DOI: 10.3217/978-3-85125-842-4-19

178 Dress and the city: a comparative study of clothing and textiles environmental policy in five European cities

Irene Maldini[1], Samira Iran[2], Kirsi Laitala[3], Gunnar Vittersø[4], Iva Jestratijevic[5], Milena Amaral[6], Katia Vladimirova[7]

[1]Amsterdam University of Applied Sciences, Rhijnspoorplein 1, 1091 GC, Amsterdam, Netherlands, i.maldini@hva.nl

[2]Technische UNiversität Berlin, Marchstr. 23 10587, Berlin, Germany, samira.iran@tu-berlin.de

[3]Consumption Research Norway, Oslo Metropolitan University, P.O. Box 4, St. Olavs plass, 0130 Oslo, Norway, kirsil@oslomet.no

[4]Consumption Research Norway, Oslo Metropolitan University, P.O. Box 4, St. Olavs plass, 0130 Oslo, Norway, gunjar@oslomet.no

[5]University of North Texas, Department of Merchandising and Digital retail, 10 Ave C, Denton,Texas,USA, Iva.Jestratijevic@unt.edu

[6] Neovili, 3 Boulevard Sebastopol,75001, Paris, France, milena.amaral@neovili.com

[7]University of Geneva, Boulevard du Pont-d'Arve 40, 1205 Genève, Switzerland, ekaterina.vladimirova@unige.ch

Abstract

European clothing consumption has increased dramatically in recent decades, leading to a current average of 26 kg of textiles annually purchased per capita (EEA, 2019). While garments (and most of clothing's environmental impacts) are produced in other parts of the world, European municipalities face a problem of increasing volumes of textile waste. Moreover, the revised waste directive of 2018 specifies that European Union countries will be obliged to collect textiles separately by 2025. This study investigates how these phenomena are affecting city-level policy and strategy, including but not limited to textile waste management. It builds on a comparative analysis of official documents informed by interviews with policy makers and waste management authorities in five European cities.

The research points out that, in these cities, clothing environmental policy and other public initiatives are at varied levels of development. The paper identifies three kinds of measures, namely (a) improving separate collection, (b) waste prevention, and (c) consumption reduction. Reducing the share of textiles disposed of in general household waste (and therefore increasing separate collection) has been a central aim

in cities where textiles fall under local waste regulation. The waste directive mentioned above makes separate collection of all textiles compulsory for EU members, leading to revisions in some cities' collection systems. Some municipalities have gone one step further in preventing these textiles from reaching waste streams by supporting local initiatives for repair and reuse. The most advanced and recent approach is aiming at reductions in new clothing demand through citizen campaigns and monitoring the effect of repair and reuse actions in consumption levels.

The comparative analysis leads to recommendations for future policy and strategy including developing the three approaches mentioned above simultaneously, further exploring measures for consumption reduction, and the integration of more concrete targets and monitoring plans, so that the most effective paths in social and environmental terms can be identified.

Keywords: Clothing, Textiles, Environmental policy, Municipalities, European cities

Introduction

The environmental impact of clothing production and consumption has received increasing public attention in recent years, following rapid growth in the quantity of clothing in circulation. Euromonitor estimates that the volume of clothes sold globally doubled between 2000 and 2015, while population increased by approximately 20% (Ellen McArthur Foundation, 2017). Most of these textiles and garments are manufactured in Asia, where the main environmental impacts associated with water and chemical use, and carbon emissions, occur (Niinimäki et al., 2020). In Europe, the environmental problems of clothing overflow are visible through rising volumes of used clothing and textile waste; but these consumption-intensive countries are also responsible for and affected by the impacts of the whole chain.

Approximately 5.8 million tons of textiles are disposed of by European households each year, equivalent to 11.3 kg per person. Between 1.7 and 2.1 million tonnes of used textiles are separately collected annually throughout the European Union (EU). The majority of the remaining 3.3 to 3.7 million tonnes are thought to be discarded in mixed household waste, with a much smaller amount being stored in increasing stockpiles in households (Beasley and Georgeson, 2014).

In European cities, separate textile waste collection is managed by commercial and charity organisations in different ways, as well as by public authorities. For instance, in the Parisian region, there are more than 300 textile collecting terminals for textiles of any quality, managed by various organisations and supported by city policy (City of

Paris, 2019). 20 of these points are connected to the Refashion program; an industry-led initiative supported by the state promoting circularity including reduction, reuse and recycling of textiles (Refashion, 2020). Notably, this initiative follows pioneering Extended Producer Responsibility in France, where clothing producers are responsible for collection. Recently, some textile retailers such as H&M also began to offer take-back systems elsewhere; they collect used textiles in their stores to recycle them in the future (e.g. Ellen MacArthur Foundation, 2017). Recycling textiles is yet a challenge. For instance, blended fibers, which can have a positive effect on the resilience or functionality of the garment (a common example is polycotton), have so far been difficult to separate and thus complicate recycling of such textile waste. Currently 73% of global textile waste is being landfilled (Ellen McArthur Foundation, 2017). Therefore, prevention of waste is a central condition for a sustainable textile sector.

The challenge of reducing textile waste volumes has led to policy initiatives at different levels including EU, national, and city leves. Cities play a central role, because in most European countries, municipalities are accounted as responsible parties for textile waste collection (e.g. Brieger et al., 2021, Watson et al., 2018). Samie (2021) has argued that textile waste is a “social phenomenon of the urbanised city”. On the other hand, the concept of “waste” in this sector is somewhat ambiguous, because post consumer textiles may fall under waste legislation or not depending on the national context, the way they are collected, and their destiny (Watson et al., 2018).

