (Green deal) seems to mark a year that initiated another stronger dynamic. Activity has accelerated markedly since 2005, with a clear inflection after the 2015 Paris Agreement. A second surge follows the 2020 European Green Deal, which triggered dense clusters of policy initiatives and industry projects. Post-2016, technological and market innovations expand rapidly, complemented by rising societal engagement (secondhand platforms, fast-fashion awareness).

B) Regulation vs. industry solutions:

Timing differs by geography. At EU level – and in Austria, Slovenia, and Italy – policy clearly precedes industry responses, setting frameworks first. In Germany, France, and Switzerland, industry innovations led the way, with policy adapting later. These distinct sequences create path dependencies and occasional cross-border frictions, but convergence increases post-2020. Political inertia is also a factor here. The evolution of policy is prompting the examination of industrial circular economy solutions. However, this can create a coordination problem between policy development and industrial implementation.

C) High-impact junctures:

Comparison of relevant events, that have had major impact can be highlighted as high-impact junctures. These include EU regulations like the European Green Deal, the Waste Framework Directive with EPR activation. But also, global tech breakthroughs (e.g., NIR sorting; enzymatic PET depolymerization), and market shifts via C2C platforms and certifications (e.g., Kleiderkreisel/Le Bon Coin; Bluesign) seem to have an impact. National standouts – France's AGEC law and Switzerland's Fabric Loop/Tell-Tex – catalyze implementation and R&D consortia (e.g., CISUTAC, WhiteCycle) bridge the existing gap between the testing stage and the market.

FINDINGS AND DEVELOPMENT POTENTIALS

Challenges and Potentials

The analysis shows that the European textile reuse and recycling sector is under significant political, market-related, technical, and societal pressure. The implementation of EU regulations, particularly Extended Producer Responsibility (EPR) schemes, is reshaping existing market structures. Although the secondhand market has long been a key pillar of the circular textile economy based on the R3 reuse principle, it is becoming increasingly unstable. Market disruptions, such as the growing dominance of low-cost exports from China and the tightening of national regulatory frameworks as the misunderstandings regarding the disposal of textiles in Germany, are causing resale markets to collapse and profit margins to shrink. This pressure is especially evident in regions where new regulatory requirements, such as minimum recycled content quotas for textiles (e.g., in France), affect SMEs disproportionately. These major regulations mean that large textile manufacturers, often in the fast fashion sector, purchase large quantities of used textiles. Consequently, SMEs have difficulty obtaining used textiles to meet their quotas.

In the DACH region (Germany, Austria, and Switzerland), the insolvency of charitable textile collection organizations highlights the current system's structural vulnerability. These developments are closely linked to the rise of fast fashion business models and the loss of traditional export markets, especially in Africa, where secondhand markets are increasingly supplied by Chinese companies. As a result, well-established European collection and reuse structures are under severe economic strain.

Two principal development pathways have emerged in response to these challenges. The first is a regulatory approach that increases minimum recycled content requirements, introduces stricter substance regulations, and imposes quantitative restrictions. Such measures could stabilize markets in the short term, especially in response to shrinking export opportunities, while also driving long-term systemic changes, including reducing harmful substances in textile production. The risk here is that recycled content from low-cost production countries is much cheaper than European content. Also, most recycled content comes from the plastics industry (bottles), which does not recycle (it's a different use), and it breaks the closed loop of plastic recycling.

The second pathway emphasizes proactive, industry-driven solutions before additional regulatory tightening occurs. This approach focuses on gaining a better understanding of the unique needs of each sector, the market's push-and-pull dynamics, and the economic realities faced by reuse operators, recyclers, and producers. Fostering dialogue between policymakers and industry stakeholders could strengthen innovation, improve the feasibility of sustainability measures, and increase acceptance.

Overall, the findings suggest that a purely regulatory or market-led approach alone will not suffice. Overregulating the sector without integrating industry expertise could lead to unintended market distortions. Relying solely on voluntary industry action is also unlikely to deliver the necessary systemic transformation. A balanced, cooperative governance model that combines clear regulatory frameworks with industry-responsive implementation appears to offer the most promising pathway to stabilizing and transforming the Alpine textile reuse and recycling sector.

