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Establishing a circular textile industry in North Macedonia

This chapter outlines recommendations for North Macedonia to establish a circular textile industry, defining the sector's role in the broader transition to a circular economy. It provides an overview of the current situation and policy framework. The gap analysis informs the subsequent formulation of policy recommendations, emphasising a shift from a focus on production efficiency and textile waste treatment to integrating circular economy principles throughout the textile value chain. This includes elements like ecodesign and awareness-raising initiatives to influence consumer habits.

Circular economy in the textile industry

The textile industry covers a large variety of textile products and applications. Textile products can be classified into apparel (e.g. clothes, accessories and footwear), industrial textiles (e.g. for different applications in the medical, sports, transportation, construction, agriculture and packaging sectors) and household textiles (e.g. used in the kitchen, bedroom and bathroom). The textile value chain contains the following activities in a linear economy (UNEP, 2020^[1]):

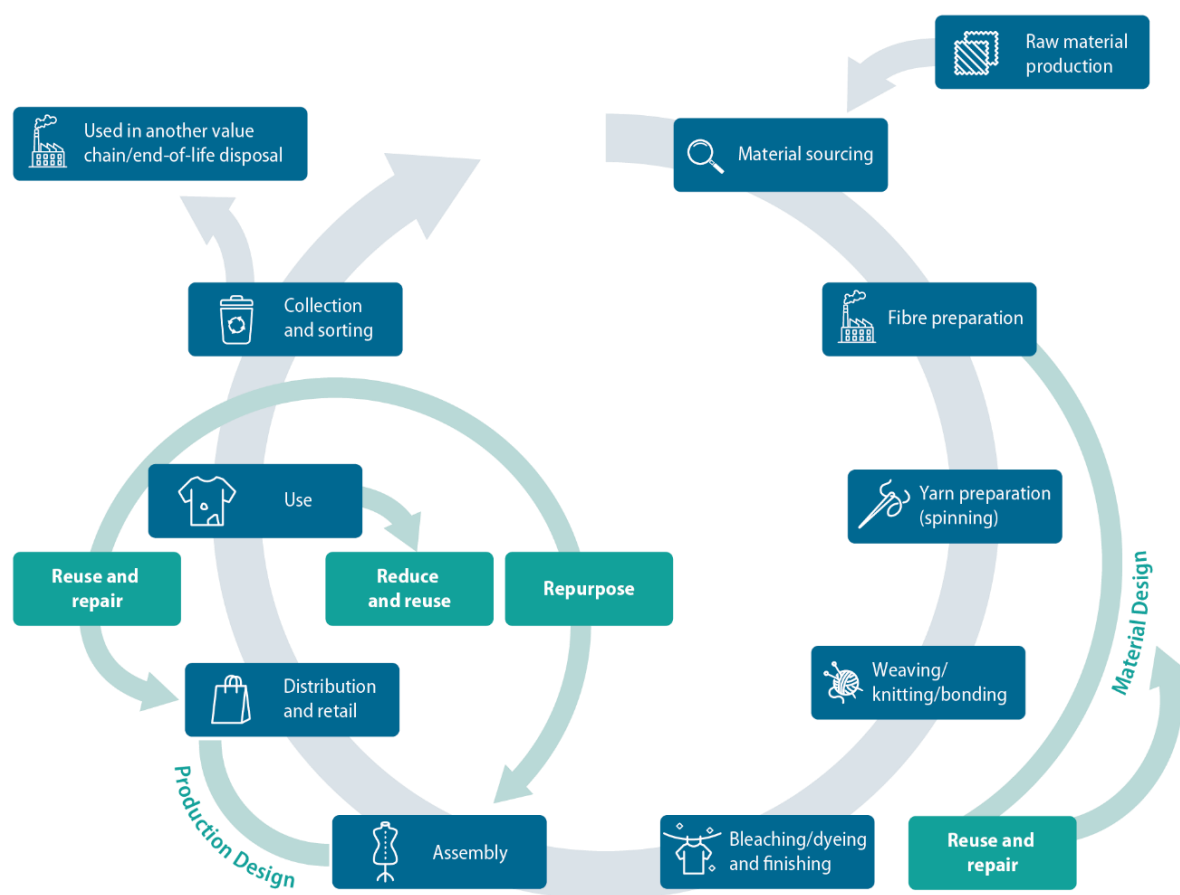
- fibre production (raw material production, material processing and sourcing, fibre preparation)
- yarn and fabric production (spinning, weaving/knitting/bonding)
- textile production (bleaching/dyeing/finishing, assembly)
- consumption (distribution and retail, use)
- end-of-life (collection and sorting, landfilling/waste to energy).