It is predicted that about 68% of the population globally will live in cities by 2050 (UN, 2018), where clothing consumption per capita is bigger than in rural areas. For instance, people living in Oslo or close by buy more clothing pieces and their total consumption is larger than the average for Norway (Laitala and Klepp, 2020). In the Netherlands, people living in cities own more garments and more clothes that are not actively used (Maldini et al., 2017). Therefore, cities are key in fostering sustainable consumption, including but not restricted to waste prevention. Reductions in the volume of clothing produced and consumed are, as the primary source of this waste, a central challenge (e.g. Iran and Schrader, 2017; Maldini, 2019; Levänen et al., 2021), also because production is the most impactful phase of the clothing lifecycle (e.g. Roos et al., 2015; van der Velden et al., 2014).

There is certain consensus that for achieving sustainable consumption, not only individual consumers should become active, but also government interventions are necessary (e.g. Newell, et al., 2021; Prothero et al., 2011; Wolff and Schönherr, 2011). European governments have tried to promote sustainable consumption through developing strategies and policy instruments that “mostly focus on technological improvements in production and products” while paying less attention to the consumption side (Wollf et al., 2017, p.457). The consumption side “has been addressed mostly by strategy papers and communicative instruments such as labels or campaigns aiming to inform, educate, appeal to, or ‘nudge’ consumers towards more

sustainable behaviours" (Wollf et al., 2017, p.457). Accordingly, Dawkins et al. (2019) highlight that there is still a lack of research on the factors influencing successful implementation of sustainable consumption interventions at the local government level. Without having an understanding of such factors, authors argue, it is difficult to determine the role of local government in fostering and facilitating sustainable consumption (Dawkins et al., 2019).

Therefore, for local governments to plan and implement successful interventions for fostering sustainable consumption, it is necessary that they thoroughly evaluate the existing instruments as well as drivers and barriers to their success (Wolff and Schönherr, 2011). In this paper, we focus on the role of cities and municipalities in developing policy and strategies to tackle challenges regarding the environmental impact of clothing and textiles consumption. To this end, the paper explores current programs and future plans of municipalities in dealing with and reducing these impacts in different European cities. Moreover, the level of development of city level policies and strategies regarding textile waste are compared between five cities: Amsterdam, Belgrade, Berlin, Geneva, and Oslo. The analysis goes beyond reporting differences in textile collection strategies to focus on how cities and municipalities have approached textile waste prevention and eventually reduction in new clothing consumption.

Methods

For the purpose of this research, a qualitative comparative study has been conducted in five different European cities. Besides being located in various European sub-regions, these cities are different regarding their level of engagement with clothing, environmental policy, and textile waste treatment and prevention. The next section discusses some of these differences. Moreover, they vary greatly in size, ranging from approximately 500,000 inhabitants (Greater Geneva) to 3.7 million (Berlin). Lastly, the countries where they are located have different relations with the EU, with implications for policy: Norway and Switzerland are not EU members, Serbia is in the process of integration to the EU, and Germany and the Netherlands are established members.

Given this variety in context, the study compares the approach to and development of clothing environmental policy in these cities, exploring the following questions:

- How do these cities and their local authorities deal with the environmental challenges of growing clothing consumption and textile waste volume?
- What city policies and strategies (if any) have emerged in this context and how are these affected by national and EU policy?
- Which city policy and strategy recommendations can we provide based on this comparative study?

The methods used include reviewing official documents (EU, national, and city level policy and strategy documents relevant for the five studied cities) and conducting semi-structured interviews with local authorities, charity organizations, and textile waste specialists in these locations. The study is exploratory in nature and, therefore, has limitations in terms of the completeness of the collected data and its accuracy, as respondents are often those designing and implementing the strategy analysed here. Still, this study addresses a research gap on the topic of textile related environmental policy in European cities and highlights measures that are being implemented and others that could be developed in the future.

Results and Discussion

Table 1 shows an overview of the national and city documents reviewed in this study. Notably, the Circular Economy framework is frequently used for national and city policy in line with European strategy. The relation between different policy levels is not to be understood only as a top-down one, as municipalities lobby at a national and European level. For instance, the Oslo Municipality has participated in, among others, the EU's Urban Agenda Partnership for the circular economy and the EUROCITIES city network.

Despite the common points in the policies summarized in Table 1, the ambitions and focus of these programs vary greatly, as does the significance of clothing and textile environmental policy in local sustainable consumption policy. For instance Geneva has an advanced policy in food waste prevention (Geneva Waste Management Strategy, 2021), but there is no specific mention of textile waste prevention and treatment in city documents. On the other hand, the Municipality of Amsterdam has chosen textiles as one of the three consumer goods value chains to focus on, and the Amsterdam Economic Board is working on textiles as the main consumer goods sector within their Green Deals program (Amsterdam Economic Board, 2021).

Another noticeable characteristic in Table 1 is the number of policy documents that are recently released or expected to be released in the coming period, suggesting that at least some governments are working hard on issues that have gained rapid public attention. For instance, Oslo is working on their Circular Economy Strategy, and a new Waste Strategy, which in line with existing national and city policy are expected to include specific measures for textiles (Oslo Municipality, 2020). Another reason for recent development of textile-specific measures may be new requirements such as the European Waste Directive, where EU member states are obliged to have a system in place for separate collection of textiles, not only re-wearable garments, by 2025. In Serbia, in the process of integration into the EU, the national government accepted the

European Waste Directive in April 2020, suggesting an upcoming revision of Belgrade collection systems in the next few years (MEPS, 2020).

Separate textile collection can be considered the entry point to clothing-related environmental policy in cities. The issue of re-wearable and non-rewearable grades - and their implications in terms of waste regulation, economic viability of the actors involved in collection, sorting and trade, etc. - has been dealt with differently across states and cities.