Take-away messages

1. **Upscaling of industry solutions:**

   Recent R&D has generated multiple innovations and technical industry solutions that are considered promising. However, they are not yet at an industrial level for upscaling and economic viability. Regulations and innovations go hand in hand and must be seen as a response to current European and global political and societal developments. Interdependencies between regulatory and industrial actors leverage more sustainable and circular textile value chains and provide economic incentives for companies and SMEs in the Alpine region.

2. **Impact of second-hand platforms and fast fashion:**

   Second hand platforms are currently very successful, which shows the impact society can have in economic development. The reason for this could be both, due to a societal shift towards more ecological consumption patterns but also due to affordability issues at the consumer level. In parallel with the growth of secondhand platforms, fast fashion is putting a strain on R3 reuse and destabilizing collection systems (notably in Germany, Austria, and Switzerland) amid the rollout of Extended Producer Responsibility (EPR) and low-cost imports. Currently, the industry gets under pressure due to density in upcoming regulations. A balanced approach of regulatory actions, industry-led innovation, and market development offers a promising pathway to stabilizing the area of tension between producer and consumer responsibilities.

3. **National implementation differs:**

   The analysis implies that the European Union, Austria, Slovenia, and Italy show most of their junctures on policy, while Germany, France, and Switzerland have their junctures mainly on industry. The global and European strategies and regulations are transferred differently from country to country. This leads to various specificities of each industrial, policy, and social ecosystem that shapes the implementation of circular processes. This results in different timings for the emergence of key policies, industry breakouts, and innovations. The evolution of these national policies is influencing the industries efforts to develop and implement circular economy solutions. Understanding these processes might provide interesting good practices and helps to better understand the underlying decision-making.

Reference to other Deliverables

This work package consists, beside this report, of six other reports that provide additional information and deeper insights into the ASTER project:

- **Input paper on R-strategies | Definitions and Understanding. A guideline through the Activities:** https://www.alpine-space.eu/wp-content/uploads/2026/02/R-strategies-and-their-use-in-ASTER_V3.pdf
- **Deliverable 1.1.1 | Mapping circular & textile actors in the Alps:** https://www.alpine-space.eu/wp-content/uploads/2026/04/D111-Mapping-circular-and-textile-actors-in-the-Alps.pdf
- **Deliverable 1.1.2 | Mapping economic flows & gaps in the Alps:** https://www.alpine-space.eu/wp-content/uploads/2026/04/D112-Mapping-economic-flows-and-gaps-in-the-Alps.pdf
- **Deliverable 1.2.1 | Regulations and economic policies for waste prevention and management in the Alps:** https://www.alpine-space.eu/wp-content/uploads/2026/04/D121-Regulations-and-economic-policies-for-waste-prevention-and-management-in-the-Alps.pdf
- **Deliverable 1.3.1 | Methods – R-potential, waste generation and waste management of outdoor products in the Alpine region:** https://www.alpine-space.eu/wp-content/uploads/2026/05/D131-Methods_R-potential-waste-generation-and-waste-management.pdf
- **Deliverable 1.3.2 | R-potential, waste generation and waste management of outdoor products in the Alpine region:** https://www.alpine-space.eu/wp-content/uploads/2026/05/D132-R-potential-waste-generation-and-waste-management-of-outdoor-products.pdf

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ANNEX

This table summarizes the background information presented in Figure 2. All of the information is based on the research questionnaire from Deliverable 1.2.1 and was supplemented by desktop research. It is important to note that this information is not meant to be exhaustive, but rather to provide a good overview of the sector.

