

# **Developing a Circular Textiles System for Ireland**

**2020-ET-CP-106**

## **GREEN ENTERPRISE: INNOVATION FOR A CIRCULAR ECONOMY**

**EPA RESEARCH PROGRAMME 2021–2030**

**NATIONAL WASTE PREVENTION PROGRAMME**

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by Community Resources Network Ireland (CRNI)

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## Executive Summary

Global textile production and consumption has major negative environmental impacts. Globally, 92 million tonnes of waste is produced every year through textile production, consumption and disposal processes, while textiles account for roughly 10% of global greenhouse gas emissions (Niinimakli et al., 2020). In the European Union (EU), policy makers are seeking to address the negative environmental impacts of global textile production and consumption through the European Waste Framework Directive (WFD), which requires that all EU Member States introduce separate collection systems for textiles by January 2025 (see European Parliament and Council, 2018). This means that textiles must be kept separate from other categories of waste ‘by type and nature’ (p. 116).<sup>1</sup>

Currently, most textile waste in Ireland is collected through unseparated municipal waste collection systems (O’Leary et al., 2021). Two national needs therefore underpin this project. First, there is a need to design and implement post-consumer textile collection systems that are fit for purpose in an Irish context. Second, there is a need to identify and develop promising business opportunities for reuse, repair and remanufacturing of post-consumer textiles in Ireland. In pursuit of these aims a project was developed with the following specific objectives.

- To review the range of potential options for the separate collection of post-consumer textiles.
- To select and pilot different separate textile collection systems in specific localities and to measure the qualities and quantities of textiles collected.
- To model the results at a national level and thereby inform the effective design of a full-scale separate textile collection system.
- To identify potential business solutions and opportunities in relation to the recirculation of used textiles.
- To identify specific recommendations for national policy makers.

In pursuit of these objectives, the project found strong indications that Ireland is unprepared to meet the requirements of the WFD. Specifically, the project revealed the following.

1. The separate collection of textiles is very resource-intensive. Indeed, running a pilot at an appropriate geographical and temporal scale was beyond the resources available to this project.

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<sup>1</sup> The WFD provides some leeway to collect different categories of waste together “provided that it does not impede the high-quality recycling or other recovery of waste” (pp. 116). Member States may also apply for derogations from these requirements if a number of conditions are met (see European Parliament and Council, 2018).

2. The main function of charity retailers is to raise funds for their respective causes. The sector does not currently therefore have the infrastructure, capacity or resources to expand its role in collecting textiles or associated qualitative and quantitative data.
3. Existing public data on post-consumer textile collections are limited. As such, there is no consistent knowledge base on which to base the development of a separate textile collection system or business solutions that may be best suited to an Irish context.
4. The post-consumer textile sector is currently underdeveloped, with the activities of different stakeholders relatively fragmented and siloed. There is little collaboration between stakeholders, no sectoral representative body, and a range of competing interests at play that may actively work against establishing a functional national system for separate collection of textiles.
5. The process of engaging with stakeholders did reveal strong support for public communications that emphasise simplicity and post-collection sorting of textiles into different quality streams.

**Based on these findings, the project identifies five main actions that policy makers should consider.**

**First,** increased infrastructure, labour capacity, and collaboration between sectoral stakeholders should be actively supported in order to improve the capacity of the sector as a whole to support the separate collection, reuse, repair and remanufacturing of post-consumer textiles.

**Second,** given the difficulty in obtaining data on the quantities and qualities of textiles that are collected through different collection methods, a national standardised reporting system for textiles collected by commercial, public and charitable organisations is recommended.

**Third,** any national separate collection system for textiles should emphasise simplicity for the public and include a campaign communicating the same. Sorting of textiles should therefore take place *after* donation by those involved in the sector.

**Fourth,** explore avenues to (1) mainstream reuse and repair and (2) implement industrial-scale remanufacturing and reuse of low-quality textiles.

**Finally,** implementing any of these actions will require significant investment and funding. Mechanisms to deliver funding that achieve the outcomes of improving infrastructure, enhancing labour capacity and developing collaborative partnerships between existing stakeholders are urgently needed.



# 1. Introduction

The European Waste Framework Directive (WFD) in Article 11.1 requires that all European Union (EU) Member States implement separate collection of post-consumer textiles by 1 January 2025. This project therefore aimed to explore the potential volumes and quality of textiles that will be generated through different separate collection systems in Ireland. Based on the results of this process, the project team sought to identify and explore potential business models that can aid in managing Ireland's post-consumer textiles in cost-effective ways.

Recent research in Ireland has shown that 110,000 tonnes of post-consumer textiles is collected as waste across all sectors annually, of which 64,000 tonnes is collected from households (O'Leary et al., 2021). An additional 60,000 tonnes is resold, reused and recycled through a variety of entities. 2021 figures indicate that 17,500 tonnes of textiles is handled by charities (O'Leary et al., 2021). Most of this amount is collected through in-store donations and textile banks (O'Leary et al., 2021). Commercial textile recyclers also play a large role in this sector and are estimated to collect roughly 40,000 tonnes of textiles per year through a large network of textile banks, collections in communities and schools, door-to-door collections and commercial retailer take-back schemes (O'Leary et al., 2021). Unsold or unusable stock received by members of Charity Retail Ireland is also directed to commercial textile recyclers. However, due to a lack of data availability, there is significant uncertainty regarding the volumes of textiles handled by commercial textile recyclers (O'Leary et al., 2021).

Considering the estimated quantity of textiles in household recycling and residual bins, the expansion of current systems or the introduction of new separate collection systems could have a significant positive impact in diverting post-consumer textiles from incineration and/or landfill in Ireland. Exports for reuse will continue to play an important role.

This project aimed to support Ireland to meet its obligation under Article 11.1 of the revised EU WFD but also the EU Circular Economy Action Plan 2.0 goals of boosting the EU market for sustainable and circular textiles. It also resonates with UN SDG Goals 12 and 13, which seek to foster sustainable consumption and address climate change respectively. Key assumptions and definitions that underpin this project are detailed in Annex 1: Assumptions and Definitions.

# 2. Project Objectives

The overarching aim of this project was to identify solutions for dealing with current, and an anticipated increase in, quantities of post-consumer textiles in economically, socially and environmentally sustainable ways. Specifically, the project objectives and activities were designed to identify circular economy approaches to dealing with post-consumer textiles, meaning approaches that will maintain the value of textiles for as long as possible by 'returning them into the product cycle at the end of their use' (Eurostat, n.d.). This includes consideration of business models, policy structures and supports, infrastructural needs, and collaboration between different stakeholders operating in the post-consumer textile sector. The key objectives developed in support of this overarching aim are outlined below.

- Review the range of potential options for the separate collection of post-consumer textiles.
- Select and pilot different separate textile collection systems in specific localities and measure the qualities and quantities of textiles collected.
- Model the results at a national level to inform the effective design of a full-scale separate textile collection system.
- Identify potential business solutions and opportunities in relation to the recirculation of used textiles.
- Identify specific recommendations for national policy makers.

In pursuit of these objectives, the project team undertook the activities discussed in the next section. It was through the experience of designing and implementing the pilot projects, more than the data generated, that the key findings, insights and recommendations of this project were developed.

### 3. Project Activities/Outputs

The following are specific activities that the project team undertook.

1. **Stakeholder engagement:** The project team continually engaged with key sectoral stakeholders as part of the development of the pilot textile collections, interpretation of the results and communication of the project findings.
2. **Review of post-consumer textile initiatives and initial project design:** A scoping exercise was carried out to identify and categorise the range of separate post-consumer textile collection systems that could be trialled. 32 collection systems were identified, reviewed and categorised. Through a stakeholder workshop, three collection systems were chosen for pilot implementation in different locations throughout Ireland.

3. **Pilot design and redesign:** The pilot design included the developing of a separate collection system for implementation, selecting pilot locations, identifying categories of textiles for collection, and developing data collection protocols and communications.
4. **Pilot implementation and data collection:** Separate textile collection pilot projects were designed and implemented in three locations supported by locally tailored communications campaigns. Quantitative and qualitative data were gathered in relation to the weight and categories of textiles collected as part of each pilot.
5. **Behaviours and attitudes survey:** A survey was developed and implemented in each of the pilot locations to gauge the behaviours and attitudes that people in those localities had around clothing and home textiles.
6. **Data modelling:** Data were analysed with the aim of modelling the different collection systems at a national scale. This was intended to support recommendations on the development of a national system for the separate collection of textiles. Due to the difficulty in obtaining reliable data from the pilots, additional datasets were drawn upon to inform recommendations arising from the project.
7. **Identification of post-consumer textile solutions:** A broad variety of potential opportunities for dealing with post-consumer textiles were identified from domestic and international contexts. Two of these opportunities were chosen based on the data available to the project, in conjunction with the project team's reading of existing research. An Eco-Business Model Canvas process was undertaken on both to identify potential barriers and benefits for closing the loop on post-consumer textiles in Ireland. An innovation showcase was created and displayed, and tours were provided.

### 3.1 Stakeholder engagement

Stakeholders from the post-consumer textile sector were engaged throughout this project,<sup>2</sup> as members of the Steering Committee, as formal collaborators and as workshop participants. This engagement allowed the project team to access expert knowledge based on professional experience on an ongoing basis, which helped to guide the project development and implementation.

### 3.2. Review of post-consumer textile initiatives and initial project design

An initial task involved selecting textile collection systems to pilot in specific localities. Through **desktop research** the project team identified 34 potential textile collection systems, as well as the benefits and challenges associated with each.<sup>3</sup> These were collated into eight categories and a ninth 'communications-only' category was subsequently added, to represent a limited intervention control scheme involving only communications about existing separate collection options. These categories were screened to assess

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<sup>2</sup> Stakeholder engagement activities are in Annex 2.

<sup>3</sup> The full list of categorised collection systems is available in Annex 3.

their suitability in the context of a *national separate collection system*<sup>4</sup> using criteria identified by the project team. **Kerbside/door-to-door collection** followed by **public collection points** ranked highly. However, many unknowns were encountered as part of the screening process, especially in relation to local infrastructure, cost to implement, potential for contamination and quality of collected textiles where these systems are rolled out in Ireland.

At a 12 May 2021 **stakeholder workshop**, a diverse set of participants<sup>5</sup> from a variety of sectors worked together to select three collection systems for piloting.

**Based on this outcome, the following three pilots were initially developed.**

- Pilot Area 1: Communications campaign with use of existing collection system infrastructure to serve as a baseline.
- Pilot Area 2: Communications campaign and new (permanent) private and public collection points.
- Pilot Area 3: Communications campaign; new (permanent) private and public collection points; and kerbside door-to-door separate collection.

The project was redesigned due to resource constraints and a number of global events – such as the Covid-19 pandemic – that were outside the project team’s control and had an extensive impact on the implementation of the project.

### **3.3. Pilot design and redesign**

Three locations were selected in which to implement the pilots: **Charleville, Arklow and Buncrana**. These locations were chosen for a number of reasons. First, experience from other projects indicated that small to medium-sized towns<sup>6</sup> are suitable for these pilots due to the clear geographic delineation, limited number of waste collectors, and a scale that was achievable within the resource constraints of the project. These locations also broadly align with national demographic composition<sup>7</sup> and are distributed in Ireland’s three NUTS II regions. The project retail charity partner – the Society of St Vincent de Paul (SVP) – is also present in each location. The project team collaborated heavily with SVP on textile and data collection.

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<sup>4</sup> See definition in Annex 1.

<sup>5</sup> Stakeholder feedback on separate collection systems is in Annex 4.

<sup>6</sup> Population centres of 5,000–100,000 inhabitants with population density >300 people/km<sup>2</sup> (Servillo et al., 2017).

<sup>7</sup> See Annex 5 for demographics of Charleville, Arklow and Buncrana

Determining the **categories of textiles that would be accepted as part of the collections** was done in consultation with project Steering Committee members, Charity Retail Ireland and individual charity retailers at an international conference (Product Lifetimes and the Environment, 2021). Through this consultation, the project team identified that it was important to include as wide a range of textiles as possible in order to provide the most accurate representation of the quality and quantity of textiles that will be generated through mandatory separate collection of textiles in 2025. Particularly important points emerged to inform this decision,<sup>8</sup> including that charity retailers and commercial textile recyclers have the expertise to sort textiles vs the public.

Specific **data collection protocols** were developed for implementation as part of each pilot to measure quantity and quality of textiles collected,<sup>9</sup> at both at the shop level (see Table 1) and the municipal waste level. Two main categories of data were to be collected: textiles collected that (1) are directly resaleable and (2) can be categorised as ‘rag’.<sup>10</sup>

**Table 1: Draft template for reporting data on textile collection quantities and quality direct to store**

For the week:	Donations	
	Direct to the shop	From the new clothes banks
<b>No. of 10 kg bags donated</b> (equivalent)		
<b>% yield</b> (saleable product)		
<b>No. of 10 kg bags of rag product</b> (equivalent)		

These were to be supplemented by carrying out a ‘material characterisation’ on a small sample of rag. Material characterisations involve identifying the material composition of the textiles in question.

Protocols were also developed for waste characterisation surveys to measure quality and quantity of textiles from municipal waste collection. However, these protocols were adapted in the final redesign due to project resource constraints and staffing shortages at the charity retail shops, and the labour-intensive work involved in sorting clothing and gathering associated data.

<sup>8</sup> Important points that informed which textiles were accepted for collections are in Annex 6.

<sup>9</sup> Initial and final data collection protocols are in Annex 7.

<sup>10</sup> Rag is defined as textiles not suitable for reuse/resale in their original form.

In the initial design, it had been envisaged that existing charity shop staff could service the permanent private and public collection points,<sup>11</sup> sort the textiles, provide a van and driver, and provide space for storage and sorting. **Implementing the pilot approach as originally envisaged was not possible** due to several key factors, including a lack of resources, health and safety concerns, competing collections, and delayed engagement with charity partners.<sup>12</sup>

For these reasons, it was necessary to **redesign the pilot programme**. This process caused significant delays to the project, as it involved additional research, planning and accommodating the restricted capacity of the project charity partner, who at the time was significantly impacted by Covid-19 challenges. A number of **alternative options were explored**<sup>13</sup> and the **final pilot design** retained many elements of the initial design, but it was scaled back and the layered approach was removed. The final redesign aimed to accommodate the needs in each local community, charity retail partner capacity and available resources in each location as well as relying on additional external assistance and collaboration with local stakeholders (e.g. Ballyhoura Development Company, County Councils) to move the project forward. Considering all these factors, the final pilot was redesigned to the following.

- Arklow, Co. Wicklow – Pilot Area 1: Communications + two event-based public collections.
- Buncrana, Co. Donegal – Pilot Area 2: Communications with existing infrastructure.
- Charleville, Co. Cork – Pilot Area 3: Communications + door-to-door/kerbside collections.

Importantly, the challenges encountered by the project team implementing the initial pilot design provided insight on the current infrastructural, capacity and resource limitations of the charity retail sector to deal with increased quantities of post-consumer textiles nationally.

Data collection sought to capture quantities of textiles collected in **new channels during each pilot**; quality of textiles (rag v. non-rag) collected in **new channels during each pilot**; detailed quality analysis on the rag fraction collected in Charleville on a 20-bag sample to identify potential **textile streams of value**; and **costs** associated with separate collection systems.

### 3.4. Pilot implementation and data collection

A strategy for promoting the pilots at a local level was developed through a review of 45 case studies from a range of organisations including the EPA, Regional Waste Management Planning Lead Authorities,

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<sup>11</sup> Prototype of private and public collection points is shown in Annex 8.

<sup>12</sup> Key lessons learned from the pilot design process are in Annex 9.

<sup>13</sup> Details on alternative options explored are in Annex 10.

Cré, WRAP and other European and US organisations. This review identified the importance of a range of elements in fostering engagement with pilot collections, such as providing information on how to reuse, donate, repair, upcycle, recycle unwanted textiles; using positive messaging; disseminating information through sources people trust and communications channels they access regularly; and including various communications methods. Communications materials were developed based on these findings and were refined through stakeholder consultation. The overall objectives of the communications campaign were **to clearly communicate how to donate unwanted textiles, the categories of textiles accepted, and who benefits from donated textiles**. Building on these principles, specific communications outputs were delivered.<sup>14</sup>

In terms of the **cost data on sorting and analysis**, it was apparent from early in the design phase that the permanent collection points were prohibitively expensive for the scale of the project funding. Kerbside door-to-door collections were more reasonable but were still only possible due to labour, resources, transportation and space provided by local partners.

As such, the costs of rolling out the pilots in each location were not reflective of the actual costs in terms of resources and labour time spent running the pilot. The pilot costs are therefore not suitable for estimating costs at a national scale. It was also found that human resources, transportation, and storage and sorting capacity were specific to each locality and, therefore, an important learning for national rollout. This experience provided further indication of the infrastructure, capacity and resources required to run separate collection systems effectively, which were lacking in the pilot locations.

#### ***3.4.1. Charleville: kerbside door-to-door collection pilot***

Full details for the Charleville pilot can be found in Annex 12. Three kerbside door-to-door textile collections took place in Charleville and a total of 70 bags were obtained from a catchment of 900 households (see Table 2). Collections were promoted through a launch event, a flyer drop by Ballyhoura Development CLG to catchment households, and engagement with local media and social media channels. CTC and Ballyhoura Development CLG carried out the collections. CTC collected data on the number and weight of the bags.

All bags from two of the three kerbside door-to-door collections were sorted in order to provide an indication of the quality of textiles gathered in each instance in terms of resaleable and rag qualities. A

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<sup>14</sup> See Annex 11 for communications outputs.

fourth private collection with a secondary school was added later to this pilot; however, data are not included in the results.

**Table 2: Summary of collections in Charleville, Co. Cork**

Collection	Date	No. of bags	Weight (kg)	Resaleable	Rag
1	31/3/2022	12	56	9%	91%
2	28/4/2022	37	234.5	37%	63%
3	26/5/2022	21	105	No data	No data
4	26/05/2022	22	100	No data	No data
Total kerbside door-to-door (excluding collection 4)		70	395.5	31.6% (from 49 bags)	68.4% (from 49 bags)
Total drop-off		22	100		

A number of points from this pilot **carry insight for future separate collection systems**. First, there was a difficulty in gaining access to resources for the purposes of implementing the project (e.g. a van for collecting textiles, personnel to carry out the collections, storage, and personnel to carry out the sorting of textiles into categories). Indeed, the collections themselves would have been prohibitively expensive had Ballyhoura Development CLG not come on board. Second, there were difficulty and delays in gathering data for the pilot period from the local charity shop due to resource constraints. Again, these points highlight the resources and infrastructure that will be needed to carry out separate collection and data reporting on a national scale.

#### **3.4.4. Arklow: event-based drop-off pilot**

Full details for the Arklow pilot can be found in Annex 13. In summary, the public were invited to donate textiles at two public event-based collection points in Arklow – at a local secondary school and Arklow Recycling Centre. Those wishing to donate were encouraged to fill their own bags with clean, dry, unwanted clothing and home textiles. The collections were publicised through flyers distributed to 6,222 households, social media posts, and local printed and radio news outlets. The 262 bags from both collections were stored in situ until they could be collected by SVP East Region staff and processed at SVP East Region’s sorting centre.

This model worked well in **establishing community involvement**; feedback was favourable and suggestions were made for collections to take place outside working hours or on the weekend. Due to



capacity constraints with the local charity partner, the data collection associated with the pilot was limited. In particular, qualitative data were obtained from only one of the two collections (see Table 3).

**Table 3: Post-consumer textile quantities and quality from community collections in Arklow**

Collection	Date	No. of bags	Weight (kg)	Saleable	Rag
1 – Secondary school	18/05/22	100	497.7	Unknown	Unknown
2 – Arklow Recycling Centre	01/06/22	162	823.4	5–10%	90–95%
Total		262	1,321.	5–10%	90–95%

The 100 bags donated during the first collection were disposed of due to contamination of a number of bags and associated health and safety concerns. Of the 162 bags from the second collection, 25 were sorted for quality. 24 bags were categorised as rag, while one bag was of sufficient quality for immediate resale, which according to Charity Retail Ireland is an unusually low resale rate.