In the Netherlands, post consumer textiles are collected in above-the-ground containers assigned by municipalities. These containers are managed by charitable organisations that used to pay a fee to municipalities to operate. Regulations introduced in 2009 oblige these organisations to collect all textiles and accessories regardless of their quality and to make that clear in their communication to citizens (Maldini et al. 2017). As a result, all collectors need to be registered as waste organisations (Watson et al. 2018). In 2020, many municipalities withdrew their fees as a result of the economic challenges suffered by collectors - which were accentuated with the COVID-19 pandemic. The Amsterdam Municipality manages the location and permits of the 370 containers run by the charitable organisation Sympany. However, city authorities are currently conducting a pilot to collect on-demand at households. The new system is expected to replace Sympany's containers by February 2022, resulting in higher quality materials collected (avoiding contamination) and more control over them (Interview with Stef Le Fevre, Amsterdam Municipality).

In Serbia there is no discrimination between rewearable and non rewearable grades either. Municipalities and small businesses are involved in textile collection, which is carried out weekly through containers. However, containers are still available in a limited number, mainly in urban areas. As per available data gathered in 2017, in that year Belgrade had 34 textile collection containers available and set up through the city (EASD, 2018).

In the Federal States of Germany, the context varies greatly between regions. In Berlin, all waste must be handed over to the main waste collection organisation (BSR) in accordance with Section 7 of the Closed Substance Cycle Waste Management Act. Paragraph 18 in this section, however, specifies that other collectors can also collect waste with a notice, if they prove that the waste is disposed of properly and in a harmless manner. As BSR does not have the capacity to collect textiles in Berlin at the moment, other organisations are allowed to collect for the time being; therefore, many organisations are active in collection, regardless of the quality of textiles (e.g. Forbig et al., 2020).

Table 1: National and city level documents considered in this study

	Amsterdam	Belgrade	Berlin	Geneva	Oslo
National environmental policy concerning consumer goods and textiles	Dutch policy programme for circular textiles 2020-2025 Waste to Resource, 2014	Roadmap for the circular economy in Serbia 2020 The Rulebook on criteria for defining by-products (Official Gazette of Republic of Serbia, no. 76/2019)	Waste Management Concept 2020-2030 National Programme on Sustainable Consumption (2016)	Program Sustainable Textiles Switzerland	National strategy on circular economy
City environmental policy and strategy documents concerning consumer goods and textiles	Amsterdam Circular 2020-2025 strategy	The 2030 Sustainable Urban Development Strategy of Belgrade and other cities in Serbia.	Re-Use initiative Waste Management Concept	Geneva Waste Management Strategy (2021) City of Geneva: Recycling Textiles	Consumption of the future: -Strategy for sustainable and reduced consumption 2019–2030 -Detailed action plan for 2020-2023

In Switzerland, there is no dedicated federal-level policy for separate textile waste collection and there are different collection systems in terms of actors involved in different cities. In Geneva, the municipality is responsible for general waste collection and treatment and provides space for containers for separate textile collection, although local authorities are not involved in the actual process of textile collection or treatment. Rewearable textiles (including shoes, accessories, and household textiles) are collected by *Coordination pour la récupération* des *textiles à Genève* (CRT)*,* an association of local charities (including CSP, Croix Rouge, Caritas, Emmaus, and Terre des Hommes Suiss) and TEXAID, a Swiss textile recycling company. There are around 3,000 tons of used textiles collected in Geneva annually via approximately 250 boxes (TEXAID, 2017, Interview with Typhaine Guihard, Vestiare Sociale; Interview with Sophie Pichon, Croix Rouge).

Norway has different collection systems for rewearable and non rewearable grades. In 2018, charitable organisations collected 79% of all separate textiles, while municipal waste companies and private organisations collected 13% and 8%, respectively. In Oslo, post consumer textiles for reuse are collected by charities and private organisations, although this fraction also includes some non-reusable textiles. The Municipality is involved by appointing city space for collection boxes and approximately 350 boxes administered by the charities (Fretex and UFF) are placed all over the city (Oslo Municipality, 2017). Other post consumer textiles (not suitable for reuse) are collected only at main recycling stations (Watson et al. 2020). The Municipality is now looking into alternatives and doing pilot studies in cooperation with charities for collecting waste either in separate collection boxes, or in separately labeled bags together with textiles for reuse (Frimann, 2021).

Increasing separate collection of textiles is an aim in all cities. However, some have moved beyond this target to focus on improving the quality of collection systems in order to ensure quality in the material collected. For example in Belgrade, communicating the value of textile recycling to citizens is a central activity of the city government, while Amsterdam and Oslo have a well established culture of separate textile collection and municipalities are now rethinking their collection systems as discussed above.

Table 2 shows the latest available information about separate post consumer textile collection volumes to our knowledge, and their destiny. Information is available at a national - rather than a city - level. In general terms, countries are making efforts to increase separate textile collection, but the destiny of these textiles is a result of market dynamics. Serbia is a particular case within the cities studied here, as it imports used garments for local consumption, and the low volumes of materials collected separately are not considered for reuse. In the other countries, textiles considered suitable for reuse are sold at a higher price and therefore reuse is prioritized by sorters. However, demand plays a big role in sorting decisions. For example, sorters are more flexible

with children's clothes and their rewearable qualities, because they are in higher demand internationally. The fact that the market determines the destiny of these textiles means that they are not always processed in the most environmentally or socially beneficial way. As the table shows, only a small share of discarded or donated garments are reused locally. What is exported for reuse abroad (mainly to African countries) sometimes does not fit local needs (e.g. winter clothes) and ends up being a burden rather than an asset in the global south (see e.g. OR Foundation, 2021).