Textiles create environmental impacts throughout their life cycle. In the upstream stage, the production of natural fibres necessitates land conversion and copious use of fertiliser and water while releasing greenhouse gases (GHGs), including methane. Synthetic fibres are produced from extracted mineral resources or through energy-intensive chemical resin production. The “wet processing” during the spinning and weaving of yarn production and dyeing uses many chemicals, which result in soil and water pollution, further degrading these resources. For example, the Ellen Macarthur Foundation has estimated that, on average, 0.58 kg of chemicals are used per 1 kg of textile produced (Ellen Macarthur Foundation, 2017^[2]). In the course of the life cycle, and particularly during the use phase, textile fibres are shed, which become a source of micropollutants. In the downstream stage, just a mere 1% of textiles undergo recycling to create a product of similar value, and they typically account for 3-6% of the weight of household residual waste composition surveys (Ellen Macarthur Foundation, 2017^[2]). Additionally, a large share of used garments and textiles waste is exported to developing countries, which can overwhelm local waste management and compete with local production.

The circular economy offers several opportunities for transforming the textile industry into a more circular industry, where textile waste is minimised and material value is maintained in the textile value chain for as long as possible (Figure 7.1). These opportunities can be structured into four blocks of actions (adapted from UNEP (2020^[1])):

- **Reduce by design** – this is an overarching guiding principle which aims to reduce the amount of (raw) material and hazardous chemicals consumed during production and/or use phases. Product design impacts the way products are produced and consumed, as well as how they are disposed of. In a circular economy, the aim is to rethink business models and consumption patterns and produce textile products that are durable and made of sustainable materials.
- **“User-to-user” value retention processes** – which includes refuse, reduce and reuse circular consumption practices. These translate into consumers buying less while buying more products made of sustainable materials, reusing more and keeping textile products in use for as long as possible. Actions in this value retention process also aim to address the fast fashion phenomenon where consumers purchase continuously cheap but stylish clothing that has moved quickly from design to retail stores to keep up with new trends.
- **“User-to-business” value retention processes** – links primarily to repair activities where a consumer engages a business to extend the lifetime of a textile product by repairing it.
- **“Business-to-business” value retention processes** – where a product loses its original function and is repurposed or recycled rather than disposed of.

Figure 7.1. Activities taking place in a circular textile value chain



Source: Adapted from UNEP (2020^[1]).

Motivations for the selection of the textile industry as a key priority area of the Roadmap

The textile industry has been selected as a key priority area of the Circular Economy Roadmap for North Macedonia because of its high economic importance, strong policy relevance, and important circularity and decarbonisation potential for North Macedonia. North Macedonia's textile industry is the second biggest industrial sector and one of the most developed and diversified in terms of industrial production, employment and export earnings, accounting for 10% of total exports and 13% of industrial gross domestic product (Invest North Macedonia, 2022^[3]). In 2019, the sector represented 7% of total employment or around one-fourth of employees in the manufacturing industry (Invest North Macedonia, 2022^[3]).

From a policy perspective, there are several existing and planned European Union (EU) obligations on textiles that North Macedonia will need to align with as part of the EU accession process. This area also offers momentum for North Macedonia to become an important player in the circular textile value chain as countries globally are preparing for increased reuse and recycling of textile waste and for changing business models and consumption practices to mitigate the negative environmental impacts of textile production, use and waste management. EU obligations include the obligation for EU member states to

introduce mandatory separate collection of municipal textile waste from 2025 (Waste Framework Directive), potentially new ecodesign requirements (EU proposal for Ecodesign for Sustainable Products Regulation), and a mandatory and harmonised extended producer responsibility (EPR) scheme (proposal for a revision of the Waste Framework Directive). The aim is to reduce the high generation of textile waste and its incineration and landfilling in the European Union as recycling technologies are currently in their infancy.

The textile industry is still characterised by landfilling (4.7% of the total municipal solid waste landfilled), low recycling, low reuse and fabric underutilisation, placing considerable pressure on resources (Jordeva et al., 2018^[4]; EEA, 2021^[5]). While textile companies in North Macedonia are not involved in the production and design phase of fabrics, the circularity potential lies mainly in sustainable textile production processes (manufacturing, treatment and dyeing) and waste reduction in fabric use during the production of textile products.