Table 1: Policy, industrial, and societal junctures

	Juncture Code	Level	Type	Year
Global	G03, G34	global	industrial	2000
	The “G03” juncture in 2000 marked a global industrial event with the establishment of the Bluesign certification body. Bluesign is an international company that helps businesses eliminate harmful substances throughout the entire textile production supply chain. Its establishment aimed to make production processes more sustainable and safer, and to certify products according to clearly defined environmental and safety standards.			
	G19	global	industrial	2009
	In 2009, the launch of the “G19” by Juncture marked a significant event in the global industrial sector, showcasing RESCOLL's pioneering research into “bonding-debonding on demand” technology. RESCOLL develops solutions for the targeted detachability of adhesive bonds using INDAR technology. Against the backdrop of increasing regulatory requirements, RESCOLL supports industrial partners in designing products that can be more easily repaired or recycled at the end of their service life. The INDAR primer is used together with common adhesives in the development phase. Targeted thermal activation reduces adhesion and enables controlled debonding. Residues can then be easily removed, facilitating the reuse or recycling of the components.			
	G21	global	industrial	2017
	In 2017, the "G21" event marked a significant milestone in the global industrial sector, showcasing research into various technologies in the field of mechanical and biochemical recycling. These new technologies include the depolymerisation of PET using enzymes and the separation of polyamide and elastane fibres from a fibre mixture.			
	G22	global	industrial	2020
	In 2020, Juncture's "G22" event will mark the global launch of the FAUME platform. FAUME is a resale technology partner that helps fashion brands tap into profitable secondhand markets.			
	G06, G23, G24	global	industrial	2021
	In 2021, junctures "G06," "G23," and "G24" will mark significant global industrial events. "G06" focuses on implementing waste gasification plants. "G23" focuses on developing and implementing various waste separation and sorting technologies, such as near-infrared spectroscopy, microwave technology, hyperspectral imaging, radio frequency identification, and coating debonding and crosslinking/decrosslinking system research. "G24" primarily focuses on researching and implementing various recycling technologies. Examples include ionic liquid technology, which removes dyes from fibers, as well as hydrothermal, thermochemical, and solvent-based dissolution and filtration technologies.			
	G02	global	policy	1992
	The "G02" juncture in 1992 marked a global policy event with the establishment of the OEKO-TEX 100 standard. This standard tests textiles for harmful substances and complies with uniform, binding test criteria and limit values worldwide. It takes into account international requirements and regulations.			
	G33	global	societal	2015
	In 2015, the Juncture “G33” marks a global social event with the increase in secondhand textile trade via platforms and apps.			

	G32	global	societal	2018
	In 2018, Juncture's "G32" event addressed the global social issue of the impact of fast fashion on textile recycling. The widespread use of mixed textiles makes recycling more difficult.			
Europe	E33	EU	industrial	2016
	In 2016, Juncture "E33" reached a milestone in European industry when NewRetex and the North-West Europe Interreg program developed several fully automated textile sorting systems.			
	E25	EU	industrial	2018
	In 2018, Juncture "E25" reached a European industrial milestone by launching the Tex.IT project. This project aims to create circular textile value chains through a digital system based on radio frequency identification (RFID).			
	E32	EU	industrial	2019
	In 2019, the "E32" event in Juncture will feature European innovations and research in recycling processes. Examples include White Cycle, a company that recycles PET from complex waste, and Bio Fibre Loop, a company that produces recyclable textiles from bio-based materials. Other projects include the production of a polyester garment that can be easily recycled chemically and the economically feasible mechanical recycling of workwear.			
	E23	EU	industrial	2020
	In 2020, Juncture "E23" will mark a European industrial event with the launch of the ReHub project, also known as the European Textile Recycling Hubs. The project aims to open five recycling sites across Europe that will process textile waste and generate new materials for the European textile value chain.			
	E26	EU	industrial	2021
	In 2021, Juncture "E26" will mark a European industrial event with the launch of the SCIRT project. The project will develop solutions for the growing volume of collected clothing and promote systematic innovations to strengthen the circular economy in the fashion sector.			
	E15	EU	industrial	2023
	In 2023, Juncture "E15" will mark a European industrial milestone with the launch of the EU-funded tExtended project. This project aims to introduce an innovative approach to recycling used textiles by developing a knowledge-based plan for optimizing the recycling of different textile streams.			
	E14	EU	industrial	2024
	In 2024, Juncture "E14" will mark a European industrial milestone with the launch of the EU-funded TRUSTex project. The project aims to transform the EU textile industry by implementing extended producer responsibility, eco-design principles, enhanced waste management, and digital tracking solutions.			
	E04	EU	policy	1999
	In 1999, the "E04" juncture marked a significant European policy event: the adoption of Directive 1999/31/EC on waste landfill, which aimed to reduce the amount of waste deposited in landfills.			
	E05	EU	policy	2006
	In 2006, the "E05" juncture marked a significant European policy event: the adoption of Regulation (EC) No. 1013/2006 on waste shipments. This regulation governs the movement of waste across EU borders and between the EU and third countries by imposing permit requirements and export restrictions.			
	E01	EU	policy	2008