City governments and waste authorities are aware of these challenges and they are trying to enable more positively impactful processes for discarded textiles. Having more control over the collection and sorting process is one way to ensure better uses for the collected material (see pilots developed in Oslo and Amsterdam above), but not all municipalities and waste management organisations have the capacity to do so (e.g. BSR in Berlin and CRT in Geneva). A hybrid solution, perhaps, is the one developed in the Netherlands at the moment, where Extended Producer Responsibility measures will help finance collection, recycling, and re-use of post consumer textiles, with city authorities remaining responsible for the management of textile collection, even if that is handled by other organisations. It is expected that this mechanism will enable better destinies for the collected material in social and environmental terms.

Given difficulties in regulating international markets, an overall approach of municipalities has been that of facilitating initiatives for local reuse and repair, complementing more traditional downcycling and second hand international trade. Table 3 summarizes initiatives aimed at preventing materials from reaching more established waste streams. Although they are mostly in their infancy and do not seem to have a significant impact yet, as the popularity of second hand consumption and environmental concerns about the fashion industry are growing in Europe, we may see rapid growth in their effects in coming years. In some cities, these efforts are carried out in line with city policy aimed at promoting local reuse and reductions in overall local clothing consumption, as a primary source of waste prevention.

In the initiatives listed in the second row of Table 3, it is visible how collaboration with other parties is currently central in waste prevention. Some policy and strategy documents promote reuse and repair and these intentions translate into support to emerging initiatives with physical spaces, linking and promoting existing premises through maps and platforms and promoting access to and collaboration among grassroots initiatives. This approach is different to the more established (container-based) waste management systems described earlier in this paper. It promotes product life-extension (e.g. through repair) and the localisation and de-centralisation of reuse, with increasing control over the final destiny of the garments traded and their social implications. It is still unclear if the current growing popularity of second hand consumption in Europe has negative or positive social and environmental implications in the areas where post consumer textiles traditionally flow to, but the simplification of

these flows enables assessment of their effects locally. Moreover, by preventing these materials from reaching waste streams, municipalities reduce the textile volumes that are under their responsibility.

The policy documents reviewed show an interest of municipalities in promoting circular strategies but remain vague in terms of the targets set, and the monitoring of environmental and social impacts. It is unclear how significantly repair and reuse practices are expected to grow and if reductions in new clothing consumption are anticipated. For instance, the environmental targets of Oslo Municipality include reductions in food waste by 30 percent in 2025 and by 50 percent in 2030. For plastics, there is a goal to phase out unnecessary disposable plastic items completely (Oslo City Council, 2019). However, local textile targets are more vague and indicators are in development.

The specific aim of consumption reduction has been incorporated very recently in policy, and it remains limited. Research in sustainable clothing consumption continues to show that longer lifetimes, reuse and collaborative consumption may not have any environmental advantages if they do not substitute the purchase of new clothes (e.g. Iran and Schrader 2017, Maldini, 2019, Levänen et al., 2021). From this perspective Oslo and Amsterdam have mentioned reduced consumption of new garments as a goal in the city strategy. In Norway, the national government has stated that it will "assess how the textile industry and consumers can be challenged to reduce consumption and environmental impact from textiles" (Norwegian ministries, 2021), and the municipality of Amsterdam is committed to reduce its own consumption via public procurement by 20% in 2025. Moreover, Amsterdam is planning a communication campaign promoting reduced clothing consumption among citizens. These measures are pioneering when compared to other cities but they have not been yet translated into specific targets for overall consumption reduction. Geneva has developed campaigns to eat local and less meat, but no communication campaigns for sustainable consumption of textiles. Oslo is studying opportunities to reduce the advertising pressure for meat and unhealthy food in municipal advertising areas. Applying restrictions in fashion advertising and season sales are promising next steps in policy aimed at reducing clothing volumes, but such measures have not been yet undertaken by governments in the cities studied here.

Table 2: Post consumer textiles separately collected

	Netherlands	Serbia	Germany	Switzerland	Norway
Post consumer textiles collected separately per capita	In 2018, approximately 8 kg of textiles were collected per person. 45% of the total post consumer textiles disposed of or donated.	In 2010 20 kg of textiles per capita were disposed of in household waste and therefore incinerated. In 2017, 0.05 kg per capita were separately collected in Belgrade.	Estimates indicate an annual textile collection volume of 15.3 kg per capita. 88% are collected through containers, 9% in the streets, and the rest through other methods such as collection in stores.	Roughly 6 kg of used textiles and accessories are separately collected nationally and annually per capita. This also applies to Geneva.	In 2018, 6 kg of textiles (excluding shoes and bags) were collected per person. This represents 45% of the volume of new textiles purchased.
Destiny of textiles collected (suitable and non-suitable for reuse)	53% of separately collected textiles (including shoes), are sold for reuse abroad (e.g. Africa and Eastern Europe). 33% are sold for recycling in Europe (as cleaning cloth or pressed fibres) and India or Pakistan (further sorting, fiberization and processing into yarns). The rest is incinerated.	Collected textiles are downcycled into wiping and polishing rags, towels and mops for industrial usage.	In 2015, 54% was collected for reuse, 17% garnetted stock industry, 21% downcycling, 6% substitute fuel, 2% burned. Only 4% are sold within Germany. 44% remained within the EU and in the former Soviet states. 28% were sold in Africa. Another 10% in India and Pakistan. 14% were exported to other regions	Charities in Geneva have capacity to sort 20% of the collected textiles. 10% (lower quality) are sold to the TEXAID organisation or incinerated. 3% are given for free to local people in need (Vestiaire Sociale). 7% are sold in local charity shops. The rest (80%) is sold unsorted to TEXAID. Most of these textiles are sold for export (primarily in Africa and Eastern Europe) and less than 25% is downcycled. A smaller portion is re-sold in TEXAID shops or incinerated.	97% of all collected textiles are exported and sorted outside of Norway. 72% of the exported textiles are reused globally, while 21,5% are recycled as industry wipes, upholstery, insulation, non-woven rugs etc. Of the 3% (550 tonnes) that stays in Norway, 54% is reused, 37% incinerated and 9% material recycling.