#### **3.4.5. Buncrana: communications-only pilot**

Full details for the Buncrana pilot can be found in Annex 14. The primary focus of this pilot was to invite the community to donate unwanted clothing and home textiles at existing collection points, including Vincent’s Buncrana and other charity shops in the locality. The pilot was promoted using the same approach as in the other pilot locations. The launch of the Buncrana pilot was delayed at the request of Vincent’s Buncrana due to local collections taking place in the community for the war in Ukraine. No discernible pattern is evident in the data in terms of the effect of the communications campaign (June–August 2022). Textile banks were added later to this pilot; however, data are not included in the results.

### **3.5. Behaviours and attitudes surveys**

The complete detailed analysis of the behaviours and attitudes surveys can be found in Annex 15. To summarise: the surveys across the three locations received 438 responses, of which 216 were valid. A particularly useful response from the survey is that across all locations more than 50% of survey respondents indicated that they would have clothing and/or home textiles available for donation every four to six months. The results also indicate that the following could act as motivators for donating unwanted clothing:

- knowledge of what happens to the textiles donated
- knowledge of what kinds of textiles could be donated
- knowledge of who benefits from donations of unwanted textiles

- knowledge of environmental benefits from donations of unwanted textiles.

### **3.6. Data modelling**

The initial intention of the project was to utilise the data generated during the pilots to model anticipated qualities and quantities of textiles that would be generated by different separate collection systems if those systems were scaled up to a national level. A key prerequisite for carrying out this task was the generation of high-quality data through the pilots. However, the data generated through the pilots were not sufficient for carrying out this exercise due to the timeframe of the project, the number of samples, and the differences in reporting of data in different pilot locations.

Due to the limitations pertaining to the pilot data, a second analytic task was undertaken. Data were gathered from a range of non-pilot sources to provide a broader indication of textile qualities that may be generated through separate textile collection systems.<sup>15</sup> Qualitative categories were utilised – suitable for resale; exported for resale to high-value markets; export for resale and remanufacturing in medium-value markets; pulping and downcycling; and waste/energy recovery. In comparing these data, a number of points are worth noting. Though fragmented, these supplementary data provide two main indications. First, the vast majority of post-consumer textiles have value either through local resale or export. Second, there is significant variation in the results from each dataset in terms of the textiles gathered through each collection method.

### **3.7. Identification of post-consumer textile solutions**

The full post-consumer textile solutions analysis can be found in Annex 17. To summarise: in order to build on the insights gained through the pilot implementation and associated data analysis, the project team undertook a review of potential solutions that could work with the qualities and quantities of textiles that would be generated through a national separate textile collection system. The project team identified 74 existing business models and technologies that can be deployed in the reuse or recycling of textiles, and two such potential solutions were selected for further exploration through an Eco-Business Model Canvas:

- Arnott's 'circular fix' provides repair services to consumers on second-hand items in a mainstream, well-known retail space.
- The concept of large-scale industrial solutions provides an alternative to recovery via waste-to-energy. Two viable solutions were identified. The UsedFULLY project in New Zealand illustrates how

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<sup>15</sup> Annex 16

such an initiative can address multiple sustainability objectives at once, for instance by keeping existing materials in circulation, and by replacing fossil-fuel-based materials. In terms of domestic solutions, the Cirtex project is currently using post-consumer textiles as an input to make a range of products, including insulation, furniture padding, water retention growth pads, flooring and carpet underlay, and all-weather arena flooring material.

An innovation showcase<sup>16</sup> was created, displayed at the Rediscovery Centre, and tours were provided.

## 4. Project Findings

The project strongly indicates that Ireland is unprepared to meet the requirements of the WFD in relation to separate collection of textiles. Specifically, the project revealed the following.

- The separate collection of textiles is resource-intensive. The main function of charity retailers is to raise funds for their respective causes. The sector therefore does not currently have the infrastructure, capacity or resources to expand its role in collecting textiles or associated qualitative and quantitative data.
- Existing public data on post-consumer textile collections are limited. As such, there is no consistent knowledge base on which to base the development of a separate textile collection system or business solutions that may be best suited to an Irish context.
- The post-consumer textile sector is currently underdeveloped, with the activities of different stakeholders relatively fragmented and siloed. There is little collaboration between stakeholders, no sectoral representative body, and a range of competing interests at play that may actively work against establishing a functional system for separate collection of textiles nationally.
- The process of engaging with stakeholders did reveal strong support for public communications that emphasise simplicity and post-collection sorting of textiles into different quality streams.

While there are significant limitations in relation to the data collected through the pilot, a number of findings were produced through this process.

- 1. There is a lack of infrastructure, resources and capacity to implement separate collection of textiles at a local level. The project team experienced significant barriers to implementing the project in pilot locations and in gathering data in a timely manner.**

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<sup>16</sup> A showcase of innovative solutions for post-consumer clothing and home textiles can be seen in Annex 18

This finding is underpinned by the challenges faced by the project team in designing and redesigning the pilots, implementing the project in pilot locations and gathering data in a timely manner. The team underestimated the resources that would be required to implement the originally designed pilot at the geographic and temporal scale necessary to obtain data that could inform national policy. The team found that the costs involved in terms of hosting and servicing collection points, transporting textiles, monitoring donation points in case of dumping, sorting textiles, and documenting the quantities and qualities of textiles generated far exceeded the budget of the project.

Importantly, these difficulties and delays were not due to any unwillingness on the part of project partners. Rather, there is an ongoing staffing and volunteer shortfall in the charity retail sector. Moreover, the project would have struggled to gain any data at all had it not been for significant resources contributed voluntarily to the project by the charity retail partner.

The scale and complexity of these kinds of challenges should not be underestimated as efforts progress to implement a national separate collection system. Moreover, they highlight that the requisite infrastructure, resources and personnel are not currently in place to enact a separate collection system. As has been pointed out earlier in this report, charity retailers' aims are generally to raise money for their respective causes and by default they do provide a separate textile collection service, albeit on a limited basis as currently operated and funded. The experience from this project therefore indicates that significant resources and investment will be required to develop the required infrastructure and support the required human capacity.

## **2. There were difficulties obtaining high-quality data from the pilots, and in obtaining non-pilot data that could provide a basis for modelling a national separate collection system.**

Data generated from the pilots themselves were limited for the reasons outlined above. The non-pilot data that were obtained were non-standardised and represented data collections by a variety of different bodies at a variety of different points in the collection process. For these reasons, in-depth understanding was required in order to read and interpret the implications of the different datasets. For instance, the relatively low percentage of textiles suitable for domestic resale from charity shop donations reported by the commercial textile recycler was recorded after charity shops had already taken high-quality textiles from the quantities collected. A national standardised dataset pertaining to post-consumer textiles will be essential in understanding the most effective collection systems; in developing the infrastructure, resources, and capacity to implement such systems; and in developing the solutions that can keep textiles in circulation or remanufacture those textiles to avoid incineration.

**3. Though limited, the data that were gathered indicate that the vast majority of post-consumer textiles have value through either local resale or export.**

All non-pilot data provide clear indication in this regard. These four datasets indicate that between 0.5% and 50% of textiles collected across the three systems have resale potential within Ireland. Importantly, commercial textile recyclers often obtain textiles only after charity partners extract the resaleable items, which helps to explain some of the discrepancy in these figures. In all instances, at least 50% of textiles had value in export markets and pulping/downcycling. Higher percentages of textiles are generally destined for export markets than pulping/downcycling. Similarly, the data from the project's pilot collections indicate that 32% and 10% of textiles generated through kerbside and event-based drop-off respectively are suitable for rewearing through resale within Ireland. Finally, all datasets support the assertion that **a very small portion of separately collected textiles is sent for waste/energy recovery** via incineration, representing an average of 2% across all data sources. This finding supports the two potential business solutions identified and explored through the Eco-Business Model Canvas: **(1) mainstreaming repair and second-hand clothing, and (2) large-scale industrial uses of low-quality post-consumer textiles.**

**4. Further exploration of behaviours and attitudes could help inform an efficient national separate collection system.**

The behaviours and attitudes survey carried out as part of this project provided a number of valuable insights. These included:

- The primary reasons for getting rid of a piece of clothing/home textile – lack of need, lack of fit, damage, wear, and not liking the item.
- Survey respondents favoured charity shops, textile banks and passing to family and friends as the primary means of getting rid of textiles – notably, kerbside door-to-door collection was absent because it is not often available at present.
- Knowledge of what happens to textiles after donations and the environmental and social benefits were reported as factors that could encourage increased donations.
- Over 72% of survey respondents said that they would have clothing/home textiles available for donation every four to 12 months.

**5. The project generated a stakeholder approved approach to communicating and promoting textile collections at a local level.**

Primarily, through in-depth engagement and workshopping with a range of sectoral stakeholders, a communication campaign was developed that emphasised simplicity. Specifically, there was resounding agreement from stakeholders that textile donation should be as simple as possible for the general public,

because if it is too complicated the textiles will end up in the general waste stream. It follows that textile sorting should be undertaken by trained staff at organisations specialising in textile collection, whether these be charitable, commercial or public organisations.

## 5. Project Recommendations

**Recommendation 1: Scope, develop and support infrastructure, human capacity and collaboration between current and future stakeholders in the post-consumer textile sector to support a national separate textile collection system.**

The project team's experience of implementing the pilots underpins this recommendation. It was found that infrastructure was lacking in terms of storage and sorting space, transport and linkages between the different stakeholders involved. Before targeted action could be taken on this front, an urgent scoping exercise of the extent of the needs of the sector should be undertaken, including mapping and typification of facilities, systems, and consultation with those already working in post-consumer textile collection and processing.

Following this broader scoping exercise, it will also be crucial to foster improved collaboration between different actors in the sector. While they had only a snapshot of the functioning of the sector, the project team observed an underdeveloped sector consisting of fragmented and siloed activities that vary significantly throughout the country. Bringing stakeholders together to develop solutions that are workable based on their current activities will therefore be important in implementing a separate collection system by 2025. Elements that could be considered include establishing a sectoral stakeholder committee with governmental involvement.

**Recommendation 2: Establish a national standardised database of quantities and categories of textiles currently gathered through different collection methods.**

The data that were collected are beset by a variety of limitations including small sample size, atypicality of some samples and a lack of longitudinal data collection, which could have revealed, for instance, seasonal variations in the quantities and qualities of textiles generated. High-quality data describing the current state of affairs are a valuable asset to public policy makers in identifying the scale and location of challenges as well as the availability of resources to address those challenges. A national standardised dataset pertaining to the quantities and categories of textiles available for reuse would be of immense value to policy makers and those seeking to establish textile reuse enterprises.

The project team argues that national reporting protocols should be developed for all textile collections, while municipal, charitable and commercial textile collectors should be financially supported to engage

in reporting of data. The challenges we encountered in obtaining high-quality data from the pilots pushed us to obtain supplementary data that helped us to explore what a national separate textile collection system would look like in terms of quantities and qualities of textiles. The project team encountered a willingness from both charity and commercial operators to carry out short-term data collection activities and share data compiled during recent years. These data were very useful in our analysis process, yet they also highlighted further the absence of a national data resource detailing the quantities and categories of textiles that are collected every year.

**Recommendation 3: A national separate collection system for textiles should be as simple as possible at the point of donation/collection.**

This recommendation is based on the development of a communications campaign with in-depth stakeholder engagement. There was resounding agreement throughout this process that in order to maximise public engagement, textile sorting should take place after the point of donation/collection. The communications campaign implemented as part of the pilots emerged from this stakeholder workshop and could form a basis for a broader public engagement campaign.

**Recommendation 4: Explore avenues to (1) mainstream reuse and repair and (2) implement industrial-scale remanufacturing and reuse of low-quality textiles**

In spite of the notable limitations, the data generated and compiled highlight that the vast majority of textiles collected can be reworn through local resale, repair or export to third countries. The two key challenges in relation to growing the rate of rewearing clothes are (1) bringing and growing the portion of second-hand clothing that is available for sale in mainstream retail spaces, and (2) a need to mainstream repair services in relation to high-street textiles and garments at prices that make it economically attractive to repair rather than to purchase new items. In this regard, forms of economic support for such initiatives should be considered by policy makers.

The data drawn upon in the research also indicate that there is an additional large portion of textiles that is suitable for reuse through downcycling in various forms of remanufacturing for industrial and infrastructure applications. Importantly, existing research highlights that mandatory separate collection of textiles is likely to generate large quantities of low-quality textiles (Dubois et al., 2020). As such, identifying pathways for reuse that can be applied at scale is essential to boosting the reuse of such textiles.

**Recommendation 5: Adequate funding must be quantified and targeted to support the other four recommendations and maximise impact.**

Implementing each of these recommendations will require financial investment. It was not within the scope of this project to determine precisely how much such undertakings would cost, but such an exercise should be carried out in earnest. The funding that does become available should also build on further collection of data to target the most effective measures.

## 6. Project Outcomes

Through the project and as discussed throughout this report, the project team has identified both the challenges that Ireland will need to address before it is ready to transition to a circular textiles separate collection system by 1 January 2025 and the opportunities a truly circular textiles system can bring to the country. The short-term and long-term outcomes are outlined below. As the project has concluded, it is not within the scope of this project to track future progress on these envisaged outcomes.

### 6.1. Short-term outcomes

- **Raise awareness among participating householders and charity shops in the pilot locations.**

The implementation of the pilots in the three selected locations raised awareness in those locales around issues pertaining to post-consumer textiles. Specific activities included the collections themselves, distributing communications materials, media coverage, launch events and the behaviours and attitudes survey. The survey, in particular, provided valuable information about the potentially optimal frequency of collection (every four to six months) and why people get rid of unwanted clothing and home textiles. This information can be used to inform future communications about the separate collection of textiles.

- **Stronger relationships and recognition of the shared challenges among sectoral stakeholders.**

Stakeholders were involved throughout the planning, implementation and reporting of the project. For many of these stakeholders it was the first time that they had been brought together in relation to a common focus. Though not within the scope of the project, these activities could be built upon through further collaboration if it were nurtured and funded. However, incentives must be aligned in order for these relationships to be productive and sustainable.

### 6.2 Long-term outcomes

- **Policy development in response to the WFD separate collection obligation.**

Policy makers were key stakeholders in this project, both on the steering committee and as active participants in the project stakeholder workshops. The recommendations outlined in the previous section should be taken on board and built upon with urgency over the next 24 months.

- **Catalysing the potential for long-term collaboration and development of business solutions for post-consumer textiles, particularly between participating Local Authorities, charity partners and**



### **commercial textile recyclers.**

The on-the-ground experience in designing, redesigning and implementing the pilots proved to be incredibly valuable and rich in lessons learned. The primary outcome is that much more work needs to be done to prepare stakeholders involved with post-consumer textiles to be ready for the influx of textile volumes that will be separately collected as of 1 January 2025. Through this project, these areas have been identified and recommendations made (see Section 5) and include investments in infrastructure, transportation, storage, collection and sorting staff, sorting centres, data collection and reporting, alignment of incentives and collaboration between stakeholders, and remanufacturing facilities.

- **Stimulate the development of promising opportunities for local reuse/recycling.**

The project's Eco-Business Model Canvas process identified the following opportunities:

1. A need to mainstream secondhand clothing sales and repair. The Circular Fix implemented by Arnotts–Brown Thomas provides one example of integrating repair into a mainstream retail space that should be explored further.
2. A need to develop a large-scale industrial use for low-quality textiles. The Strength-Tex road-building project by UsedFULLY in New Zealand provides an illustrative example of such an initiative working in practice, again with certain caveats/questions.

- **Enhance the competitiveness, sustainable growth and resilience of the second-hand sector.**

The project findings indicated that further investment would need to be made in the charity retail sector in order for it to accept and sort textiles that cannot be sold in their shops. Investments would need to be made for example in personnel, transportation, storage space, sorting centres, and data collection and reporting. Partnerships already exist between charity retailers and textile recyclers but to increase the domestic capacity to divert post-consumer textiles from landfill and towards reuse, remanufacturing or other valuable activities, further development of the relationships and national infrastructure would need to be explored.

## **7. Next steps**

The next steps for creating textile circularity in Ireland and lessons learned through the Developing a Circular Textiles System for Ireland project are highlighted throughout this report. In particular, Sections 4, 5 and 6 outline the project's findings, recommendations and outcomes – all of which will be helpful in creating an environment for textile circularity and innovation in Ireland.

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### Acronyms and Annotations

CTC	Clean Technology Centre at MTU
CTR	Cookstown Textile Recyclers
CRNI	Community Resources Network Ireland
DECC	Department of the Environment, Climate Action and Communications
EPA	Environmental Protection Agency
SVP	Society of St Vincent de Paul
Vincent's	Charity retail shops run by the Society of St Vincent de Paul
WFD	Waste Framework Directive 2018

## **Annex 1: Assumptions and definitions**

### **Post-consumer Textiles**

Post-consumer textiles are textiles requiring separate collection (see definition below) that the public or commercial enterprises do not require anymore and have decided to reuse or dispose of. In the context of this research, the aim is to maximise the reuse of collected post-consumer textiles (in line with the waste hierarchy).

#### **Post-consumer textiles requiring separate collection**

In line with the definitions in *Guidance for separate collection of municipal waste* (Dubois et al., 2020), the minimum municipal waste streams to be separately collected under textiles include European Waste Codes (EWC) 200110 (clothes), 200111 (textiles), 150109 (textile packaging). Municipal waste includes mixed waste and separately collected waste from households and from other sources where such waste is similar in nature and composition to waste from households.

Textiles included in this definition are clothing, linen and footwear such as used garments and home textiles (clothing, shoes & bags, bed linen, towels, tablecloths) and similar used textiles from private companies and public organisations (hospital linen, uniforms or workwear). Textiles excluded from this research are carpets with non-textile heavy backing material, duvets and pillows, textiles that are integrated into furniture (e.g., upholstery) and industrial textiles.

#### **Separate Collection Systems**

The EU Waste Framework Directive provides the following description of separate collection: ‘separate collection’ means collection whereby “waste is kept separate by type and nature” so as to facilitate “high quality recycling or recovery of waste” (European Parliament and Council, 2018). In other words, materials collected separately must not be mixed with other waste streams so they may be dealt with based on their own specific characteristics. It is noted that post-consumer textiles obtained through existing collection systems (in-store drop-off, textile banks) are not classified as waste in Ireland.

The European Commission provided further guidance in a 2020 document pertaining to municipal waste collection which states, “separate collection could be achieved through door-to-door collection, bring, and reception systems or other collection arrangements” (Dubois et al., 2020, pp 10). Building on these definitions, it was decided through consultation with the project steering committee that textile collection should be more extensive than at present in order to address the high percentage of textiles ending up as residual waste in Ireland.

## **Local post-consumer textile management solutions**

It is recognised that exports for reuse will continue to play an important role in diverting post-consumer textiles from waste-to-energy and landfill. A recent report produced by the Institute of Economic Affairs in Kenya asserts that textile imports generate significant government revenue in terms of import taxes and also provide affordable clothing to large portions of the population (Institute of Economic Affairs (Kenya), 2020). Moreover, exporting textiles for reuse can be a more environmentally sustainable option than local alternatives such as downcycling or incineration.

By identifying suitable local outlets for textile reuse or recycling, this research aims to inform actions in Ireland that will reduce the reliance in the post-consumer textile sector on exports, build local resilience, create local textile reuse opportunities and address some of the disruptive challenges posed by Covid-19 (including the limitations of export, which has led to local stockpiling and a collapse in rag price) and fluctuating markets more broadly (threats of bans on imported textiles and the saturation of the larger international markets).

This research begins from the position that such activities should prioritise reduction and reuse, over recycling or downcycling, in line with the waste hierarchy.

## **Annex 2: Stakeholder Engagement Activities**

Engagement with stakeholders included the following:

- Development of a project description document for various stakeholders to engage them in the project.
- Project overview presentations at Charity Retail Ireland Steering Group meeting and a Charity Retail Ireland Member coffee morning.
- Stakeholder workshop for the purposes of ranking separate collection systems against a set of criteria on 12 May 2021.
- Project overview presentations to other stakeholders who collaborated on the project including the charity retail partner, Local Authorities, and Ballyhoura Development Company.
- Direct discussions with project partners, project steering group, charity retailers, county councils, communications organisations in pilot areas, and commercial textile recyclers.
- Stakeholder workshop at the PLATE conference in May 2021, which included a project overview, ideation session about separate textile collection systems, public communication, and potential business solutions.
- Presentation at a RREUSE Textile Working Group on 13 July 2021.
- Tours of the project's innovation showcase were provided to stakeholders who were attending a CRNI event at the Rediscovery Centre on 28 September 2022.
- Final stakeholder workshop at which preliminary findings and recommendations were presented for feedback on 19 October 2022 at the Rediscovery Centre. Tours of the project's innovation showcase provided to in-person and online workshop attendees.



