

ECAP

European Textiles & Workwear Market *The role of Public Procurement in making textiles circular*



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Executive summary

The 2015 EU action plan for the circular economy highlighted the need for integrated action across design, production, consumption and waste management, including a 'demand-led' approach through public procurement, in order to realise up to €600 billion of benefits across Europe.

Textiles and workwear procurement is one category with significant untapped potential. This report uses available data to set out the context of workwear within the wider EU textiles market. It also identifies opportunities and threats along with recommendations on how these could be addressed within the public procurement of workwear. It estimates that across Europe, there was upwards of €8.6 billion spent on public sector textile and workwear procurement equivalent to around 93,000 tonnes of workwear consumption in 2015.

Whilst many public sector organisations and businesses in Europe utilise workwear, few appear to consider end-of-life opportunities for the garments they purchase. In many EU member states, e.g. the United Kingdom, the majority of workwear, is sent to landfill or incineration (90% in 2012¹). Limited resources are allocated to ensuring these items stay out of landfill.

There are significant challenges to closing the workwear loop in Europe including an extended supply chain across fibre producers, fabric and garment manufacturers, retailers and suppliers. A wide variety of public bodies responsible for procuring workwear items. Over the course of the EU LIFE 2014 European Clothing Action Plan (ECAP) project, the demand-led activities coordinated by the Rijkswaterstaat in the Netherlands is seeking to bring together these varied stakeholders to demonstrate how workwear textile loops can be closed through circular procurement actions. This collective action, requires the procurement cycle to consider not just the stakeholders involved in sourcing workwear, but also the users, collectors, recyclers and remanufacturers of workwear, who are critical at end of first use.

The circularity of Workwear textiles, both synthetic and natural fibres, are potentially highly circular. Increasing quality and quantity of supply through more controlled collection and take-back could increase circularity, e.g. by including such requirements in public procurement contracts. Opportunities exist for more recovery through current infrastructure, including secure shredding collections. However, within the public sector there is greater potential to close product and materials loops for textiles by creating demand for recycled content and encouraging end of use options such as re-use and recycling of workwear through more circular procurement practices. This can be achieved by encouraging and incentivising better design for durability, lifetime optimisation and end-of-life. Circular procurement can also facilitate better collections for re-use, e.g. through more resource efficient business models such as servitization, take-back and buy-back. Recycling into low-grade outputs, such as automotive felts and wiper rags is already typical, but there are also opportunities to close textile loops through fibre recycling back into workwear where re-use is no longer economically viable.

¹ A review of UK workwear arisings and opportunities. WRAP 2012

Glossary

BBG - Bundesbeschaffung GmbH, a central purchasing body (Austria)

CA - Contract award

CAN - Contract award notice

Central Product Classification (CPC) – codes assigned by the United Nations to categorise products, works and services.

Central Purchasing Body - a contracting authority which provides centralised purchasing activities and which may also provide ancillary purchasing activities.

CO₂ - Carbon dioxide

Common Procurement Vocabulary (CPV) – codes assigned to the different categories of works, services and supplies to enable standardised European categorisation.

Contracting Authority – a body governed by public law which is predominantly financed by the state, or regional or local authorities.

CSR - Corporate Social Responsibility

DK - Denmark

EC - European Commission

ECF - Elementary chlorine free

EMAS - Eco-Management and Audit Scheme

EU - European Union

European Union (EU) Procurement Directive – sets out the procedures to be followed by purchasers in the public and utilities sectors. Under these rules, public sector procurement must follow transparent open procedures to ensure fair conditions of competition for suppliers.

GBS – UK Government Buying Standards

GPP - Green Public Procurement

GDP - Gross Domestic Product

GPP - Green public procurement

ILO - International Labour Organisation

Invitation to Tender (ITT) – a document in which the contracting authority invites interested companies or organisations to submit a tender for a public sector contract. It outlines the conditions for the submission of a tender and gives the terms of reference or the technical qualifications required.

Invitation to Participate in Dialogue (ITPD) – a document in which the contracting authority invites participants who have pre-qualified for a public sector contract, to participate in the competitive dialogue phase.

LCC – Life Cycle Cost. The sum of all recurring and one-time (non-recurring) costs over the full life span or a specified period of a good, service, structure, or system. It includes purchase price, installation cost, operating costs, maintenance and upgrade costs, and remaining (residual or salvage) value at the end of ownership or its useful life.

MEAT - Most Economically Advantageous Tender

MS - Member States. Relating to the 28 member states of the European Union.

NAP - National Action Plan. In 2003, the European Commission encouraged Member States to draw up publicly available National Action Plans (NAPs) for greening their public procurement.

NHS – United Kingdom National Health Service

NL – The Netherlands

Official Journal of European Union (OJEU) – publication (formerly known as OJEC) in which all contracts from the public sector (which are valued above a certain threshold) must be published. The term 'Journal' can be misleading, as production of the hard copy version ceased in 1997 and is now only accessible online.

PCP - Pre-commercial procurement. Designed to steer the development of solutions towards concrete public sector needs, e.g. the procurement of research and development.

Pre-Qualification Questionnaire (PQQ) – this enables public sector purchasers to identify the most suitable suppliers to invite to tender for contracts. It is a formal mechanism for assessing whether potential suppliers are suitable to tender for contract opportunities in terms of their legal, financial and technical capacity.

Prior Information Notice (PIN) – the annual or occasional advertisement in the Official Journal of the European Union, advising the contracting community of a contracting authority's future procurement plans. PINs are intended to ensure that interested parties have as much time as possible to prepare to participate.

PPI - Public procurement of innovation. PPI is exclusively carried out on a voluntary basis. PPI is more complex and less suitable to standardisation as SRPP and GPP, where ready-made criteria can simply be "copy and pasted" in tender documents.

R&D - Research and development

Servitization – The provision of goods and products through service based solutions

SME - Small and medium-sized enterprise

SRPP - Socially responsible public procurement

SVHC - Substance of very high concern

TCF - Totally chlorine free

TCO - Total-Cost-of-Ownership. The purchase price of an asset plus the costs of operation. Used as a financial estimate to help buyers and owners determine the direct and indirect costs of a product or system. It can be used in full cost accounting and in ecological economics where it includes social costs.

TCU – Total Cost of Usership. Does not include the requirement to own the products or asset.

TED - Tenders Electronic Daily. TED is the online 'Supplement to the Official Journal of the EU', dedicated to European public procurement.

TFV - Total final value

UK – United Kingdom of Great Britain (England, Scotland and Wales) and Northern Ireland.

VA – Value added. The amount by which the value of an article is increased at each stage of its production, exclusive of initial costs.

1.0 Introduction

1.1 Background to the European Clothing Action Plan EU LIFE 2014 project

1.1.1 European Clothing Action Plan (ECAP)

The overall objective of the EU LIFE2014 project is to create a European Clothing Action Plan (ECAP)² to drive a European-wide circular economy approach for the clothing sector that delivers against European policy directives on waste and sustainable consumption and production; and, EU ambitions for developing low carbon and more circular approaches to economic growth.

Specifically, the Action Plan will provide a consistent framework to measurably:

- Reduce the carbon, water and waste impacts of EU clothing.
- Prevent waste in the clothing supply chain and the use of domestic clothing and workwear by business, consumers and governments.
- Ensure that less low grade clothing goes to incineration or landfill.
- Encourage innovation in resource-efficient design and service models to encourage business growth in the clothing sector and its supply chain.

Between 2015 and 2019 the project aims to adopt proven systematic practices for partner countries to reduce the environmental impacts of clothing production and consumption and in developing more circular approaches to business thinking and economic growth.

The learnings will be brought together in a single European wide action plan that identifies and systematically addresses the key challenges to reducing the environmental impact of clothing consumption across the domestic, private and public sectors. The plan will provide a framework for a generic approach supported by guidance for participants to identify and adopt the behaviour changes required to deliver on clearly identified environmental, social and business benefits. This framework will then be rolled out across EU member states over the course of the three year project to demonstrate take-up and action.

1.1.2 ECAP work package B5 – public procurement action

The aim of Action B5 in the EU LIFE 2014 ECAP project is to use the drivers for wider EU green public procurement to generate demand pull to support the companies that operate as suppliers of corporate workwear and uniforms (B2B) to inform existing criteria, and where necessary suggest new criteria, for sustainable and circular public procurement in clothing. For example, sustainable public sector procurement criteria will encourage demand for fibre to fibre clothing. In turn it will help develop stable markets and de-risk investment in the new product lines. This ultimately results in more sustainable and circular public procurement.

1.2 Aim of the report

This market report seeks to explain the context of workwear in terms of wider clothing production and consumption within the European Union (EU). It also aims to identify the

² Further information: ECAP website www.ecap.eu.com

opportunities for public sector procurement to contribute towards a more circular European economy by identifying trends in sustainable procurement and workwear and recommending next steps for action through the EU LIFE 2014 ECAP project.

1.3 Structure of report

The report is focussed on the public procurement of workwear. The scope does not extend to clothing in general, or to broader public procurement of textiles, linens and textile-based products (e.g. carpets, towels, curtains etc), although many of the impacts, barriers and opportunities are the same or similar. It is structured according to a number of themes:

- description of workwear production and consumption in the context of wider EU textile and garment consumption and production;
- description of drivers that impact on the procurement of workwear;
- discussion on the overlap between workwear and public procurement through identification of trends, opportunities and threats for closing workwear garment textile loops; and
- recommendations for next steps and action in the EU LIFE 2014 ECAP procurement-related activities.

The initial emphasis is on presenting available data and information in descriptive form. Data (primary and secondary) has been gathered through sources via desk-based research including Boolean web searches, stakeholder interviews and information available through the project partners and contractors' knowledge base.

The later sections develop themes and discussion from the data including some examples of circular procurement in workwear. This is followed by recommendations based on the available data.

2.0 Textile & workwear production in Europe

2.1 European overview

Clothing and textiles represent about 9.1% of world exports based on 2013 figures^{3,4}. More than a quarter of the world's production of clothing and textiles is in China, which exports the largest amount of textiles by volume (and value) to Europe, followed by India and Pakistan. European countries are still important exporters of clothing and textiles, particularly the 'Big 5' European producers: Germany, Italy, Spain, UK and France. These export some 30% of throughput either as direct production or by adding value to imported textile products before re-exporting. With regards to external trade performance, about 20% of EU production is sold outside the EU despite limited access to many non-EU markets.

The main focus of EU consolidated reporting on textiles is on the value and employment within the European textiles sector. The textile and clothing sector is an important part of the European manufacturing industry. According to data from 2013, there were 185,000 companies in the industry employing 1.7 million people and generating a turnover of €166 billion. The sector accounts for a 3% share of value added and a 6% share of employment in total manufacturing in Europe.

³ WTO (2014), UN World Trade statistics (2015) and Textile & Apparel Compendium (Technopak, 2015)

⁴ Well dressed? The present and future sustainability of clothing and textiles in the United Kingdom. Cambridge University 2006

The sector in the EU is made up mainly of small and medium sized enterprises (SMEs) with companies with less than 50 employees accounting for more than 90% of the workforce and produce almost 60% of the value added³.

In terms of workwear, the indications are that global growth has slowed to 2.19% from 4% due to the economic crisis of 2008-09⁵. Recovery in Europe, the second largest market for workwear, has taken until 2012 for growth to recover the 8% drop in sales and the workwear sector is forecast to continue to be weak with high rates of unemployment. In 2015, employment turned positive in the European clothing sector (+0.3% as compared to 2014) and went slightly up in the textile industry (+0.6%), reinforcing recent positive trends. European textile and clothing production was -1.7% lower than in same period of the previous year. Total European textile output went down by -0.7% in the man-made fibres industry, by -1% in textiles and by -2.3% in the clothing sector⁶.

2.1.1 Industry structure

There are primarily two types of textile fibres:

- 'Natural' fibres including cotton, wool, silk, flax, hemp, and jute; and
- 'Man-made' fibres including those coming from the transformation of natural polymers (e.g. viscose, acetate, and modal), synthetic fibres (i.e. organic fibres based on petrochemicals such as polyester, nylon/polyamide, acrylic, and polypropylene), and fibres from inorganic materials (e.g. glass, metal, carbon, or ceramic).

EU member states produce both types across the different manufacturing stages:

- The treatment of raw materials, i.e. the preparation or production of various textile fibres, and/or the manufacture of yarns (e.g. through spinning).
- The production of knitted and woven fabrics.
- Finishing activities aimed at giving fabrics the visual, physical, and aesthetic properties that consumers demand. This includes bleaching, printing, dyeing, impregnating, coating, and plasticising.
- The transformation of those fabrics into products including:
 - clothing and workwear (knitted or woven);
 - carpets and other textile floor coverings;
 - home textiles such as bed, table or kitchen linen, and curtains; and
 - technical or industrial textiles.

Southern European countries such as Italy, Greece, and Portugal; some of the new EU countries such as Romania, Bulgaria, and Poland; and, to a lesser extent, Spain and France, contribute more to total clothing production. On the other hand, northern countries such as the United Kingdom, Germany, Belgium, the Netherlands, Austria, and Sweden contribute more to textile production, notably technical textiles, and to finishing of workwear for internal consumption or export.

Although some textile and clothing companies have set up their own distribution networks as part of their vertical integration strategy, the manufacturing and distribution sectors remain very different in their characteristics.

⁵ *The global market review of workwear – forecasts to 2018.*

⁶ http://ec.europa.eu/economy_finance/db_indicators/surveys/index_en.htm

2.2 Production & consumption estimates

The last full sectoral report for textiles across the EU was conducted in 2006⁷. This highlights the gap in reliable data generally for EU textiles production and consumption but specifically for EU workwear production and consumption.

The number and tonnage of workwear is not currently recorded in any aggregated reporting, and therefore a methodology based on official PRODCOM⁸ sales was used to create a best estimate of garments supplied across Europe. These have been converted to estimates of tonnage figures using garment weights supplied in the last EU sectoral report on textiles in 2006⁷. A full explanation along with PRODCOM codes is given in Annex 1.

2.2.1 European quantities and flows

PRODCOM data for 2015 suggest that the total value of EU28 clothing was €30.9 billion in 2015 with the value of workwear accounting for just under 5% (ca€1.5 billion). The Big 5 producers accounted for 57% (€17.5 billion) of this value and 37% (0.55 billion) of the total value of workwear produced.

The estimates of tonnages are summarised in Table 1 for production, import and export estimates for the EU28, the Big 5 and the respective ECAP partner countries (Netherlands, Denmark and the UK).

Overall, around 1.6 million tonnes of clothing was produced within Europe in 2015. This is not the same as consumed, for which the figure is 6.4 million tonnes. Workwear production accounted for 31.5% (48.3 ktonnes) and around 1.5% of consumption (93.3 ktonnes).