Sources	Ffact, 2020	Statistical office of the Republic of Serbia, 2012	Forbrig et al., 2020	Swiss Federal Office for The Environment, 2019 Interview Typhaine Guihard, Vestiare Sociale TEXAID, 2017	Watson et al., 2020

Table 3: Overview of waste prevention city targets and initiatives

	Amsterdam	Belgrade	Berlin	Geneva	Oslo
Targets and initiatives in city policy beyond collection	The Amsterdam Circular 2020-2025 Strategy includes measures for consumption reduction: an awareness campaign aimed at citizens, and measures to reduce consumption by the Municipality itself in 20% by 2025 and implement 100% circular procurement by 2050. Support for repair and reuse initiatives.	The current focus is on developing new and improved textile waste management policies, and textiles sorting systems, and communicating the value of separate collection to citizens.	The initiative Re-Use of the Berlin Senate Department for the Environment, Transport and Climate Protection promotes the increased reuse of used goods, less waste and more ecological production cycles. The overall aim is to achieve zero waste in Berlin.	Agenda 21 (City of Geneva) runs sustainable initiatives such as GE:Repair, which offers repair cafes and lists of repair ateliers available in the city. GE:Reutilise, in development, will gather information about reuse options for different consumer goods in the city, including a list of second hand clothing shops.	The "Consumption of the future" documents include textile specific plans for promoting reuse and repair through various communication channels (see map of repair premises below) and facilitating premises for reuse, repair, redesign, exchange, rental and lending of clothes (see example of the annual reuse week below).
Municipalities' collaboration with other city initiatives for sustainable clothing consumption (reduced consumption, reuse, repair, etc)	Initiatives from the Municipality and the Amsterdam Economic Board include: a series of multi stakeholder meetings including companies, knowledge institutions and the local governments leading to green deals focused on textiles. Municipal support for initiatives such as a clothing brands' shared repair facility in the city, neighborhood swap shops, discount card for low income citizens to be used in local repair shops	There are privately organized clothes resale, and clothes swap events in the city, but involvement by the Municipality could not be identified. Remarkable perhaps because second hand garments are imported but the city doesn't stimulate local reuse. Other cities in Serbia have a stronger involvement of municipalities in collection and other initiatives.	Department stores "of the future" are developed with the waste collection organisation of Berlin (BSR), public, private, non-profit and charitable organisations. These include resale of products, refurbishment, repair and upcycling facilities, providing educational opportunities. See already operating stores of this kind below. The city organised the competition "circular fashion" in 2020, the winning proposal (Smart Guide Textilien: a map and platform linking all	Besides running their own initiatives, Agenda 21 financially supports other projects through the G'Innove program. One of the projects funded by the program explores alternatives to fast fashion in the city and aims to develop policy recommendations to transition to more sustainable fashion consumption by April 2022.	The "Consumption of the future" detailed action plan includes actions to be carried out by specific premises within the municipality and external parties. Libraries facilitate events, such as clothing swaps. The Agency for Waste Management (REG) facilitates non-profit actors to further develop second hand markets. Districts of Oslo arrange premises for reuse, repair, redesign, exchange, rental and lending of textiles (one example is Vollebekk factories, a private-public

			existing textile-related initiatives) was funded and will be implemented by the city.		collaboration including Bjerke City district)
Initiatives mentioned above	Amsterdam Metropolitan region's Green Deals The swap shop Repair shared service center Amsterdam discount card		Noch-Mall (2020) B-Wa(h)renhaus (2020) Reuse Zentrum (2021) Circular Fashion competition	Agenda 21 GE: REPARE	Vollebekk factories Map of repair facilities developed together with Friends of the Earth Norway Reuse week 2018

Conclusions

In light of the growing volumes of discarded post consumer textiles, city governments that are responsible for dealing with residential waste have been increasingly confronted with the environmental challenges of clothing in recent years. Cities with more established collection systems for re-wearable textiles are now improving collection of non-rewearable grades (e.g. Oslo). Following the example of France, the Netherlands has decided to assign responsibility to the companies producing and selling new clothes in the first place. However, producers are expected to finance collection and processing of post consumer textiles while municipalities keep responsibility over the process and, therefore, certain control over the environmental and social effects.

The EU European Waste Directive, where member states are obliged to have a system in place for separate collection of all textiles by 2025, is pushing some cities that are late in this process, like Belgrade, to get up to speed. However, not all cities have developed clothing-focused environmental policies. For example, Geneva has not introduced textile specific measures in city waste management policy, and separate collection - the entry point of clothing-related measures - remains a challenge. These shortcomings are partially explained by the fact that post consumer textiles are not included in local waste regulations.