In 2008, Juncture "E01" marked a significant European policy event with the passage of Directive 2008/98/EC on waste. The directive established a waste management hierarchy, recycling targets, waste management plans, and waste prevention programs. It also implemented the "polluter pays" principle, extended producer responsibility, and the circular economy.			
E30	EU	policy	2009
The year 2009 (and 2006) marks a significant European policy event: the implementation of Regulations No. 1907/2006 on the registration, evaluation, authorization, and restriction of chemicals (REACH), the establishment of a European Chemicals Agency, and Regulation No. 66/2010 on the EU Ecolabel. These regulations govern hazardous and chemical substances.			
E21	EU	policy	2011
In 2011, Juncture "E21" held a European policy event, marking the adoption of Regulation No. 1007/2011 on textile fiber names and the labeling and marking of textile products' fiber composition.			
E07	EU	policy	2015
In 2015, Juncture "E07" was a notable European policy event, marking the introduction of the first action plan for the circular economy. The plan included measures to promote Europe's transition to a circular economy, strengthen its global competitiveness, encourage sustainable economic growth, and generate new jobs.			
E08	EU	policy	2019
In 2019, Juncture "E08" coincided with the European Green Deal, a European policy event that set the goal of making the European Union climate-neutral by 2050.			
E09	EU	policy	2020
In 2020, Juncture "E09" marked a significant European policy event: the new action plan for the circular economy, which aims to make Europe cleaner and more competitive. The plan aims to make the European Union's economy more climate-friendly, competitive, and independent of primary raw materials by promoting sustainable product design, resource efficiency, waste prevention, and closed material cycles.			
E13	EU	policy	2021
In 2021, Juncture "E13" marked a significant European policy event: the establishment of "Horizon Europe," the framework program for research and innovation, along with its participation rules and results dissemination guidelines. Horizon Europe is the European Union's primary research and innovation funding program, with a budget of approximately €95 billion.			
E34	EU	policy	2022
In 2022, Junctures' "E34" marks a significant European policy event involving various product sustainability regulations. These include the EU Strategy for Sustainable and Circular Textiles; Regulation No. 2024/1781, which establishes a framework for setting eco-design requirements for sustainable products; and the Commission Communication on "Making Sustainable Products the Norm."			
E31	EU	Industrial	2022
In 2022, Juncture "E31" will be a European industrial event that promotes circularity and increases recycling efficiency through projects such as CISUTAC, INCIRCULAR, and PLASTICE.			
E28	EU	policy	2025
In 2025, the "E28" juncture marks a European policy event: the European Waste Management Association's policy recommendations for the Circular Economy Act. The association represents the private waste and resource management sector across Europe and strongly supports the EU's Circular Economy Act.			