### Annex 3: Categorised List of Collection Systems

#### **Kerbside door-to-door collection: textiles are left outside domestic dwelling for collection possibly in partnership with municipal waste collection companies.**

Municipal kerbside waste collection - Door to door (kerbside) collections in partnership with municipal waste collection companies; Textiles separated but collected through regular waste collection service

Door to door bag drops via collection bags delivered to householders by charity / commercial operators

Collaborative waste collector partnering with charity

Collaborative between charity and commercial textile recycler

#### **In-store drop-off at retailers: textiles are brought to a charity or commercial premises for direct donation.**

Charity shops - users bring garments to charity shop as a donation

Commercial retailers - users bring garments back to retailer - commercial retailer take back schemes (e.g., receive a percentage of value as a store credit based on garment type and condition)

Commercial retailer partners with charity

Cash for clothes shops - users bring to shop in exchange for cash

In-store consignment - users bring garments to consignment shop and receive a percentage of the sale

A mobile application that tells consumers about the nearest location of a charity organisation and retail store, which collects used textile products - users bring garments to the charity org or retail store

#### **Home door-to-door collections: textiles are collected door-to-door by appointment using digital scheduling technology.**

Door to door collections by appointment using bespoke technology

Ordered courier collects textiles
Pickup of box of secondhand clothes same day new clothes are delivered
<b>Public collection points: textiles are donated by the public through publicly accessible textile collection points (e.g. boxes or banks) placed in high density or targeted collection points; these points may be fixed (e.g. in permanent locations) or temporary (e.g. mobile textile banks or event-based collections).</b>
Donations to textile banks
High density or targeted collection points
Containers in the streets or on other public ground
Mobile containers
Bring-back sites
Neighbourhood collection containers
Containers in recycling centres/ civic amenity sites
Collection points in libraries and shops
<b>Private collection points: textiles are donated to collection points (e.g. boxes or banks) placed in private or closed locations such as retail stores (in-store charity shop and commercial retail drop-off and take back schemes), schools, sports clubs, businesses etc.; these points may be fixed (e.g. in permanent locations) or temporary (e.g. mobile or event based collections).</b>
Collections in communities, businesses
Collections in schools
Apartment buildings/ backyards of multi-apartment housing

Collections in sports clubs (e.g., GAA, leisure centres)

**Postal system: textiles returned to an address via post.**

Secondhand online clothing retailer - envelope sent to user from secondhand retailer for consignment

Donate to secondhand online clothing retailers to benefit charity

Brand mail-back - users are asked to mail their unwanted clothes back to brands

Mail-back of unwanted clothes when a purchase is made (envelope included in new purchase)

Donate to charity by post - (many ways but one is A biodegradable shopping bag can be made into an envelope by turning it inside out. A proper postage stamp with the address of the charity organisation helps consumers to easy donations).

**Peer to peer: textiles are given / sold / exchanged between members of the public.**

Peer-to-peer selling of secondhand clothing - user posts items for sale on social app

Peer-to-peer swap/ free - in-person swap events

Peer-to-peer online swap/ free

**Collection from brands: retailer/brand takes back textiles from consumer.**

Users return garments to brands and a portion they cannot resell - donate to charity (corporate donations) otherwise would go to waste, also end of season stock/ surplus stock

#### Annex 4: Stakeholder feedback on separate collection systems

The 12 May 2021 stakeholder workshop included representatives from the following bodies: The European Commission's Directorate-General for the Environment (DG ENV), Ireland's Environmental Protection Agency (EPA), Ireland's Department of the Environment, Climate, and Communications (DECC), Local Authorities (Donegal County Council and Wicklow County Council), Community Resources Network Ireland (CRNI), Charity Retail Ireland, Society of St. Vincent's de Paul (SVP), Oxfam Ireland, Cookstown Textile Recyclers, Zeronet, Key Waste (commercial waste collectors), Clean Technology Centre, Ballyhoura Development CLG. The following table presents stakeholder feedback on the separate collection systems. The criteria used to evaluate and rank each of the systems included the following: economic viability, scalability, convenience, impact on textile quality, impact on contamination, impact on the quantity of textiles in residual waste, impact on reuse of textiles in Ireland, carbon footprint and likelihood of uptake.

Collection system	Stakeholder feedback - benefits	Stakeholder feedback - drawbacks
<b>1. Private collection points</b>	<ul style="list-style-type: none"><li>● Highly scalable, especially through GAA clubs and schools which are widespread in rural areas and in every town and village</li><li>● This option is becoming increasingly widespread / visible currently</li><li>● Expect to obtain high volumes and generally good quality</li><li>● Event driven / local</li></ul>	

<b>2. Public collection points</b>	<ul style="list-style-type: none"> <li>Some stakeholders felt that the fact textile banks are already widespread points to this being more scalable / making economic sense.</li> <li>One stakeholder observed that clothing banks are less likely to be contaminated when branded by a charity.</li> </ul>	<ul style="list-style-type: none"> <li>It was noted this option is less convenient than the kerbside option.</li> <li>Some stakeholders saw this to be less accessible / scalable especially in rural areas. In general, they noted public collection points would only be installed in areas of higher population, e.g. a small town. Therefore, for people living in rural areas the nearest collection point could be far away.</li> </ul>
<b>3. Kerbside door-to-door collection</b>	<ul style="list-style-type: none"> <li>Highly scalable and accessible - ability to cover most of the country. People want something that is easy and responsive</li> <li>Some stakeholders had experienced kerbside collections with SVP.</li> <li>Expect this system would likely get the largest quantity. Volumes will probably be larger at the outset and then should settle down, but it was also noted that volumes would be seasonal. Stakeholders felt kerbside collections may also facilitate frequent collections (more than a few times a year).</li> <li>It would be essential that there is a good communication campaign with it. Householders should be involved in separating quality at source, with guidance on how to do this.</li> <li>Stakeholders suggested this may be the most effective as it is closest to existing systems for the public. Many people keep</li> </ul>	<ul style="list-style-type: none"> <li>Expect quality to be an issue - if commingled it would have a high potential for contamination (better to have a separate system - e.g., separate bag within the recycling stream). This system may involve a greater level of sorting at a later stage. It can be hard to match capacity with demand (as found by the experience with cages receiving WEEE in Brighton).</li> <li>May be more challenging to pilot. Short term quality issues exist with kerbside collection because people see it as a waste collection. Education is therefore essential, but takes time. For example, with glass Ireland hasn't yet achieved national scalability though trialled caddies at householder level.</li> <li>Likely that the collectors will ship this to the best outlet and this is likely to be exported</li> </ul>

	<p>items with the intention to donate but often convenience dictates that these kept items end up in the waste stream (convenience).</p>	
<b>4. Post / parcel service</b>	<ul style="list-style-type: none"> <li>● Potential for rural and older people through the post office, and younger demographic who use this system now through depop and might be more likely to return goods by post.</li> <li>● This is a hassle for people - going to the post office. People hate hassle.</li> <li>● May see higher quality items returned, least likely to see contamination</li> <li>● Not likely to deliver on quantity</li> <li>● Would require subsidised post</li> </ul>	<ul style="list-style-type: none"> <li>● It could work in the urban locations but not sure if people would want to pay either the recipient or the people providing the textiles.</li> </ul>
<b>5. Home / door-to-door collections</b>	<ul style="list-style-type: none"> <li>● Could be scalable if linked to other waste streams, the economics of textiles along probably not worthwhile</li> <li>● While providing this service may be difficult in a rural area, it could serve a need for parts of the county that have large distances to travel.</li> <li>● Appeals to a younger generation.</li> <li>● Hassle free</li> <li>● Would need to be responsive.</li> <li>● One stakeholder felt this could be as effective as kerbside collection. Econet uses wards in the UK so it becomes economically viable to collect. It's got to be face-to-face in terms of collection</li> </ul>	<ul style="list-style-type: none"> <li>● Several stakeholders pointed out that this may not work in rural areas, due to a lack of supply chain / infrastructure. Would need a high volume to justify collection costs.</li> <li>● What about people who are offline? Allow for manual collections on the driver side. SMS would be another way of doing it. An app provides a richer experience than SMS.</li> </ul>

	<p>(emphasis on high value).</p> <ul style="list-style-type: none"> <li>● We know that the quality at the kerbside can be poor, so public facing/focused points can garner higher quality items.</li> </ul>	
<b>6. Comms only</b>		<ul style="list-style-type: none"> <li>● Communication can be effective in combination with something else, but not on its own. It may create awareness but probably won't drive action and lead to less textiles in the MDR/waste bin.</li> </ul>

### Annex 5: Demographics of Charleville, Arklow and Buncrana (2016)

Population	Households	Female	Male	Under 19	20-49	50-64	65+
National							
4,761,865	1,707, 142	2,407,437	2,354,428	1,309,368	2,006,037	808,893	637,567
		50.56%	49.44%	27.5%	42.13%	16.99%	13.39%
Charleville							
3,919	1,533	1,979	1,940	1,094	1,627	577	602
		50.4%	49.6%	27.9%	41.5%	14.7%	15.3%
Arklow							



13,163	4,847	6,738	6,425	3,948	5,517	2,152	1,546
		51.1%	48.9%	30%	41.9%	16.3%	11.7%
Buncrana							
6,785	2,530	3,476	3,309	2,203	2,694	1,132	936
		51.2%	48.8%	29.8%	39.7%	16.7%	13.8%

Central Statistics Office, 2017)

## **Annex 6: Important points that informed which textiles to be accepted for collections**

The following are important points that informed which textiles would be accepted as part of collections:

- Experience from the charity retailers that restricting donations to certain textile categories impacts consumer behaviour by turning potential donors away **in favour of other, less restrictive collections.**
- Restricting donations to certain textile categories can **undermine business models.** Both commercial and charitable textile collectors rely on high and medium quality reusable textiles to underpin revenue. Directing high quality rewearable textiles to one channel over another may compromise that revenue.
- Charity retailers and commercial textile recyclers have the expertise to sort textiles into categories for reuse. By designing pilots that would accept a wide variety of textiles, the project team sought to avoid de facto sorting of textiles by the public.

## **Annex 7: Data collection protocols**

### **Initial data collection protocols**

Specific data collection protocols were developed for implementation as part of each pilot. These protocols specified that data would be gathered related to the following:

- Quantities and qualities of textiles collected through the new systems being piloted. This would involve weighing and sorting collections in “saleable” and “rag/waste” categories.
- Quantities and qualities of textiles collected through existing channels within a specific radius of the target area before and after the pilot;
- Quantities and qualities of textiles disposed of via municipal waste collection before and after the pilot;
- Costs of sorting / disposal of unsuitable materials collected via new vs. existing channels before and after the pilot.

The charity partners were asked to retain samples of the rag product over a number of weeks in the lead up to the ‘material characterisation’, which would consist of a one day survey of this rag product, breaking it down into the material constituents, such as denim, cotton, polyester, neoprene, mixed fabric, etc. The rag would then be sold on to commercial textile recycling partners.

Local St. Vincent de Paul stores in the pilot locations were asked to record donations made directly to their stores — e.g., the number of equivalent 10kg bags donated per week, the yield between saleable product and rag and the number of equivalent 10kg bags of rag per week. These data were to be shared with CTC and CRNI over the course of the pilot on a periodic basis and compared against typical donation levels to the same store prior to the pilot commencing (using the same metrics). A template was developed for the charity retail partner to record data on direct donations and donations to the additional collection systems as shown in Table 3.3. The project team encountered significant difficulties in obtaining said data from charity stores due to staffing shortages at said stores and the labour intensive work involved in sorting clothing and gathering associated data. Further planned work was to involve data validation through random sampling and weighing of retained bags by CTC, on a frequent basis initially so that a sample of 40 plus bags are weighed. This weighing exercise was designed to help inform the exact degree of accuracy/uncertainty.

**Table 3.3: Draft template for reporting data on textile collection quantities and quality direct to store.**

For the week:	Donations	
	Direct to the shop	From the new clothes banks
<b>No. of 10 kg bags donated</b> (equivalent)		
<b>% yield</b> (saleable product)		
<b>No. of 10 kg bags of rag product</b> (equivalent)		

In addition to measuring the quantity and quality of textiles gathered through separate collections systems, a waste characterisation study was proposed as part of the pilots. Waste characterisation studies measure the composition of waste generated in a given waste stream. In the case of this project, such a study would quantify and categorise the textiles generated through household waste streams over the course of the pilot. This would provide a basis for understanding the impact of separate textile collections on household textile waste generation in the pilot locations. The focus on waste streams, rather than recycling, is justified by previous national waste characterisation studies that have shown that the majority of textiles collected at a household level occurs in the general waste bin (89%). Protocols were developed for these waste characterisation surveys with one of the main local waste management contractors.

### Final data collection protocols

Data collection sought to capture the following:

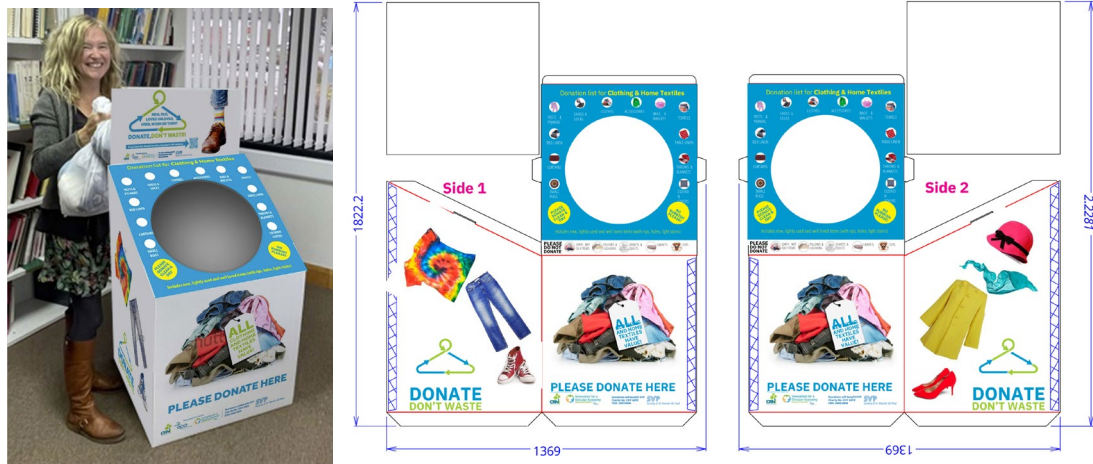
- Quantities of textiles collected in **new channels during each pilot**;
- Quality of textiles (rag v non-rag) collected in **new channels during each pilot**;
- Detailed quality analysis on the rag fraction collected in Charleville on 20-bag sample to identify potential **textile streams of value**;
- **Costs** associated with separate collection systems.

### Sample of data collection sheet provided to charity partner

For the week from:	Number of bags <b>donated direct to the shop</b> for the week	Number of bags of <b>rag collected for recycling</b>
Mon 4 <sup>th</sup> – Sat 9 <sup>th</sup> April 2022		
Mon 11 <sup>th</sup> – Sat 16 <sup>th</sup> April		
Mon 18 <sup>th</sup> – Sat 23 <sup>rd</sup> April		
Mon 25 <sup>th</sup> – Sat 30 <sup>th</sup> April		
Mon 2 <sup>nd</sup> – Sat 7 <sup>th</sup> May		
Mon 9 <sup>th</sup> – Sat 14 <sup>th</sup> May		
Mon 16 <sup>th</sup> – Sat 21 <sup>st</sup> May		
Mon 23 <sup>rd</sup> – Sat 28 <sup>th</sup> May		
Mon 30 <sup>th</sup> May – Sat 4 <sup>th</sup> Jun		
Mon 6 <sup>th</sup> Jun – Sat 11 <sup>th</sup> Jun		
Mon 13 <sup>th</sup> – Sat 18 <sup>th</sup> Jun		
Mon 20 <sup>th</sup> – Sat 25 <sup>th</sup> Jun		
Mon 27 <sup>th</sup> Jun– Sat 2 <sup>nd</sup> Jul		

## Annex 8: Prototype of permanent private and public collection points

Permanent private and public collection points were professionally designed and were to be made from cardboard, and as such were low cost, easily transportable and branded for maximum visual appeal. The worked-up design and prototype is shown below. Collection points were intended to be hosted in charity retail spaces, community organisations, and local businesses and would need to be continually serviced by staff.



## Annex 9: Key lessons learned from pilot design process

### **Resources: the costs of the initial pilot design would have significantly exceeded the project budget.**

Human and physical resources for carrying out the pilots were found to be insufficient. These conditions were exacerbated by the Covid-19 pandemic. Indeed, the Vincent's charity retail shops in Arklow and Charleville had lost significant staff and volunteer capacity. In both such locations, resources, such as vans for collection and storage space, were also very limited. A weekly servicing of permanent private and public collection points would therefore have required additional external resources. Initial costing for procuring a van and driver as well labour time for sorting collected textiles was estimated at approx €750 - 1,060 / week depending on the number of sorting staff required. The initial plan was to run these collections over a six-month period with projected costs therefore hovering between €19,500 - 27,560. These costs would have significantly exceeded the €3,000 budget for this part of the project. The waste characterisation surveys would also have exceeded the budget of the project. As such, these were not carried out either.

**Health and Safety:** Many of the commercial retailers, and especially food retailers, who were approached about placing permanent collection points (e.g. light transportable collection boxes in Figure 3.2) in or near their premises raised concerns about sanitation issues associated with dumping or used textiles more generally. The Covid-19 pandemic resulted in new health and safety regulations and concerns. For instance, in Buncrana, local businesses and community organisations were either closed or unwilling to host the boxes due to Covid-19 transmission concerns. In Charleville and Arklow, concerns were also raised that collection points would attract illegal dumping and would therefore require **monitoring or CCTV surveillance**. The anticipated costs of addressing these concerns were beyond the budget of the project.

**Competing collections:** both Covid-19 and the war in the Ukraine influenced donation patterns. This included new consumption and donation behaviours, as well as diverting textiles through special donation drives. These factors impacted the availability of baseline data and the ability to run collections in certain locations. In Buncrana in particular, community members and groups were already running community collections for the war in Ukraine prior to the pilot intervention. These collections were considered to be diverting significant quantities of textiles so it was felt that layering community collections in this location would not generate data that could be compared with the other locations. In Buncrana many of the local schools and sports clubs also had textile collection agreements with other entities, including commercial textile recyclers and charities.

**Delayed engagement with charity partners at a local level:** The exploratory phase and also the unique charity offtake partner structure (e.g., decentralised decision making) delayed the outreach and direct contact with local Vincent's charity retail shops in Charleville and Arklow. Capacity constraints were therefore identified late in the pilot planning phase, which led to unanticipated timeline and budgetary constraints.



## Annex 10: Alternative options explored

A number of alternative options were explored, including the following:

- **Obtain additional sources of funding** to supplement the project budget. A number of funding opportunities were identified but it was not possible to pursue these per Green Enterprise project terms and conditions.
- Overcoming human resource constraints by availing of secondment from **labour activation programmes and contracting private resources (e.g. a van) to aid with servicing textile collection points**. In both Charleville and Arklow the project team discussed options with local collaborators. These included the potential secondment of Community Employment scheme participants, through the Probation Services, or through private contractors.
- **Leasing a storage and sorting space** next to the charity partner's shop in Charleville was explored. However, it was determined that the cost (€550 per month) could be used for other aspects of the pilot and there was a charity shop partner preference for the team to be located under the primary premises.
- Bringing in **another charity partner** who may have increased capacity to participate in the interventions. However this would have caused additional delays to the project timeline in terms of identifying new locations, intervention design, communications, and developing new relationships with local stores. Such delays would not have allowed for the timely completion of the project.
- Replacing the indoor permanent collection boxes with **secure, weatherproof wheelie bins**. This type of bin was identified. However, location options were limited and this option would have required hiring a contractor with a van to collect regularly for just two locations. This challenge was discussed with the Circular Textiles Steering Committee members who confirmed that pursuing textile box hosts would be an extremely time intensive task and would not yield the desired results.
- Replacing the indoor permanent collection boxes with a **larger outdoor metal clothing bank** in a business carpark location. However, the business management was not receptive due to dumping concerns.