Textiles also generate significant GHG emissions throughout their value chain, as the sector contributes to 10% of total carbon emissions worldwide, surpassing those of aviation and marine shipping (European Commission, 2020^[6]). With its associated CO₂ emissions projected to increase by more than 60% globally by 2030, “a new textile economy” based on a circular model will, therefore, be key to reaching climate-neutral targets (Design4Circle, 2021^[7]).

Overview and approach to selecting the proposed policy recommendations

The approach to selecting the proposed policy recommendations for the textiles priority area is similar to that used for the other sectoral priorities. Recommendations aim at improving the circularity of the industry along the textiles life cycle, with a focus on design, production, (re)use and end-of-life stages. They also try to bridge the gap between national and EU obligations and the current situation in North Macedonia. North Macedonia's textile industry positions itself in the apparel production stage of the textile life cycle. Around 75% of production is organised as a cut-make-trim model and the remaining 25% as a full production package (from design to garment completion). The main challenges of the textile industry in North Macedonia underlined during stakeholder consultations include the amount of waste produced in textile production processes, the limited amount of training on sustainable practices (including digital tools) for textile engineers and workers, and the lack of relevant infrastructure for textile waste. Considering the local context and stakeholder discussions, it is proposed that the roadmap focus on three key areas:

1. developing a national strategy on sustainable and circular textiles
2. reducing and better managing textile waste from production and households
3. strengthening the circular design of textiles.

This does not imply that other areas do not need to be addressed, but that they can be addressed at a later stage or through other strategies.

Table 7.1 provides an overview of the proposed policy recommendations to support these three key areas.

Table 7.1. Overview of the proposed policy recommendations in the priority area textiles for North Macedonia

Short term	Medium term	Long term
Develop a national strategy on sustainable and circular textiles	Introduce ecodesign requirements for textiles to make them last longer, easier to repair and recycle, as well as requirements on minimum recycled content	Financially support circular design projects and innovation
Provide financial and technical support for projects that reduce textile waste in manufacturing	Introduce mandatory separate collection of textile waste for households	
	Introduce an extended producer responsibility take-back scheme for textiles	
	Support investment in recycling and reuse of textiles	

Key proposed policy recommendations

1. Develop a national strategy on sustainable and circular textiles

Apart from their inclusion as a priority area in the National Plan for Waste Management (2021-2031) and the National Waste Prevention Plan (2022-2028), policy does not currently address sustainability and circularity of textiles sufficiently in North Macedonia. Besides waste management, governments need to address upstream production and use phases to achieve a sustainable and circular textile value chain.

In the short term, North Macedonia could develop a national strategy on sustainable and circular textiles that considers the entire textile value chain in North Macedonia. The strategy could map the state-of-play of the industry and the current regulatory framework; present the key trends and recent developments, including data on textile waste generation and management; and outline the key challenges and barriers to sustainability and circularity in the industry. The strategy should describe the overall strategic objectives, goals, policy measures and possibly targets to improve the sustainability and circularity of textiles in the country. The strategy could also address unsustainable consumer consumption practices of textile products, such as the fast fashion phenomenon, mainly through awareness raising and the promotion of second-hand shopping. Fast fashion involves increased consumption of textiles, the quick discarding of clothing and is linked to a diminishing quality of clothing items, which hampers reuse and recycling.

Mechanisms for reporting textile waste data could also be established as part of the strategy. The textile industry is not legally obligated to report textile waste data or achieve targets, but this may change in the near future, as the industry has recently started to receive policy attention at the EU level as well as globally. Consulted stakeholders in North Macedonia expressed interest in in-depth data analyses of textile waste generation, in particular related to the pre-consumption stage. The amount of imported textile fabrics and products is also unknown in North Macedonia as there is no mandatory registration in place for Customs to record such information.

To develop such a strategy, North Macedonia could learn from the example of Albania, which launched a Zero Draft Roadmap on Sustainability and Resource Use in the Textiles, Clothing, Leather and Footwear industries in October 2022 within the framework of the Business Partnerships and Solutions for SDGs, a project funded and implemented by international co-operation partners. The overall objective of that roadmap is to improve the sustainability of the textiles, clothing, leather and footwear sector in Albania with evidence on its environmental, social and economic impacts, and to work with a wide range of stakeholders all along the supply chain to support the transition to formality and fill existing sector gaps regarding waste

collection, separation, recycling, energy efficiency and water treatment (ILOSTAT, 2023^[8]). Another example is the European Union's Strategy on Sustainable and Circular Textiles (2022-2030), which lays out a forward-looking set of actions, such as design requirements for textiles to make them last longer (including a minimum recycled content), the introduction of a Digital Product Passport, mandatory EPR rules for textiles and support for circular business models in the textile sector.