Austria	A05	national	industrial	2006
	In 2006, Juncture "A05" reached a milestone in Austrian industry by founding Willhaben, Austria's largest online marketplace and second-hand sales platform.			
	A01	national	policy	2002
	In 2002, the juncture "A01" marked an Austrian policy event: the Waste Management Act went into effect. The act aims to avoid harmful effects on people and the environment, in line with the precautionary principle and sustainability.			
	A02	regional	policy	2011
	In 2011, the "A02" juncture marked a regional Austrian policy event concerning waste management in Tyrol. This event established fundamental principles for waste prevention, separation, and disposal.			
	A04	national	policy	2023
	In 2023, the Austrian Water and Waste Management Association published a discussion of the possibility of higher taxation of primary fibers in relation to secondary fibers at the Juncture "A04" policy event.			
	A03	national	policy	2025
	In 2025, the "A03" juncture marks an Austrian policy event: the publication of a position paper by the Association of Austrian Waste Disposal Companies. The paper asserts that EU emissions trading is not an effective way to avoid CO2 emissions from waste incineration.			
Germany	D16	national	industrial	2009
	In 2009, the "D16" juncture marked the founding of the secondhand sales platforms Kleiderkreisel and Mamikreisel, which merged under Vinted.			
	D15	national	industrial	2013
	In 2013, Juncture marked a milestone in the German industrial sector by founding the luxury secondhand sales platform Rebelle. Rebelle has since merged with Vinted.			
	D14	national	industrial	2024
	In 2024, the juncture "D14" was an event in Germany that showcased innovations in equivalent recycling. Examples include CARIBOS's biorecycling technology, which produced a garment made entirely from textile waste, as well as a polo shirt made from triple-recycled cellulose fiber.			
	D08, D13	national	industrial	2025
	In 2025, the junctures "D08" and "D13" will mark two German industrial events. These events will showcase the collaboration between AUNDE and PreZero in material recycling, focusing on polyester-containing textile waste. The goal is to produce high-quality recycled polyester granules. Additionally, there will be increased research activity to promote the recycling of high-performance fibers.			
	D01	national	policy	2012
	In 2012, the Juncture "D01" marked a significant German policy event: the mandatory separation of textiles for collection.			
	D02	regional	policy	2014
	In 2014, the "D02" juncture marked a regional policy event involving the regulation of the Bavarian waste management plan.			
	D17, D18	national	policy	2025
	In 2025, junctures “D17” and “D18” mark German policy events with the obligation to collect textile waste separately under the Circular Economy Act and a press release on the separate collection obligation.			
	D05	national	societal	2015
	The Juncture "D05" was a significant event in German society in 2015, with an average annual increase in collection volume per capita of 2.2% and an increase in actual collection volume of over 90,000 tons, bringing the total to 1,271,242 tons.			

France	F10	national	industrial	2006
	In 2006, the "F10" juncture was a significant moment in French industry, marked by the creation of the Leboncoin platform for selling used clothing.			
	F14	national	industrial	2008
	In 2008, the Re:Fashion initiative marked a French industrial milestone for Juncture "F14." It is the government-approved eco-organization responsible for clothing, household textiles, and shoes. It is responsible for implementing extended producer responsibility. It also ensures that end-of-life textiles are kept out of landfills. Re:Fashion is financed by eco-fees that brands must pay as part of the initiative.			
	F11	national	industrial	2018
	In 2018, the "F11" juncture marked a significant moment in French industry with the founding of Crush On. It is a startup that operates in the secondhand trade.			
	F01	regional	industrial	2019
	In 2019, Juncture "F01" was a regional industrial event held with the Eclaira network. The network's goal is to expand the number of separate collection points and increase waste collection and recycling.			
	F13	national	industrial	2021
	In 2021, Juncture "F13" will be a French industrial event showcasing innovations in preparation for recycling. These innovations include terahertz technology for identifying disruptive factors and an automated system for sorting shoes and textiles into the most suitable recycling streams.			
	F02, F07, F09	Regional/national	industrial	2023
	In 2023, junctures "F02," "F07," and "F09" will mark regional and national industrial events, including the opening of the first industrial plant for the automated sorting and recycling of textile waste; the creation of an ecosystem for the upcycling of shoes through refashioning; and innovations in the chemical recycling of polyamides from non-reusable household textiles, which will produce new, high-quality materials for other industries.			
	F12	national	policy	2021
	In 2021, the French policy event "Juncture F12" introduced regulations on waste separation and environmental impact through the French Eco-score and Info-tri system, which aims to make waste separation easier in everyday life.			
	F15	national	policy	2025
	The "F15" juncture in 2025 marks a significant French policy event: the passing of a law to regulate fast fashion. This law includes a tax based on the eco-score, bans on fast fashion advertising, and sanctions against influencers who promote it.			
	F16	National	Policy	2020
	In 2020, the "F16" juncture marked a significant French policy event: the passage of the AGEC Act, which aims to reduce waste and promote a circular economy. The AGEC Act sets a minimum value for recycled materials in textiles, provides customers with better information, prohibits the destruction of unsold items, and promotes extended producer responsibility.			
	F100	National	Policy	2026
	In 2026, the “F100” juncture includes examples such as the PFAS ban for textile products, which excludes specific technical and professional textiles (e.g., for firefighters).			
	F101	National	Policy	2025
	In 2025, the “F101” juncture, marks the 9-stream decree which adds professional textiles to the mandatory sorting and valorization of end-of-life textile products. This is not limited to regular clothing, shoes, and home textiles. It includes identification, qualification, sorting, collection, and management.			