- **Reducing the number of pilot locations** to one, layering the interventions over time - this was not adopted as it was felt critical to the findings to trial different collection systems in different locations
- **Reducing the length of the pilot** to reduce servicing costs. The length of the pilots were ultimately reduced due to delays to the project design, but the cost for fixed collection points remained prohibitive.
- **Removing the layered approach** so the pilot involved only one intervention in two of the pilot locations (and communications-only in the remaining location) to reduce overall budget cost. **This was adopted in the final design.**
- **Shortening the length of the pilot intervention** to four months from the original six months. **This was adopted in the final design.**

## Annex 11: Communications outputs

Communications outputs included the following:

- Branding / identity, including name, logo, colours, messaging in consultation with a graphic designer.
- A project webpage and three location-specific websites that included project information and maps specifying donation points.
- A donation infographic/leaflet about the textiles that would be accepted for donation.
- Leaflet distribution to 900 homes in Charleville and 6,222 homes in Arklow. In Buncrana there was no leaflet distribution, though leaflets and posters were distributed at the local launch of the pilot.

### Branding/identity



### Project webpage

<https://crni.ie/circular-textiles/>

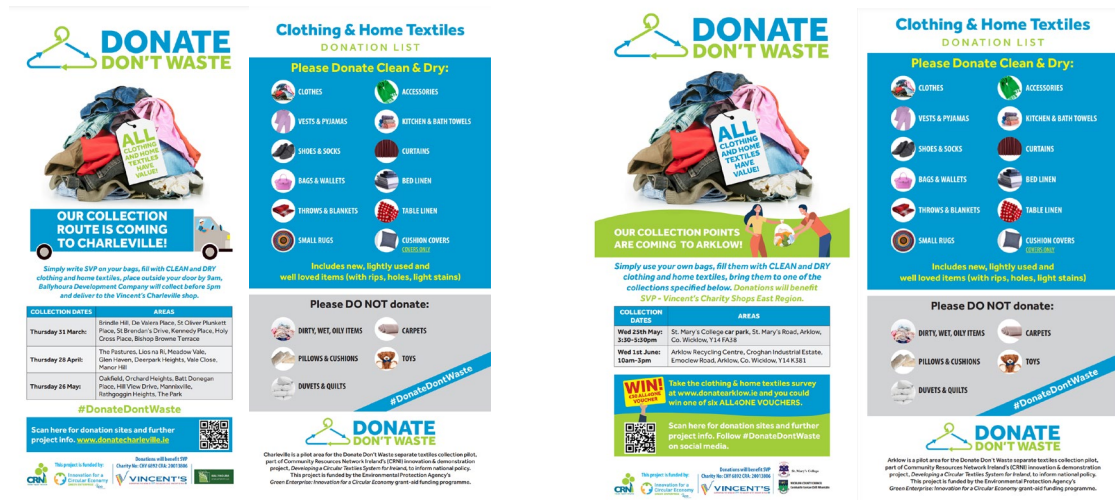
### Three location-specific websites

Charleville: [www.donatecharleville.ie](http://www.donatecharleville.ie) ; Arklow: [www.donatearklow.ie](http://www.donatearklow.ie) ; Buncrana: [www.donatebuncrana.ie](http://www.donatebuncrana.ie)

### Donation infographic/leaflet about the textiles that would be accepted for donation



Leaflet distribution to 900 homes in Charleville, to 6,222 homes in Arklow, distribution at local launch in Buncrana.



Leaflets delivered to households in Charleville      Leaflets delivered to households in Arklow



Leaflet and poster distributed at the Buncrana launch

Separate launch events in each location that were promoted locally in collaboration with stakeholders, community groups, and Local Authorities



Launch event in Charleville

Launch event in Arklow

Launch event in Buncrana

Additional media coverage garnered from each pilot is included on the location-specific websites.

## Annex 12: Charleville pilot details

In Charleville three kerbside door-to-door textile collections took place. The first collection took place on 31/3/2022, the second on 28/4/2022, and the third on 26/5/2022. Each of these collections extended to a catchment area of roughly 300 households, meaning that 900 households had the opportunity to engage with the collection pilot in total. Groupings were established on a purely functional basis through consultation with the Vincent's Charleville and were based on catchment areas used for stations of the processions<sup>17</sup> by the Holy Cross Parish Office of the Roman Catholic Church outlined in the parish newsletter dated 27 February 2022. The geographical extent of these groupings are also contained within the town boundaries. Hinterlands were intentionally excluded due to the highly dispersed housing patterns that are common to rural Ireland (Gkartzios & Scott, 2009). A kerbside collection in such locations would have been prohibitively expensive for this project.

The three collections were promoted through a launch event (see Figure 3.5), flyer drop by Ballyhoura Development CLG to catchment households in advance of each collection as well as through engagement with local media and social media channels<sup>18</sup>. Ballyhoura Development Company CLG also provided a van and driver for the collection days and brought the collected bags to Vincent's Charleville. CTC accompanied Ballyhoura Development Company CLG on the neighbourhood collection days, the additional collection at the local secondary school, and provided data on the number and weight of the bags.



**Figure 3.5: Launch event in Charleville**

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<sup>17</sup> religious processions that are typically held in the weeks prior to Easter religious celebrations

<sup>18</sup> <https://www.mywaste.ie/news/donate-don-t-waste-launched-in-charleville/>;  
<https://www.irishexaminer.com/news/munster/arid-40829162.html>;  
<https://www.facebook.com/CRNIreland/videos/525088152620059/>;

The quantities and qualities of textiles collected are summarised in Table 3.4 below. The first door-to-door collection (31 March 2022) yielded low quantities of textiles with only 12 bags collected despite extensive local media coverage. Additional promotional work was undertaken in advance of the second door-to-door collection (28 April 2022), including requests to community stakeholders, the Local Authority, and the EPA to share on social media, targeted social media ads and a community notice in a local paper. 37 bags were collected through the second collection. 21 bags were collected through the third collection (26 May 2022).

All bags from two of the three kerbside door-to-door collections were sorted in order to provide an indication of the quality of textiles gathered in each instance in terms of resaleable and rag qualities. Table 3.4 shows that a total of 70 bags were obtained through kerbside collection from a catchment of 900 households.



Figure 3.6: Flyers delivered to households in Charleville

A fourth event-based private collection was later conducted as part of the Charleville pilot. Transition year students at a local secondary school ran this private collection event for other students under the *Donate Don't Waste* campaign. The college had recently served as a community drop-off point for collections in aid of Ukraine in the context of the ongoing Russian invasion. This additional *Donate Don't Waste* collection was run opportunistically on an exploratory basis. However, as this collection involved an entirely different collection methodology, the project team determined that the data was not suitable to include as part of the kerbside door-to-door collection figures.

Table 3.4: Summary of collections in Charleville Co. Cork

Collection	Date	No. of Bags	Weight (kg)	Resaleable	Rag



1	31/3/2022	12	56	9%	91%
2	28/4/2022	37	234.5	37%	63%
3	26/5/2022	21	105	No data	No data
4	26/05/2022	22	100	No data	No data
Total kerbside door-to-door (excluding collection 4)		70	395.5 (in 70 bags)	31.6%(from 49 bags)	68.4% (From 49 bags)
Total drop-off		22	100		



**Figure 3.7: Kerbside door-to-door collections in Charleville. Captions from left to right: Ballyhoura Development CLG provided van, driver & staff support; Donations left out for collection on the day; Donations ready for sorting at Vincent’s Charleville shop**

Assuming that multiple households did not contribute to the same bag, this amounts to a maximum of roughly 7% of households in the catchment engaging with the collection. Via kerbside door-to-door, 395.6 kg of textiles was collected from a catchment of 900 households, or 0.44 kg per household. 31.6% of the entire weight was deemed to be resaleable. As will be shown later, this is significantly higher than the quantities of resaleable textiles that commercial textile recyclers receive through kerbside door-to-door collections (0.5% - Comparing qualitative data from non-pilot sources).

In addition, material analysis was carried out on a sample of 62 kg, or 42% of the total rag generated during the Charleville pilot. Eight individual sample rag bags were analysed to examine and illustrate the variation and composition of materials classified as “rag”. The composition of the sample is summarised in Table 3.5 <sup>19</sup>.

**Table 3.5: Material composition of rag sample from Charleville collection**

All fabrics together	Average % by weight
mixed fabric	44%
unlabelled	17%
polyester	13%
denim	12%
cotton	12%
acrylic	1%
viscose	0.5%
nylon	0.4%

The composition of the sampled textile rag in terms of whether it was clothing or household textiles was looked at. This is summarised in Table 3.6.

**Table 3.6: Composition of Charleville rag sample: clothing vs. household**

Type of textile	Average % by weight
Clothing	94%
Household	6%

A more detailed look at the composition of the clothing and household textiles fractions in terms of the different types of fabrics is as in Table 3.7.

**Table 3.7: Material composition of Charleville rag sample: clothing vs. households**

Textile type	Fabric type	Average % by weight
--------------	-------------	---------------------

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<sup>19</sup> Note: ‘mixed fabric’ is a labelled blend of two or more material types, while ‘unlabelled’ is a textile item without any label to indicate its composition.



Clothing	mixed fabric	41%
	unlabelled	15%
	polyester	13%
	denim	12%
	cotton	11%
	acrylic	1%
	viscose	0.5%
	nylon	0.4%
Household	mixed fabric	3%
	unlabelled	2%
	cotton	1%

Based on the Charleville pilot, a number of points are worth noting and carry insight for future separate collection systems. First, there was a difficulty in gaining access to resources for the purposes of implementing the project. This included a van for collecting textiles, personnel to carry out the collections, storage, and personnel to carry out the sorting of textiles into categories. Indeed, the collections themselves would have been prohibitively expensive had Ballyhoura Development Company CLG not come on board. Second, there was difficulty and delays in gathering data for the pilot period from the local charity shops. Again, these points highlight the resources and infrastructure that will be needed to carry out separate collection and data reporting on a national scale.

## Annex 13: Arklow pilot details

In Arklow, Co. Wicklow, the public were invited to donate textiles at two public event-based collection points at a local secondary school and Arklow recycling centre. These locations were selected due to public knowledge of site locations and ease of access. The former is located near the centre of the town, while the latter is in close proximity to the M11 motorway. A third event-based collection was initially planned. However, the intended location of the collection did not have sufficient space to temporarily store the textiles.

In the case of the two event-based collections that did take place, those wishing to donate were encouraged to fill their own bags with clean, dry, unwanted clothing and home textiles. The collections were again publicised through flyers (see Figure 3.8), social media posts, and via local printed and radio news outlets<sup>20</sup>. A print and distribution company was engaged to assist with the flyer drop to 6,222 households in the Arklow area. This is slightly larger than the official number of households in Arklow per the 2016 census (Central Statistics Office, 2017). As such, this figure may reflect an area that is slightly greater than the official boundaries, or increases in the number of households since 2016.



Figure 3.8: Arklow open / public event-based collection flyers delivered to households

Both collections took place on weekdays due to availability of human resources required to undertake the collections. The school based collection was implemented in collaboration with Transition Year students and teachers working at the school. The donation window was open for two hours (3.30pm - 5.30pm) based on the school and students' schedules so public drive-up access would be available. On the collection day, CRNI and Transition Year students accepted donated bags from members of the public. A second collection was held at Arklow Recycling Centre on Wednesday, 1 June 2022 with a 5 hour

<sup>20</sup> <https://www.independent.ie/regional/wicklow/news/arklow-joins-nationwide-initiative-aiming-to-create-circular-economy-for-clothing-and-textiles-41653817.html>; <https://www.eastcoast.fm/news/wicklow-news/arklow-encouraged-to-donate-clothes-this-week-as-part-of-donate-dont-waste-pilot/>; <https://wicklownews.net/2022/05/donate-dont-waste-clothing-and-home-textiles-pilot-coming-to-arklow/>

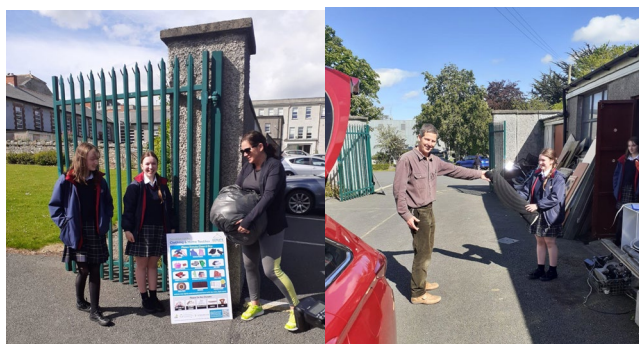
window open for donations (10am - 3pm) in partnership with Wicklow County Council. At this event, CTC accepted donated bags from members of the public.

Bags from both collections were stored in situ until they could be collected by SVP East Region staff and processed at SVP East Region’s regional sorting centre. SVP East Region staff carried out a manual sort on a sample of 20 bags from each collection. The sample from the secondary school was dumped due to contamination and health and safety concerns. Table 3.8 shows the composition of the sample from the recycling centre collection. 90% of the textiles gathered were of unsaleable/rag quality, while 10% was resaleable. Additional data categorised 60% of the textiles as women’s clothing, 20% was categorised as men’s wear, and 20% was for children and babies. Half of the resaleable textiles were from the women’s clothing category. The other half was sourced from the children’s/baby clothes category. None of the men’s wear was resaleable. Data on the subsequent treatment of the 90% portion of the sample that went for recycling is not available. Much of the cost of this activity was absorbed by SVP East Region, while a payment was made to the national office for the service of processing additional textiles for the three pilot locations.



Figure 3.9: Launch event in Arklow

This model worked well in **establishing community involvement**. Feedback was received from members of the public on collection days. Many noted that they were in favour of the collections overall. However, many also expressed a preference for those collections to take place outside of working hours or on the weekend. One participant suggested that putting a large collection box at the Arklow Recycling Centre out on a Saturday for drop-offs would be more convenient. This may explain the relatively low level of engagement observed in Arklow - just 262 bags from a catchment of 6,222 households. The data collected from this pilot are presented in Table 3.8 below.



**Figure 3.10: Arklow event-based collection at secondary school**



**Figure 3.11: Arklow event-based collection at Arklow Recycling Centre**

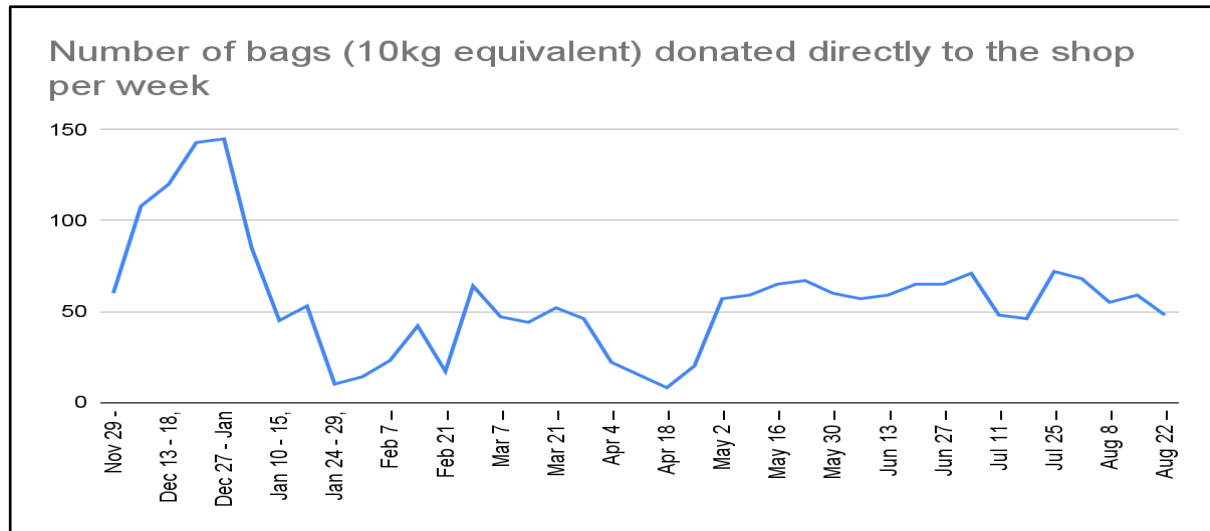
Due to capacity constraints with the local charity partner, the data collection associated with the pilot was limited. In particular, qualitative data was only obtained from one of the two collections. The 100 bags donated during the first collection were disposed of due to contamination of a number of bags and associated health and safety concerns. Of the 162 bags from the second collection, 25 were sorted for quality. 24 bags were categorised as rag, while one bag was of sufficient quality for immediate resale.

**Table 3.8: Post-consumer textile quantities and quality from community collections in Arklow**

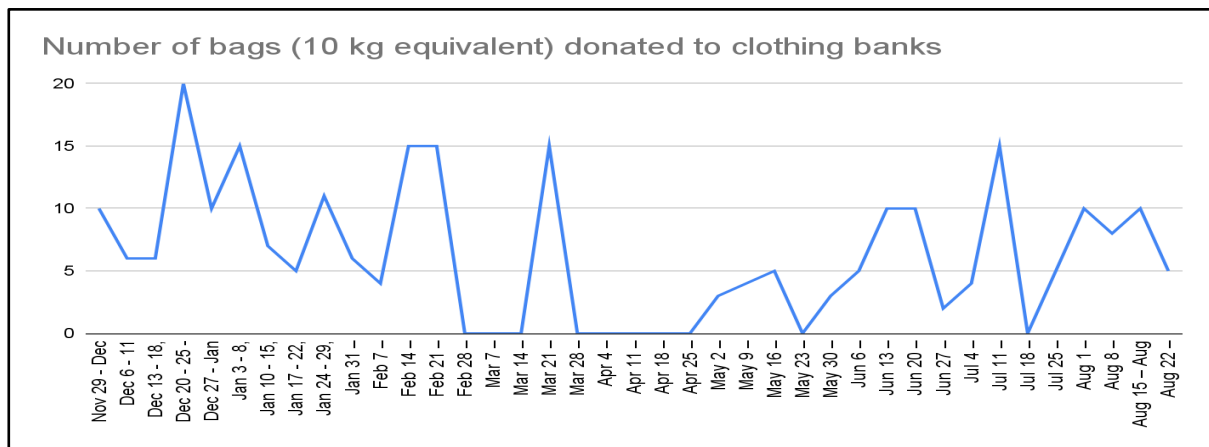
Collection	Date	No. of Bags	Weight (kg)	Saleable	Rag
1 - Secondary School	18/05/22	100	497.7	Unknown	Unknown
2 - Arklow Recycling Centre	01/06/22	162	823.4	5-10%	90-95%
Total		262	1,321.1kg	5-10%	90-95%

The project team used the figure of 6,222 as the catchment area for the Arklow collection based on the number of houses to which promotional flyers were delivered. 1,321 kg of textiles were collected in Arklow as a whole, representing a rate of 0.21 kg per household per collection.

## Annex 14: Buncrana pilot details



**Number of 10kg bags donated to Buncrana Vincent's shop per week**



**Number of 10kg bags donated to clothing banks in Buncrana during 2022**


**Additional textile bank in Buncrana** (note: data was not included from this additional intervention)



**Textile banks installed behind the Buncrana library with support from Donegal County Council (approval), Cookstown Textile Recyclers (installation) and Vincent's Buncrana (servicing)**

## Annex 15: Behaviours and attitudes survey analysis

### Behaviours and attitudes survey:

 **Innovation for a Circular Economy**

## Charleville Clothing & Home Textiles Survey

Charleville has been selected as a pilot area for important EPA research to inform national policy!

Community Resources Network Ireland (CRNI) is undertaking this survey as part of our innovation & demonstration project, Developing a Circular Textiles System for Ireland. This project is funded by Environmental Protection Agency (EPA) under the remit of its Circular Economy (Science Enterprise grant) funding programme.

Your support with this survey will help us gain better understanding about attitudes and behaviours around unwanted clothing and home textiles.

Thanks for your time in answering this survey, which should take about 10 minutes, and there's a chance to win one of six €50 Shop Local gift vouchers valid in over 60 businesses in Charleville!

For more information about the project, please visit [www.crneireland.ie/circular-textiles](#) or contact Christine Costello, Research Lead, at [info@crni.ie](#) or 087 773 3104.