2. Reduce and better manage textile waste

Results of a research study indicate that 25-40% of the total fabric used in garment production becomes fabric leftovers or textile waste (Aus et al., 2021^[9]). In general, cutting is the major stage among the various processes of textile production where most of the fabric waste/leftovers is generated (Aus et al., 2021^[9]). Reducing and better managing textile waste from production is a high priority for North Macedonia, as Macedonian companies are heavily involved in cutting. According to the circular economy stakeholders consulted for the development of this roadmap, a significant amount of textile waste is generated from cutting processes, as these processes are not optimised and employ low levels of digitalisation and automation. Education and training for engineers would be needed to increase digitalisation and automation of processes. Furthermore, textile waste is often disposed of in landfills that are not specifically designed for this purpose. Additionally, some textile waste is incinerated in cement factories due to a lack of recycling capacity. Based on this local context, it is proposed that the roadmap address textile waste by focusing on reducing textile waste in manufacturing and increasing the recycling, reuse and repair of textiles.

Reducing textile waste in manufacturing by improving production processes

In the short term, North Macedonia needs to provide financial and technical support, including training, to businesses and their employees to improve production processes and reduce textile waste from production. The aim of this support would be to increase the efficiency of production processes through better technologies and equipment which minimise textile waste generated from cutting. Digital tools, such as computer-aided design and computer-aided manufacture, can support such processes. Another possible objective of the support could be to help companies grow and scale up their production (by, for example, investing in new technologies), which may increase the efficiency of production processes. For example, a research study found that larger factories produce less textile waste as they generally operate more efficiently and larger orders help them better minimise cut waste from routines and fewer alterations (Aus et al., 2021^[9]). The financial support could be provided through more general funding for digitalisation and technology development, or through one of the funding programmes that support green investments in North Macedonia, as outlined in Chapter 4. This may require focusing on the textile industry in the calls for projects as a key priority of the circular economy roadmap. In addition, universities or research centres that work to develop expertise on sustainable textile practices could provide financial and technical support. The Faculty of Technology and Metallurgy of the Ss. Cyril and Methodius University in Skopje has some funds available to increase the use of resources in the textile sector. This programme could be scaled up to further support designers and manufacturers' access to expertise and invest in new technologies to reduce waste from production processes. The Future Fashion Factory, led by the University of Leeds in the United Kingdom, represents a good practice in this regard (Box 7.1) The funding support also needs to be combined with support for education and training for employees working in the industry to improve their digitalisation and engineering skills to deal with new software and technologies that help optimise production process and reduce generated waste. Developing ecodesign, innovative textile production, and repair and reuse skills are also crucial and will become even more so in the future (EU Strategy on Sustainable and Circular Textiles).

Box 7.1. The Future Fashion Factory

The Future Fashion Factory represents an innovative collaboration driven by industry-led research and development dedicated to exploring and advancing digital and sophisticated textile technologies for the purpose of fostering innovation within the UK fashion and textile sector.

Spearheaded by the University of Leeds and in partnership with the University of Huddersfield and the Royal College of Art, the programme's primary objective is to facilitate collaborative efforts among designers and manufacturers, allowing them to leverage the expertise of fashion and textile researchers. Their collective focus is on developing technologies that enhance productivity, reduce lead times, cut costs and minimise waste. The Future Fashion Factory concentrates on five core research themes aimed at cultivating cutting-edge technologies, enabling businesses to create precisely tailored products for their intended customers at the opportune moment:

1. late-stage customisation
2. sustainability and circular economies
3. digital communication of fabric aesthetics
4. data-driven design
5. skills and education.

The Future Fashion Factory boasts a membership exceeding 250, with over 100 located in the Leeds City Region, comprising independent fashion brands, textile mills and various technology providers. Companies join the Future Fashion Factory's network to access exclusive events and resources and foster a collaborative community where industry leaders and members can exchange and cultivate ideas. Membership grants access to a wealth of information about emerging technologies within the core research themes, providing opportunities to pilot these innovations or become early adopters.

Source: West Yorkshire Combined Authority (2020^[10]).

Increasing recycling and reuse of textiles

Recycling, including chemical recycling,¹ and reuse of all textile waste, including industrial and household textile waste, should be encouraged. To increase the recycling and reuse of textiles, North Macedonia will need to ensure that there is domestic recycling capacity and/or the textile waste is exported for recycling and reuse elsewhere. On the other hand, to support the recycling and reuse of household textiles, textile waste from households should be separately collected to ensure that it does not end up in municipal landfills or illegal dumpsites or is incinerated for energy recovery in the future. Moreover, implementing the polluter-pays principle by introducing an EPR take-back scheme for textiles could help fund recycling and reuse by shifting some of the waste management costs from municipalities to the manufacturers and importers of textiles. An EPR take-back scheme for textiles is planned as part of the new Waste Management Law and sub-acts adopted in 2021.