In terms of ECAP members the production figures for the Netherlands (NL) are subject to considerable uncertainty (see section 3.5.1) but suggest a much higher than average production of workwear compared with the EU28 or other ECAP partners. It may be more practical to look at consumption by employed population. This shows the average workwear weight for NL to be 178g pp⁹ compared with 259 g pp¹⁰ for the UK and 939 g pp¹¹ for DK. The assumption, based on Table 1, is that proportionately Denmark produces more workwear for export than either the UK or NL.

⁷ *Environmental Improvement Potential of Textiles (IMPRO-Textiles). EC JRC 2006*

⁸ <http://ec.europa.eu/eurostat/web/prodcom>

⁹ *NL employed population estimated at 8.45 million from a total population of 16.9 million*

¹⁰ *UK employed population estimated at 31.4 million from a total population of 64.1 million*

¹¹ *DK employed population estimated at 2.7 million from a total population of 5.75 million*

Table 1 Production and consumption (tonnes). PRODCOM 2015

	PRC Code Indicator	Produced (tonnes)	Imported (tonnes)	Exported (tonnes)	Apparent Consumption (tonnes)
Netherlands	ALL CLOTHING	n/a ¹	764,976	304,983	n/a ¹
	WORKWEAR	n/a ¹	3,182	1,720	n/a ¹
	%	n/a ¹	12.6%	0.3%	n/a ¹
	Clothing % of EU28	n/a ¹	9%	8.3%	n/a ¹
	Workwear % of EU28	n/a ¹	4.5%	6.5%	n/a ¹
Denmark	ALL CLOTHING	7482	167489	102170	72,801
	WORKWEAR	1,514	2,310	1,288	2,536
	%	20.2%	0.95%	0.87%	3.5%
	Clothing % of EU28	0.5%	2%	2.8%	1.2%
	Workwear % of EU28	0.1%	3.2%	14.9%	2.72%
Belgium	ALL CLOTHING	92,432	416,911	356,217	60,725
	WORKWEAR	54,877	3,244	3,271	0
	%	86%	0.5%	0.6%	0%
	Clothing % of EU28	0%	4.9%	9.7%	0%
	Workwear % of EU28	<0.1%	4.5%	12.4%	<0.1%
United Kingdom	ALL CLOTHING	45,005	1,271,219	324,185	992,040
	WORKWEAR	2,036	16,612	2,031	16,617
	%	4.5%	0.9%	0.4%	1.7%
	Clothing % of EU28	2.8%	15%	8.8%	15.4%
	Workwear % of EU28	4.2%	23%	7.7%	17.8%
	Clothing % of EU Big 5	5.3%	24%	17%	23%
	Workwear % of EU Big 5	11%	36%	24%	30%
Germany	ALL CLOTHING	44,796	1,616,871	538,457	1,123,210
	WORKWEAR	1,199	12,250	2,237	11,212
	%	2.7%	0.5%	0.3%	2.7%
	Clothing % of EU28	2.8%	19%	15%	17%
	Workwear % of EU28	2.5%	17%	8.45%	12%
	Clothing % of EU Big 5	5.3%	30%	28%	5.3%
	Workwear % of EU Big 5	6.6%	27%	26%	6.6%
EU28	ALL CLOTHING	1,591,509	8,511,505	3,667,081	6,435,933
	WORKWEAR	48,326	71,429	26,464	93,290
		3%	0.6%	0.5%	1.5%
Big 5²	ALL	853,975	5,405,184	1,890,166	4,368,993
	WORKWEAR	18,274	45,887	8,626	55,534
	%	2.1%	0.6%	0.3%	1.3%
	% of EU Clothing	54%	64%	52%	68%
	% of EU28 Workwear	38%	64%	33%	60%

I. Production figures not available through PRODCOM for the Netherlands – see section 3.3.1 for explanation

II. Germany, Spain, U.K, Italy and France

2.2.2 Data uncertainties, gaps and limitations

The level of accuracy of the PRODCOM database is uncertain. When production, import and export amounts for individual EU-28 Member States are added together, for most categories the totals do not match those aggregated within PRODCOM for the EU-28. This has been noted previously as has the fact that confidential or missing data are common in textile statistics. The Dutch government has, for example, not returned (suppressed) production quantities since 2008. Estimates of Dutch workwear from other sources are given in Section 3.3.1.

Some product categories presented in PRODCOM are generic, meaning that detailed information on fibres or processes used for manufacturing end products can be difficult to assess and that the composition of production can in some cases differ from that of trade. This is particularly so for workwear where for example, some items of 'uniforms' such as polo shirts, skirts, trousers, shirts etc. may not be declared as occupational or industrial wear but may be catalogued more generally through 14133XX categories.

A further uncertainty is the calculation of garment weights, which at best can only be described as a broad estimate. The IMPRO workwear average weight was 488 grams across the categories in Table 5 (Annex 1). However the WRAP report on workwear¹² identified lower estimate of 415 grams per garment giving a variance of 15% on the IMPRO figure. Factors such as variations in requirements (and therefore weights) from different member states will contribute, however, the lack of detail makes this difficult to assess without primary research.

2.3 Environmental impacts

Clothing and workwear cause environmental impacts throughout their life cycle, covering a wide range of environmental issues. The major environmental impacts of the sector arise from production impacts (energy and toxic chemicals) through to disposal impacts (landfill and incineration):

- **Resource consumption** - due to the use of fossil fuels (transport, electricity and manufacturing of synthetic fibres), water (cultivation of crops, wet processes during the manufacturing process and cleaning during the use phase), incineration and landfill. Many clothing items and other textiles typically have average lifetimes of just over 3 years according to WRAP (2015)¹³. Waste volumes from the overall sector are high and growing across Europe with the advent of 'fast fashion' which has indirect impacts on workwear for some garments. For example, on average, UK consumers send 30kg of clothing and textiles per capita to landfill each year³. Indirectly, workwear packaging waste also contributes to environmental impacts. Even where clothing in general is collected for re-use (ca 55% in the UK and similar proportions in Northern European countries), this re-use is predominantly outside of European territorial boundaries and therefore disposal at end-of-life is unaccounted for.
- **Greenhouse gas emissions** - the sector's contribution to climate change is dominated by the requirement for burning fossil fuel to create electricity for heating

¹² A review of UK workwear arisings and opportunities. WRAP 2012

¹³ Sustainable Clothing Guide. WRAP 2015

water and air in laundering. Other major energy uses arise in providing fuel for agricultural machinery and electricity for all stages of production. Workwear is typically of a higher quality than similar fashion garments. Therefore under-utilisation of functional life will have proportionately greater impacts.

- **Air and water pollution** - including air acidification due to SO_x emissions (fossil fuel combustion) and NO_x emissions (electricity production).
- **Water consumption and pollution impacts** - particularly relating to production of natural cotton fibres through the extensive use of water in cotton crop cultivation. Eutrophication is mainly generated by laundry effluents during use phase, wet processes during the manufacturing phase and the use of fertilizers during crop cultivation. Through the cleaning cycle, micro-fibres from synthetics are also contributors to the marine plastics pollution (the 'plastics soup').
- **Toxicity issues** - covering aquatic, sedimentary and soil toxicity due to the use of chemicals during crop cultivation (defoliants and pesticides) and in many manufacturing stages such as pre-treatment, dyeing and printing. Impacts also arise through clothes cleaning (laundry detergent production and the use of electricity) and by coatings and additives, e.g. stain inhibitors and fire retardants on workwear.
- **Biodiversity loss and land-use** - linked to crop cultivation practices mainly for natural fibre production.

2.4 Defining occupational wear

Definitions of occupational wear have been taken from the WRAP (2012) report on workwear. The UK definitions are based on upon previously defined categories, listed in Company Clothing and Company Clothing (2007)¹⁴. These are consistent with workwear categories defined elsewhere from other EU member states¹⁵. However for simplicity, the term 'workwear' will be used throughout this report to denote all the definitions below given the lack of more specific breakdowns in data for each variant:

Workwear: Garments of simple and typically very durable construction usually in poly/cotton fabrics, including boiler suits and coveralls, bib and brace, coats, jackets and trousers, as well as a wide variety of similar styles used in the catering and wholesale/distribution sectors. Nurses' uniforms also fall into this category. The garments are frequently made specific to the company through badges and logos.

Career-wear: Garments similar to everyday men's suits and ladies' dresses, skirts, jackets and blouses worn in business environments such as banking, hotel receptions, airlines etc. Quality standards are similar as well. Sometimes the corporate colour(s) or logo of the employer is incorporated in the fabric.

Corporate casual-wear: Garments are mainly knitted tops (polos, sweatshirts and knitwear) and jeans / chino style trousers or jog pants. These are of similar quality to mid-price consumer equivalent garments.

Uniforms: Typically highly durable and very good quality tailored outfits, e.g. for military and public service institutions. Some uniforms, such as those of fire services, are part uniform and part protective clothing and will contain additives such as fire retardants.

¹⁴ *The Company Clothing Market Report, 2006-2012 6th ed. Company Clothing 2007*

¹⁵ *The market for workwear in the Netherlands. Modint/GfK, 2013*

Protective clothing (also PPE): High performance, durable and high quality specification garments designed to protect the wearer in a particular environment such as foul weather clothing, acid resistant or fire retardant garments.

Table 6 in Annex 2 highlights the variations within fibre composition (natural and synthetic) for different type of workwear and the common mixes. This highlights some of the potential challenges posed by composite fabrics in workwear. It also shows the importance and potential for procurement to target design of workwear making re-use and recycling more favourable options at end-of-life.

It is not possible to comment on the design life of the different garments but apart from damage, the garments are unlikely to reach the end of their functional and design lives before discard from first use. This makes them suitable for re-use if technical (e.g. cleaning, repurposing) and security issues (e.g. de-branding) can be overcome.

2.5 Textile & workwear waste

According to work by WRAP (2012¹⁶) on corporate workwear, between 12-15% is a realistic waste arisings percentage based on industry and other sources. This is not the same yield, as some of the textile off-cuts may be re-used 'in house' and never be declared in official waste statistics.

In the absence of hard evidence it is assumed post-production waste levels for workwear are similar across European. European and ECAP partner country waste levels (per annum) for workwear are therefore estimated in Table 2 based on the 12% value.

Table 2 Estimated post-production workwear waste levels 2015

	Tonnes (High average garment weight)	Tonnes (Low average garment weight)
EU 28	11,533	9,800
EU Big 5 producers	6,664	5,663
Netherlands¹	181	154
Denmark	304	259
United Kingdom	304	259

1 data for the Netherlands is compromised by lack of reporting to Eurostat for production values since 2007

There are no published figures on workwear waste available to this report. The assumption for workwear is that garments are replaced on a one-to-one basis¹². It did however go on to note that this is not always applicable, as some replacement may be due to more staff or increased propensity for workwear. This will also be balanced by other factors, e.g. businesses closing or decreasing the workforce in both public and private sectors, with clothing being disposed of and not replaced.

The collection systems for workwear comprise three principles routes:

¹⁶ *Textiles flow and market development opportunities in the UK. WRAP 2012*

- commercial recycling (and re-use) collections;
- take-back and commercial collections; and
- household waste disposal.

Estimating the proportions for these routes is not possible although anecdotally, many case studies, e.g. City of Herning in Denmark and Welsh NHS Trust nurses' uniforms, noted that the leakage of workwear such as uniforms into the household waste collection system was a significant factor in considering procurement options for managed services and take-back.

However, once collected the majority of workwear is bulked with household textiles and clothing. In northern European countries these bulked 'rag' bales are destined for re-use and recycling abroad either in sorted or semi-sorted grades. However the proportion varies from country to country and data are variable in availability and quality. The UK is the 3rd largest exporter of used textiles (8% share of total mass exported globally) behind Germany (12%) and the USA (18%). The Netherlands is the 6th largest (4%) and Belgium 8th largest (3%)¹⁷.

3.0 Public procurement and workwear

3.1 Public procurement

Europe's public authorities are major consumers. By using their purchasing power to choose environmentally friendly goods, services and works, they can make an important contribution to sustainable consumption and production through Green Public Procurement (GPP). Although GPP is a voluntary instrument, it has a key role to play in the EU's efforts to become a more resource-efficient economy, for example in contributing to a more resource efficient Europe¹⁸. It can help stimulate a critical mass of demand for more sustainable goods and services which otherwise would be difficult to get onto the market. GPP is therefore a strong stimulus for eco-innovation.

Analysis of the Tenders Electronic Daily (TED), the online supplement to the EU Official Journal suggests that for 2015, €8.6 billion of contract awards for textiles and workwear were made across the EU28 countries. It only reflects contracts published above the relevant OJEU threshold values, therefore is probably an underestimation.

Table 3 provides a breakdown of the awards and shows that outside of non-specific categories, health, defence and the emergency services account for the largest individual procurement services for textiles and clothing.

¹⁷ *Textiles Market Situation Report. WRAP 2016*

¹⁸ *Roadmap to a Resource Efficient Europe. EC, 2011*

Table 3 TED textile and clothing procurement contract awards, 2015

Service	TED Value (€)	percent
Education	12,812,366	0.1%
Social services	15,293,967	0.2%
Energy & Water Utilities	15,075,647	0.2%
Housing	18,629,094	0.2%
Environment	19,983,478	0.2%
Transport utilities	42,072,974	0.5%
Postal services	45,038,328	0.5%
Public Order and safety	192,827,612	2.2%
Defence	230,114,384	2.7%
Health	617,064,497	7.2%
Other	1,514,860,723	17.6%
General services	5,901,706,040	68.4%
TOTAL	8,625,479,111	

3.2 EU regulatory drivers for workwear

3.2.1 EU textile drivers

Most textiles specific EU legislation addresses the issues of imports from low-wage countries, sets standards for textile names or sets standards for the chemical analysis of textile fibres.

From an environmental perspective, most legislation is chemical related given the safety aspects of many garments, additives and treatments used. REACH (Registration, Evaluation, Authorisation and Restriction of Chemical substances) (Regulation (EC) No 1907/2006)¹⁹ is particularly important. For textiles produced in Europe, substances incorporated in the textiles, need to be registered. Importers of textiles need to notify the European Chemicals Agency (ECHA) if the textiles they import contain SVHC (substances of very high concern) over certain concentrations. Other pieces of legislation include the Biocides Regulation (Regulation (EU) No 528/2012)²⁰, which establishes the regulatory framework for the making available on the market and use of biocidal products. These are particularly relevant to workwear

Unlike REACH and the Biocides Regulation, the Waste Framework Directive (Directive 2008/98/EC) specifically refers to textiles¹⁹. Besides defining the waste hierarchy i.e. prevention, preparation for re-use, recycling, energy recovery and disposal, the directive also calls for end of waste specific criteria for textiles to be developed. Criteria have been developed for textiles (Commission Decision 2009/567/EC) Under the EU Eco-label²⁰.