---

\*1. Where do you live? ☐

☐ Charleville

☐ Townland/Village near Charleville

☐ Other (please specify)

---

\*2. What is your age? ☐

☐ Under 13    ☐ 15 to 24

☐ 13 to 18    ☐ 35 to 44

☐ 19 to 24    ☐ 45 to 74

☐ 25 to 34    ☐ 75 or older

☐ 35 to 44

---

\*3. Please choose the statement most relevant to you. ☐

☐ I am the person in my household most likely to sort / get rid of unwanted clothing and home textiles.

☐ I share the responsibility of sorting / getting rid of unwanted clothing and home textiles.

☐ Someone else in my household is more likely to sort / get rid of unwanted clothing and home textiles.

Other (please specify)

---

\*4. Why do you get rid of clothing / home textiles?  
Please select all that apply. ☐

<input type="checkbox"/> no longer like it	<input type="checkbox"/> The item is ripped, torn, stained, damaged (e.g., a broken zipper, holes).
<input type="checkbox"/> it does not fit anymore	<input type="checkbox"/> The item is worn out
<input type="checkbox"/> it is no longer needed	<input type="checkbox"/> The item is spoiled
<input type="checkbox"/> have replaced with a new item	<input type="checkbox"/> I consider the items risky / unsuitable
<input type="checkbox"/> it is no longer in fashion	<input type="checkbox"/> My kids have outgrown it.

☐ Other (please specify)

---

Please select all that apply. ☐

<input type="checkbox"/> Charity shop	<input type="checkbox"/> Don't own anything else requiring recycling
<input type="checkbox"/> Clothing bank (living bank)	<input type="checkbox"/> Sell online
<input type="checkbox"/> Pallet sale to family / friends	<input type="checkbox"/> Sell at second-hand shop
<input type="checkbox"/> Refurbish for at home	<input type="checkbox"/> Swap shop
<input type="checkbox"/> Recycling bin at home	<input type="checkbox"/> Clothing donation bank at retail shop
<input type="checkbox"/> Charity bag collected from my doorstep	<input type="checkbox"/> Clothing donation through school work or sports club
<input type="checkbox"/> Other (please specify)	
<input type="text"/>	

---

\*5. These are comments about getting rid of unwanted clothing / home textiles.  
Please select either one **best**, **second best** or **third best** with which comment. ☐

	Best	Second best	Third best
I expect to get rid of it as soon as possible.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I don't want to think about taking items to a charity shop or clothing bank (or similar).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Items that are worn or stained cannot not be donated.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There are too convenient options for me to go off donations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Looking giving my items to people twice who have used it third-most often.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use of clothing / home textiles are so cheap and new that it isn't worth donating or in the cabinet.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am so afraid about what other people will say about my donation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is easy to find alternatives without using clothing / home textiles for free (e.g. if I can't afford to donate them).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am conscious of what I donate to look the way I would like to see myself.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I don't believe that the most of clothes in the most environmentally friendly way to dispose of them is materials.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reusing clothing and home textiles are the best ways to deal with them (I should be a charity shop or clothing bank).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can reuse the charity shops and online websites to sell and buy clean and dry and fashionable clothes, bags, shoes, gym gear for recycling.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can use the benefits from the charity shop and online websites and selling and buying clothes and home textiles.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I hang onto things because they might be useful for other people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

---

\*6. What would motivate you to start donating or increase donations of unwanted clothing / home textiles?

<input type="checkbox"/> A charity shop were more accessible.	<input type="checkbox"/> If some pick-ups by request were available.
<input type="checkbox"/> If a charity shop were more convenient (opening hours, location).	<input type="checkbox"/> If I knew who could/donated instead of putting it in the rubbish bin.
<input type="checkbox"/> If a clothing bank (living bank) were open.	<input type="checkbox"/> If I knew that buyers had good intentions.
<input type="checkbox"/> If a clothing bank (living bank) were more accessible (open, parking, close to transport).	<input type="checkbox"/> If I knew how the environment suffers from what I donate.
<input type="checkbox"/> If facilities to store scheduled collections were offered.	

Other (please specify)

---

\*7. How would you typically get rid of each of the following unwanted items, assuming you're least, 2nd, 3rd, 4th, 5th choice?  
Please select for each item either: [Donate to charity](#), [Recycle](#), [Sell online](#), [Selling locally](#) or [Bin it](#).

	Don't know / never owned	Donate to charity	Sell online	Selling locally	Bin it
Clothes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Household linens	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Shoes / boots	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bags and suitcases	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Accessories	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bed linen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Towels & Blankets	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kitchen & Bath towels	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dish cloths	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Knitwear	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Curtains	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Children's Clothes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

---

\*8. If you would you typically get rid of well loved items (e.g., work tools, light scanner)?  
Please select the answer most relevant to you. ☐

☐ Reuse (sell on, re-sell)

☐ Recycle

☐ Sell

☐ Other (please specify)

---

\*9. Considering distance and accessibility, how convenient is your nearest charity shop or clothing bank?

Please select the answer most relevant to you. ☐

☐ I know a few places and at least one is very convenient for me to reach

☐ I know where a charity shop or a clothing bank is and it is reasonable to reach

☐ I know at least one place, but it is not very convenient to reach

☐ I don't know where to donate my clothing / home textiles, but I could try to learn.

☐ I don't know where to donate my clothing / home textiles, and I don't ask.

☐ I don't really need a charity shop or clothing bank, a charity pick up (clothing / home textiles from my doorstep).

Other (please specify)

---

\*10. How often do you give clothing / home textiles away to someone?  
Please select the answer most relevant to you. ☐

☐ More than once a month

☐ Every month

☐ Every few days or weeks

☐ Once per year

☐ Less than once a year

☐ Other (please specify)

## Behaviours and attitudes survey analysis:

In each of the pilot collection locations a behaviours and attitudes online survey was carried out using the SurveyMonkey platform and was promoted in each of the pilot locations alongside the communication activities. The aim of the surveys was to gain an understanding of potential differences in attitudes and behaviours toward separate collection of textiles in the different pilot locations. Responses are summarised in Table 3.9. As shown in the table, a large portion of the responses in each case was deemed to be invalid.<sup>21</sup> Nonetheless, in each instance a usable sample was obtained. These results are not representative at a national level, but provide an indication of the attitudes and behaviours among the population in the pilot locations. Certain biases in responses must be noted as they relate to online surveys: *under-coverage* and *self-selection* Bethlehem (2010). In these two ways, the online survey does not represent a randomised sample from the entire population. Rather, it is a self-selected sample from the portion of the population with access to the internet. However, the project team explored some of

<sup>21</sup> Invalid responses are those originating outside of the pilot location or surrounding area based on either the answer or phone numbers provided by the survey respondent, where the respondent heard about the campaign, and/or the presence of an IP address from another country.

the biases through alternative analysis and determined the results did not differ significantly from those presented below.

**Table 3.9: Overview of online survey**

Location	No. of responses	No. of valid responses
Arklow	223	79
Charleville	113	98
Buncrana	102	39

Figures 3.16 - 3.21 illustrate some of the key results of the survey. The data did not indicate dramatically different attitudes toward post-consumer textiles between different locations. Respondents highlighted the same top five reasons for getting rid of textiles, the same top three places where they would dispose of textiles and identified similar factors that would affect their motivations to donate. The vast majority of respondents claimed that they do in fact avoid simply dumping textiles (Figure 3.18). Donations to charity shops is the leading preference for people across all pilot locations (>70%), followed by textile banks, and passing on the family / friends. All other options were below 25%.

In Arklow and Charleville — where schools were involved in the pilots and more young people responded to the survey — a high proportion of respondents indicated “it does not fit anymore” as the leading reason for getting rid of an item of clothing / home textile, perhaps due to growth. The leading reasons across the three pilot areas are lack of fit, lack of need, damage, worn, and no longer liking the item (Figure 3.8).

In all pilot locations, more than 88% of survey respondents said that they either know of a few places to donate textiles that are within reasonable reach or know of a charity shop or clothing bank within reasonable reach. Although respondents highlighted that better access to a charity shop would motivate them to increase donations (Figure 3.20), it appears the areas are reasonably well served. What may be more significant are indications that knowledge of what happens to the textiles donated, what kinds of textiles could be donated, who benefits, and how the environment benefits could be important motivators (Figure 3.20). A particularly useful response is that across all locations more than 50% of survey respondents indicated that they would have clothing and/or home textiles available for donation every four to six months (Figure 3.21) and could indicate an appropriate frequency for textile collections.



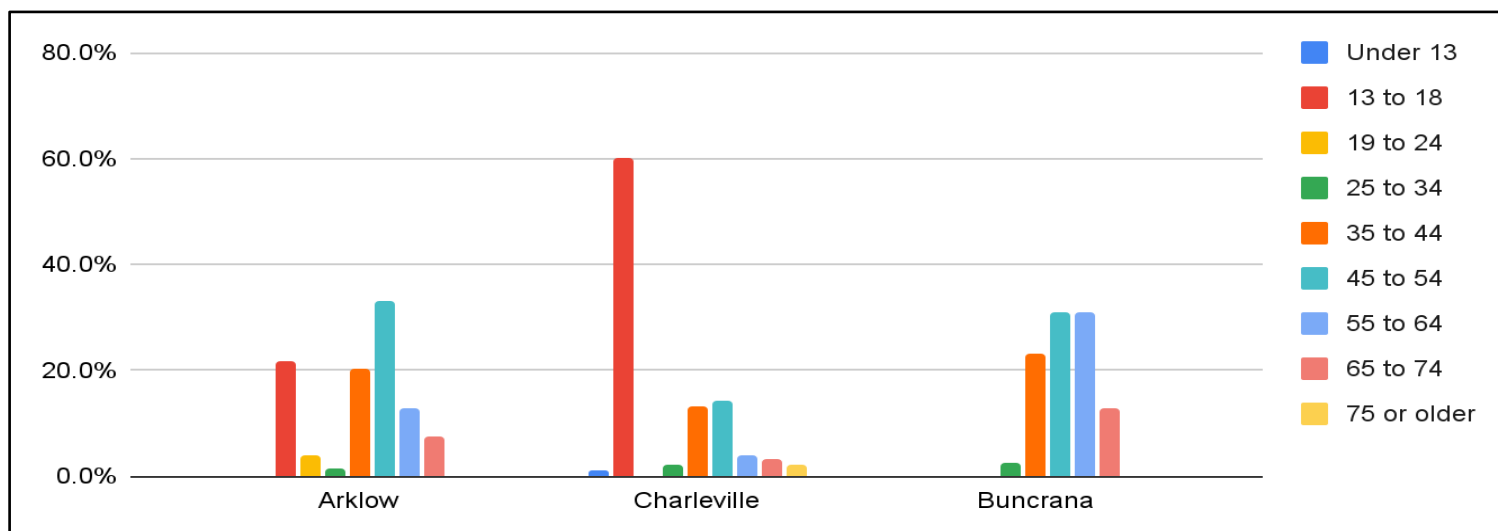


Figure 3.16: Age of survey respondents

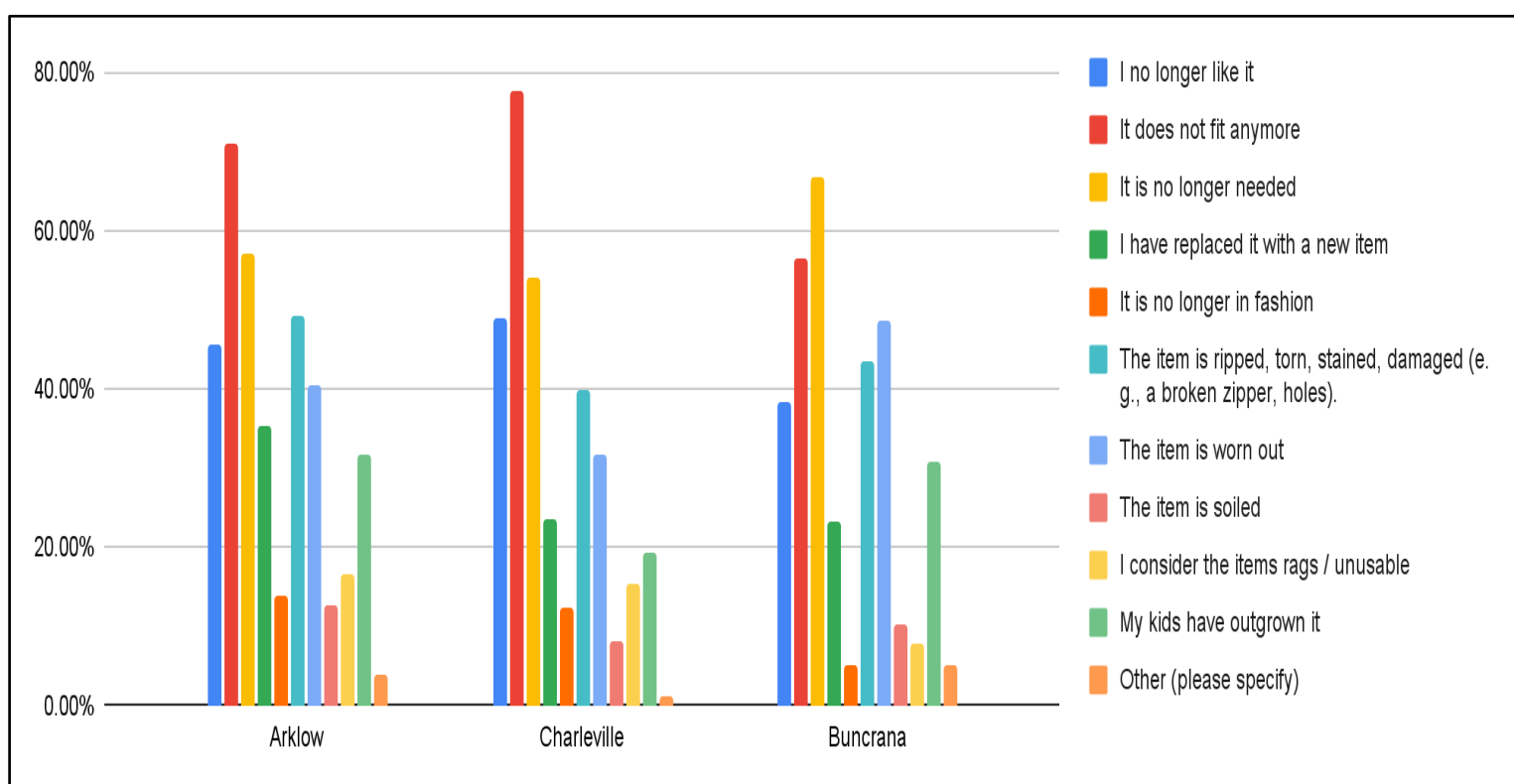
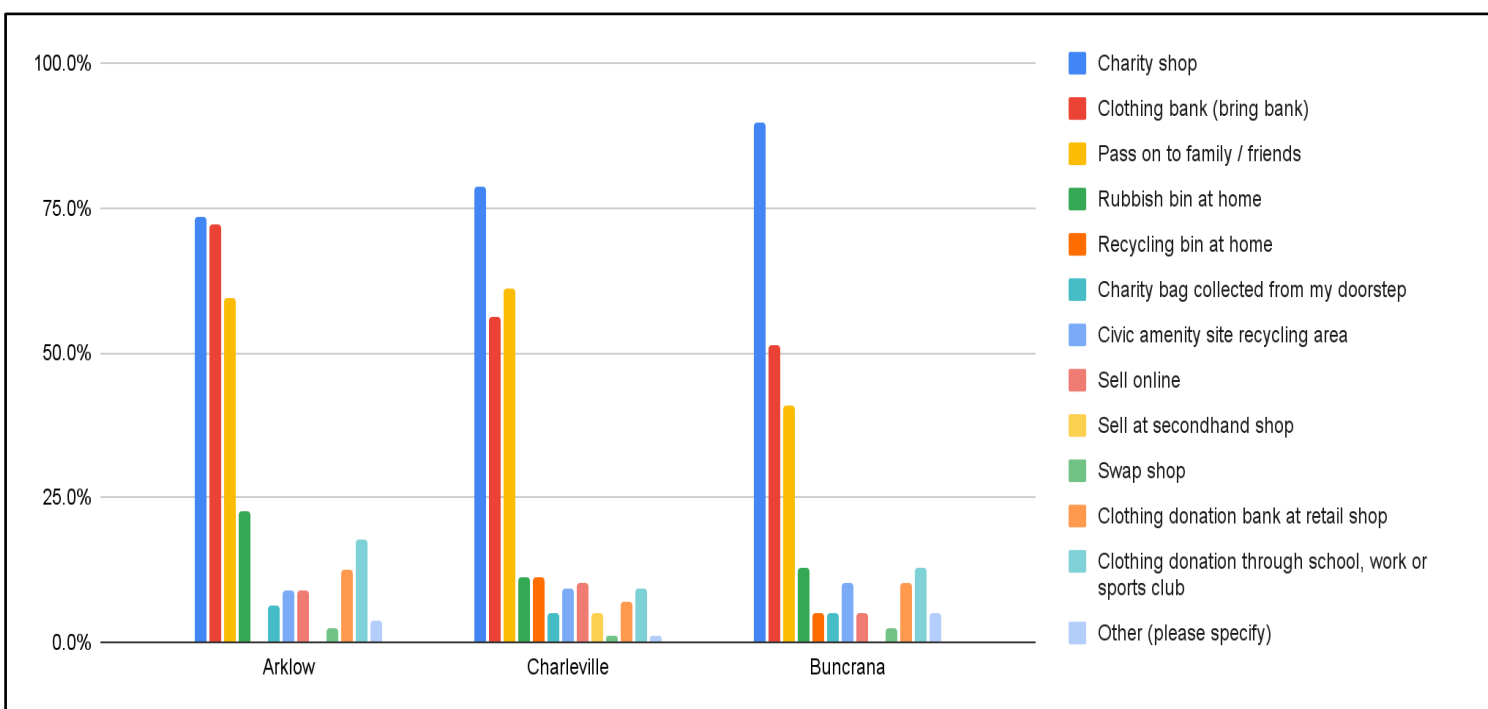
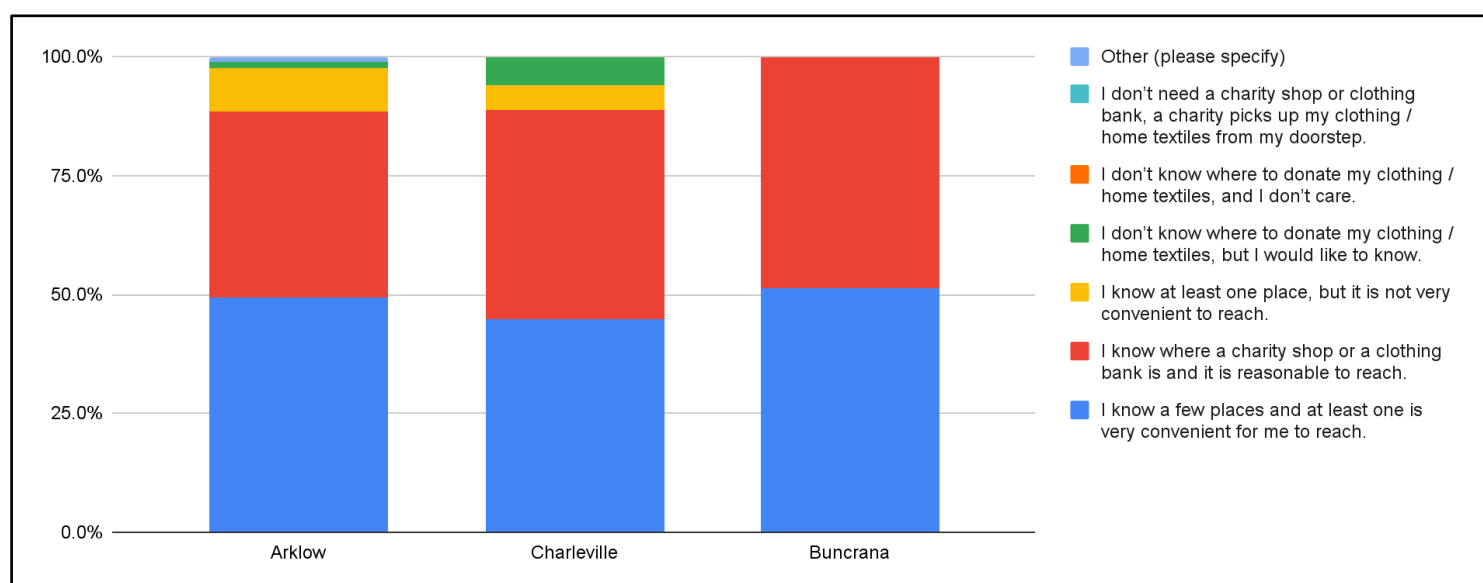