Interest in reducing the volumes of materials that are municipal responsibility, concerns about the environmental and social effects of global post consumer trade, along with interest in enabling healthier urban ecosystems have motivated city authorities in developing local repair and reuse policies and strategies for consumer goods, including clothing and textiles. For example, in Berlin, the focus of the Re-Use policy is to promote access to second hand goods, recreating a similar experience to that of purchasing new products. That is the purpose of their “Department Stores of the future” which include repairing facilities and education. Despite the limitations mentioned above, the Municipality of Geneva has developed programmes promoting access to existing repair and resale facilities through official maps and platforms and also runs its own repair workshops. Norway offers a similar map at a national level. What is remarkable in the efforts summarised in the second row of Table 3, is that municipalities are acknowledging the importance of collaboration and grassroots initiatives, supporting and enabling their actions, rather than redesigning local post consumer textile flows from scratch. Still, a thorough assessment of the social and environmental effects of local reuse in Europe and their implications for the people and places traditionally involved in global post consumer trade are recommended while prioritizing this path.

Lastly, reduced consumption is starting to receive some attention as a source of waste prevention. Moreover, in targeting consumption reduction, municipalities acknowledge the environmental responsibility of consumption-intensive countries. However, current policies lack concrete targets and monitoring programs, or are at their nascent stages. For instance the City of Oslo is currently working on developing indicators for sustainable and reduced consumption for textiles in collaboration with Oslo Metropolitan University.

Based on this comparative study, we recommend city policy and strategy to tackle strategies at all three levels mentioned above simultaneously, including:

- Improving separate collection. Increasing separate collection of post consumer textiles volumes and safe processing of these materials in social and environmental terms; questioning not only the quantity of post consumer textiles that are and could be separately collected but also the environmental and social effects of their destiny.
- Waste prevention Prevent used textiles to reach more established post consumer streams by facilitating local repair, exchange, and reuse and empowering local initiatives. This can be done, for instance, by facilitating physical spaces in the city or promoting collaboration between different local organisations.
- Consumption reduction. Tackle new clothing demand as the primary source of waste, by setting up targets and developing initiatives that focus on both citizens' purchasing habits and companies' practices that lead to overconsumption and overproduction. Regulation of advertisement and season sales are some examples of measures that have not been yet applied and could deliver overall reductions. More advanced measures can be considered in the design of commercial areas in city planning, discouraging overlaps between leisure and purchasing activities.

In considering all the strategies described above, municipalities can learn from each other, as textile-focused policy is at different stages of development in these and other cities. Moreover, we encourage more concrete, iterative cycles of target setting and impact measuring, so that the most effective paths can be identified. In most of the policy documents reviewed, the overall intentions are stated, but it is unclear how these are expected to change the overall impact of local clothing consumption and how they are going to be evaluated. We note that local knowledge institutes can help in developing concrete goals and monitoring programmes, as a way to bridge rapidly advancing knowledge in the field of sustainable clothing consumption and the interest of citizens and local governments in enabling more sustainable cities and ways of living.

References

Amsterdam Economic Board., 2021. Green Deals. Duurzaam uit de Crisis [Sustainable out of the crisis] https://amsterdameconomicboard.com/initiatief/mra-green-deal-duurzaam-uit-de-crisis (accessed 26.07.2021).

Beasley, J., Georgeson, R., 2014. Advancing resource efficiency in Europe indicators and waste policy scenarios to deliver a resource efficient and sustainable Europe. www.eeb.org/EEB/? LinkServID=4E9BB68D-5056-B741-DBCCE36ABD15F02F (accessed 26.07.2021).

Brieger, I.M., Jarmer, J-P., Muschkiet, M., 2021. Coping with challenges of textile collection through an innovative framework towards a sustainable textile Circular Economy, PLATE Conference, Limerick.

City of Paris., 2019. Paris city policy. https://www.paris.fr/pages/reduire-et-recycler-ses-dechets-114/#reemployer-and-nbsp-donner-une-seconde-vie-a-ses-objets-occasionnels (accessed 25.07.2021).

Dawkins, E., Andre, K., Axelsson, K., Benoist, L., Swartling, A.G., Persson, A., 2019. Advancing sustainable consumption at the local government level: A literature review. Journal of Cleaner Production, 231, 1450-1462.

EASD (Environmental Ambassadors for Sustainable Development)., 2018. Reciklaza i upravljanje tekstilnim otpadom [Recycling and waste management strategies for textiles]. https://ambassadors-env.com/blog/2018/10/24/reciklaza-i-upravljanje-tekstilnim-otpadom/ (accessed on 05.07.2021)

EEA (European Environmental Agency)., 2019. Textiles in Europe's Circular Economy. https://www.eionet.europa.eu/etcs/etc-wmge/products/etc-reports/textiles-and-the-environment-in-a-circular-economy/@@download/file/ETC-WMGE_report_final%20for%20website_updated%202020.pdf (accessed 26.07.2021).

Ellen MacArthur Foundation., 2017. A new textiles economy: Redesigning fashion's future, 2017. https://www.ellenmacarthurfoundation.org/publications/a-new-textiles-economy-redesigning-fashions-future (accessed 26.07.2021).

Ffact., 2020. Massbalans textiel 2018 [Textiles mass balance 2018]. https://www.ffact.nl/wp-content/uploads/2020/04/Rapport-massabalans-textiel-2018-20200327.pdf (accessed 26.07.2021).

Forbrig, S., Fischer, T., Heinz, B., 2020. Demand, Consumption, Reuse and Recycling of Clothing and Textiles in Germany.

https://www.bvse.de/dateien2020/2-PDF/02-Presse/06-Textil/2020/bvse-Textilstudie_2020_eng.pdf (accessed 26.07.2021).

Frimann, S., 2021. Fretex-utfordringen [Fretex challenge]. https://frelsesarmeen.no/krigsropet/fretex-utfordringen-gjenvinning-milj%C3%B8-gjenbruk-kl%C3%A6r-tekstiler-tekstilavfall-sirkul%C3%A6re-tekstiler-sn%C3%B8hetta-renewcell-forbruk-b%C3%A6rekraft-energigjenvinning-innovasjon-norge (accessed 26.07.2021).