¹⁹ <http://ec.europa.eu/environment/waste/framework/>

²⁰ <http://ec.europa.eu/environment/ecolabel/ecolabel-and-green-public-procurement.html>

3.2.2 EU procurement drivers

Annex 3 summarises the procurement drivers relating to textiles within the EU. Although Green Public Procurement (GPP) is a voluntary instrument, it has a key role to play in the EU's efforts to become a more resource-efficient economy. To be effective, GPP requires the inclusion of clear and verifiable environmental criteria for products and services in the public procurement process. The European Commission and member states have developed guidance in this area, in the form of national GPP criteria. The basic concept of GPP relies on having clear, verifiable, justifiable and ambitious environmental criteria for products and services, based on a life-cycle approach and scientific evidence base. As of 2016 GPP criteria for textiles (issued in 2012) is under revision. It covers textile clothing and accessories along with interior textiles and fibres, yarns and fabrics²¹.

3.2.3 Other procurement drivers for workwear

The EU's Roadmap to a Resource Efficient Europe¹⁸, the Roadmap for Moving to a Competitive Low Carbon Economy in 2050, the Energy Roadmap 2050, and the Europe 2020 Strategy are all highly relevant to, and dependent on, closing textiles and workwear materials management within an emerging European circular economy.

The EU action plan for the circular economy²² announced in December 2015 specifically highlights the need for integrated action across design, production, consumption and waste management. This reinforces the need, where appropriate, to create a -demand-led- approach through public procurement – in this case of workwear and textiles – in order to ensure an integrated approach to realising the benefits.

The high embodied carbon of garments (natural and synthetic)²³ mean that sustainable consumption and production has a role to play in the delivery of the Paris climate conference (COP21) Agreement. In December 2015, 195 countries adopted the first-ever universal, legally binding global climate deal aimed at limiting global average temperatures to 1.5°C and imitating rapid reductions thereafter.

3.3 National examples

3.3.1 Netherlands

Regulatory drivers

As well as transforming the 2015 EU Procurement Directive into national law, the key driver in Netherlands for workwear is the Government-wide programme for a circular economy: *A Circular Economy in the Netherlands by 2050*. The new programme sets a target of a 50% reduction in raw materials use by 2030 and builds on the *Waste to Resource* programme that was announced in 2014.

²¹ http://ec.europa.eu/environment/gpp/eu_gpp_criteria_en.htm

²² *Closing the loop – An EU action plan for the circular economy. EC COM(2015)614, 2015*

²³ *Providing 1 tonne of T-shirts for re-use can result in a net GHG saving of between 11-13 tonnes CO2-eq according to WRAP (Benefits of Re-use Case Study: Clothing, 2011).*

The focus is to stimulate and encourage the market to create a more circular economy within the Netherlands by:

- Reducing the obstacles entrepreneurs face in making their production processes circular and reusing residual streams of waste.
- Reducing the volume of material that 'leaves' the economy, e.g. halving the 10 million tonnes of Dutch waste still going to waste incineration plants and landfills in 2012 and directing effort towards more sustainable products and sustainable consumption patterns, for example in workwear.
- Improving separation of domestic waste and similar commercial services waste including textiles and workwear to achieve 75% waste separation by 2020.
- To support innovative technical and business economics solutions and societal innovation enabling the Netherlands to be a hotspot of the circular economy.

The new Clothing and textiles covenant (see Section 3.4) also enables roadmaps for the circular economy to be developed as part of the new programme.

Procurement of workwear

The National Category Plan for Workwear in the Netherlands notes that the sector had a turnover of €22 billion in 2010²⁴, half of which is spent on clothing. It further implies the majority of production and finishing is done by Dutch SMEs who imported most textiles from China, India and Bangladesh in 2011²⁵. Procurement volumes by value for various public sector segments covered in the Category Plan (20% of overall public expenditure on workwear) are shown in Table 4. This highlights the importance of focussing on uniforms has a key area to influence but also the importance of more basic workwear.

Government agencies purchase €102 million a year of workwear, or about 1% of the Netherlands' expenditure on clothing and about 7% of overall European expenditure. Suppressed reporting of data to Eurostat on production in the Netherlands makes it difficult to assess the true contribution to overall EC production and consumption of workwear. Figures from Modint and GfK¹⁵ suggest that 42.3 million workwear items were consumed in 2013. When converting to tonnage figures using the methodology in Section 2.2.1 this equates to around 20,600 tonnes. This would suggest that consumption was around 25% greater than the UK for a working population that is only a quarter the size of the UK's^{9,10}. It is unlikely that consumption per head is more than double (2.4kg per worker) that of the UK (0.53kg per worker) and a more likely explanation lies in the inclusion of broader workwear segments (see Table 4) for the Modint figure than the CPV codes used in the PRODCOM analysis in Table 1. It is therefore not useful to compare the Dutch figures directly with those of other countries highlighted in this report.

²⁴ Dutch CBS, 2010

²⁵ Categorieplan bedrijfskleding Rijk. April 2015

Table 4 Average annual procurement volume in the Netherlands by segment

	Segment	Value (€M)
1.	Representative and uniform clothing	4.4
2.	Workwear and work shoe wear	6.7
3.	Personal protective equipment	6.8
4.	Medical clothing	-
5.	Washing and (dry) cleaning	1.6
6.	Processing returned goods	0.39
7.	Sport wear and shoe wear	2.1
8.	Other	0.35
9.	Negotiated contracts	0.08
	Total	22

Current practice

Various government departments in the Netherlands have set themselves the goal of achieving 100% sustainable procurement by 2015. This requires at least all minimum requirements in the product groups for which sustainability criteria are available to be applied in all procurement and tender processes. The Workwear Category Plan supports this objective and aims higher by including the first two recommendations of the Advies Duurzaam Inkopen (sustainable procurement advice):

1. Boost sustainability by focusing on innovation oriented procurement.
2. Encourage functional specification.

Alongside promoting innovation, key aspects of the new policy from 2014 have been to be proactive, dynamic and targeted in the approach to encouraging market innovation to improve sustainability. The policy specifically targets public bodies in the Netherlands to develop their own sustainable procurement policies and ensure these are linked through to procurement implementation.

In the context of workwear and textiles, this includes a voluntary 'CSR covenant' with the textile sector since 2015 for agreements between the government and other parties with the aim of promoting a good cooperation and coordination in efforts to increase the sustainability of the textile sector. This also links to a national set of priorities within the 'Plan van Aanpak verduurzaming Nederlandse textielsector 1.0' (*Plan of action for making the Dutch textile sector more sustainable*).

3.3.2 Denmark

Regulatory drivers

The new Public Procurement Act in Denmark approved in November 2015 simplifies procedures to facilitate negotiations between the contracting entity and bidders about available solutions and contractual terms. This should encourage more innovative solutions and also encourage alternate business models based on life cycle costing that can be applied to workwear.

The vision in Denmark is to pursue efficient procurement with low prices while supporting a competitive market. The 2013 resource efficiency strategy focussed on recycling more and incinerating less²⁶. This has now been superseded by a more holistic circular economy approach²⁷. Environmental concerns rank equal to other concerns and are implemented where standard products can meet the criteria, thereby ensuring extensive competition. In Denmark, one role of government is to help companies to achieve certification. Certification is one of their minimum procurement requirements and they see certification as an efficient instrument to influence sustainability.

Current practice

There are no specific references to workwear flows within the 2012 Nordic Council of Ministers report²⁸ or from other sources.

From the PRODCOM and COMEXT data summarised in Table 1 it is estimated that Denmark produces only about 0.5% of the EC's total clothing per annum but it produces just over 3% of the EU's workwear. In terms of actual 'consumption' of workwear, it accounts for about 2.7% suggesting it exports around the same as it produces (1,300 tonnes pa) to other countries.

Denmark, along with the Netherlands and Finland, has been piloting circular procurement practices for textiles in recent years. The main example being the procurement of Fire Service uniforms in the City of Herning (see case study example). Partnering with the design school at the VIA University College TEKØ the project also looked at recycling and repurposing options alongside development of objective criteria for more circular procurement. Evidence of these pilot practices being scaled-up is however not available.

Case study: City of Herning, Denmark – Uniforms

The project's starting point was the purchase agreement between De Forenede Dampvaskerier and the City of Herning on renting, washing and repairing of work clothes for the city's technical operations department. This extended to the development of objective criteria for purchasing new branded fire service work clothes to address discard, regardless of the quality and lack of recycling. Re-use of work clothes and transfer of work clothes, from the current contract to the next, will save €6,700 and 1,011 tonnes of CO₂ in a 4 year period in the technical operations department alone.

Very small amounts of textiles are produced, consumed and recycled in Denmark relative to the rest of Europe. Recycling textiles as industrial wipes is done as a community project in some places, e.g. the municipality of Haderslev. Recycling textiles into industrial wipes have is estimated to be <100 tonnes per year in the recent years mainly due to the lack of manpower²⁸.

²⁶ *Denmark without waste. The Danish Government, 2013*

²⁷ *Delivering the circular economy: a toolkit for policymakers. Ellen MacArthur Foundation, 2015*

²⁸ *Prevention of Textile Waste: Material flows of textiles in three Nordic countries and suggestions on policy instruments. Nordic Council of Ministers. 2012*

3.3.3 United Kingdom

Regulatory drivers

In the UK, Government Buying Standards (GBS) – have provided a set of product specifications for public procurers since 2003. They have a mandatory and a best practice level.

The GBS are part of public procurement policy, with individual standards (including textiles) developed with input from across government, industry and wider stakeholders. Sustainable procurement typically fall within the voluntary best practice level. The textiles GBS was last revised in 2010 and the proportion of the product by weight made of recycled fibres (part of award criteria) forms the only explicit resource efficiency criteria within the GBS.

Procurement of workwear

In 2012, WRAP produced a broad estimate of textiles materials flow in its 2012 report that indicated around 16.7k tonnes of apparent workwear consumption. Current PRODCOM estimates (Table 1 suggest 992,040 of net UK clothing consumption (production and imports minus exports) with around 16,600 of net workwear consumption which is broadly consistent. It also implies that UK consumption has remained reasonably stable over the last 4 years.

The UK is one of Europe's largest workwear consumers at just under 18%. On balance, proportionately more is produced for national consumption than export relative to the other big European producers like Germany, Italy and Spain.

Current practice

WRAP produced a broad estimate of textiles materials flow in its 2012 report²⁹. The UK market trends data available is however focussed on consumer clothing (WRAP, 2016). The UK consumes around 1.1 million tonnes per annum of textiles (clothing and workwear) of which only around 17k tonnes of this are workwear items²⁹. Using a different methodology the current PRODCOM estimates (Table 1) suggest 992,040 tonnes of reported net UK clothing consumption (production and imports minus exports) with around 16,600 of net workwear consumption. Workwear textiles waste (production and consumption) from the commercial and services sector is estimated to be around 71.4 ktonnes in 2015. This implies the majority of textiles workwear waste is post production rather than post consumption. In terms of waste and end markets, around 42,000 tonnes of textile waste arising from commercial and industrial sources in 2010 occurred in the services sector. This was around 60% of the overall total of Commercial & Industrial waste arising.

The UK study on workwear in 2012 found that branded work-wear (e.g. police uniforms) had a lower value due to the security requirement for shredding of branded items rather than re-use³⁰. This issue of permanent branding has been highlighted as a barrier to closing the workwear clothing loop through re-use in several European countries including the Netherlands, Norway, Sweden and Denmark as well as the UK.

Annex 8 provides a list of UK textile recyclers. These sort, re-use (the majority) recycle, and in some cases collect, commercial workwear alongside the majority of household textiles. UK collection rates are very sensitive to price and have been falling since 2011 according to

²⁹ *Valuing Our Clothes consumer clothing report. WRAP, 2012*

³⁰ *Textiles flow and recovery market opportunities in the UK. WRAP 2012 (withdrawn)*

data from WRAP and the Charity Retail Association. Estimates for 2014 suggest that despite this around 650,000 tonnes of textiles were collected equal to 59% of overall annual consumption. Lack of detail in data prevents any separate assessment for the devolved nations and for workwear so the assumption is that the collection rate for workwear is at least the same as for household but probably higher due to more managed commercial collection arrangements.

Around 68% of all clothing (including workwear) is exported from the UK either for re-use or for recycling. Table 2 shows that the UK is the 3rd largest global exporter of used textiles (8%). No distinction is made between workwear and general clothing at this stage of the textile loop.

The UK is also the single largest exporter of used textiles to a number of countries, predominantly in sub-Saharan Africa, the European Union (mainly Poland and Hungary), Asia (mostly Pakistan) and non-EU Eastern European countries (mostly Ukraine)¹⁷.

3.3.4 Belgium

Procurement in Belgium is a federal responsibility. This means that there is one law (and derivative royal decrees and circulars) that applies to all Belgian contracting authorities including, among others, the departments of the federal government, the three regions (Flanders, Wallonia and Brussels-Capital), local governments and organisations that receive more than 50% of government subsidies. This legislation supports the transposition of European Directives on public procurement.

At policy level, there is more variation and freedom. Depending on the level of governance and the product is purchased more centralised or decentralised. On some levels there is a move toward centralisation with the main driver being economies of scale. Belgium imports and exports of workwear are almost in balance (Table 1). However the Eurostat data for production is anomalously low compared with other EU countries of similar size and GDP.

3.3.5 Nordic countries

The Nordic Council of Ministers *LCA in Textiles* report in 2016³¹, quoting extensively from Palm et al (2014)³² noted the following flows for Nordic textiles that like most other national studies do not make any distinction for workwear:

- Sweden - in 2013, textiles put on the Swedish market had reduced to 121,000 tonnes, and re-use increased to 8,600 tonnes, with export remaining at 19,000 tonnes.
- The supply of new textiles put on the market in Norway is based on clothing only and in 2011 was estimated at about 72,000 tonnes with 23,000 tonnes being collected separately at end-of life (assumed to be the predominant workwear collections pathway) and the majority (91%) being sent for re-use abroad.

³¹ *Gaining benefits from discarded textiles LCA of different treatment pathways*, Nordic Council of Ministers, 2016

³² *Towards a Nordic textile strategy: collection, sorting, re-use and recycling of textiles*. Palm, D., M. Ellander, et al. Nordic Council of Ministers, 2014 <http://dx.doi.org/10.6027/TN2014-538>

- In Finland similar quantities of textiles and clothing were produced in 2010 (71,000 tonnes) and separately collected (25,000 tonnes) as in Norway. However, the fate of collected clothing is significantly different with only 25%. Around 28% is re-used in Finland and 34% recycled in Finland.

The NCM report notes that 10-30% of sorted textiles are suitable for resale. The remaining fractions are typically exported along with unsorted textiles. Approximately 60% of all used textiles separately collected in the Nordic countries are exported for further processing or resale. Nordic textiles are no longer used directly in humanitarian aid in any significant volume. Instead, they are sold to raise money for charitable operations (or profit in the case of private collectors).