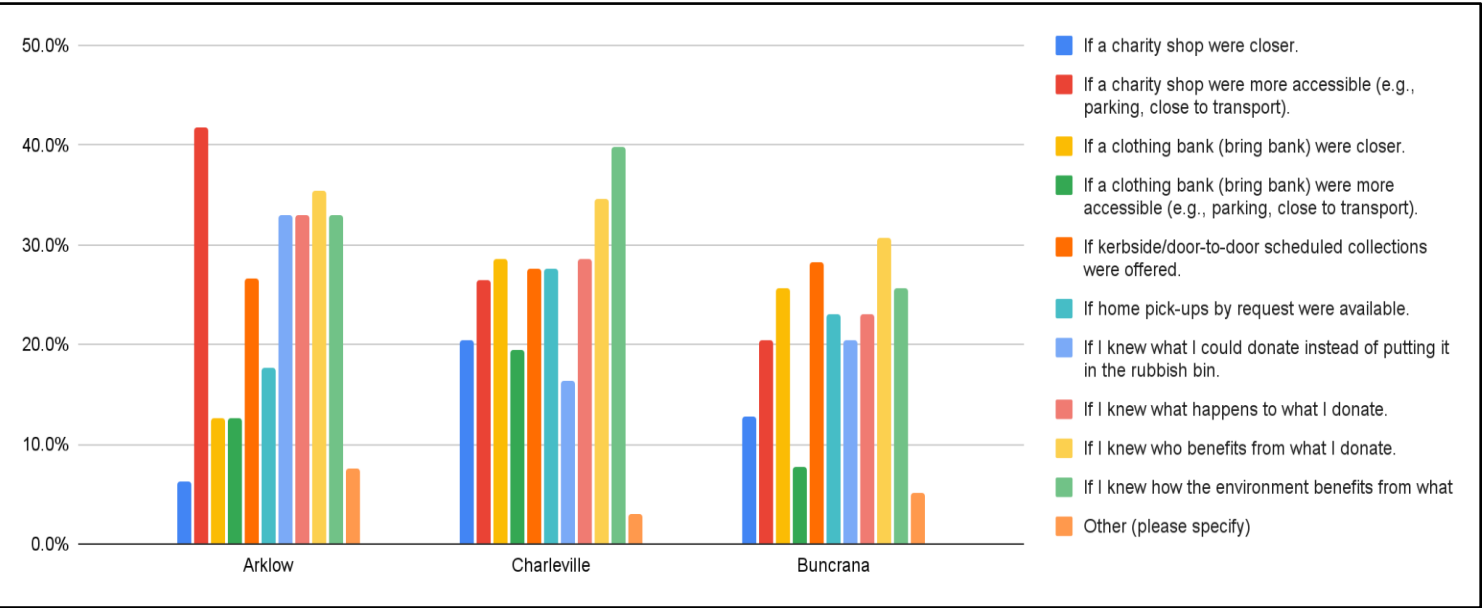
Figure 3.17: Why do you get rid of clothing / home textiles?



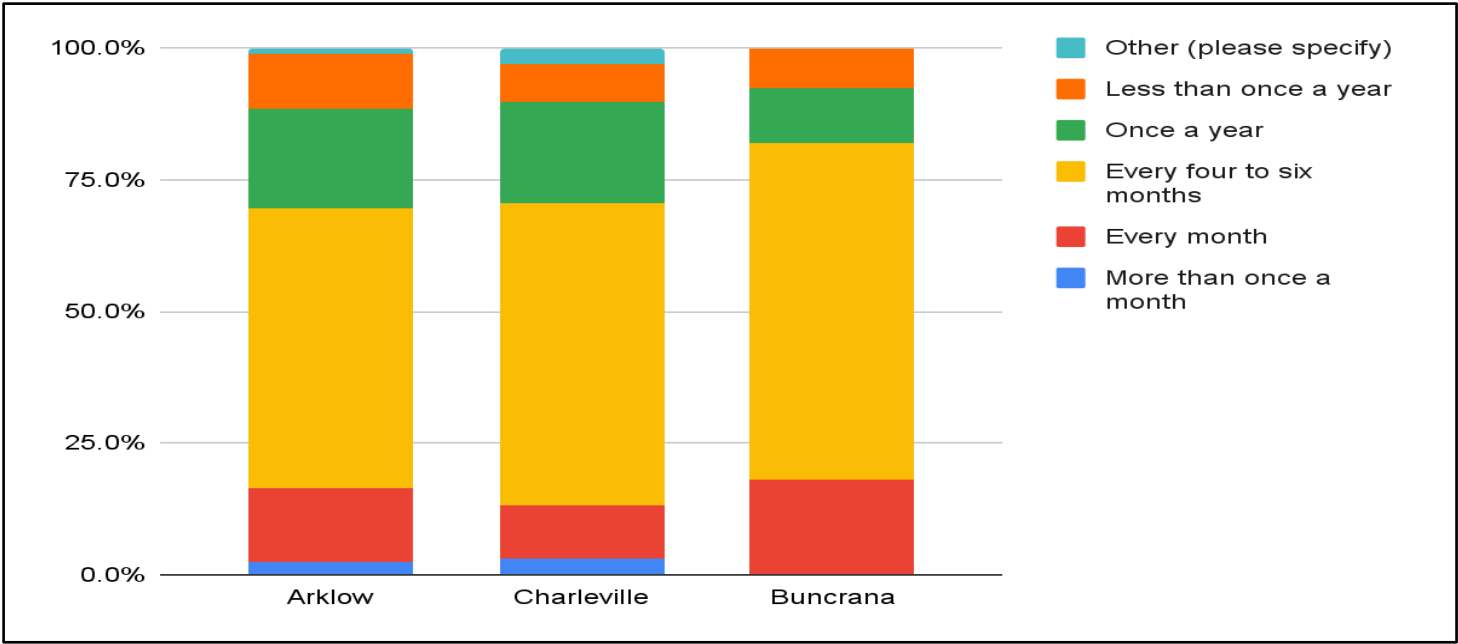
**Figure 3.18: How do you get rid of unwanted clothing / home textiles**



**Figure 3.19: Considering distance and accessibility, how convenient is your nearest charity shop or clothing bank?**



**Figure 3.20: What would motivate you to start/increase donations of unwanted clothing / home textiles?**



**Figure 3.21: How often do you have clothing / home textiles available for donation?**

## Annex 16: Data modelling at a national scale

The initial intention of the project was to utilise the data generated during the pilots to model anticipated qualities and quantities of textiles that would be generated by different separate collection systems if those systems were scale up to a national level. This exercise was carried out and is outlined in the following. However, a key prerequisite for carrying out this task process was the generation of high quality data through the pilots. This objective was not achieved. The following limitations were identified in relation to the pilot data.

- **The timeframe of the project:** collections in the pilot locations were run over the course of just 3-4 months during the Summer. As such, the timeline of the project was not sufficient to account for seasonal variations in the quantities and categories of textiles that might be donated.
- **The number of samples:** the pilots involved just three and two collections in Charleville and Arklow respectively. As such, the data is based on a small number of samples that cannot be generalised to a national scale.
- **Differences in reporting of data:** the samples from the Charleville pilot were analysed in terms of broad categories of resaleable and rag, and then in terms of the material composition in high resolution. The samples from the Arklow pilot were analysed much differently. 25 bags were analysed and divided into the following categories: men's wear; women's wear; children's wear. Saleable vs. rag categories were reported within these categories. Also reported were the most frequent materials encountered. While there were similarities in how the qualities of textiles were reported, these variations make it difficult to compare between datasets.

Kerbside door-to-door collections nationally per annum (tonnes)			
	Resaleable (31.6%)	Rag (68.4%)	Total
Quarterly	949.41	2,055.05	3,004.462
Bi-annual	474.70	1027.52	1502.23

Event-based drop-off nationally per annum (tonnes)			
	Resaleable (10%)	Rag (90%)	Total
Quarterly	144.99	1304.88	1449.86
Bi-annual	72.49	652.44	724.93

### Comparing qualitative data from non-pilot sources

Due to the limitations pertaining to the pilot data, an additional analytic task was undertaken. Data were gathered from a range of non-pilot sources to provide a broader indication of textile qualities that may be generated through separate textile collection systems. In relation to the non-pilot data the following should be noted.

1. Secondary data were collected for the purposes of different studies and so did not have a coherent data collection and categorisation protocol. Data were standardised post-hoc.
2. Primary data collection relied heavily on the voluntary labour and input of specific individuals. A commercial textile recycler (Cookstown Textile Recyclers (CTR)), for instance, gathered data in line with their own internal quality categories. Similarly, data from the SVP East Region sorting facility adhered to internally defined criteria.
3. As will be evident in the overview of data presented in Table 3.12 below that there were differences in the categorisation of textile qualities. For this reason, we present a range of possible values for qualities of textiles generated through each collection method, where relevant.

**Table 3.12: Data sources used**

Source No.	Source	Textile collection system	Data collection method	Scale	Timescale	Categories of measurement

1	NATEX	Charity shop and clothing banks	Data collected by Environmental Protection Agency (EPA) and Charity Retail Ireland	National	One year - 2019	Quantities by collection method; onward destination.
2	Charity Retail Ireland	Charity shop and clothing banks	Data provided by members, aggregated nationally and provided openly	National	One year - 2020	Quantities by collection method; onward destination
3	Cookstown Textile Recyclers (CTR)	Charity shop, kerbside, and clothing banks	Trained textile sorter recorded quality over four days	Unknown	June 2022	Quantities by collection method; onward destination
4	The Society of St. Vincent de Paul (SVP)	Clothing banks	Trained textile sorter recorded	Six counties in northeast of Ireland	June 2022	Material composition ; onward destination

			quality over three days			
5	Charleville pilot collection	Kerbside door-to-door collection of textiles	Data collected by CTC and Vincent's Charleville charity retail shop staff and volunteers	Catchment of 900 households	Three non-consecutive days in March, April, and May 2022	Quantity in kg; awaiting quality on a limited sample
6	Arklow pilot collection	event-based drop-off point	Data collected by CRNI, CTC, and SVP East Region sorting centre staff	Catchment of 4847 households	Two non-consecutive days in May and June 2022	Quantity in kg;  Quality on a limited sample

The four additional data sources include the following. **First**, data were compiled from a previous study funded by the EPA, the Nature and Extent of Post-consumer Textiles in Ireland (O'Leary et al., 2021), which was completed in 2019 and is national in scope. **Second**, data were provided by Charity Retail Ireland — the umbrella group for charities who operate retail shops to fundraise for their causes. These data relate to the year 2020 and were gathered from 40 Charity Retail Ireland member organisations operating 463 retail outlets. **Third**, a commercial textile recycler (CTR) in Northern Ireland carried out a manual sort on three tonnes of clothing. One tonne was collected from each of three different systems: charity shop donations, kerbside door-to-door collection, and textile bank collection. Data were provided on the textile collection system, and onward destination of the textiles across five categories. **Fourth**, SVP staff gathered data at one of their sorting centres pertaining to a manual sort of 1100 textile items. Data were gathered on the quality of the items in terms of material composition. All such textiles were

gathered through SVP branded clothing banks in six northeastern counties of the Republic of Ireland. Rows 5 and 6 in Table 3.12 pertain to data generated through the two pilot collections.

In bringing these data together qualitative categories used by CTR were utilised. These categories were deemed to be suitable due to the focus of this study on 1) textile collection systems and 2) identifying end-of-life solutions for textiles. In addition, these same categories have been used in previous studies (Botticello, 2012). These categories are outlined below.

- **Suitable for resale:** these items can be resold directly to consumers without repair or alteration.
- **Exported for resale to high value markets:** these items typically require some repair and/or alteration. Higher value markets typically include African and Eastern European markets.
- **Export for resale and remanufacturing in medium value markets:** there was a high degree of uncertainty around such items. These are exported, often to Pakistan where there is a significant consumer textile resale market for reuse and remanufacturing into medium value items such as rugs (Anzak et al., 2019).
- **Pulping and downcycling:** lower quality textiles that are shredded for industrial wipes and padding.
- **Waste / Energy recovery:** low-quality textiles incinerated for electricity generation.

Data were compiled from the four sources detailed in Table 3.12 and were divided into these same qualitative categories while also specifying the collection system. The results of the process are presented in Table 3.13. Each of the data sources did not match exactly with the qualitative categories used. For this reason, minimum (min) and maximum (max) possible values are presented in several cases. Additionally, data was not available in all instances. For instance, only the CTR data provided a breakdown of quality in relation to textiles gathered through kerbside door-to-door collection.

**Table 3.13: Overview of compiled data**

	Resaleable / high value	Exported for resale - high value	Exported for resale - medium value	Pulping / downcycling	Waste / energy recovery
Charity shop collection					
CTR	2.3%	58%	31%	7.6%	1.1%



Natex	48.6%		51.1%		No data
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Charity Retail Ireland	50%		50%		0.0%
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Kerbside door-to-door collection

CTR	0.5%	43%	26%	24.2%	5.5%
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Textile bank collection

CTR	4.50%	47%	27%	17.8%	3.6%
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SVP	50%		50%		0%
-----	-----	--	-----	--	----

Natex	0%	70 - 75%		30%	1%
-------	----	----------	--	-----	----

Charity Retail Ireland	50%		50%		0%
------------------------	-----	--	-----	--	----

In comparing these data there are a number of points worth noting. **First, these data indicate that the vast majority of post-consumer textiles have value either through local resale or export.** Indeed, these four datasets indicate that between 0.5% and 50% of textiles collected across the three systems have resale potential within Ireland. Importantly, CTR often obtains textiles only after charity partners extract the resaleable items (discussed further below) which helps to explain the lower figures of resaleable items reported by CTR. In all instances, at least 50% of textile had value in export markets and pulping/downcycling. Looking at the datasets where subdivisions between export and pulping/downcycling end-points, higher percentages of textiles are generally destined for export markets than pulping/downcycling. Similarly, the data from the project’s pilot collections indicate that 31.6% and 10% of textile generated through kerbside and event-based drop-off respectively are suitable for rewearing through resale within Ireland. Finally, all datasets support the assertion that **a very small portion of textiles are sent for waste/energy recovery** via incineration in order to generate electricity, representing an average of 2% across all data sources.

The high proportion of textiles destined for export presents a particular challenge. Through engaging with stakeholders the project team learned that the majority of this amount is exported to West African and Eastern European markets. However, the market in Eastern Europe evaporated after the Russian invasion of Ukraine in February 2022. Exports will remain an important outlet for textiles and indeed the Mitumba Institute & Research Centre argues the secondhand clothing sector makes a fundamentally important economic contribution to African economies (Prashar, 2022). Specifically, many African consumers have low purchasing power and therefore need access to relatively inexpensive clothing options. Indeed, it is believed that four-fifths of people in the African continent wear secondhand clothing (Prashar, 2022). At the same time, a study carried out by the European Commission's Joint Research Centre argues that many export markets in Africa and Asia are becoming oversaturated and will therefore have limited capacity to take additional textiles from European countries (Kohler et al., 2021). Kohler et al. (2021) also anticipate that as the volume of collected textiles increases the quality of those same textiles will decrease. These points support the need to develop domestic solutions for dealing with additional quantities of textiles from new separate collection systems to support local business opportunities, jobs and resilience to supply chain shocks.

**Second, there is significant variation in the results from each dataset in terms of the textiles gathered through each collection method.** For instance, the amount of high quality resaleable textiles collected through direct charity shop donations was reported as 2.3% by CTR, 50% by Charity Retail Ireland, and 48% in the NATEX report. Some of this variation can be explained by understanding the processes through which post-consumer textiles pass. In this instance, the low figure reported by CTR is likely due to charity retailers receiving donations, taking the highest quality items for resale, and subsequently passing the leftover textiles to CTR. Other differences in the data between sources are due to different categorisation and reporting protocols. As such, these figures should only be taken as a broad indication of the distribution of textile quality across the sector, which will vary depending on the categorisation and methodology used.

**Third, qualitative data is very limited in relation to certain collection systems.** For instance, only one source (Charity Retail Ireland) identified end destinations for textiles gathered through kerbside door-to-door collection. Charity Retail Ireland and NATEX identify only “reused” — meaning suitable for resale in Ireland — and “recycled” - which means that the remainder is sent to a commercial textile recycler. These same categories are used by Charity Retail Ireland in relation to textiles collected through clothing banks. There is, therefore, a high degree of uncertainty in these data in terms of where textiles end up.

## Annex 17: Post-consumer textile solutions analysis

In order to build on the insights gained through the pilot implementation and associated data analysis, the project team undertook a review of potential solutions that could work with the qualities and quantities of textiles that would be generated through a national separate textile collection system. Two such potential solutions were selected for further exploration through an Eco-Business Model Canvas. The first step in this process was to identify the existing business models and technologies that can be deployed in the reuse or recycling of textiles. The project team identified 74 different post-consumer textiles initiatives. The models identified were divided into six different categories based on the type of operation and how they sought to redirect textiles from waste streams. These categories included,

- **Resale** — initiatives that resell second hand textiles online, in physical spaces, as commercial entities, or through peer-to-peer selling.
- **Rent/share** — initiatives that rent clothing.
- **Repair/upcycled products** — initiatives that sell repaired or remanufactured textiles that maintain original function and/or maintaining or increasing economic value.
- **Repair services** — initiatives that offer repair services for textiles.
- **Fibre to fibre** — initiatives that specifically employ technologies for remanufacturing existing textiles into new fibres for further production.
- **Downcycling** — initiatives that remanufacture textiles for lower value uses, e.g., insulation.

Name	Description
H&M preloved (Sweden)	Secondhand clothes shopping in regular H&M stores, shoppers earn points for buying secondhand. Garments are quality assured, can be returned, and ordered online. Trying to mainstream secondhand shopping.
Designer Exchange Dublin	
Poshmark	Decentralised online resale

<b>Refashion</b>	Centralised online resale
<b>Kids Klothes</b>	<b>Centralised</b> online resale - social enterprise
<b>Adevinta/Schibsted</b>	<b>Decentralised</b> online resale
<b>thriftify</b>	Platform for charities to resell donations online
<b>Cycle Up</b>	Resells upcycled clothes from Roscommon women's network - they don't do repair - only remanufacture.
<b>Down Syndrome Centre</b>	Resale of 30,000 pre-loved dresses
<b>Charity Retail Ireland</b>	Natex report - 8.5 k tonnes sold through all charity shops - not all are included in charity retail Ireland.
<b>Eastern Europe Grade</b>	Paid for cream from Ireland, so sorting centre was more inclined to send to these markets until the war in Ukraine.
<b>African Grade Resale</b>	Fluctuating currency can impact return to supplier.
<b>Lower Grade Resale (Asia)</b>	Lower grade of textiles exported to Asian markets.
<b>Rag Revolution</b>	Dress rentals
<b>Designer Room</b>	Clothes rentals

<b>Sharedrobes</b>	Clothes sharing online platform
<b>The Nu Wardrobe</b>	Online rentals/clothes, app
<b>Cloth Nappy Library Ireland</b>	Online rental for cloth nappies, in person meet-ups
<b>Arnotts Circular Fix</b>	
<b>Repair Shop: <a href="https://rrepairs.shop/">https://rrepairs.shop/</a></b>	A research and learning studio, investigating maintenance, craft and design. A bit of a think tank really.
<b>Heddel Free online DIY repair guides</b>	The organisation provides people with free online guides that show the processes of darning, patch work, getting tear gas out of technical textiles, and more with a step-by-step format
<b>FixUp</b>	Organisation based in New York, USA that began as a pop up repair shop, and now virtually employs fixers and connects them with people who are in need of a repair of some sort. Fixers fill out a google form that answers what they fix, and customers fill out a similar form for what they need.
<b>Rediscovery Centre</b>	Rediscover fashion
<b>Attention Attire</b>	Outerwear from camping stuff from Ireland's music festivals

<b>bebrave</b>	Neckties to accessories
<b>Felted Knits and Quirky Bits</b>	Old textile to new accessories
<b>Jump the Hedges</b>	Yoga bags from textiles
<b>Loved and Upcycled</b>	Reuse of out-of-service sports gear
<b>Natasha Fakkeldij Upcycled Design</b>	Reuse of old textiles to accessories
<b>Roscommon Women's Network</b>	Textile upcycle training project
<b>The Upcycle Movement</b>	Neoprene, priscia and a range of recycled materials incl. bags, watches, slings.
<b>Athbags</b>	Upcycles textiles into athletic bags
<b>Official Rebrand</b>	Company that upcycles old textiles into new, "anti-waste" and "gender-free" clothes
<b>Zip Yard</b>	Repairs and alterations for clothing
<b>United Repair Centre in Amsterdam</b>	Makers Unite, Patagonia, and Scotch and Soda have teamed up to create a space dedicated to clothing repair, to extend the lives of textiles and decrease the overconsumption.
<b>Patagonia</b>	Send clothes back for repairs, has free diy/repair tutorials on their website.
<b>Mobilitruck/Repara Truck</b>	Mobile repair service for computers, small electrical appliances, and bikes

<b>Eco-Equitable</b>	Sewing for Jobs program newcomers to Canada, provides class members with a donated sewing machine at the end of the class, uses donated fabrics for projects/for mega fabric sales to gain revenue
<b>Sew Last Season</b>	Galway sewing group
<b>The Useless Project</b>	group that provides tips and tutorials on how to upcycle things like clothes
<b>Repair Cafe</b>	Toronto area event where people can bring clothes to learn how to mend them/ to have them mended by someone else - A Repair Cafe for textiles
<b>RenewCell</b>	Used textiles to paper and new textiles
<b>SingTex</b>	Used coffee ground to textiles
<b>3SIXTY</b>	Single use plastics to a range of textile-based products - not fibre to fibre - plastic to fibre. Also does recycled cotton - surf towels and ponchos.
<b>Bolt Threads</b>	Use mycelium and spider silks to make sustainable fabrics
<b>Amber Cycle -USA</b>	Fibre to fibre - Polyester and polycotton blends separated chemically and respun into PET pellets

and polyester fibres

**Aquafil - Italy**

Nylon 6 chemically processed into polymer and spun into yarn for carpets and textiles

**Evrnu-USA**

Any blends treated with solvents to extract cellulose, then respun into new fibre

**Hkrita - Hong Kong**

Research institute in Hong Kong focused on sustainable and circular textiles.