In the medium term, North Macedonia needs to support investments in recycling and reuse projects for textiles and/or facilitate the export of textiles for recycling and reuse. There are currently around ten registered entities that collect and export or recycle textile waste in the country. North Macedonia should first assess (for example through a diagnostics study) the current state regarding these companies then propose the best strategy to increase national recycling and reuse rates. This may be done by increasing domestic recycling and reuse capacity, the export of textile waste for recycling and reuse, or a combination of both. As mentioned earlier, globally, less than 1% of textile waste is estimated to be recycled into new textiles (Ellen Macarthur Foundation, 2017^[2]). This is because recycling textiles is

challenging with the current technology due to the materials used in textile products. For instance, fibres are often blended with others (e.g. polyester with cotton), and added elastane can act as a contaminant in textile fibres recycling technologies, making recycling more difficult and costly (European Commission, 2022^[11]). If textile waste cannot be recycled into new products of the same value, textile waste materials can be transformed into products of lesser value, or so-called “downcycled”. Currently, most common textile recycling activities consist of producing insulation materials for the automotive and construction industries and using absorbent textiles to produce cleaning cloths (Switchmed, 2020^[12]). If downcycling options are not possible, textile waste, depending on its composition, can be a good source for producing refuse derived fuel.²

Domestic recycling and reuse capacity can be increased by providing support for investments for building new infrastructure or projects that support recycling and reuse of textiles. For example, within the United Kingdom’s Resource Action Fund, there is a specific grant programme for recycling and reusing textiles supporting projects put forward by commercial and not-for-profit organisations (Wrap, n.d.^[13]). Funding supports capital expenditure for equipment costs and technologies enabling the recycling and/or reuse of textile waste materials sourced from either post-consumer textiles from municipal sources or pre-consumer (or post-industrial) textiles for recycling projects. Investments into chemical recycling would increase the amount of waste that can be recycled.

North Macedonia is a party to the Basel Convention, which regulates and facilitates transboundary movements of waste, including textile waste. North Macedonia could develop guidelines for exporters and customs to facilitate the export of textile waste along with an electronic register for shipments of waste, as suggested during the stakeholder consultations. As these measures go beyond textile waste, they can facilitate transboundary shipments of waste in general, and help align North Macedonia with the EU Waste Shipments Regulation. In the scope of regional initiatives or existing platforms, North Macedonia could suggest the development of a regional recycling company that will collect and recycle regional textile waste, as suggested by consulted stakeholders.

In the medium term, North Macedonia will also need to introduce mandatory separate collection of textile waste from households. Such a requirement will become mandatory for EU member states on 1 January 2025. There are different approaches for achieving mandatory separate collection of textile waste. Currently, separate collection of textiles is voluntary in EU member states and is organised by municipalities or charitable organisations. The collected textile waste from households is currently sent for recycling or sale on reuse markets, albeit primarily to developing countries where the waste is not always managed in an environmentally sound manner. Governments thus need to ensure that shipments of textile waste only take place when there are guarantees that the shipped waste can be properly treated and recycled. Countries are also discussing the option of using retailers or postal services to collect textile waste from households (e.g. Canada, the United Kingdom). If North Macedonia decides to use municipalities or charitable organisations’ networks to separately collect textile waste from households, it should try to ensure that the collected waste is first prepared for reuse to the extent possible (e.g. resold or donated), and only if it cannot be reused, sent for recycling. Recycling should be prioritised over energy recovery and landfilling. A good example of this is the greater Helsinki Region in Finland, which has implemented pilots since 2019 (See Box 7.2).

Box 7.2. Finland: Collecting and sorting textile waste in the absence of an extended producer responsibility scheme

Finland made the separate collection of textile waste mandatory in 2023.¹ The environmental services of the greater capital region of Helsinki had been implementing collection pilots since 2019. In the region, textile waste, including clothing, is gathered at outdoor stations with a charge (though this was

discontinued due to significant contamination) and at free-of-charge collection points in ten shopping malls. Citizens receive instructions on acceptable donations of clothing and household textiles through a dedicated regional guide. The initial sorting for textile reuse occurs at a waste service centre through a company selected via public tender. Using scanning technology, textiles are sorted based on quality, fibre and recyclable material. Non-reusable textiles are sent to a recycling plant, forming part of a public-private partnership, for further sorting and processing. At the recycling plant, end-of-life textile waste undergoes mechanical processing. While the regional structures strongly support the recycling of waste, the Finnish Waste Law explicitly prioritises reuse over recycling, offering additional advantages to local charities and vintage markets. While acknowledging the positive direction taken, municipalities recognise the need for increased recycling capacities to align with the volume of textile waste requiring sorting and recycling.