As with most other northern European countries, the economic value of used textiles lies almost entirely in the reusable component. Prices for non-re-usables are low and can often barely pay for transport. The most common forms of recycling today are downcycling, e.g. industrial rags, low-grade blankets, insulation materials etc. However there is evidence of closed loop recycling practices (see case study box).

Chemical recycling is used for synthetic materials or mixtures of synthetic and natural fibres. The resulting fibre quality is said to be more reliable than for mechanical recycling. The products made are used for car upholstery and household textiles.

3.4 Voluntary drivers

Voluntary mechanisms play an important role in encouraging markets and supply chains to improve performance instead of, or ahead of, regulation. For textiles, a number of different voluntary environmental labelling schemes exist on the market. They include the ISO 14024 "Type I" EU Eco-label, the Nordic Swan and the Blue Angel. Other standards address environmental and social criteria along the supply chain e.g. Global Organic Textile Standard (GOTS), Better Cotton Initiative etc.

In the Netherlands, voluntary initiatives like the Green Deal, since 2011, have been a part of the green growth policy. For textiles, the Green Deal was superseded by a Textiles Covenant launched in 2016 covering a broad coalition of industry organisations, trade unions, civil-society organisations and the Dutch government. The agreement focusses on international responsible business conduct in the garment and textile sector in an effort to achieve practical improvements in and ensure the sustainability of the international garment and textile supply chain.

In the UK, WRAP (Waste & Resources Action Programme) set up the Sustainable Clothing Action Plan (SCAP) in 2012, primarily targeting clothing consumer retailers and brands. The SCAP2020 voluntary commitment targets leading organisations (representing 54% by sales value) from across clothing sector; supply; retail; civil society; re-use and recycling, to work together to reduce the environmental footprint of clothing. Signatories have pledged to collectively reduce the carbon, waste and water footprints of clothing they supply or receive in the UK by 15%, starting from a baseline year of 2012, measured through the use of a lifecycle assessment tool developed for the SCAP signatories. This initiative does not explicitly cover the design, supply or disposal of workwear in the UK although clearly has the potential to do so if there is a demand from the UK government to extend the initiative.

Other public and private initiatives establishing environmental and social standards have also been set up and taken up both by producers and retailers. For example, in France, under

the framework of Grenelle II law, a pilot aimed at developed a multi-criteria LCA based indicator to be used for communicating the environmental performance of textile to consumers. The results of the feasibility testing have been welcomed by both industries and consumers³³.

One business-led initiative of relevance is the Sustainable Apparel Coalition (SAC). One of the objectives of this initiative is the development of the Higg Index, an indicator based tool for apparel that enables companies to evaluate material types, products, facilities and processes based on a range of environmental and product design choices.

Ethical sourcing and manufacturing is particularly important to textile and clothing production, especially given the levels of imports for clothing and workwear to the EU (see Section 2.2.1). A broad range of social standard schemes have been developed by retailers and producers. The most common are summarised under the umbrella of the Global Social Compliance Programme³⁴.

3.5 Evolving public procurement practice

Embedding Sustainable Procurement in common practice has been a focus of the EC over the last decade, e.g. through the development and implementation of Green Public Procurement criteria. The new procurement directives also encourage more whole life thinking through the adoption of appropriate MEAT (Most Economically Advantageous Criteria). The new EU Circular Economy package also provides the opportunity for public procurement to extend the scope of existing SPP principles to consider use and disposal as well as sourcing in order to help close material and product loops. The principles also apply to single product purchases, e.g. workwear, carpets etc as well as to broader categories, e.g. textiles.

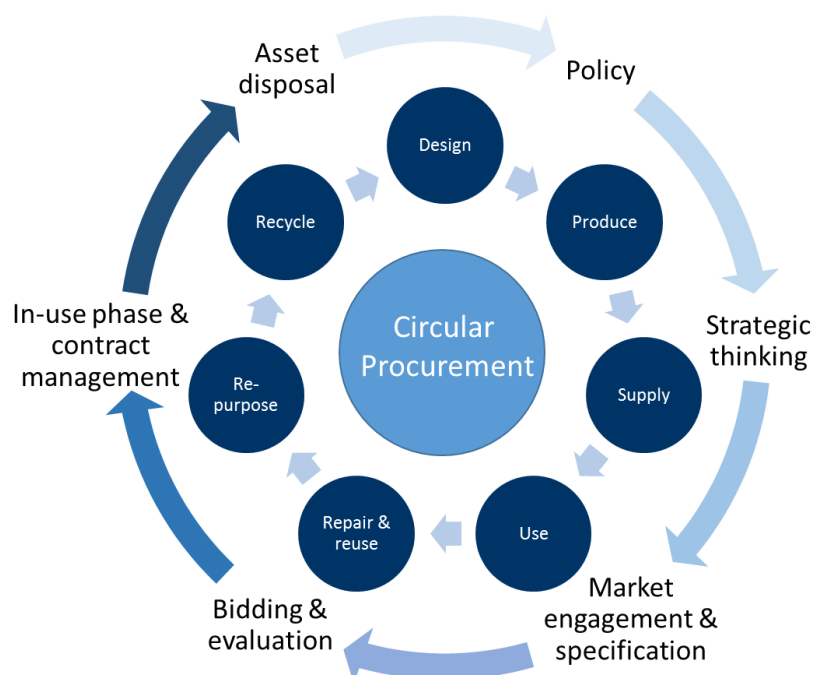
3.5.1 Circular procurement principles

The potential for textiles in general, and clothing in particular, to be circular in production and consumption is potentially very high but requires procurement actions to address all parts of the textiles lifecycle chain (Figure 1).

³³ *Retour d'expériences sur la filière textile/chaussure en Alsace, Bourgogne et Lorraine* (<http://www.afnor.org/atlas/europe/france/alsace-lorraine-bourgogne>)

³⁴ http://www.un.org/partnerships/Docs/GSCP_Guide.pdf

Figure 1 Embedding circular thinking within the whole procurement cycle



3.5.2 Resource efficient business models

Circular procurement also provides options for adapting the business as usual (produce-consume-dispose) model to a more resource efficient procurement model that delivers broader policy goals as well as benefits like cost savings, reduced environmental impacts and improving social wellbeing. There are many examples and some, such as service-based models are common in many EU member states for certain workwear items. There are broadly three types:

- Take-back – using the procurement exercise to enable suppliers and /or manufacturers to take-back workwear at end of use so that they can either be re-used, repurposed or recycled more effectively than going into general textile collection schemes.
- Buy & sell on – these models can create revenue streams and typically incorporate arrangements for the purchasing body to sell-on workwear at end of use either for re-use or recycling.
- Servitization - Product Service System (PSS) models can be relevant to workwear where in-use impacts and end-of-(first) life pathways can have a big influence of the overall environmental impacts. Product-service systems however are not by definition sustainable³⁵. PSS can include incentives for sustainable practices, but this needs to be organised and specified in the right way. Details on what is needed to ensure sustainability within the services are required to maximise their potential.

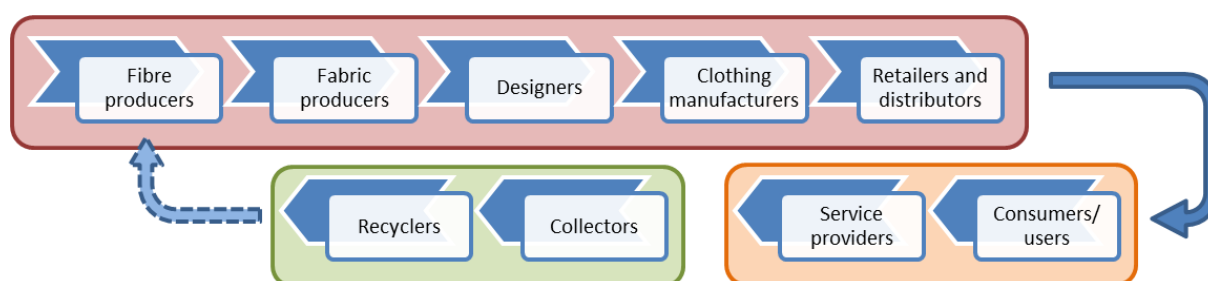
³⁵ UNEP SPP Working Group 3a 2015 *Using Product-Service Systems to Enhance Public Procurement. Technical Paper*

4.0 Textiles & workwear stakeholders

There is an extended chain of textile and workwear stakeholders from fibre production through manufacturing to disposal, that are involved the textiles and workwear clothing production and consumption loop. Stakeholders can be broadly divided into supply; demand; and, end-of-life. (Figure 2).

There are also a variety of other stakeholders with significant influence across policy & regulation (e.g. lobby and representative bodies), research & development (e.g. academia, testing & standards bodies), purchasing (e.g. central and bi-lateral procurement organisations), garment use (e.g. washing machine and washing agents manufacturers and suppliers), and end-of life (e.g. repurposing and repair businesses, textile brokers etc). Annex 4 provides a more extensive listing of some of the influential players within each group.

Figure 2 Key stakeholder groups for workwear



Government is both a consumer and also a significant influencer – through legislative, fiscal and regulatory mechanisms; and, through purchasing power. Government thinking is influenced by each policy think-tanks, industry organisations and academia. Academia also plays an important role in the development of technical and design advances within fabrics and fabric applications, e.g. dyeing and manufacturing processes. The distinctions and roles these stakeholders play are not necessarily mutually exclusive.

The heterogeneous nature of the various stakeholders as well as the extended supply chain they cover is a barrier to closing product and material loops. Developing roles, e.g. the Category Plan Manager in the Netherlands, and procurement processes that facilitate bringing these heterogeneous stakeholders together will be a valuable step in help to close the material loop. This highlights the importance that a -demand-led- approach can have in encouraging greater circularity in the workwear product loop.

4.1 Workwear demand

4.1.1 European Union

At a macro level, the European commission is an overarching stakeholder through its influence on policy drivers (see Section 3.2.1) as well as the provision of guidance, best practice case studies and procurement criteria through Green Public Procurement (GPP)³⁶.

³⁶ http://ec.europa.eu/environment/gpp/index_en.htm

4.1.2 Government

Government procurement bodies clearly have significant demand-pull potential within the workwear garment sector. In addition to its direct role as a purchasing client for workwear textiles, Government also has an indirect role through legislation and regulation. In some cases this can lead to challenges around overcoming significant barriers (e.g. fiscal) to encouraging more circular pathways for workwear procurement within public bodies.

Governments can also act collectively at an international scale to set policy direction and practice. A good example is the role the Nordic Council of Ministers (Denmark, Finland, Iceland, Norway and Sweden as well the Faroe Islands, Greenland and the Åland Islands)³⁷, founded in 1971, plays in encouraging research into the benefits of more sustainable textiles within its member countries.

In addition to national governments, the increasing trend for major cities to develop their own circular economy roadmaps, e.g. Rotterdam, Amsterdam, Copenhagen, London and Glasgow, makes these levels of government potentially very significant stakeholders alongside local authorities and municipalities, etc.

4.1.3 Procuring bodies

Within the public sector purchasing cycle, the main stakeholders are typically:

- Executive/Board (and potentially elected members);
- Policymakers;
- Budget holders (the internal client);
- Procurement team; and
- Users/ employees.

The key organisational roles to address when instigating changes in procurement practice around more circular workwear will be:

- Risk managers, e.g. to address process change;
- CSR specialists, e.g. to help identify benefits and make the case;
- Finance specialists, e.g. to address budgetary changes where required; and
- Innovators or 'champions' to engage in collaboration internally and externally.

Public sector bodies

Within the public sector there are a variety of stakeholders for workwear with varying needs in terms of garments, technical quality, functionality, durability/ service life and identity. Examples include, but are not limited to:

- Group service providers – uniforms for officials, security, facilities management etc.
- Emergency services – fire, police and ambulance
- Health sector workers – nurses and front-line staff uniforms, laboratory workwear and manual workers
- Education & research establishments – research, maintenance etc
- Military – uniforms
- Shared service organisations – postal services, maintenance operatives etc

³⁷ <http://www.norden.org/en/nordic-council-of-ministers>

- Infrastructure & construction – maintenance and servicing.

Central purchasing bodies

Central purchasing bodies (CPBs) are leading actors in the GPP landscape. Among the 10 member states (MS) considered in a 2015 study on strategic use of procurement strategies³⁸, Austria, France, Portugal, Spain and Sweden stood out as those MS where central purchasing bodies are committed to implementing strategic public procurement. For example, the Swedish central purchasing body (Statens inköpscentral) applies GPP criteria in the majority of its framework contracts. Similarly, one of the core mandates of the Portuguese central purchasing body eSPap is to contribute to environmental protection.

In the Netherlands, the Dutch government has centralised 'markets' for up to 30 categories by creating a national 'Category manager' role. This role provides a strategic link between policy and the suppliers within given markets such as textiles and workwear. This strategic role is mirrored in some cases, by CPB's. Their role often goes beyond their purchasing function, e.g. extending to promoting national sustainable procurement goals. For example, in Portugal eSPap, a CPB, makes GPP policy and contributed to the creation of the country's new GPP Action Plan together with the Portuguese Environment Agency (APA) and the National Innovation Agency (ANI). In Austria, the BBG (*Bundesbeschaffung*) is active on several strategic public procurement issues, and plays a key role as a PPI advisory body by supporting contracting authorities in implementing PPI projects.

In the UK, the role of the Crown Commercial Services brings together policy, advice, direct buying and providing commercial services to the public sector. As such it is a critical stakeholder within UK Public Procurement. Its current priorities do not explicitly extend to sustainability or encouraging more circular products and purchasing. However, the devolved nature of the UK government means that procurement responsibilities also lie within Scottish Government (SG) and the Welsh Government. The SG have their own legislation covering sustainable public procurement - The Procurement Reform (Scotland) Act 2014³⁹ – while in Wales the National Procurement Service for Wales was established to include all Welsh local authorities, the NHS, police forces, fire services, higher and further education, the Welsh Government and Welsh Government sponsored bodies.

Belgium is typical of many EU countries having some contracting authorities that purchase direct whilst others use a CPB framework or cooperate with one or more other contracting authorities. In many cases, this depends on the nature of the specific procurement. Central purchasing is typically organised by an entity that is part of the provincial or federal government, for example the Agency Services Department of the Government of Flanders has some framework agreements for workwear. Large federal departments such as the police and military have their own buyers and contracts.

Annex 5 summarises the different roles of CPBs in sustainable public procurement within their respective countries³⁸.