**Infinited Fiber - Finland**

Cotton chemically recycled in existing viscose/pulp factories. textiles shredded, reduces to cellulose powder, respun into new fibres

**Ioncell - Finland`**

Cotton and cellulose based fabrics chemically processed into cotton-like yarn for textiles - currently at research phase and looking for collaborators and investors to commercialise

**Ioniq-Netherlands**

Polyester chemically recycled into PET for food safe containers

**Refibra/Tencel - Austria**

Pre- and post-consumer cotton waste processed chemically into yarn for textiles

**SaXcell - Netherlands**

Pure cotton chemically recycled into fibres for textiles

**SodraCell:OnceMore - Sweden**

Cellulose from forestry, Cotton and polycotton blends chemically recycled into pulp for yarn, and textiles



<b>Tyton Bioscience: Circ-USA</b>	Post-consumer blends chemically recycled into new fibres
<b>Worn Again - UK</b>	Cotton, polyester and polycotton (up to 20% contaminants) chemically recycled into PET resin and cellulose pulp for textiles
<b>Altex - Germany</b>	All types of textiles mechanically recycled into fibres for insulation, geotextiles, drainage, and the automotive industry
<b>Antex-Spain</b>	Post-industrial polyester and synthetic fibres mechanically recycled into yarn for clothing and automotive industries
<b>Cardato - Italy</b>	Wool, cashmere & wool-polyester and wool-polyamide blends mechanically recycled into yarn/fabric for new textiles
<b>European Spinning Group - Belgium</b>	Cotton, denim and polyester mechanically recycled into denim, towels, tents and workwear
<b>Reverso-Italy</b>	100% wool products mechanically recycled into 100% wool and cashmere yarns
<b>Wolkat - Netherlands</b>	All natural and synthetic material textiles mechanically recycled into textiles with 65-95% recycled fibres
<b>Re:Mix - Sweden</b>	Textiles with elastane mechanically recycled into elastane yarn (using injection moulding)
<b>Fibersort</b>	

<b>Cirtex</b>	Textiles to insulation and a range of other products.
<b>Industrial wipes</b>	Cutting and baling for use as industrial wipes / rag
<b>Pakistani Grade</b>	Clothing, rugs, padding, wipes (determined at end point)
<b>Mutilation (10-12%)</b>	Mechanical shredding of materials
<b>Chemical separation</b>	Chemical based separation of components of textile
<b>Edward Clay</b>	Textiles to mattresses/padding/basket lining
<b>Rossins</b>	No info found
<b>John Cotton</b>	Textiles into pillows/mattresses/duvets - large scale and established manufacturer. Group owns multiple companies.
<b>UsedFULLY</b>	Takes high cellulose textiles and uses in road building New Zealand

Solutions in these categories were evaluated in relation to nine questions, outlined below, that helped to determine their suitability and scalability in terms of advancing a circular textile industry in Ireland.

1. How scalable are these systems?
2. Where is the textile sold and to whom?
3. Can collectors/sorters/processors derive a gate-fee by supplying inputs?
4. What quality of textiles, in terms of reusability, will be collected with these systems?

5. How sensitive are these systems to contamination?
6. How viable is this system in an Irish context?
7. Are there regulatory barriers to implementing this system?
8. How likely are these systems to have a low carbon footprint?
9. Where does this solution sit in the waste hierarchy?

The scoping exercise was built upon further with guidance from a close reading of the European Commission Joint Research Centre's (JRC) report, *Circular Economy Perspectives in the EU Textile Sector* (Kohler et al., 2021).

The focus of this research was on identifying potential solutions for dealing with additional post-consumer textiles domestically to support new business opportunities, jobs and local resilience so this point was not relevant for the analysis. The data analysis conducted by the project team indicated that a large portion of textiles are rewearable through local resale or export, with the largest fraction being export for resale to high value markets.

Through stakeholder engagement, the project team also learned that many textiles that could be reworn if minor repairs were carried out are currently exported. This is because charity retailers in Ireland do not generally have the capacity to carry out such repairs. As such, most of these textiles are passed onto commercial textile recyclers who often export such items. For this reason, the project team identified a business model that mainstreams repair and second-hand clothing in a conventional commercial retail space as one potential solution.

Second, the third highest category of textiles by median value identified in the data analysis is pulping/downcycling. The JRC report also identifies that increased collection of textiles post-2025 are likely to lead to large increases in the volumes of low-quality textiles being collected from European households. Low-quality textiles are equated with those that are suitable for pulping and industrial uses such as insulation and industrial wipes. As such, the second potential solution that will be explored in the Eco-Business Model Canvas focuses on large scale uses of low quality textiles in infrastructure, namely the construction of roads.

### **Eco-Business Model Canvas**

The eco-business model canvas is an exploratory tool that can be used for a range of purposes. The tool essentially provokes an exploration of nine dimensions of a business model, along with two additional dimensions focused on ecological and social considerations. The eleven dimensions specified in Figure 3.24

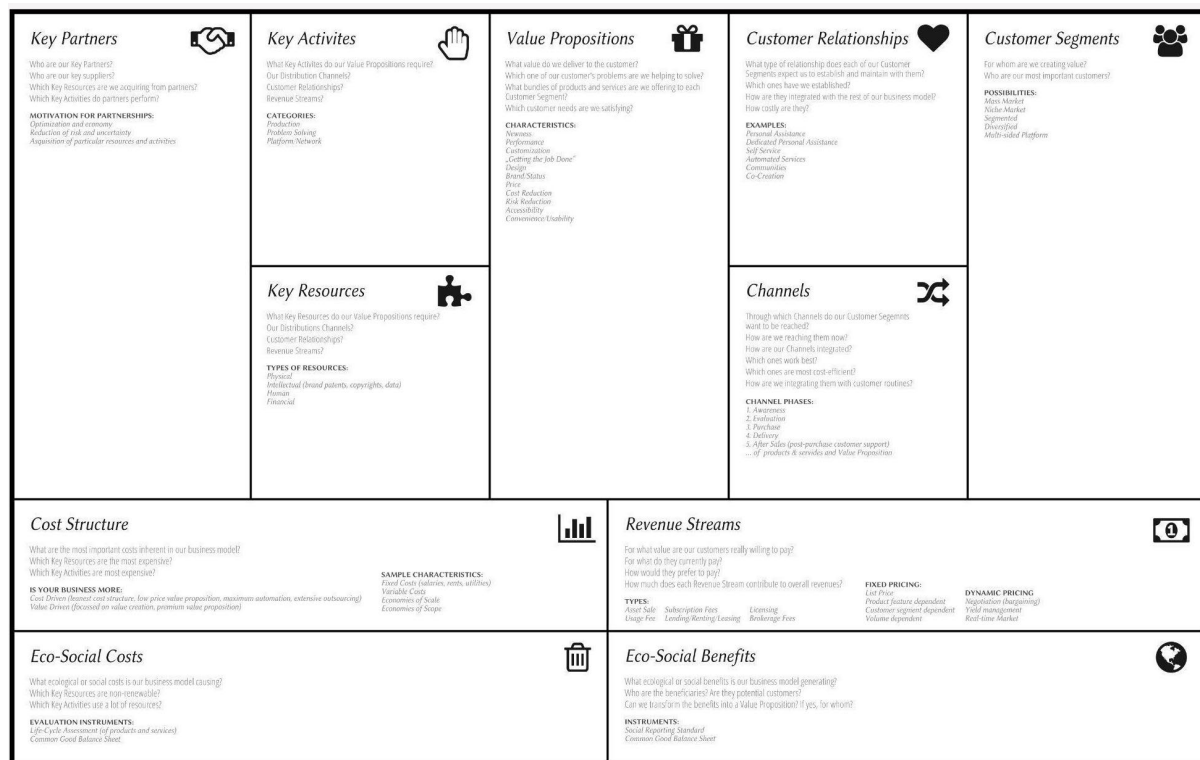


Figure 3.24: Eco-business model canvas

### Eco-Business Model Canvas: Arnotts Circular Fix

A first action is focused on incorporating secondhand and repaired textiles into mainstream retail spaces. This solution responds to the finding that a large portion of post-consumer textiles collected have resale potential either in domestic Irish markets or through export, but require minor repairs. Recent research has highlighted the need to expose consumers to sustainable clothing options, and the desire for a pleasant shopping experience free from the “clutter typically found in second hand shops” (Sorensen & Johnson Jorgensen, 2019, 11). These points resonate with some of those asserted by stakeholders with whom the project team engaged. Specifically, that a small category of people frequently shop at charity shops, while the vast majority of the population do not due to cultural preferences. Accordingly, there is potential to resell and increase consumption of secondhand textiles domestically if they are normalised in mainstream retail spaces.

On this basis the project team asserts the importance of exploring the potential to incorporate secondhand textiles into commercial retail spaces, such as H&M, Zara, Penneys, and Arnotts/Brown Thomas (Remington, 2022). One example that we identified through the scoping exercise of potential solutions for application in an Irish setting is currently in action in Arnotts, a retailer on Henry Street in Dublin. The initiative is entitled “Circular Fix”. It provides repair services to consumers on secondhand

items in a mainstream, well-known retail space. The following sections detail our exploration of the Arnott's Circular Fix through the eco-business model canvas.

**Customer segments:**

- The general public, particularly those people who would not otherwise engage with or be exposed to secondhand clothing options.
- The current price list indicates a strong focus on restoring footwear. However, an interview with a representative from Arnotts indicated that the service is available for all products.

**Value proposition:**

- This business model is focused on extending the life of the products to which one is already attached. As such, the activity is presented as “restoration” more so than “repair”.
- This value proposition is framed in terms of the circular economy — extending the life of materials — the focus is less on purchasing secondhand clothing and more on repairing and providing alterations for that which a consumer already has.
- A divergent approach is taken by H&M Sweden’s “preloved” initiative<sup>22</sup>, which takes secondhand clothing donations from consumers and resells them. However, these are resold as part of collections that are curated in physical retail stores and online. Zara has also developed a pre-owned fashion platform of its own that will be accessible via its website and app. Importantly, both value propositions are framed in language that avoids terms like “used” or “secondhand”.

**Channels for communicating with customers and delivering value:**

- The value proposition is communicated through the initiative’s website<sup>23</sup>.
- The initiative is visible in-store.

**Customer relationships:**

- Some interaction and consultation between the repair staff and customer: Items are dropped off for repair, are photographed, and sent to external repairers. Customers are then provided with a quotation for how much the repair will cost, at which point customers may withdraw from the

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<sup>22</sup> [https://www2.hm.com/sv\\_se/dam/resell/pre-loved.html](https://www2.hm.com/sv_se/dam/resell/pre-loved.html)

<sup>23</sup> <https://www.arnotts.ie/whats-on/store-services/circular-fix/>

process without charge. Following the completion of repairs, items are returned to the customer with agreed price collected at that point.

**Revenue streams:**

- Revenue generated from the repair service. Arnotts effectively acts as a facilitator for repairs because the repairs themselves are carried out by external craftspeople. Arnotts then charges a fee for the service, some of which is passed onto the individual carrying out the repair.
- An important revenue benefit to commercial retailers of providing this service is enhancing brand loyalty and alignment with consumer values which are increasingly supporting the green agenda.
- The pricing itself is “project based” (e.g., the costs depend on the requirements of the specific item in terms of materials and repair).
- It is not evident that there are any tax incentives for the business for this kind of service nor a reduced VAT for the customer at present.

**Key resources:**

- The skills and knowledge of the craftspeople who carry out the repairs.
- Craftspeople rely on the availability of repair tools and replacement materials where necessary.
- Draws on the customer services skills of the in-store staff who liaise with the customers.
- Draws on the physical space of the store as a drop-off and information points.
- Draws on web resources through the Circular Fix webpage.

**Key activities:**

- The service primarily involves liaising with customers and craftspeople who carry out the repairs.
- Arnotts acts as a conveyor of items for repair between the parties.

**Key Partnerships:**

- The key partnership in this instance is between Arnotts and a variety of sole trading craftspeople who are skilled and knowledgeable in textiles repair.
- In an extended network, the relationships between the craftspeople and the suppliers of replacement materials and repair tools are also important to this service.

**Cost structure:**

- Fixed costs include staffing of the repair station, VAT charged on services rendered, shop maintenance and website expenses.

- Variable costs include the cost of materials and tools and associated with this is the cost of contracting and transporting goods to the repair craftspeople.

#### **Eco-social benefits:**

- Encourages people to keep textiles in circulation for longer by providing a repair service for existing goods.
- Potentially reduces consumption by preventing the purchase of new goods.
- Introduces repair activities to a mainstream retail space, which may help to normalise repair in public consciousness.

#### **Eco-social costs:**

- A possible negative lies in the relationships between Arnotts and the contracted repairers. Is a fair price delivered for the service provided?
- The listed prices for the repair services themselves range from €10 for shoe stretching<sup>24</sup> to €150 for replacing the soles on runners<sup>25</sup>. These prices may reflect the labour and skill involved. However, the higher end prices for restoration indicate that they are only economically worthwhile if a consumer is in possession of expensive products to begin with.

#### **Potential for scalability:**

Potential barriers to scaling include,

- Organisational resistance to providing repair services.
- Repair may be seen as a threat as it undermines the consumption model that otherwise drives return business
- The cost of repair in comparison with buying low cost new textiles may lead to low consumer engagement. This barrier, unless addressed, could restrict the scaling of such services to high end textiles. This barrier was also highlighted by NATEX (O'Leary et al., 2021).

#### ***Eco-Business Model Canvas: UsedFULLY Strength-Tex***

A second business model was researched based on a different need identified through the research project in conjunction with existing research literature. Research carried out by the Joint Research Council

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<sup>24</sup> <https://bta.a.bigcontent.io/v1/static/Shoe-Fix-Menu>

<sup>25</sup> <https://bta.a.bigcontent.io/v1/static/Arnotts-Trainer-Fix-Menu>

of the European Commission identified that with mandatory separate collection, it is probable increased quantities of low quality textiles will be generated (Kohler et al., 2021). Moreover, the research project indicates that between 7% and 51% of all textiles collected through our various collection methods is suitable for downcycling, pulping and industrial uses. Accordingly, there is a rationale to provide a secondary pathway for post-consumer textiles. Specifically, if textiles cannot be resold for reweaving in domestic or export markets, then large scale industrial solutions provide an alternative to recovery via waste-to-energy.

In this category two potentially viable solutions were identified from the scoping exercise of potential solutions. Cirtex<sup>26</sup> is one organisation, which has already trialled technology, supported by CIRCULÉIRE, that may in the future be suitable for shredding and converting post-consumer textiles into insulation. This is presented in the case study below.

Another potential solution is the UsedFULLY<sup>27</sup> project Strength-Tex, which is trialling the use of high cellulose textiles in construction roads in New Zealand. While this is not a high value activity on a per item basis, it does provide a long term use for such textiles at an industrial scale and replaces imported materials, saves carbon emissions, and water usage. The UsedFULLY project was explored for the purposes of this research to add a further novel option to the development landscape in Ireland, to complement the opportunity presented by Cirtex as described in the case study. The following sections detail the research team's exploration of UsedFULLY's Strength-Tex project through the eco-business model canvas.

#### **Customer segments:**

- This business model provides a product that is consumed publicly by road users.
- However, the direct customers for the product will be construction contractors, who will be contracted through public tendering processes. Public procurement policy would ideally require the inclusion of circular materials in building public infrastructure.

#### **Value Propositions:**

- Offers to displace imported materials and instead use what would otherwise end up as waste to (re)construct a piece of public road infrastructure throughout New Zealand, thereby saving

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<sup>26</sup> <https://cirtex.ie/>

<sup>27</sup> <https://www.textilereuse.com/>



water, carbon emissions, and construction costs. It also supports organisations to take action on climate change by diverting their unwanted textiles from waste into onshore solutions.

- Direct engagement with UsedFULLY representatives elicited assertions that global uncertainty around the supply and price of oil, bitumen, mineral waxes, and related substances, and other natural resources is driving industrial players to consider waste as a viable alternative for asphalt roads and pavements.
- UsedFULLY representatives asserted further that the reliability of imported bitumen and fluctuating prices of oil could bring uncertainty to Ireland's sourcing of materials for road construction.
- It could be worth exploring the potential to source bitumen alternatives domestically in Ireland on sustainability and resource security grounds.
- In terms of the performance of the material, UsedFULLY representatives asserted that lab testing results were promising and provided project partners and funders with the confidence to progress to a demonstration project whereby Strength-Tex was used in the construction of an inner-city road in Wellington New Zealand. Reports and analysis should be sought in order to better understand the performance of the materials and how they might translate to an Irish context.

#### **Channels for communicating with customers and delivering value:**

- The UsedFULLY team has engaged extensively with local governments. These bodies are crucial as the procurers of roading contracts and are responsible for the management of municipal waste and community recycling centres.
- Upon full roll out, the business would communicate with customers through an online presence, through tendering for public contracts, through sales pitches to construction companies, and through presence at industry events such as conferences and trade fairs.

#### **Customer relationships:**

- This business model would involve in-depth engagement with construction customers to tailor large scale orders of materials to specific needs of a project.

#### **Revenue streams:**

- May initially rely on investors to get up and running beyond a pilot phase. However, in the long run, revenue would be secured through ongoing contracts associated with construction of road infrastructure.

- There may be additional revenue streams secured for providing a textile processing service. For example, municipalities or government agencies may pay UsedFULLY for the service of taking away and reprocessing unwanted textiles in ways that avoid landfill and/or incineration.

#### **Key resources:**

- A secure supply of a stream of poly-cotton based textiles that are rich in cellulose. In order to establish a pilot, UsedFULLY partnered with local suppliers on unwanted textiles and clothing who provide warehousing. In addition, this is a highly specialised product and process.
- Knowledgeable and trained personnel are important, as is a storage facility for textiles awaiting processing.
- A textile sorting and processing facility, the construction of which is likely capital intensive thereby requiring significant investment.
- Machinery for moving and transporting materials, whether this is supplied by a contractor or through vehicles owned by the business itself. Third parties were contracted during the pilot phase to process the Strength-Tex material.

#### **Key activities:**

- Collecting materials
- Shredding, processing, and preparing materials for reuse.
- Delivering materials to the locations in which they are to be used.