Iran, S., Schrader, U., 2017. Collaborative fashion consumption and its environmental effects. Journal of Fashion Marketing & Management, 21(4), 468-482.

Laitala, K., Klepp, I. G., 2020. Klær og miljø: Innkjøp, gjenbruk og vask [Clothes and the environment: acquisition, reuse and laundering]. OsloMet, Oslo: https://hdl.handle.net/10642/9047 (accessed 01.07.2021).

Levänen, J., Uusitalo, V., Härri, A., Kareinen, E., Linnanen, L., 2021. Innovative recycling or extended use? Comparing the global warming potential of different ownership and end-of-life scenarios for textiles. Environmental Research Letters, 16(5), 054069.

Maldini, I., Duncker, L., Bregman, L., Piltz, G., Duscha, L., Cunningham, G., Vooges, M., Grevinga, T., Tap, R., van Balgooi, F., 2017. Measuring the Dutch clothing mountain: data for sustainability-oriented studies and actions in the apparel sector. https://www.hva.nl/binaries/content/assets/subsites/kc-fdmci/fashion/measuring-the-dutch-clothing-mountain_final-report-1.pdf (accessed 26.07.2021).

Maldini, I., 2019. From speed to volume: reframing clothing production and consumption for an environmentally sound apparel sector. PLATE conference, Berlin.

MEPS (Ministry of Environmental Protection, Serbia)., 2020. Roadmap for circular economy in Serbia. https://circulareconomy.europa.eu/platform/sites/default/files/roadmap-for-circular-economy-in-serbia.pdf (accessed 28.06.2021).

Newell, P., Daley, F., Twena, M., 2021. Changing our ways? Behaviour change and the climate crisis. https://www.rapidtransition.org/wp-content/uploads/2021/04/Cambridge-Sustainability-Commission-on-Scaling-behaviour-change-report.pdf (accessed 26.07.2021).

Niinimäki, K., Peters, G., Dahlbo, H., Perry, P., Rissanen, T., Gwilt, A., 2020. The environmental price of fast fashion, Nature Reviews Earth & Environment, 1(4), 189–200.

Norwegian ministries., 2021. Nasjonal strategi for ein grøn, sirkulær økonomi [National strategy for a green, circular economy]. Oslo. https://www.regjeringen.no/contentassets/f6c799ac7c474e5b8f561d1e72d474da/t-1573n.pdf (accessed 26.07.2021).

OR Foundation., 2021. Dead White Man's Clothes. https://deadwhitemansclothes.org/intro (accessed 26.07.2021).

Oslo City Council., 2019. Framtidens forbruk – strategi for bærekraftig og redusert forbruk 2019–2030 [Consumption of the future - strategy for sustainable and reduced consumption 2019–2030]. https://www.klimaoslo.no/wp-content/uploads/sites/88/2019/11/Framtidens-forbruk.pdf (accessed 26.07.2021).

Oslo Municipality. (2017). Miljø- og klimarapport 2017 [Environmental and climate report 2017]. City Council Department for Environment and Transport, Oslo. https://www.oslo.kommune.no/getfile.php/13292171-1535463230/Tjenester%20og%20tilbud/Politikk%20og%20administrasjon/Statistikk/Oslo%20kommunes%20milj%C3%B8-og%20klimarapport%202017.pdf (accessed 28.07.2021)

Oslo Municipality. (2020). Nasjonal strategi for sirkulær økonomi - Innspill fra Oslo kommune [National strategy for circular economy - Input from Oslo Municipality]. The Agency for Waste Management (REG). Oslo. https://www.regjeringen.no/contentassets/445aed28340b43bd84b1b20c4e517bd2/oslo-kommune---nasjonal-strategi-for-sirkular-okonomi.pdf (accessed 28.07.2021)

Prothero, A., Dobscha, S., Freund, J., Kilbourne, W.E., Luchs, M.G., Ozanne, L.K., Thøgersen, J., 2011. Sustainable consumption: opportunities for consumer research and public policy. Journal of Public Policy & Marketing, 30, 31-38.

Refashion., 2020. Rapport d'activité 2020 [Activity report 2020] https://refashion.fr/pro/sites/default/files/rapport-etude/RE_FASHION%20RA%202020_BD.pdf (accessed 27.07.2021).

Roos, S., Sandin, G., Zamani, B., Peters, G., 2015. Environmental Assessment of Swedish Fashion Consumption. http://www.mistrafuturefashion.com/en/PublishingImages/Single-use pictures/Environmental assessment of Swedish fashion consumption - LCA.pdf (accessed 27.07.2021).

Samie, Y., 2021. Towards a Healthy Urban Metabolism for Textile Waste through Social Theories, PLATE Conference, Limerick.

Statistical office of the Republic of Serbia., 2012. Waste statistics and waste management in the Republic of Serbia. Morphological composition of municipal waste in the Republic of Serbia. http://publikacije.stat.gov.rs/G2012/pdfE/G20126012.pdf (accessed 27.07.2021).

Swiss Federal Office for The Environment., 2019. Clothing and Shoes. https://www.bafu.admin.ch/bafu/en/home/topics/waste/guide-to-waste-a-z/clothing-and-shoes.html (accessed 26.07.2020).

TEXAID (2017). Sustainability Report. Retrieved from: https://www.texaid.ch/sustainability-report/

United Nations., 2018. 68% of the world population projected to live in urban areas by 2050. https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html (accessed 01.07.2020).

van der Velden, N., Patel, M. K., Vogtländer, J. G., 2014. LCA benchmarking study on textiles made of cotton, polyester, nylon, acryl, or elastane. The International Journal of Life Cycle Assessment, 19(2), 331-356.