4.2 Workwear supply

Stakeholders can broadly be grouped into 3 categories within the workwear supply chain:

- Designers, producers and manufacturers – comprising product designers, fibre

³⁸ Study on "Strategic Use of Public Procurement in promoting green, social and innovation policies" DG GROW, 2015

³⁹ <http://www.gov.scot/Topics/Government/Procurement/about/Review>

producers (natural and synthetic; EU and importers); spinning; weaving; dyeing, printing, finishing; garment manufacturers. These stakeholders have a very significant role in terms of reducing overall environmental impacts of workwear and also, in the case of designers, improving the options for closing workwear product loops through re-use and recycling.

- Brands, retailers and distributors – comprising the retailers and suppliers of finished workwear. Their influence varies from country to country depending on the consumption and mix of imports and national production. However, they are an important stakeholder within the workwear sector and could be potentially high profile supporters and may be more willing to embrace opportunities due to wider CSR agendas.
- Service managers – service companies, group service providers and agencies are potentially important in terms of their role in optimising workwear lifetimes particularly through the delivery of more resource efficient business models (REBMs such as take-back, buy-back and servitisation. Washing & cleaning agencies.

Like other sectors, different parts of the supply chain are represented both collectively and separately by trade associations. Annex 6 provides a list of general EU textile associations. It is not possible to distinguish here which, if any, are specific to workwear but some assumptions can be made when reviewing the names on the list. The small scale nature of workwear production in Europe and relatively, the modest volumes and tonnage consumed makes these associations potentially useful access points to extended supply chains.

4.3 End-of-life, Re-use and recycling

The principal end-of-life stakeholders can be summarised as:

- Waste management companies;
- Dedicated textile collections services;
- Textile recyclers (including re-use);
- Charitable organisations – often included in CSR partnerships for re-use of workwear and often in partnership with or on behalf of collectors and recyclers; and
- Garment and textile brokers – traders (national and international) in any form of used clothing such as institutional mixed used clothing, credential clothing or sorted and graded used clothing.

Annex 7 provides a listing of Dutch textile recyclers and Annex 8 a similar list of UK textile recyclers. In the UK the Textile Recyclers Association acts as the member based body representing collectors, re-use and recycling within the UK. It is not possible to distinguish between those collectors and recyclers who focus on workwear but in the UK the leakage in the take-back loop means that a significant proportion of workwear will be disposed of through non-commercial routes.

In terms of ECAP project partners, the key associations of relevance to clothing (and therefore workwear) are likely to be:

- Denmark - Federation of Danish Textile & Clothing www.textile.dk,
- Netherlands - Association of the Netherlands Textile Industry www.textielnet.nl; and
- United Kingdom – Textile Recycling Association www.textile-recycling.org.uk.

There are numerous international trade and umbrella organisations that also cover workwear garments as part of wider textiles, for example, the Secondary Materials and

Recycled Textiles Association (SMART)⁴⁰. Umbrella associations like SMART support not just trade but also educate and carry out awareness raising activities.

4.4 Summary of stakeholders

The roles and relative degree of influence of stakeholders on national consumption and production of workwear depends heavily on the size of procurement opportunity and the EU member state involved. For most member states demand is influenced, when applied, through sustainable public procurement policy and Green Public Procurement criteria.

The supply is typically driven in response by national regulatory requirements and in workwear, is not seen as particularly proactive in terms of innovation for closing material loops. Stakeholders have yet to extend good practice in sourcing public textiles and workwear into better use, e.g. extending product life, and closed loop recycling options. Demand, for example for more circular procurement of workwear, therefore requires the demand-side stakeholders to stimulate and incentivise the supply-side stakeholders to deliver more circular products. There is some emerging evidence of more collaborative approaches to supply, such as Dutch aWEARness initiative⁴¹. However, these partnerships and new business models need more encouragement from the demand-side to ensure commercial viability through critical mass.

Further research would be required to identify and understand better the detailed stakeholder relationships and potential influence across the different workwear categories outlined in Section 2.4. This is particularly important in identifying the role that collective action, e.g. through the EU LIFE 2014 ECAP, can play in achieving more circular workwear.

Case Study: Rijkswaterstaat, The Netherlands

The Dutch Rijkswaterstaat lock stewards wear distinctive clothing which is replaced every season. A pilot for a circular work clothing package over two years for 56 stewards showed a good opportunity to develop a circular model that Rijkswaterstaat can make purchasing a contribution to the circular economy.

The performance-based procurement with Dutch Awareness focusses on leasing so the supplier remains the owner of the clothes and hence the raw materials. The items go back after use to the supplier for recycling using a track and trace system (Circular Content Management System).

The rainwear items are 100% recyclable thanks to Infinity, a 100% recyclable polyester fabric. This substance is shredded into fibres, which are then be used for new items of clothing for the next season. The environmental impact of this pilot is minimal, since no new materials are used and no waste is created. According to the supplier, this process can be repeated up to eight times.

After the two year period if the evaluation shows that the pilot is a success, the circular approach, including leasing of garments, will be extended to other workwear products within the Rijkswaterstaat.

⁴⁰ <http://www.smartasn.org/>

⁴¹ Dutch aWEARness initiative <http://dutchawareness.com/>

5.0 Challenges and opportunities

5.1 Sustainable workwear

Evidence from a growing number of EU countries suggests that significant opportunities for resource efficiency exist within clothing and workwear. By extension, these will help close the loop for workwear if adopted. In the UK, no cost/low cost resource efficiency improvements of around 2-10% are achievable at each of the different stages of clothing production. If higher investment in business models, processes and infrastructure is considered, then resource efficiency savings of 10-75% are typical. The scope for resource efficiency improvement appears roughly equal between polyester and cotton.

Potential improvements in design and the supply chain include:

- cotton fibre production stage – growing and ginning (where energy savings of up to 5% and water savings of up to 82% are possible);
- polyester yarn production stage (where energy savings of up to 84% are possible);
- polyester fabric dyeing/production stage (where energy savings of up to 40% and water savings of up to 100% are possible);
- integrating a (mixed) fabric dyeing stage (where energy savings of up to 70% and water savings of up to 40% are possible); and
- manufacturing of garments (where energy savings of up to 25% and waste savings of up to 10% are possible)⁴².

The challenge is to understand how encouraging these improvements through proactive procurement in workwear would help reduce the impacts of workwear consumption and production alongside closing the workwear textiles loop.

5.2 Sustainable procurement of textiles

Many EU member states use sustainable procurement of the products purchased to set an example to wider business and society. This approach acts as a market driver to encourage innovation and a change in purchasing habits although price and existing procurement models continue to act as barriers where whole life costing approaches are not taken.

The heterogeneous nature of both the demand side and the supply chain for workwear highlights the challenge in increasing their circularity. By definition, adopting more circular procurement that account for usage as well as disposal increases the burden of responsibility. This requires an effective top-down approach to procurement that ensures risk and responsibilities are equally shared. Even where there are top-down drivers, it has proved difficult to introduce new fabric requirements as each demand/procurement has its own characteristics, and typically procurers can't copy pilot procurements.

Procurement in the Netherlands over the last 5 years has moved beyond simply setting criteria, either GPP or EcoLabel, as a mechanism for encouraging green products. The prevailing view has been that procurement has to be more dynamic and proactive in facilitating markets and conditions that actively encourage suppliers to close product loops. Since 2013, a sectoral approach has been adopted and the workwear category was formally

⁴² Review of resource efficiency opportunities in clothing production. WRAP 2012

established in 2014; a further example is the Textiles Covenant. The total potential saving is estimated to be about €3.3 million over the next 5 years divided proportionally among the participating departments. Buyers can stimulate and demand circularly produced goods with public and private parties (for example the four largest municipalities and the Ministry of the Interior and Kingdom Relations on behalf of the Dutch government) agreeing to use their procurement policies to boost the circular economy.

Garments and textiles are also increasingly forming part of Product Roadmap workstreams where national governments, like the Netherlands and the UK, are targeting effort on high impact product categories. This focussed on three high-level aims to:

- establish the impacts that occur across the life cycle of each product;
- identify existing actions being taken to address those impacts; and
- to develop and implement a voluntary action plan to address any gaps.

A number of trends are evident from the overlap between the supply of textiles and workwear and the development of sustainable public procurement practices:

- Socially responsible procurement of workwear – typically led by risk around ethical sourcing but increasingly, e.g. through Dutch Green Deal pilots, focussing on closing garment loops through increase lifetime optimisation, re-use and recycling. These typically promote the core values of business ethics; expertise and objectivity; promoting competition; and sustainability.
- Innovation oriented procurement – encouraging the market to innovate and deliver more sustainable and more circular products. Workwear provides a particularly strong example given the purchasing power of public bodies within the workwear sector.
- Corporate Social Responsibility – the extended global supply chain for the sourcing of raw materials, production and finishing of workwear has profound implications on the CSR of purchasing organisations. Closing material loops can help mitigate this risk to some extent.
- Strategic purchasing – using the procurement of workwear to contribute to wider policy goals, for example contributing to greater resource efficiency and a more circular economy where countries, like Denmark, the Netherlands and Scotland have developed CE strategies.

Suppliers are now offering alternative raw materials, such as bamboo or bio cotton, particularly because of quality requirements (cf Rawicz Hospital case study). However there is little evidence that recycled content is widely offered, partly because workwear items are not yet standardised. Procurers are typically adopting lowest pricing rather than BPQR performance base environmental criteria⁴³.

The Dutch aWEARness initiative highlights the need for collaboration within the supply chain and that cooperation is a necessary condition in the chain to facilitate greater circularity. Someone must take the lead and bring the necessary parties together and Otto advocates the creation of a 'Chain Director' or champion to make the chain work.

⁴³ Rijkswaterstaat. Personal communication. September, 2016

5.3 Challenges and opportunities

The textiles sector in Europe has suffered from the global economic recession along with other EU manufacturing. The impact has been greater since a number of the Big 5 EU textile and workwear producers, e.g. Spain, Italy and the UK, were all particularly hard hit by the recession. To maintain their competitiveness, many countries have been forced to further reduce production costs. This may have implications when considering end-of-life recycling opportunities for closing the fibre loop.

The European Union faces a choice between the transition into a de-industrialised economy and defending manufacturing production capacities according to a 2010 EU textiles sector report⁴⁴. Current trends indicate the former rather than the latter. The report concludes that the production of manufactured goods such as clothing is less profitable than the production of services, and that the growth potential lies in services. This provides a clear opportunity for workwear, given its commercial and strongly public sector client base. Not only is there the potential for niche, high value manufacturing and finishing but developing a closed European workwear loop could encourage more servitization within workwear through more circular procurement practices.

The textiles sector report also concludes that Europe has the choice between the continuation of its growth strategy, an ecological economy or a "jobs first" strategy⁴⁴. However, this either/or choice takes no account of the opportunity to deliver both through a wider perspective focussing on developing a more circular European economy.

There are numerous opportunities for public procurement to encourage closing the textile loop in workwear through more informed demand, including better understanding of use and disposal as well as sourcing options. A key opportunity is embedding circularity of products within the relevant GPP criteria to ensure action is taken at a mandatory and voluntary level. Some opportunities are dependent on national ambition, e.g. fiscal incentives and disincentives; some require collective action, e.g. where global supply chains are involved; whilst others can be considered on individual procurements, e.g. incorporating reporting and encouraging servitization.

Opportunities for using procurement to help close workwear textile loops span all parts of the supply chain and should be considered as part of a wider package to ensure the greatest impact and take-up. However, due to the varied nature and purposes of workwear, opportunities can also be targeted at certain parts of the workwear loop and can be considered on a case by case basis.

5.4 Workwear supply chain

5.4.1 Challenges

The environmental and social impacts of fibre and fabric production and manufacture are well documented. Sourcing of fibres, fabric and finished articles is influenced by a global supply chain and world trade rules and markets where full environmental & social costs not internalised. Table 2.2.1i highlights the level of imports within EU member states. Europe is a net importer and relative to other markets is not necessarily the most influential which reduces the influence of procurement upstream in production and design decisions. This also means waste materials and pollution in the production process are inside and outside of EU

⁴⁴ *The textile and clothing sector in Europe. 2010*

territorial boundaries. It also increases the levels of packaging waste to longer supply chains and also examples of re-packaging. Global sourcing and markets also make traceability and transparency problematical, and longer supply chains add to pollution impacts.

There is still a limited awareness of new technologies, across the wider market, that can reduce waste through better design, e.g. computer cutting, non-chemical dyes.

Cost pressures are perhaps the most easily recognisable challenge both to the producers as well as the purchasers. Low margins in fibre production, fabric and finishing, impact on production processes and working conditions at all stages of the production process.

5.4.2 Opportunities

Industry led approaches have shown potential to reduce energy, chemical and water use. These can overcome geographical and cultural differences across extended global supply chains with major exporters such as China, India & Pakistan. Supply chain initiatives can also broaden the scope for improved transparency, e.g. increased audits, indicators, reporting, standards/labelling. These initiatives can be supported by public sector bodies through enforcing and encouraging use of ILO standards (e.g. child labour, gender issues for women) for supply chain outside of EU regulation to ensure consistent approach to standards. Shorter closed loop supply chains are also beneficial for quicker response to market trends and can reduce transportation impacts.

In terms of infrastructure, better understanding of trade-offs between competing technologies, e.g. for innovative fibres and production and improving end-of-life options. The Polish Rawicz Hospital procurement of an alternative cellulose yarn produced from the pulp of eucalyptus tree – is a good example of the role procurement can play in encouraging new materials. Customer demand can encourage for increasing innovation for improved sustainability. A better understanding of market demand can widen the scope for employing more efficient new technologies and more research. The scope can also extend to reduction of packaging, or using re-usable containers. Tax and procurement policies can also be used to incentivise circular product suppliers and good employers.

5.5 Workwear design

5.5.1 Design challenges

A significant challenge identified in the Netherlands, but widely relevant across the EU, to promoting innovation within workwear procurement is the need to allocate an R&D budget alongside longer lasting contracts (typically 4 years). This is necessary to enable some degree of confidence within the supply chain. To encourage investment by the market, benefits should also run back to the supplier and/or manufacturer. This is more likely to happen if contracts are extended beyond 6 years⁴⁵.

Branding and design choices within public sector workwear mean that lifetime optimisation, in particular, is often low. Re-branding and design choices can account for around 50% of all replacement needs.

⁴⁵ *Rijkswaterstaat. Personal communication September, 2016*

Materials choices at the design stage have significant consequences on the impacts in-use and options for recycling and re-use at end-of-life. The heterogeneous nature of workwear and lack of standardisation even in the same service, e.g. nurses uniforms, all act as barriers to closing the workwear material loop. Design is not just limited to garments, but also fibres used (e.g. recycled, low impact fibres), and production processes (e.g. dyeing, energy efficiency).

5.5.2 Design opportunities

Design of the garment and of the garment management scheme can help facilitate re-use or recycling. This can include fibre choice, labelling, product take-back schemes or partnerships with third parties who can re-use or recycle high proportions of the used textiles.