#### **Key Partnerships:**

- State bodies that have a throughput of uniforms, e.g. law enforcement, health services. The benefit of this approach is that the business receives large quantities of textiles that are the same in material composition, thus lowering the expense and labour involved in analysing and sorting the textiles for reuse.
- Construction contractors who may seek to incorporate Strength-Tex into road building projects. As part of this, public bodies that fund road building are also a key partner.

#### **Cost structure:**

- Fixed costs for this business model includes staff, taxes, facilities and building upkeep.
- Variable costs include energy, the price of material inputs, price of transporting materials to and from sources and projects.

- There is an economy of scale involved in this business model (e.g., once the processing facility is up and running it makes sense to process more material rather than less).

### **Eco-social benefits**

- This business model could divert textiles from undesirable and unsustainable end-of-life solutions.
- It replaces an expensive and resource intensive imported material with one that is diverted from a domestic waste stream.
- The business model offers an opportunity and a case study for communicating novel and creative solutions to waste streams.

### **Eco-social costs**

While there are many potential benefits to this business model, it is also important to identify some of the potential risks and costs.

- The processing of materials may be resource intensive and could be dangerous working environments. As such, safeguards would need to be put in place to ensure that human health is protected and that environmental impact is kept to a minimum.
- In providing a pathway processing textiles from public institutions there is potential for this business model to discourage reuse and/or repair within those institutions. For example, by providing a pathway for dealing with used police uniforms, models like this one could discourage repair and reuse of used police uniforms.
- UsedFULLY representatives explained how they mitigate this risk. First, in the context of New Zealand Police, Armed Services, Customs and other government agencies are destroyed then landfilled or incinerated to prevent security risks. Strength-Tex provides an alternative pathway for the material and addresses security risks by shredding the uniforms before processing into second generation products. As such, UsedFULLY positions itself at the end of the value chain after charities, reuse, and repair sectors.

### **Scalability in Ireland?**

In Ireland several current policy developments are of relevance to the scalability of a project like Strength-Tex in an Irish context. As part of the Whole of Government Circular Economy Strategy and the Circular Economy Act, Ireland is seeking to improve reuse and recycling rates on a number of fronts and halve carbon emissions by half by 2030. More efficient use of our existing resources, such as using end-of-life textiles in road construction aligns with each of these goals. Moreover, the National Development Plan,

with an overall budget of €165 billion until 2030<sup>28</sup> provides for a gradual increase in funding for regional and local roads. In 2022, the budget for roads and greenways was €676 million<sup>29</sup>. As such, there is significant scope from an infrastructural budget point of view to scale this kind of approach in an Irish context.

The other scalability aspect of this business model relates to the availability and procurement of textile inputs. The approach employed by UsedFULLY in New Zealand has been to partner with large national laundries and uniform suppliers who warehouse decommissioned textiles resources until they are ready for processing. Third parties were also contracted to deliver Strength-Tex to the building contractors who added the material to the road construction mixture. Once sufficient capital has been generated it is anticipated that UsedFULLY will be able to develop in-house processing facilities. UsedFULLY reports back to the laundry partners and uniform suppliers, who are able to report on waste diversion and emissions reporting in their own Environmental and Social Governance (ESG) reporting.

In an Irish context, a feasibility study should be undertaken to examine the availability of textile inputs, processing partners, and costs of setting up processing facilities.

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<sup>28</sup> <https://www.gov.ie/en/press-release/7ac57-government-launches-the-renewed-national-development-plan-2021-2030/>

<sup>29</sup> <https://www.gov.ie/en/press-release/9b8cf-over-two-thirds-of-a-billion-euro-allocated-to-irelands-national-roads-and-greenways-for-2022/>

## Annex 18: Showcase of innovative solutions for post-consumer clothing and home textiles

As part of the project, a showcase of innovative solutions for post-consumer clothing and home textiles was developed and was on public display at the Rediscovery Centre during the month of October 2022. Sector stakeholders were provided tours of the showcase at both the 19 October 2022 final project stakeholder workshop as well as another CRNI event held on 28 September 2022. A photo of the overall showcase can be seen in Figure 3.25.



**Figure 3.25: Developing a Circular Textiles System for Ireland: a showcase of innovative solutions for post-consumer clothing and home textiles**

The showcase illustrated the different value categories of post-consumer clothing and home textiles in Ireland through pull-up banners and sample textiles to demonstrate what each means in physical form. Value categories were named and defined as follows:

- **Suitable to Rewear, Highest Value:** The wearable fraction of post-consumer clothing and home textiles that is in very good or good condition and appeals to Irish consumers.
- **Suitable to Rewear, Medium Value:** The wearable fraction of post-consumer clothing and home textiles that is in moderate condition or lightly damaged and does not appeal to Irish consumers.
- **Suitable to Rewear, Low Value:** The wearable fraction of post-consumer clothing and home textiles that is in poor condition, very worn or damaged but not soiled.

- Suitable for Recycling: The fraction of post-consumer clothing and home textiles that is not wearable due to damage but is not soiled.
- Suitable for disposal: The fraction of post-consumer clothing and home textiles that is soiled or mixed with other waste streams.

The innovation path for each value category was then illustrated by answering the following questions:

- How much is collected in Ireland?
- Current models?
- Examples?
- Innovations to explore?
- Investments required to scale?
- Benefits?

Close-up images of each pull-up banner can be seen in Figure 3.26 and a detailed matrix of the content is contained further below.



### Suitable to Rewear Highest Value

The wearable fraction of post-consumer clothing and home textiles that is in very good or good condition and appeals to Irish consumers

**How much is collected in Ireland?**  
Estimate 9,700 tonnes each year

**Current models?**  
Sold, rented or shared within Ireland directly without repair or alteration (e.g., brick and mortar secondhand retailers, online platforms for secondhand retailers, online platforms for peer-to-peer selling and swapping)

**Examples?**  
Charity retailers, thriftily, Nu Wardrobe, Adverts, depop

**Innovations to explore?**  
Mainstream the sale of secondhand clothing and home textiles through increased capacity of existing retailers/swap shops and incentives for public-private-charity partnerships

**Investments required to scale?**  
Incentives to expand business models; storage facilities; sorting and distribution centres; capital equipment and transportation; technology infrastructure; human resources; reduce VAT on secondhand purchases

**Benefits?**  
Direct local reuse leads to greatest reduction of textile consumption and maximises transport emissions savings; increases business opportunities; develops skills; creates jobs

Logos: CRN, Innovation for a Circular Economy, REDISCOVERY CENTRE

### Suitable to Rewear Medium Value

The wearable fraction of post-consumer clothing and home textiles that is in moderate condition or lightly damaged and does not appeal to Irish consumers

**How much is collected in Ireland?**  
Estimate 22,400 tonnes each year

**Current models?**  
Sold to export markets for direct rewear  
Limited amount of upcycling in Ireland

**Examples?**  
Export by commercial textile recyclers (e.g., Cookstown Textile Recycling, All-Tex Recyclers, Liberty Recycling)  
Upcyclers (e.g., The Upcycle Movement/Re Source platform, Attention Allire, the Rediscovery Centre, Roscommon Women's Network/CycleUp)

**Innovations to explore?**  
Establish service centres to undertake repairs, alterations and upcycling; mainstream the sale of repaired or upcycled clothing and home textiles in Ireland; expand collaborations and textile sharing among upcyclers; expand upcycling training; improve sorting capacity to redirect some to highest value category

**Investments required to scale?**  
Workspace and capital equipment for service centres; transportation and technology; business development capacity to secure stock and grow distribution channels; reduce VAT on repair and alteration services

**Benefits?**  
Extends wearable life of existing textiles while minimizing carbon emissions; reduces new textile consumption; reduces reliance on export markets by keeping textiles in Ireland; reduces transport emissions; builds resilience to supply chain shocks; increases business opportunities; develops skills; creates jobs; adds economic value to textile stream

Logos: CRN, Innovation for a Circular Economy, REDISCOVERY CENTRE

### Suitable to Rewear Low Value

The wearable fraction of post-consumer clothing and home textiles that is in poor condition, very worn or damaged but not soiled

**How much is collected in Ireland?**  
Estimate 12,800 tonnes each year

**Current models?**  
Sold to limited export markets for rewear or shredded to make other products (e.g., rugs, wipes)

**Examples?**  
Exported by commercial textile recyclers (e.g., Cookstown Textile Recyclers, All-Tex Recyclers, Liberty Recycling)

**Innovations to explore?**  
Develop opportunities for textile processing in Ireland; explore applications and business opportunities for shredded textiles; improve sorting capacity to redirect some to medium value category

**Investments required to scale?**  
Storage, sorting and mechanical shredding facilities; business development capacity to grow end markets

**Benefits?**  
Reduces reliance on export markets by keeping textiles in Ireland; reduces transport emissions; builds resilience to supply chain shocks; adds economic value to low value textile stream

Logos: CRN, Innovation for a Circular Economy, REDISCOVERY CENTRE

### Suitable for Recycling

The fraction of post-consumer clothing and home textiles that is not wearable due to damage but is not soiled

**How much is collected in Ireland?**  
Estimate 15,000 tonnes each year

**Current models?**  
Mechanically or chemically processed to make products of lower value than the original material (downcycling)

**Examples?**  
Cut and bale for use as cleaning wipes, shred for use in carpets, mattresses, sofas and sound proofing (e.g., Acara Concepts)

**Innovations to explore?**  
Expand textile shredding in Ireland; expand local manufacturing and business opportunities for shredded textiles, such as insulation (e.g., CirTex), high cellulose textiles in road building, padding (e.g., mattresses, upholstery, packaging), sound proofing, rugs and carpets, fibre-to-fibre recycling (most likely via export to EU hubs); improve sorting capacity to redirect some to low value category

**Investments required to scale?**  
Storage, sorting and mechanical shredding facilities; business development capacity to grow end markets

**Benefits?**  
Creates local manufacturing opportunities; increases business opportunities; develops skills; creates jobs; adds economic value to textile stream

Logos: CRN, Innovation for a Circular Economy, REDISCOVERY CENTRE

### Suitable for Disposal

The fraction of post-consumer clothing and home textiles that is soiled or mixed with other waste streams

**How much is collected in Ireland?**  
Estimate 110,000 tonnes each year

**Current models?**  
Disposed for incineration or sent to landfill

**Examples?**  
Dublin Waste to Energy (DWTE), Meath Waste to Energy

**Innovations to explore?**  
Remove textiles from residual waste bin by improving separate collection infrastructure; align incentives for entire supply chain to separate and sort textiles

**Investments required to scale?**  
Separate collection infrastructure including logistics, storage and sorting capacity; incentives to cover labour cost of collection, storage and sorting

**Benefits?**  
Reduces quantity of residual waste; creates value from residual waste stream

Logos: CRN, Innovation for a Circular Economy, REDISCOVERY CENTRE

Figure 3.26: Close-up images of innovation showcase pull-up banners

## Content matrix for Developing a Circular Textiles for Ireland: a showcase of innovative solutions for post-consumer clothing and home textiles

Value category	Definition	How much is collected in Ireland?	Current models?	Examples?	Innovations to explore?	Investments required to scale?	Benefits?
Suitable to Rewear  Highest Value	The wearable fraction of post-consumer clothing and home textiles that is in very good or good condition and appeals to Irish consumers	Estimate 9,700 tonnes each year	Sold, rented or shared within Ireland directly without repair or alteration (e.g., brick and mortar secondhand retailers, online platforms for secondhand retailers, online platforms for peer-to-peer selling and swapping)	Charity retailers, thriftify, Nu Wardrobe, Adverts, depop	Mainstream the sale of secondhand clothing and home textiles in Ireland through increased capacity of existing retailers / swap shops and incentives for public-private-charity partnerships	Incentives to expand business models; storage facilities; sorting and distribution centres; capital equipment and transportation; technology infrastructure; human resources; reduce VAT on secondhand purchases	Direct local reuse leads to greatest reduction of textile consumption and maximises transport emissions savings; increases business opportunities; develops skills; creates jobs
Suitable to Rewear  Medium Value	The wearable fraction of post-consumer clothing and home textiles that is in moderate condition or lightly damaged and does not	Estimate 22,400 tonnes each year	Sold to export markets for direct rewear  Limited amount of upcycling in Ireland	Export by commercial textile recyclers e.g., Cookstown Textile Recyclers; All-Tex Recyclers; Liberty Recycling	Establish service centres to undertake repairs, alterations and upcycling; mainstream the sale of repaired or upcycled	Workspace and capital equipment for service centres; transportation and technology; business development capacity to	Extends wearable life of existing textiles while minimizing carbon emissions; reduces new textile consumption;



	appeal to Irish consumers			Upcyclers: (e.g., The Upcycle Movement/Re Source platform, Attention Attire, the Rediscovery Centre, Roscommon Women's Network/ CycleUp Textiles	clothing and home textiles in Ireland; expand collaborations and textile sharing among upcyclers; expand upcycling training; improve sorting capacity to redirect some to highest value category	secure stock and grow distribution channels; reduce VAT on repair and alteration services	reduces reliance on export markets by keeping textiles in Ireland; reduces transport emissions; builds resilience to supply chain shocks; increases business opportunities; develops skills; creates jobs; adds economic value to textile stream
Suitable to Rewear	The wearable fraction of post-consumer clothing and home textiles that is in poor condition, very worn or damaged but not soiled	Estimate 12,600 tonnes each year	Sold to limited export markets for rewear or shredded to make other products (e.g., rugs, wipes)	Exported by commercial textile recyclers (e.g., Cookstown Textile Recyclers; All-Tex Recyclers; Liberty Recycling)	Develop opportunities for textile processing in Ireland; explore applications and business opportunities for shredded textiles; improve sorting capacity to redirect some of these textiles to medium value	Storage, sorting and mechanical shredding facilities, business development capacity to grow end markets	Reduces reliance on export markets by keeping textiles in Ireland; reduces transport emissions; builds resilience to supply chain shocks; adds economic value to low value textile stream
Low Value							

category							
Suitable for Recycling	The fraction of post-consumer clothing and home textiles that is not wearable due to damage but is not soiled	Estimate 15,000 tonnes each year	Mechanically or chemically processed to make products of lower value than the original material (downcycling)	Cut and bale for use as cleaning wipes; shred for use in carpets, mattresses, sofas and sound proofing (e.g., Acara Concepts)	Expand textile shredding in Ireland; expand local manufacturing and business opportunities for shredded textiles, such as insulation (e.g., Cirtex), high cellulose textiles in road building, padding (e.g., mattresses, upholstery, packaging), sound proofing, rugs and carpets; fibre-to-fibre recycling (most likely via export to EU hubs); improve sorting capacity to redirect some to low value category	Storage, sorting and mechanical shredding facilities, business development capacity to grow end markets	Creates local manufacturing opportunities; increases business opportunities; develops skills; creates jobs; adds economic value to textile stream
Suitable for	The fraction of	Estimate 11,0000	Disposed for	Dublin Waste to	Remove textiles	Separate	Reduces quantity

Disposal	post-consumer clothing and home textiles that is soiled or mixed with other waste streams	tonnes each year	incineration or to landfill	Energy (DWTE); Meath Waste to Energy	from residual waste bin by improving separate collection infrastructure; align incentives for entire supply chain to separate and sort textiles	collection infrastructure including logistics, storage and sorting capacity; incentives to cover labour cost of collection, storage and sorting	of residual waste; creates value from residual waste stream
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## **Annex 19: Stakeholder feedback from final workshop**

A final stakeholder workshop took place on 19 October 2022 to present and receive feedback on the project's preliminary findings. The workshop took place both in-person at the Rediscovery Centre and online via Zoom in order to make the workshop accessible to all stakeholders. Representatives from the following organisations were in attendance: EPA, CRNI, Rediscovery Centre, Charity Retail Ireland, DECC, Eastern Midlands Region Waste Management Plan Office, Southern Region Waste Management Plan Office, Cork County Council, Donegal County Council, Wicklow County Council, Clare Haven Horizons, Dublin Simon Community, Oxfam, Textile Recycling Limited (TRL), Cirtex, Meraki Marketing and CLÁN, Retail Excellence and THINK PLAN DO CONSULTING, and REvolve Waste.

The findings that were presented included an overview of the activities outlined in the report thus far. Emphasis was placed on the difficulties encountered during the pilot design and implementation process and how these affected the data collected. The national modelling based on the pilot data was, nonetheless, presented, along with the potential solutions explored through the Eco Business Model Canvas.

Feedback from the end-of-project stakeholder workshop and the project team's observations of engaging with stakeholders throughout the project revealed that the post-consumer textile sector is heavily fragmented. In particular, there is very little coordination between the charity retailers, Local Authorities, and commercial textile recyclers. The implementation of industrial scale reuse of textiles will require coordination and collaboration between different stakeholders. For example, in a remanufacturing process, coordination and collaboration is required to ensure that there is 1) a reliable supply of used textiles as an input, 2) demand for used textiles inputs, and 3) a market for the remanufactured product.

As such, more work is needed to map current stakeholders and the extent of operations so that areas of potential collaboration can be developed. This could involve establishing a sectoral committee with representation from all sectoral interests tasked with identifying and developing new solutions that either 1) reduce textile consumption in the first instance, 2) keep existing textiles in circulation in their current form, or 3) remanufacture textiles for new uses at end of life. It is important to note that incentives and/or financial support may be required for some stakeholders to be involved, particularly if this activity is not aligned with their current business model.

Insights relevant to the project were incorporated into the final report and further details from the workshop are outlined in the table below.

General
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- Difficult to generalise based on data
- Value of exports = part of solution
- Conscious of global nature > framework/ coordinated system & collaboration (who does what) with recyclers > competition, profitable business model, LAs also make money from textiles
- Central sorting capacity / multiple centres
- Doing another pilot study won't help; not sure about getting data there either
- EPR as one way to improve data
- There is a disconnect between upcyclers, recyclers, charity retail; piecemeal
- Acknowledge displacement/repair
- Creating markets here
- Focus on medium and low value/ shred, not recycling fibre to fibre
- No infrastructure for facilitating tech / mechanical shredding nor facilitating mainstreaming demand of secondhand (e.g., tax breaks & incentives)
- Need for central sorting capacity, storage - these facilities are lacking
- Need national reporting structure; reporting on goodwill assumptions, willingness to share; commercial also reporting incentivised by money to under reflect
- Lack of cohesion, fragmented; incentives of different actors working in textiles not aligned...etc.
- Not enough data, doesn't align with expectations
- Potential for reporting of data - there are business model barriers to that. It suits the commercial operators not to report accurately because the LAs charge them by weight for the usable textiles that they collect
- Potential to collaborate more broadly in the sector to create needed infrastructure and material flows - again there are business model barriers to this - it suits the commercial players to have the existing sources of textiles for export
- Collaboration & infrastructure
- Current financial models work against domestic circularity or collaboration
- Shocked by contamination - should we expect contamination?

Data	
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[illegible]

- |   |   |   |
|---|---|---|
| <ul style="list-style-type: none"> <li>• Data on textiles is poor</li> <li>• We're not alone</li> <li>• Data gaps opens door to further research</li> <li>• Repetition of this study is necessary</li> <li>• EPR</li> <li>• Environmental taxes: what can be done to get the data flowing?</li> <li>• Is there an appetite for more taxes at the moment?</li> <li>• Reduction of VAT!</li> <li>• Reduction of VAT for repaired items</li> </ul> | <ul style="list-style-type: none"> <li>• Scaling up? We need more data!</li> <li>• Improved reporting and data is around the corner</li> <li>• An online platform?</li> <li>• New reuse criteria from the Commission</li> <li>• Small datasets</li> <li>• No data on waste prevention, things that don't enter the waste stream at all</li> <li>• We don't measure our success</li> </ul> | <ul style="list-style-type: none"> <li>• Ukraine war!</li> <li>• The only real carrot (for private sector) is economic</li> <li>• EPR + tax rebates</li> <li>• Waste data</li> <li>• How good is it... how is it collected?</li> <li>• ... Don't care ... marketing. The incentive MUST be financial</li> <li>• Commission wants it to happen every 4 years</li> <li>• Waste characterisation studies!</li> </ul> |
|---|---|---|



<ul style="list-style-type: none"> <li>● Retail sector involvement</li> <li>● Repair: insurance issues!</li> <li>● Repair for sale onto someone else!</li> </ul>		<ul style="list-style-type: none"> <li>● But material passports are important for short term and long term</li> <li>● Adoption curve...</li> <li>● Legislative sandboxes</li> <li>● Short term of passports: for SMEs and charities</li> </ul>
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