Watson, D., Aare, A.K., Trzepacz, S., Petersen, C.D., 2018. Used Textile Collection in European Cities. Study commissioned by Rijkswaterstaat under the European Clothing Action Plan (ECAP). Retrieved from: http://www.ecap.eu.com/wp-content/uploads/2018/07/ECAP-Textile-collection-in-European-cities_full-report_with-summary.pdf

Watson, D., Trzepacz, S., Rubach, S., Johnsen, F. M., 2020. Kartlegging av brukte tekstiler og tekstilavfall i Norge [Mapping of used textiles and textile waste in Norway]. English summary. PlanMiljø and Østfoldforskning for the Norwegian Environment Agency. https://norsus.no/wp-content/uploads/or1120-kartlegging-av-brukte-tekstiler-og-tekstilavfall-i-norge.pdf (accessed 27.07.2021).

Wolff, F., Schönherr, N., 2011. The impact evaluation of sustainable consumption policy instruments. Journal of Consumer Policy, 34, 43-66.

Wolff, F., Schönherr, N., Heyen, D.A., 2017. Effects and success factors of sustainable consumption policy instruments: a comparative assessment across Europe. Journal of Environmental Policy & Plan, 19, 457-472.

Policies, strategies, and initiatives mentioned:

Agenda 21: https://www.geneve.ch/fr/autorites-

administration/administration-municipale/departement-finances-environnement-logement/services-municipaux/service-agenda-ville-durable

Amsterdam Circular 2020-2025 strategy:
https://www.amsterdam.nl/en/policy/sustainability/circular-economy/

Amsterdam discount card: https://www.amsterdam.nl/toerisme-vrije-tijd/stadspas/

Amsterdam Metropolitan region's Green Deals:
https://amsterdameconomicboard.com/initiatief/mra-green-deal-duurzaam-uit-de-crisis

B-Wa(h)renhaus:
https://reuse-berlin.de/aufruf-b-wahrenhaus/

Circular Fashion competition Berlin: https://www.berlin.de/senuvk/umwelt/abfall/re-use/de/ideenwettbewerb.shtml

City of Geneva: Recycling Textiles: https://www.geneve.ch/en/themes/urban-environment-green-areas/sorting-recycling-household-waste/textiles

Consumption of the future:
Strategy for sustainable and reduced consumption 2019–2030:
https://www.klimaoslo.no/wp-content/uploads/sites/88/2019/11/Framtidens-forbruk.pdf
Consumption of the future: https://bit.ly/3laLvLb

Dutch policy programme for circular textiles 2020-2025:
https://www.government.nl/documents/parliamentary-documents/2020/04/14/policy-programme-for-circular-textile-2020-2025

Geneva Waste Management Strategy(2021): https://www.ge.ch/document/dechets-reduire-dechets-accelerer-transition-ecologique-geneve

GE: REPARE: https://www.ge-repare.ch/

National Programme on Sustainable Consumption Germany (2016):
https://www.bmu.de/fileadmin/Daten_BMU/Pools/Broschueren/nachhaltiger_konsum_broschuere_en_bf.pdf

National strategy on circular economy Norway:
https://www.regjeringen.no/contentassets/f6c799ac7c474e5b8f561d1e72d474da/t-1573n.pdf

Noch-Mall: https://www.nochmall.de/

Program Sustainable Textiles Switzerland:
https://www.bafu.admin.ch/bafu/en/home/topics/economy-consumption/info-specialists/sustainable-textiles.html

Repair shared service center: https://amsterdameconomicboard.com/app/uploads/2020/12/Repair-Shared-Service-Center-V5MM-contouren.pdf

Re-Use initiative: https://www.berlin.de/senuvk/umwelt/abfall/re-use/index.shtml

Reuse Zentrum: https://www.berlin.de/senuvk/umwelt/abfall/re-use/de/re-use-zentrum.shtml

Reuse week 2018: https://www.oslo.kommune.no/getfile.php/13302817-1542279944/Tjenester%20og%20tilbud/Avfall%20og%20gjenvinning/Ombruk/Ombruksuka/Ombruksuka%202018_Program.pdf

Roadmap for the circular economy in Serbia 2020: https://circulareconomy.europa.eu/platform/sites/default/files/roadmap-for-circular-economy-in-serbia.pdf

Textile waste recycling and management: https://ambassadors-env.com/blog/2018/10/24/reciklaza-i-upravljanje-tekstilnim-otpadom/

The Rulebook on criteria for defining by-products (Official Gazette of Republic of Serbia, no. 76/2019): http://extwprlegs1.fao.org/docs/pdf/srb189515.pdf

The swap shop: https://www.the-swapshop.com/nl/

The 2030 Sustainable Urban Development Strategy of Belgrade and other cities in Serbia. : http://extwprlegs1.fao.org/docs/pdf/srb189515.pdf

Vollebekk factories: https://vollebekkfabrikker.no/about

Map of repair facilities developed together with Friends of the Earth Norway: https://tavarepadetduhar.no/finn-en-reparator/category856.html?fbclid=IwAR2SrwhMocd5Sp7wwWWMsHh0RpE3vHqSJU6SQm45603YO349Edzvx7Ubsg8

Waste Management Concept 2020-2030: https://www.berlin.de/senuvk/umwelt/abfall/konzept_berlin/
Waste Management Concept: https://www.berlin.de/senuvk/umwelt/abfall/konzept_berlin/download/AWKBerlin2020-2030.pdf

Waste to Resource, 2014: https://www.government.nl/binaries/government/documents/parliamentary-documents/2014/01/28/waste-to-resource-elaboration-of-eight-operational-objectives/vang-bijlage-brief-engels-vert.pdf