Note: ¹ 978/2021 Waste Decree, pursuant to the decision of the government, under the Waste Act (646/2011).

Source: Zero Waste Europe (2023^[14]).

Mandatory separate collection of textile waste could also be achieved by introducing EPR obligations for textiles, for example through a mandatory EPR take-back scheme. The EPR approach has proven effective in improving the separate collection and recycling of waste but its effectiveness for textile waste is yet to be seen as only a few countries have such a scheme in place. The EPR should, in principle, also incentivise product design that promotes circularity throughout the life cycle if eco-modulated fees are applied within the system. A few EU member states (e.g. Belgium, France and the Netherlands) have already introduced or are considering introducing an EPR take-back scheme for textiles to fulfil their obligation under EU waste legislation to establish mandatory separate collection of textile waste by 1 January 2025 (see for the example of France's well-established EPR scheme for textiles). North Macedonia adopted a set of laws targeting specific waste streams in 2021, in parallel with the Law on Waste Management. These include, among others, the Law on Extended Producer Responsibility regulating EPR schemes for different waste streams, including textile waste. However, the Law on EPR for textiles is not fully implemented, as Customs does not require mandatory registration of companies importing textile materials. The quantities of textile materials and products imported are also not recorded. According to the consulted stakeholders, this slows down the proper functioning of producer responsibility organisation (PROs) and of the EPR system as such. There is also a need to improve the traceability of post-consumption textile waste placed on the domestic market, as highlighted by consulted stakeholders. To effectively implement an EPR for textiles, North Macedonia could tap into the experience of other EU countries, such as France (Box 7.3). More practice and guidelines will become available in the coming years as more countries gain experience implementing such schemes.

Box 7.3. Extended producer responsibility for textiles and clothing in France

The extended producer responsibility (EPR) scheme for textiles (clothing, shoes and household linen) was introduced in France in 2007 under Article L-541-10-3 of the Environmental Code and further regulated by the enactment of the Anti-Waste and Circular Economy Law in 2020. It placed obligations on firms in the textiles and clothing sector in France to ensure a given standard of recovery and recycling. Firms could achieve this directly through their own actions or by contributing to an accredited producer responsibility organisation (PRO). In practice, a single non-profit PRO, Re_fashion (formerly Eco-TLC – Eco-organisme du textile, du linge et de la chaussure), has emerged as the sole vehicle for collective action in this sector. It was initiated in 2008 by a consortium of some 30 large retailers, manufacturers, wholesalers and industry organisations. In 2022, the PRO collected 260 kilotonnes from more than 6 500 marketers submitting declarations, comparable with the 827 kilotonnes of textiles placed on the market. While the collection rate increased by more than 15 000 tonnes compared to 2021, it remained below the national target (50% of products placed on the market).

Member contributions are based on the previous year's sales of items in four size categories of clothing and two categories of footwear. The contribution for a clothing item of average size was about EUR 1.16 cents in 2021. New eco-fees specifications are to be defined for the 2023-28 period. Reduced contribution rates ("eco-modulation") apply to producers promoting eco-design initiatives in three main areas: 1) durability; 2) the integration of recycled post-consumer materials; and 3) the introduction of recycled post-production materials. In 2021, the application of these reduced rates appears limited to less than 1.6% of total output, because the benefit of the reduced rates was insufficient to warrant the audit documentation that must be supplied. In 2022, the PRO carried out prospective studies for new eco-modulation criteria to address these challenges.

Re_fashion provides financial support for sorting and recycling facilities owned by private operators, including the non-profit organisations Le Relais and Emmaüs. Subject to meeting various performance and traceability requirements, a rate of 80 EUR/tonne is paid for items sent for reuse, 180 EUR/tonne for items sent to recycling and 20 EUR/tonne for items sent for energy recovery. Higher rates are paid to operators hiring disadvantaged workers. These subsidy payments account for about two-thirds of revenues from member contributions. Much of the remainder is devoted to consumer awareness campaigns and funding innovative demonstration projects and research.