Market engagement with designers and producers can encourage more closed-loop thinking around the design of textile and clothing products through fibre choices, application of additives, quality levels etc that impact on re-use potential, durability and recyclability (e.g. ease of taking apart).

Uniforms often include logos or badges that are difficult to remove, but many could use removable badges if specified, for example, when standardising nurse's uniforms in the Welsh National Health Service⁴⁶. Opportunities also exist to specify levels of recycled content in new textiles (e.g. carpet tiles) and clothing. The Dutch Textiles Covenant and EU LIFE 2014 pilots are trialling requirements for between 20-25% recycled fibres in certain product categories.

Encouraging new technologies can reduce waste through better design, e.g. computer cutting, the appropriate use of additives and non-chemical dyes. This requires dialogue with designers as well as manufacturers at the market engagement stage of the procurement cycle.

Market engagement should also focus attention on the design phase, e.g. to a ensured 'cradle to cradle' approach such as design for re-use, re-purposing and recyclability; lifetime optimisation for more circular products. This also provides the opportunity to identify and specify the use of lower impact fibres, fabrics and designs in workwear garments.

5.6 Workwear purchasing and use

5.6.1 Challenges

The reliance of many national governments on mandatory and/or voluntary GPP or buying standards means that unless these are revised regularly to reflect developing EU policy, e.g. on resource efficiency and increasing product circularity, then opportunities to extend garment life and encourage re-use and recycling will typically be overlooked without additional action.

Over-ordering can account for around 13%⁴⁷. Allocation of clothing is often based on entitlement rather than need so many items are either not allocated or allocated but not

⁴⁶ UK Defra 2011 *Sustainable Clothing Procurement – Uniforms in the NHS*.

⁴⁷ Laitala K. & I.G. Klepp, 2011 *Environmental improvement by prolonging clothing use period*

Case study: Rawicz Hospital, Poland – Nurses Uniforms

Rawicz County Hospital is a 200 bed county hospital serving a population of about 69,000 in the west of Poland. In addition to overall refurbishment of hospital buildings, the management set up a pilot for the supply of hospital uniforms, due for renewal in 2012, to explore new approaches to public procurement.

In addition to user dialogue (based on knowledge gained from visiting practices in the Netherlands and the UK), the pilot developed outcome based specifications in addition to using whole life costing. These included:

- easy to wash and keep clean;
- environmentally friendly (with no impact on its usefulness);
- durable and of good quality (allowing an extension of its lifespan); and
- cost effective.

An important innovation for the hospital was external collaboration to build economies and benefits of scale. Rawicz approached other hospitals, healthcare centres, associations and the LCBHEALTHCARE network and recruited 8 partners covering 13,000 staff.

Following supplier engagement, testing garments for three months highlighted the benefits of a new mix for the nurses uniforms: 50% polyester and 50% tencel (tencel is a new generation of cellulose yarn produced from the pulp of eucalyptus tree). This textile has all the required clearances to be used in healthcare. Following tendering, the preferred bid did not offer the lowest purchase price of the product but had the lowest whole-life cost due to low exploitation cost and longer life period. The offer with the lowest initial purchase price turned out to be the one with the highest whole-life cost.

used. This reduces the overall functional lifetime of the garment if it isn't tracked or collected for re-use.

Where pilot for good and best practice exist, scaling up pilot projects into wider practice also remains a significant challenge as the EU LIFE REBus project has demonstrated in conjunction with the Green deal initiative in the Netherlands. Even where centralised policies encouraging greater circularity in procurement are in place and pilot projects exist, the scale of ambition varies between different Government departments and procuring bodies. This extends to regional variations in ambition and implementation for example between different municipalities and, in the case of the U.K., different devolved governments.

Procurement needs to consider the impact of design and consumption trends that typically emphasise short product lifetime e.g. re-branding/labelling or new regulatory requirements (e.g. for Health & Safety, uniforms etc). Where recycled content specifications are being set, it is important to ensure that verification of RC is robust and where self-certification is accepted, testing methods are open and transparent without loading suppliers with undue costs of certification.

Rental/service models not universally available or requested across all public services. Additionally, cleaning during lifetime has significant adverse impacts (use of water, energy, chemicals, etc.) and unnecessary washing and drying practices (e.g. tumble drying) have become embedded in servicing to reduce labour and cost requirements. Therefore service-based models need to be looked at carefully in terms of requirements and specifications to

ensure they do not increase the environmental burden from the in-use phase of workwear garment lifetimes.

In terms of use the biggest challenge in-use comes from care and maintenance, particularly through washing. Repair options are limited outside of service contracts as repair services, e.g. in Northern European countries, have been declining over the last decade. This reduces the potential lifetime of garments.

5.6.2 Opportunities

Public bodies can encourage and adopt practical, clear, and meaningful standards, certification, labelling and traceability systems that address all aspects of sustainable development balancing benefits across different policy goals. There is also considerable **scope for increased circular procurement of workwear garments that help deliver higher sustainability standards and corporate social responsibility**, e.g. through GPP criteria. This can be achieved through increasing awareness within public sector bodies and stakeholders of the benefits of more circular textiles and workwear procurement.

Encouraging procurement champions, like the Category Manager and 'Chain Director' approach in the Netherlands, which coordinate the workwear demand and supply chain in a more systematic way enabling innovation and development of more circular practices and products. There is also scope for reducing the distribution impacts by encouraging more local production within closed loop European markets.

There is **scope for promoting greater awareness of circular textiles** by procuring bodies. This requires increasing the availability of information at key decision points within the procurement and use phases of the garments lifetime. Sustainability footprints, e.g. ecological or carbon based, can be made more transparent through better procurement. The importance of ensuring ethical issues is already high profile, so linking circularity with ethical benefits can deliver multiple benefits. Closing workwear textile fibre loops within Europe can create greater transparency in production and sourcing as well as retain and grow skilled workforces within the wider European Union. Governments also have the opportunity to encourage and implement "track and trace" systems within markets like workwear and can use their 'demand-pull' to create greater awareness for returning clothes. This can mitigate sourcing and ethical risks as well as close textile loops.

Encouraging more resource efficient business models (REBMs) that enable a whole life approach to be adopted within workwear procurement. There are numerous models that can be summarised as either servitization, take-back or buy & sell-on opportunities and could be considered as part of initial procurement rather than through separate waste contracts. Certain services, like the Police, Fire and military, potentially offer scope for increasing servitization and leasing approaches. Many examples are already in operation so

Case Study: Sustainable workwear, The Netherlands

Alliander, Dura Vermeer, TBI and Croon have set a combined target on sustainable corporate clothing of 40% of the purchased company clothing to be circular by 2017. The project stems from the Green Deal circular buying in 2014.

Although the individual businesses have highlighted challenges around increasing circularity, for example in non-standardised and multi-standard clothing, they have all initiated individual procurements and are working with their supply chains to achieve the 2017 target.

the scope exists to broaden their use across other public services and also to include specifications and requirements for closing workwear product loops.

Collaboration among procuring bodies not only has the potential to realise economies of scale, but also to enable greater influence further down the supply chain, e.g. in design and material choice. CPBs are one option but regional collaborations, e.g. like those in healthcare procurement could be extended more widely in workwear. The Dutch Category Plans provide a useful framework to consider.

There is also now increased scope for including **proportionate criteria for more circular workwear through the use of Best Price-Quality Ratio (BPQR)** under the new EU Procurement Directive. For example, using BPQR can enable targets for recycled content of fibres to be set within tender specifications to help close textile fibre loops.

Increasing the functional life of workwear garments is a key opportunity.

Specifying product care labels can also improve durability through recommended approaches to washing (detergent dosing levels and temperature of wash) and drying (line drying versus tumble-drying) of garments. Improving durability within clothing is an important element for circular procurement. However, durability may not be a relevant attribute for all end products. In some cases, specifying 'better quality' does not mean hard-wearing but instead may refer to user comfort and aesthetics. These qualitative attributes may mean the item can be worn more frequently and kept for longer.

Developing markets for re-use and recycled products and materials is critical to closing material loops. Creating demand-pull to encourage stronger markets for better products, through government policy measures is an integral part of a sustainable procurement policy. In addition, the procurement process can also be used to encourage industry cross-sector improvements linked to workwear, e.g. industrial cleaning equipment, white goods and detergent ingredients, detergent use, lower temperature washing etc.

In the use phase there is scope for influencing and specifying cleaning and servicing practices, e.g. guidance and labelling for washing, care & maintenance and repair options. Linking these to personal incentives would help ensure take-up by the user.

More **education/awareness-raising on sustainability impacts and benefits** of closing workwear textile loops through controlled disposal re-use and recycling rather than open (exported) re-use options is required. The potential for promotion of second-hand workwear also requires further research, for example the impact of textile coatings (deodorising and anti-sweating agents etc).

5.7 Workwear end-of-life

Many textile products, especially clothing, have longer functional lives than the contract-life or financial write-down allow for. What happens to clothing at the end of the use phase therefore has a significant environmental and potentially economic impact but is typically not considered at the purchasing stage in any detail.

5.7.1 Challenges

A significant portion of discarded textile and clothing is sent to landfill or to energy recovery from waste (EfW). Work wear often has higher quality specifications than consumer equivalents. For example, in the Netherlands the denim in military uniforms has been re-purposed in other garments and into tent fabric following de-camouflaging. Through the

Green Deal for circular procurement and the new Textile Covenant⁴⁸ the Dutch are also piloting an upgraded collection and sorting project to enable new fibres to be produced from collected corporate clothing.

Currently, too little fibre is re-used and recycled (less than 3%). If the sector is to be sustainable 'waste' needs to be treated as a resource. The EU LIFE REBus Dutch MoD pilot highlighted that colour requirements from the air force are so specific they are difficult to combine with recycling opportunities. This is typical of many specifications not just for uniforms but also for example, security requirements. Many public sector services require secure disposal of items at end-of-life. However there are still options for recycling and fibre recovery in place of incineration.

Dedicated workwear re-use and recycling operations frequently encounter feedstock problems relating to volumes and quality. Lack of dedicated textile collection methods can also reduce quality and potential for re-use due to contamination. Many collection services also co-mingle workwear garments with household clothing of variable quality which potentially reduces its re-use and economic value.

5.7.2 Opportunities

Legal & fiscal instruments discouraging landfill and encouraging greater circularity and use of secondary raw materials are a high level option. For example, landfill bans and landfill levies have all played significant roles in reducing materials to landfill in countries where they have been employed. Fiscal incentives to encourage greater take-up of secondary raw materials would address the significant price sensitivity with re-used clothing and recycled fibre production.

Adopting more resource efficient business models can address issues of both quality and volume where dedicated arrangements are factored into the procurement exercise. Take-back and servitization models are both potential options. It is important to identify the mix of benefits of options available for ensuring the most viable 'end-of-life' transition to 'beginning of next life'. For example, options include producer responsibility schemes; recycling/ and/or re-use targets; technologies, like track& trace, that optimise re-use and quality control.

The EU LIFE+ REBus project has shown that realising the benefits from procuring more circular products is not so much hindered by policy but by existing processes and in some cases by the financial structures, e.g. separate capital, operational and waste disposal budgets.

There are numerous technologies available for workwear recycling, including:

- textile sorting: manual and automated;
- mechanical recycling: flocking, nonwovens and shoddy manufacture; and
- chemical recycling: polyester, nylon and polypropylene.

Sorting typically provides the most economically viable mechanism as it promotes lifetime optimisation through re-use – a key opportunity for workwear. The other recycling technologies are either small-scale or low value (e.g. 'downcycling') or currently uneconomic with current collection and quality levels. Chemical recycling is technically feasible and whilst a report in 2012 found it was economically unfeasible in the UK at the time, market

⁴⁸ Green Deal (in Dutch) <http://tinyurl.com/bujrlco>

conditions vary from country to country and change over time. Public sector procurement for certain items such as uniforms can create a critical mass for changes in design specifications and demand for viable garment quantities.

Public sector bodies can also encourage industrial symbiosis for better matching supply (of waste) and demand (for waste as a feedstock for new products) through the procurement process.

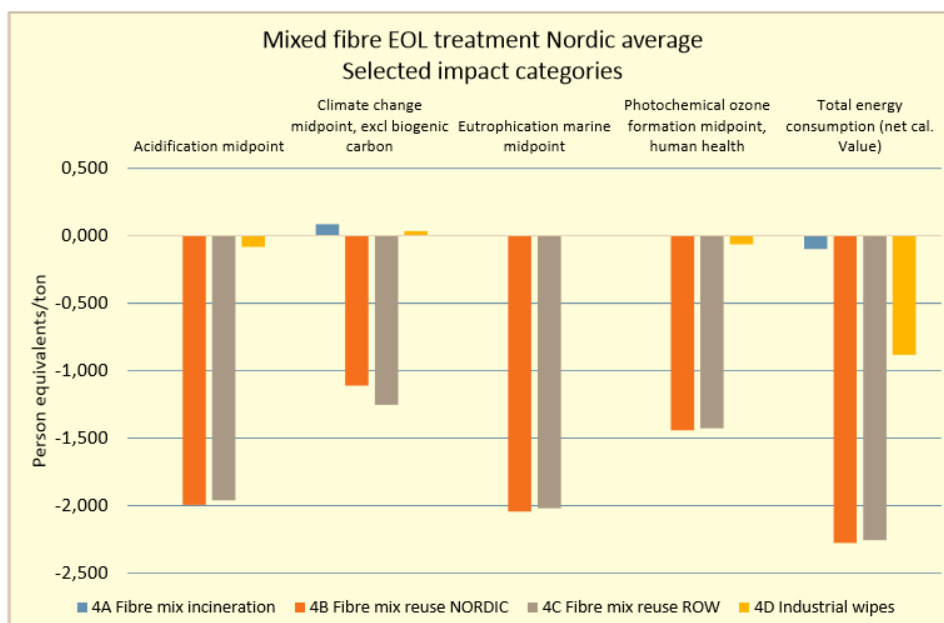
5.7.3 Life cycle impacts and scale-up potential

Significant ecological and climate change benefits are potentially available from closing the workwear textiles loop. Figure 5.7.3i shows the variation when one tonne of textiles from mixed fibres is incinerated, re-used or recycled. In each scenario all fractions of the (Nordic average) mixed fibres composition are assumed to follow the same treatment route after collection³¹. The results give an indication of the significant potential environmental benefits that can be achieved on the national level through diverting textile and clothing from incineration and waste to energy pathways at end-of-life to more circular pathways.

In Sweden, the amount of textiles that currently are not collected separately amount to about 100,000 tonnes per year. By following more circular pathways at a national level, the 2016 NCM report estimates annual savings in Sweden alone of the order:

- 466 thousand tonnes of CO₂-equivalents;
- 54 million cubic metres of water; and
- 6,600 TJ of energy.