	F04	national	societal	2024
	In 2024, the "F04" juncture marks a French social event, with textile consumption standing at 7.4% secondhand goods this year.			
Italy	I03	national	industrial	2017
	In 2017, Juncture "I03" reached an Italian industrial milestone by founding the ASTRI organization. The Italian Recycled Textile Association aims to produce high-quality fabrics from recycled materials and to collaborate with other organizations in the same industry.			
	I02	national	policy	2006
	In 2006, the Ministry for Ecological Transformation published the National Strategy for the Circular Economy, marking an Italian policy event with the Juncture "I02."			
	I01	regional	policy	2021
	In 2021, the Juncture "I01" event will mark the regional policy of the Ligurian waste management and recovery plan.			
Slovenia	S03	EU	industrial	2024
	In 2024, Juncture "S03" marked a significant European industrial event with the Interreg project, TEX-DAN. This transnational project involves SMEs from the Danube region and aims to enhance the circular economy within the textile and fashion industry's value chains. The project partners include a Slovenian company.			
	S02	national	policy	1999
	In 1999, the "S02" juncture marked a Slovenian policy event: the national environmental action program.			
	S01	national	policy	2004
	The juncture "S01" marked a Slovenian policy event in 2004 with the passing of the Environmental Protection Act.			
Switzerland	C02	national	industrial	2005
	In 2005, Juncture "C02" reached a Swiss industrial milestone by founding Säntis Textiles, a company that offers high-quality solutions for reusing cotton. The company also developed a method for recycling cotton yarn from old textiles that does not use chemicals.			
	C08	national	industrial	2021
	In 2021, the "C08" juncture marked a Swiss industrial milestone when Texaid transformed the textile industry from linear to circular.			
	C06, C07	national	industrial	2023
	In 2023, Junctures "C06" and "C07" are two Swiss industrial events showcasing products and prototypes from Texaid made from 50–100% recycled materials, as well as the Circular Workwear project. The latter aims to test fiber-to-fiber recycling using workwear as an example.			
	C03, C09	national	industrial	2024
	In 2024, junctures "C03" and "C09" mark two significant events in the Swiss industrial sector: the construction of Switzerland's first industrial textile recycling plant by Tell-Tex AG. The plant will sort and mechanically recycle old textiles fully automatically to keep them in the recycling cycle as secondary raw materials. The practical implementation of recycling is supported by the FOEN, which promotes public-private partnerships and integrates sustainable business practices into cantonal policies. The FOEN also supports pilot projects. Additionally, the Fabric Loop association is developing an industry solution for the nationwide organization and financing of the R-principles.			
	C04	national	societal	2025
	In 2025, the "C04" juncture marks a Swiss social event in which the public petitions the Federal Council to take action against fast fashion by establishing a fashion fund.			

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