In 2022, the reuse rate of collected textiles was roughly 59.5%. From its introduction in 2009 to 2022, the share of collected garments used as material for garmenting (recycling) grew from 14% to 31.3%; however, energy recovery also grew from 0% to 8.2%.

Source: OECD (2022^[15]); Re_fashion (2023^[16]); Bukhari, Carrasco-Gallego and Ponce-Cueto (2018^[17]);

3. Strengthen the circular design of textiles

As highlighted above, circular design of textiles is an overarching guiding principle to make the textile value chain more sustainable and circular. A mix of policy instruments, from financial and economic incentives to ecodesign requirements and awareness-raising and education measures, can strengthen the circular design of textiles. The circular design of textiles also requires good data and feedback loops from the different life cycle stages, including how much material is wasted in production and knowledge of available recycling technologies and processes, in order to design textile products in a way that maximises the use of waste as a resource but also allows for reuse and recycling. It is proposed that North Macedonia focus on two key measures to support the circular design of textiles: 1) introducing ecodesign requirements to extend the lifetime of textile products, in line with the EU proposal for Ecodesign for Sustainable Products

Regulation in the medium term; and 2) financially supporting innovative projects that aim to develop circular design and cut patterns, with a focus on optimising textile waste generated in production in the long term, as this is one key issue in the country.

Introduce ecodesign requirements for textiles to make them last longer, easier to repair and recycle, as well as requirements on minimum recycled content

Ecodesign and labelling measures have positively reduced GHG emissions associated with a range of products in the European Union. These measures not only lead to consumer savings but also enhance business revenues and create job opportunities (European Commission, 2021^[18]). This is particularly crucial in the realm of textiles, considering their significant environmental footprint. Embracing ecodesign principles would not only contribute to reducing the environmental footprint of the textile industry but would also align with global sustainability trends, enhancing North Macedonia's competitiveness and fostering responsible consumption and production practices. Moreover, it can empower consumers in North Macedonia by providing them with clear and transparent information about certain features of the products, such as their durability, reparability and environmental performance, enabling more informed and sustainable purchasing decisions.

In the medium term, North Macedonia must introduce ecodesign requirements for textiles to make textile products more circular, in line with the EU proposal for Ecodesign for Sustainable Products Regulation, as the country is a key exporter of textiles to the European Union, and as such will need to comply with these requirements. Under this proposal, the European Commission aims to develop binding product-specific ecodesign requirements to increase textiles' performance in terms of durability, reusability, reparability, fibre-to-fibre recyclability and mandatory recycled fibre content; minimise and track the presence of substances of concern; and reduce the adverse impacts on climate and the environment. The ecodesign requirements will include performance requirements and information requirements. The performance requirements can take the form of either a quantitative level or a non-quantitative requirement that aim to improve a certain product aspect, such as, for example, recyclability. Information requirements will be related to the adoption of digital product passports and requirements related to substances of concern. The digital product passports will provide the means to electronically register, process and share product-related information among supply chain businesses, authorities and consumers (EU proposal for Ecodesign for Sustainable Products Regulation). There will also be a need for co-operation among supply chain actors, manufacturers, public authorities and other competent bodies to ensure the product complies with such requirements. The introduction of ecodesign requirements will also need to be supported by eco-labels to comply with the information requirements. Box 7.4 presents the ecodesign criteria for consumer textiles that might be relevant to consider when introducing ecodesign requirements. Companies can also start preparing by paying attention to traceability and impact calculation of their textile products.

Box 7.4. Mapping possible ecodesign criteria for circular fashion and textiles

Description of the research in Flanders, Belgium

In 2020, the Public Waste Agency of Flanders facilitated a study focused on ecodesign criteria for circular textiles. Collaboration with stakeholders allowed identifying key aspects to enhance the circularity of the textile chain.

The criteria outlined in the published report emphasise factors such as longevity, reuse, disassembly, repair, upcycling and high-quality recycling, which play a crucial role in fostering a transparent and sustainable textile chain. The report defines distinct product categories for ecodesign in textiles, spanning:

- clothing
- protective clothing
- bath, bed and kitchen textiles
- curtains
- upholstery fabrics
- mattress ticking
- floor coverings.

To support the implementation of ecodesign, the study investigated standards that could serve as requirements within a regulatory framework. These elements were identified then categorised into three main aspects related to the ecodesign of textile products: 1) life prolongation; 2) closing the loop; and 3) responsible production.