Figure 3 Contribution to selected impact categories in the mixed fibre scenarios



5.8 Learning summary

5.8.1 Supply

The sustainable procurement opportunities relating to workwear can be summarised as:

- The delivery of more innovation by suppliers.
- Increasing take-up of alternate, more resource efficient business models.
- Management and anticipation of supply risks to ensure the continuity of the business activities.
- Increasing margins through adoption of service-based models.
- Increasing recycled content of products to meet demand for more circular products.
- Improving design of workwear items to enable lifetime optimisation and improved recyclability at end-of-life.
- Partnering, e.g. in repair, collections, recycling and industrial symbiosis to promote more circular textile loops where take-back models are not a viable model.

5.8.2 Demand management

Demand side opportunities can be summarised as, but not limited to:

- Greater awareness of the contribution of procurement in a broad sense to benefits for the organisation.
- Challenging the need, e.g. to own workwear.
- Utilising resource efficient procurement and REBMs to increase the depth and the effect of cost management.
- Management and anticipation of supply risks through circular procurement to ensure the continuity of the operational activities.
- Influencing design of garments to optimise functional life and improve end-of-life re-use and recycling options.
- Increasing lifetime and durability in-use to reduce embodied energy impacts, e.g. through washing, and to improve quality of workwear at end of use.

On the demand-side the introduction of roles like the category manager in the Netherlands provides opportunities to harness economies of scale both for impact reduction and purchasing power at a sectoral level. For heterogeneous sectors like workwear this is important but requires the category and the contract manager to understand the business alongside his or her professional knowledge of procurement, knowledge of and proactive relationship with the market and with various interest groups.

6.0 Summary and recommendations

The following summary statements and recommendations are grouped according to the themes developed within the report. These recommendations are intended for consideration initially the EU LIFE 2014 ECAP partners but are relevant to stakeholders within the procurement and workwear user categories of public bodies.

6.1 Current position

- Workwear accounts for a very small percentage of overall textiles clothing production (ca 3%) and apparent consumption (ca 1.5%). However, in the context of

procurement, public bodies have a high degree of influence and across the EU contribute to over 93,000 tonnes of workwear consumption per annum within multi-year contracts totalling over €8.6 billion in 2015.

- Beyond these headline figures the availability of data for workwear is very limited at the European level. National data is not easily available for individual countries if it exists at all. Primary research on workwear is required to address the data gaps and assess the true material flows for European workwear. This will enable a better understanding of the impacts and the opportunities for public procurement to stimulate more closed loop textile production and consumption in Europe.
- Green public procurement criteria are available for workwear but Northern European countries are currently the most proactive in encouraging market innovation around closing textile loops. Amongst these the Dutch Government has shown the importance of linking policy and implementation through its integrated Circular Economy strategy and procurement Category Plan for workwear.
- Analysis is required to understand the cost benefit of centralised service contracts versus purchase-distribution models. The trade-off between consistent washing of garments versus service life and durability needs to be understood for high quality items where individual washing results in inconsistent lifetimes of workwear garments.
- Current trends in Europe towards de-centralisation of textile manufacturing highlight that the production of manufactured goods such as clothing is less profitable than the production of services, and that the growth potentials lie in services. This provides a good opportunity for workwear in contrast to the wider clothing sector, to explore the potential to encourage more servitization within workwear to help close product loops.
- A distinction is made between the definition of workwear, which covers multiple products and segments and the broader public procurement of textiles. As the evidence shows, it would be more effective to focus on segments within the broader public procurement of textiles where impact by volume, value and environmental benefits are greatest. The approach to closing the material loop will vary depending on the influence of the procuring body in specifying the design and the business model (e.g. take-back). Where the influence is low, focus should be on increasing recycled content in new products, ensuring longer lifetimes and better collection for re-use and /or recycling.

6.2 Closing the workwear textile loop

- The theoretical potential for circular workwear is high for both synthetic and natural fibres. However, to achieve the full potential a balanced approach that engages and incentivises a wide group of stakeholders will be necessary.
- There's a reasonably high level of collection for re-use in clothing within northern European countries, typically between 50-60%. This is based primarily on re-use of household clothing so typically discourages collection of lower quality and value re-use garments which could potentially be re-used or recycled. However, for commercial workwear there is significant leakage in the household collection system the rate could be much higher if greater attention was paid to dedicated commercial collection. This would aid both re-use and recycling and help close the fibre loop for workwear items.
- Influencing the design phase provides best opportunity to ensure 'cradle to cradle' design for materials choices. This can impact positively on lifetime optimisation, e.g. repair; and re-use, re-purposing, recyclability.

- Market development is critical to ensuring the commercial viability of closed textile loops. This includes recycling options as well as alternatives, including re-purposing, for re-use.
- As well as focussing on design and procurement criteria for more circular workwear, more focus and awareness is needed around minimising in-use impacts, for example through lower impact washing practices and through encouragement of repair and re-use within the functional lifetime of workwear garments.

6.3 Stakeholders

- Government procurement bodies clearly have significant demand-pull potential within the workwear garment sector. This 'demand'-pull' is not yet fully exploited regarding sustainable procurement and specifically, the development of more circular workwear within European member states. Greater collaboration is required within different roles in the procuring organisations and with the workwear supply chain to understand the full potential for closing the textile loop. Pre-competitive market dialogue workshops have been shown to be important mechanisms for enabling circular visions to be shared and innovation to be encouraged.
- The heterogeneous nature of both the demand side and the supply chain for workwear highlights the challenge in increasing the circularity of products and workwear services. An effective top-down approach to circular workwear procurement, implemented at all levels, would ensure risk and responsibilities are equally shared.
- Communicating circular ambitions to the market early will help enable innovation in design, manufacture and supply (e.g. REBMs).
- Collective action such as industry led approaches can work well and can be encouraged through market engagement and workwear tenders. For example, supply chain collaboration to deliver more circular products and services, e.g. manufacturers with service agents, repair and re-use SMEs and collections (take-back; buy: sell-on models)
- A better understanding of market demand can de-risk innovation. Sectoral approaches in the Netherlands and the UK have successfully demonstrated the potential for voluntary agreements to use collective action to close material loops. There is scope to expand these to cover workwear items in countries where voluntary initiatives already exist and to consider them as mechanisms for closing textile loops in EU countries where they do not.
- Further research would be required to identify and understand better the more detailed stakeholder relationships and potential of influence across the different workwear categories. This is particularly important in identifying the role that supply chain collaboration and collective action across EU members states, e.g. through the EU LIFE 2014 ECAP, can play in realising the potential for more circular workwear.

6.4 How circular can workwear be?

- The circularity of workwear textiles is potentially much higher than present for both synthetic and natural fibres subject to commercial viability. Virgin fibres are required in some cases but increasing quality and quantity of used workwear supply through more controlled collection and take-back would help address both aspects.
- Including targets for recycled content and for re-use/recycling as requirements in public procurement contracts would help close loops and encourage the adoption of more whole life approaches and business models for workwear. Research is required

to understand the detailed cost-benefits as these will vary with scale. Adopting national procurement strategies as the Dutch have done through the Textiles Category Plan could help provide the necessary scale and scope for collaboration within the supply chain.

6.5 What are the priorities for next steps

- The role of certification and its potential in helping to close textile loops has not been identified in the available evidence base. It could be potentially a useful mechanism as part of a broader strategy for closing materials so further work is required to examine its potential role and impact.
- Developing a market led roadmap for circular workwear over the next 5 years to identify the mix of actions, timescales, stakeholders, costs, benefits and incentives required to ensure appropriate buy-in and take-up of more circular workwear across EU member states.
- The EU LIFE 2014 ECAP project is in a position to address some of these recommendations directly as part of its ongoing activities. Where it cannot, it is recommended that the project communications activities highlight the relevant action required at national (partner) and European Commission level.

Annexes

Annex 1 Workwear production and PRODCOM codes

EU trade by SITC (since 1988) to get weights for imports and exports is based on Standard International Trade Classification (SITC) classification of goods used to classify the exports and imports of a country to enable comparing different countries and years. For clothing these are 84XXX. However these cannot be reconciled for workwear, occupational or industrial wear against the PRODCOM PRC codes in Eurostat used to extract economic value and 'sold production, exports and imports' clothing given in units (garment numbers). Table 5 summarises the relevant codes for workwear. Quantitative estimates at national and EU level therefore recognise and suffer from the inherent lack of accuracy in using this approach. It also highlights this as a significant gap in the way that clothing - specifically workwear items are reported.

Table 5 Production and consumption of 'industrial and occupational wear', PRODCOM 2015

PRC Code	Description
14121120	Men's or boys' ensembles, of cotton or man-made fibres, for industrial and occupational wear
14121130	Men's or boys' jackets and blazers, of cotton or man-made fibres, for industrial and occupational wear
14121240	Men's or boys' trousers and breeches, of cotton or man-made fibres, for industrial or occupational wear
14121250	Men's or boys' bib and brace overalls, of cotton or man-made fibres, for industrial or occupational wear
14122120	Women's or girls' ensembles, of cotton or man-made fibres, for industrial or occupational wear
14122130	Women's or girls' jackets and blazers, of cotton or man-made fibres, for industrial or occupational wear
14122240	Women's or girls' trousers and breeches, of cotton or man-made fibres, for industrial or occupational wear
14122250	Women's or girls' bib and brace overalls, of cotton or man-made fibres, for industrial or occupational wear
14123013	Men's or boys' other garments, of cotton or man-made fibres, for industrial or occupational wear
14123023	Women's or girls' other garments, of cotton or man-made fibres, for industrial or occupational wear

Apparent consumption is estimated as:

$$\text{Apparent Consumption} = \text{Production} + \text{Import} - \text{Export}$$

As PRODCOM provides data in terms of garment volumes, tonnages have been estimated using average garment weights from the 2006 IMPRO report⁷. Available data does not allow for further sub-division within the UK between Scotland and England – separate ECAP partners within the ECAP project.

Annex 2 Summary of workwear range and composition

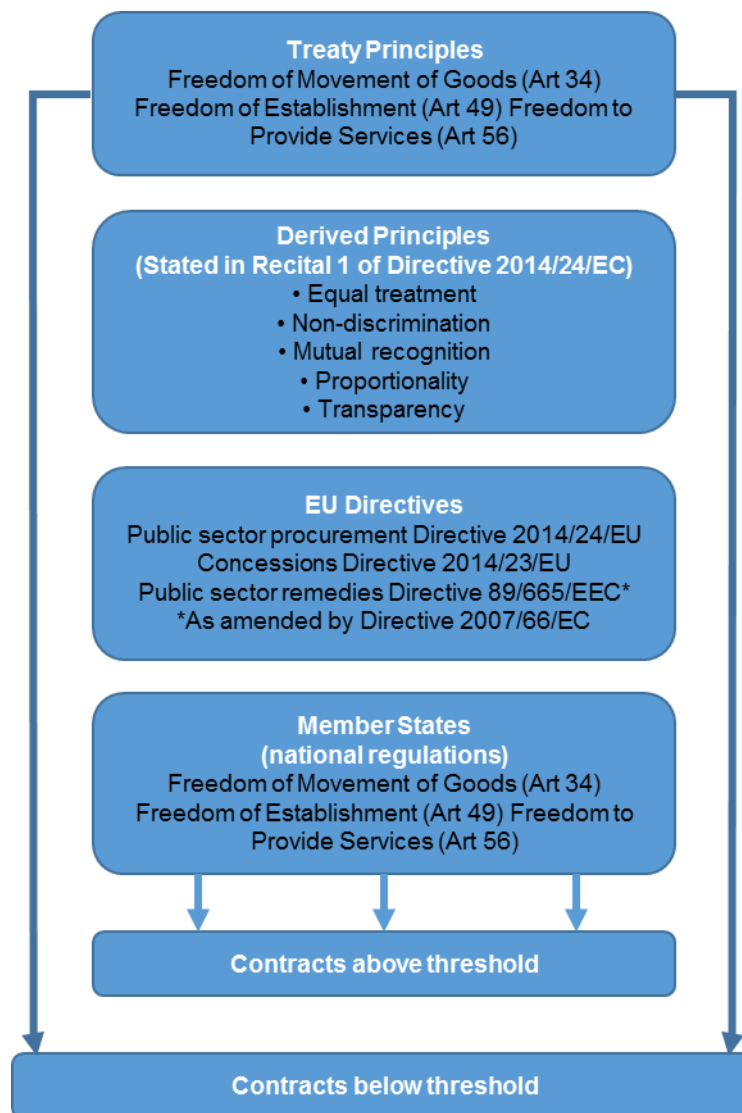
Table 6 Range and composition of typical workwear items

Clothing type	Garment	Purpose	Composition	Branding
Uniform	Military dress	Formal dress uniforms that, depending on the role of the wearer, can be worn on a daily basis or only for occasions.	Can vary: 50/50% wool/poly 100% cotton; Polycotton 100% wool	Not typically branded other than by fixed or removable rank
Career-wear	Man's or lady's suit	For a man this would be a jacket and trouser, for women this can be jacket with dress, skirt or trouser, all made in the chosen corporate colour, often in a variety of style options. Developments in garment technology would mean that most suits are washable.	Can vary: 100% poly; 50/50% wool/poly; 65/35% poly/viscose	Tax tabs
Career-wear	Blouse	Often used to inject strong and bright corporate colours, patterns and logos into the careerwear ranges. Generally designed and developed to be very low maintenance.	Varies for purpose often cotton rich blends – with polyester, sometimes elastane	In the fabric
Career-wear	Shirt	Tend to conform to conventional men's shirt styling.	Often cotton rich blends – with polyester or sometimes elastane	Can have tab to fasten name badge
PPE	High visibility jacket	The principal function of this garment is to ensure the worker is clearly seen in all light conditions, generally neon yellow or orange with reflective strips applied to catch light in darkness.	100% polyester, typically PU coated	Embroidered, badge applied by heat seal or stitching
PPE	Overall / boiler suit	Often looking like a regular boiler suit, fabrics can be treated to be flame retardant. Where branding is required, this should receive the same treatment as main body of garment.	65/35% polycotton	Made in corporate colours, or badge applied
Work wear	Polo shirt	Straightforward polo shirt, an easycare item that is smart but casual, and easily worn by either sex.	Can vary: 65/35% poly/cot; 100% poly	Corporate colour, embroidered branding

Work wear	Tunic or coverall	A garment that can be used as a uniform item, also worn over the workers clothes.	Can vary: 65/35% poly/cot; 100% poly	Corporate colour, embroidered branding
Work wear	Trouser	Generally a standard styled trouser that does not normally carry branding.	Can vary: 65/35% poly/cot; 100% poly	Generally not used

Source: adapted from WRAP (2012)¹²

Annex 3 Summary of EU procurement drivers



Source: Brief Guide to Public Sector EU Procurement Legislation. www.achilles.com 2015