Life prolongation as an aspect of ecodesign for circular textiles

Among the textile industry stakeholders involved in the study, life prolongation emerged as the most crucial aspect of ecodesign, recognised for its potential to swiftly achieve significant environmental gains. Within its subcategories – quality, repairability and maintenance – the predominance of quality was emphasised as key for extending a product's life. Criteria were formulated for each product category, establishing the minimum quality threshold that designates a textile product as suitable for prolonged use. The selection of these criteria was guided by insights from standards associated with the product category and Centexbel's (scientific centre for the Belgian textile industry) expertise as a testing lab. The proposed quality criteria for the final product group consist of a comprehensive set of test standards, minimum test values and product standards, incorporating categorisation based on quality considerations.

The following steps are deemed necessary to develop a solid quality standard for all product categories:

1. Identifying the reasons for the end-of-life of a particular textile product category and, if necessary, breaking it down into subcategories.
2. Linking these end-of-life reasons to specific product quality parameters (for clothing these are usually the strength of seams, tears, colour, appearance after a wash/dry cleaning, etc.).
3. Identifying a suitable test method for each identified parameter.
4. Determining minimum limits for every test method through a correlation study examining the relationship between the lifetime of a textile product and the outcomes of the test method.
5. Consolidating the various test methods and their associated minimum limits into a comprehensive set of requirements.

Source: OVAM (2021^[19]).

Financial support to circular design projects and innovations

North Macedonia should provide financial support to projects that promote and implement circular design projects and innovations in the textile industry in the long term. Around 95% of the domestic apparel production is export-oriented, meaning that the product design is developed in the exporting countries, mainly in Europe. Supporting local projects in circular design is of key importance to minimise textile waste from production. This could include projects that aim to develop product designs for longevity, recycling or disassembly, including, for example, modular designs, removable stitches/glue, mono-material designs, or 3D design and pattern development. Other supported projects could focus on design and cut patterns development to help optimise efficiency in textile production and minimise textile waste and fabric

leftovers from cutting (the so-called upcycling approach). Providing innovative circular design methods for fabric leftovers and textile waste can significantly reduce the environmental impact of the fashion and textile industry (Aus et al., 2021^[9]). Upcycling is generally understood as a design-based circular fashion approach, where pre- or post-consumer textile waste material is repurposed to create new garments (Aus et al., 2021^[9]). Such financial support could be provided in the context of supporting the uptake of circular business models, as outlined in Chapter 4 (this would be more relevant for scaling up upcycling), or through GPP that could focus on promoting the uptake of the use of recycled textile fibres (see Box 7.5 for an example from Italy).

Box 7.5. Supporting the circular design of textiles through green public procurement

In Italy, since 2016, all public entities are obliged to apply green public procurement (GPP) criteria for products and services for which GPP criteria have been defined (Italian Public Contract Code). For some products, the presence of recycled content constitutes an award criterion that improves the evaluation score for the good or service. This is the case, for instance, for GPP criteria for textile products that reward the presence of recycled textile fibres, for by-products from industrial symbiosis processes, and goods prepared for reuse and the presence of additional repair and maintenance services offered for the goods supplied (Ministerial Decree 30/06/21). Specific voluntary labelling and certification schemes enable companies to declare compliance with GPP criteria (both minimum and award criteria), such as the Remade in Italy environmental certification for recycled content. Moreover, minimum recycled content requirements constitute eligibility criteria to benefit from certain tax benefits targeted at enterprises.

Source: OECD (2024^[20]).

Government support for the circular design of textiles is relatively new, and there therefore is a lack of examples of international good practices. However, more examples will become available in the near future, in particular in EU member states as the European Commission rolls out its plan for sustainable and circular textiles. Upscaling of upcycling and of other circular design approaches will, nevertheless, require multi-stakeholder collaboration throughout the value chain, including collaboration between designers and manufacturers but also recyclers to better understand the waste flows and the opportunities brought by new designs and materials used in textile production. Such collaboration could be facilitated by industrial symbiosis within green industrial zones in North Macedonia and promoted as part of a circular economy business platform, as recommended in Chapter 4.

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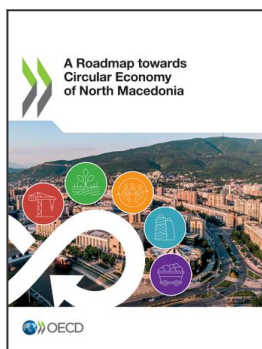
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Notes

¹ Chemical recycling processes plastic waste by applying chemical agents that break down waste material into its building blocks (either polymers, monomers or fuels) (OECD, 2022^[22]).

² Refuse derived fuel is a fuel produced from different types of combustible waste that are commonly used in cement plants or as a co-combustion fuel in power and other industrial plants (Gold Standard, 2023^[21]).



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