Annex 4 Examples of stakeholders within key groups

Key EU Workwear Stakeholder Groups

INDUSTRY ORGANISATIONS

Clothing

- Danish Fashion Industry
- VTN (Netherlands)
- Textiles institute (UK/international)
- Design Council (UK)
- Design & Technology Association
- Detergent Manufacturing Association

Recycling

- European Textile Network - European Used Clothing Recyclers (online) Directory
- The European Recycling Company/ SOEX/!Co (largest global recyclers)

SUPPLY CHAIN

- International Wool Textile Organisation
- International Apparel Federation
- International Textile Manufacturers Federation
- Global & EU brands & retailers
- LAUNCH Nordic platform
- Eurotex
- European Textile Services Association
- UK SCAP members
- UK Chemical Industries Association
- Standards & Accreditation (ISEAL)
- Textile service companies
- Business Social Compliance Initiative

GOVERNMENT

Procurement

- EU GPP
- Dutch Green Deal
- Central Procurement Bodies (partner countries & EU wide)
- Central government departments (partner countries & EU wide)
- Local authorities (partner countries & EU wide)

EOL

- EEA & national Environment bodies (CAs)

CONSUMERS & SOCIAL

- Young consumers (ECAP)
- Brands & retailers
- Consumer groups (e.g. UK WHICH)
- Consumer initiatives (e.g. Urgenda NL; Schone Kleren Campagne, NL; SCAP, UK)

Social Organisations

- Solidaridad (Netherlands)
- MVO Nederland (CSR Netherlands)
- Charities & civil society

RESEARCH

- Autex (Association of Universities 34 members: 28 countries)
- TEXTRANET (Textile Transfer Network)
- European Textile Technology Platform
- Centre for Sustainable Fashion (UK)
- MISTRA project (Nordic countries)

POLICY & THINKTANKS

- Dutch National Plan on Sustainable Textiles
- Nordic Council of Ministers
- Nordic Action Plan
- Ellen MacArthur Foundation (CE100)
- Textile and Clothing Information Centre
- Sustainable Apparel Coalition
- ICLEI
- BSR (Business for Social Responsibility)
- Forum for Sustainability

Annex 5 Role of central purchasing bodies in selected EU Member States

Role of central purchasing body in strategic public procurement	
Austria – <i>Bundesbeschaffung GmbH (BBG)</i>	<ul style="list-style-type: none"> • Mandatory inclusion of GPP criteria in its framework contracts • Signalling of “green” products in its e-catalogue. • Advisory function to contracting authorities via the PPI Service Centre; main focus on PPI but also on GPP/SRPP on request. • Advanced monitoring system on GPP/SRPP/PPI with annual reporting to the Ministry of Finance.
France - UGAP	<ul style="list-style-type: none"> • UGAP has a supportive role for GPP/SRPP. • A UGAP applies the label “Sustainable development” for better orientation of public buyers towards GPP/SRPP. • Important activities in the monitoring field: 1) UGAP is developing a reporting tool that allows contracting authorities to determine how much their procurement is sustainable; 2) UGAP is working on automatic data generation based on customer ID 3) producing procurement data specific to company size, <i>e.g.</i> SME, micro-business, large business.
Portugal - eSPap	<ul style="list-style-type: none"> • “Promoting environmental protection through the use of environmental criteria” is part of eSPap’s mandate. • Targets of 2008-2010 GPP Action Plan valid for eSPap: 50% of procedures and 50% of value of public procurement shall include environmental criteria. • Since the introduction of the 2008-2010 GPP Action Plan, eSPap aims at fulfilling GPP priorities in all its contracts. • GPP framework agreements on electricity, vehicles, travels considered best practice.
Spain - Directorate General for Rationalisation and Centralisation of Procurement	<ul style="list-style-type: none"> • Acts as central purchasing body for the State administration and related public entities. • Public entities can purchase goods and services through an online catalogue. • The Directorate implements the targets of the GPP Action Plan.
Sweden - <i>Statens inköpscentral</i>	<ul style="list-style-type: none"> • Applies GPP/SRPP criteria either from the Swedish criteria library or from the EU GPP Toolkit, particularly for environmentally critical framework contracts. • Has produced an environmental handbook, which guides its GPP purchases. It is available for download on its website and can be of help to other stakeholders. • From an analysis of its framework contracts it emerges that environmental requirements are applied in the majority of framework agreements.
United Kingdom – Crown Commercial Service (CCS)	<ul style="list-style-type: none"> • As an executive agency of the Cabinet Office, the CCS has responsibilities for procurement policy in addition to aggregating demand for the Central Government • The Department for Environment, Food and Rural Affairs (DEFRA) collaborates with the CCS to embed UK’s Government Buying Standards in the CCS’s framework contracts that have high environmental impact, such as ICT and transport.

Annex 6 EU Textile Federations and Associations

EU Textiles Federations and Associations	
CEC - European Confederation of Footwear industry	www.cecshoe.be
CELC - European Confederation of Flax and Hemp	www.mastersoflinen.com
CIRFS - International Rayon and Synthetic Fibres Committee	www.cirfs.org
COTANCE - Confédération des associations nationales des tanneurs et des mégissiers de la Communauté européenne	www.euroleather.com
CRIET - The European Textile Finishers' Organisation	www.criet.org
EUROCORD - European Liaison Committee of Twine, Rope and Netting Industries	www.eurocord.com
EURATEX - The European Apparel and Textile Organisation	www.euratex.org
INTERLAINE - Committee of the Wool Textile Industries in the E.U.	www.interlaine.org
ALSI - Association of Leather and Shoe Industry of the Slovak Republic	www.zkop.sk
ANCI - National Association of Italian Footwear Manufacturers	www.anci-calzature.com
ANIVÉC/APIV - National Association of Clothing Manufacturers (Portugal)	www.anivec.com
APICCAPS - Portuguese Footwear, Components, Leather Goods Manufacturers' Association	www.apiccaps.pt
AATI - Association of the Austrian Textile Industry	www.textilindustrie.at
ATI - Italian Textile Association	www.astex.it
ATOK - Association of Textile, Clothing and Leather Industry (Czech Republik)	www.atok.cz
ATOP - Association of textile and clothing industry in the Slovak Republic	www.atop.sk
ATP - Associação Têxtil E Vestuário de Portugal	www.apim.pt
BFA - British Footwear Association	www.britfoot.com
CIE - Consejo Intertextil Español (Spain)	www.consejointertextil.com
CFA - Czech Footwear and Leather Association	www.leatherindustry.cz
CREAMODA - Belgian Fashion	www.creamoda.be
DTB - Federation of Danish Textile & Clothing	www.textile.dk
ECTA - Estonian Clothing and Textile Association	www.textile.ee
ELSEVIE - Hellenic Association of Footwear Manufacturers and Exporters	www.elsevie.gr
FBÖ - Association of the Austrian Clothing Industry	www.fashion-industry.at
FEBELTEX - Belgian Textile Federation	www.febeltex.be
FEBIC - Belgian Federation of the Footwear Industry	www.febic.be
FICE - La Federación de Industrias del Calzado Español (Spain)	www.fice.es
FFC - Federation Francaise de la Chaussure	www.chaussuredefrance.com
FINATEX - Federation of Finnish Textile and Clothing Industries	www.finatex.fi
FNS - Federatie van Nederlandse Schoenfabrikanten (The Netherlands)	www.shoeplaza.nl
GSITCEU - General Secretariat of Istanbul Textile and Clothing Exporters Union (ITKIP) (Turkey)	www.itkibusa.org
GTMI - Confederation of the German Textile and Fashion Industry	www.textil-mode.de
ICATA - Irish Clothing & Textile Alliance	www.ibec.ie/icata
LATIA - Lithuanian Apparel and Textile Industry Association	www.latia.lt
MODINT - Trade Association for Fashion, Interior Design, Carpets and Textiles	www.modint.nl
PFAT - Polish Federation of Apparel and Textiles	www.textiles.pl
SEPEE - Hellenic Fashion Industry Association	www.greekfashion.gr
TEKO - Swedish Textile and Clothing Industries' Association	www.teko.se
TVI -Verband e.V. (Germany)	www.tvi-verband.de
UFIH - French Apparel Association	www.lamodefrancaise.org
UIT - Union of Textile Industries (France)	www.textile.fr
VTN - Association of the Netherlands Textile Industry	www.textielnet.nl

Annex 7 Textile Recyclers in the Netherlands

As of December 2016:

Textile Recyclers in the Netherlands	
<u>A.C. de Jong en Zn. B.V./ DJ Group</u>	<u>Ple4 BV</u>
<u>ADA Textiel Recycling B.V.</u>	<u>Plooij Hats and Materials B.V.</u>
<u>Boer Groep Holland B.V.</u>	<u>Rommersteeg B.V.</u>
<u>Climpex B.V.</u>	<u>SRS Textile Recycling B.V.</u>
<u>Curitas</u>	<u>Sympany</u>
<u>Erdotex Recycling B.V.</u>	<u>Wieland Textiles B.V.</u>
<u>Euro Used Clothing B.V.</u>	<u>Rag Dealers -</u>
<u>Faritex B.V.</u>	<u>D.A.N.</u>
<u>Gökhan Textiel B.V.</u>	<u>Dejotex Recycling BV</u>
<u>Gebotex BV</u>	<u>Flobberdewotsky</u>
<u>Green Textile B.V.</u>	<u>Jabro B.V.</u>
<u>Handelsonderneming Brak B.V.</u>	<u>Jesse's Vintage</u>
<u>Henri Vernooij & Zn./Sort B.V.</u>	<u>KHCN Limited</u>
<u>Hoba Holland IJmuiden B.V.</u>	<u>Kledinginzameling Nederland BV</u>
<u>Inyotex Recycling B.V.</u>	<u>Lebotex Bv</u>
<u>Joan Smaal Textielrecycling B.V.</u>	<u>Martin Rood Textile Export & Trade BV</u>
<u>Karadenix Textielrecycling B.V.</u>	<u>Midtex BV</u>
<u>Leger des Heils - ReShare</u>	<u>Nesstar im-en Export</u>
<u>Listex B.V.</u>	<u>Radstok Clothing Recycling</u>
<u>Loonen B.V.</u>	<u>Textiel Recycling Dordrecht</u>
<u>Lowie-TEX</u>	<u>Theredmorliz Company</u>
<u>Majac B.V.</u>	<u>Tunisimpex</u>
<u>Marbo Recycling B.V.</u>	
<u>Midtex B.V.</u>	
<u>Oftex Textiel Recycling B.V.</u>	
<u>O.V.U. Recycling</u>	
<u>Packmee (Texforcare Nederland B.V.)</u>	
<u>PDB Cleaning Solutions</u>	
<u>Perfect Logistics Quality BV</u>	

Sources:

<http://www.textielrecycling.nl/vht-onze-organisatie/de-leden/?page=1>
www.wipingrag.net/dealer/clothing/index-netherlands.html

Annex 8 Textile Recyclers in the UK

UK Textile Recycling Association <http://www.textile-recycling.org.uk/>

Textile Recyclers in the UK	
4 Rags Recycling (England) A.J. Prosser & Sons Ltd. A1 Export A1 Recycling (UK) Advance Wipers, Ltd. Advantage Fibres International Ltd. Affordable Clothing Ahiabu Enterprise Aldfern Alexander Philately Limited Ali Trader Alliance Textile Fibres Ltd. Allouche Import and Export Alpha Export Ltd Anielka Asigame Market Lome-Togo Asprey Corporation Awale & Co. Azbhn International Bag and Save Clothes Recycling Bag and Save Clothes Recycling Bargain Corner Salerooms Barracoon Vintage Clothing Bella Dame Blue Nile East Africa Limited Boss Re-used Clothing Botomex Limited Bread for Threads Ltd Brigates World Britannia Wiper Company Ltd. Britstar Company Limited C.E.M.A Holdings UK Cambs International CC Textiles Cheap as Skips Chukwuka-Nzewi Clothes Sense Clothes Rescue Clothexport Clothing Exports (Irelandie) Ltd. Clothing Solutions Commodities Exchange Inc. Content Unit Co. Ltd. Crown Salvage Limited CTS Collections CWA Clothing Boutique	D & P Clothes Ltd. D & S Juniper Distribution Ltd DanaTextile Limited Danny Elders Ltd. Dawood Estates Devizes Textile Dexpol E & C Export East London Textiles Limited EDR Textiles Ely Enterprises UK Ltd English Cream Company Envirotex International Ercc Essential Vintage Clothing Euro Collections (UK) Ltd Euro Export UK Ltd. Euronation Ltd European African Trading European Textile Co. Ltd European Textile Recycling Eurotex (UK) Ever So Bazaar F Brown & Associates Fans International Fashion Trade Fibretek UK Ltd Freezol G & J Textiles Ltd. Garments2 Ukr Garson & Shaw Ltd.(UK) Global Exporters H G Moda UK Limited Heath Park Trading Ltd Horizon LC Ltd HST I & G Cohen Ltd ICC Kent Ltd Impex Textiles (uk)Ltd Instanzia International Clothing Collections LTD Intersecond Ltd Ivor LottMoore
J's Seconds	Rag Collectiions Ltd

JC International Import-Export agency Jenda Collection Services Jimac International Ltd. JJP Logistics Limited JNBH Limited Jotas Textile Just Delivered Trading Co Kabirah Couriers Kate & Aud Kenlon Ltd KGS Khan Enterprises Klio Ltd Kofi Enterprises Labuzinski, Marcel Leathers Galore Links Consulting Ltd. Little Pretty Things London Guangdong Soutions Ltd London Used and Vintage Clothing M M Fashions Mahek UK Mali Import & Export (UK) MBA Textiles MBA Textiles Micratex (UK) Midland Trading Mochli Trading Limited Mulitwaves Trading Company N & F Trading Limited Naff Clothing Nash & Co. Nes-Star New Glory Limited NEWS Recycling Ltd Nick's Recycling North West Textile Recyclers Oaks UK Limited One2call Communications P.S Clothing Pasoro Tarining Ltd PFCM Planet Aid UK Limited Prestige Import & Export Quest Group	Rag Traders Limited Ragnet Ltd Rags R Us Ragsperts UK Limited Ragtex UK Rainforest Green Limited Rainforest Green Limited Randisi Textiles Recycling Waste Solutions Retro Rehab RM Consultants Robert Cooper (U.K.) Ltd. Rontex Limited S & B Textile & Clothing Processors Ltd S-Style Safinat International Traders (u) Limited Sahid Enterprises Sam Greenberg, Ltd. Second Chance Clothing Ltd. Second Hand Clothing Limited SHABCO Sherry Traders Simply Recycling Solutions Ltd SIS Ltd. Sisters Textiles Skegness Industrial Wipes Skygates Co UK Skypacer Slick Chick Vintage Clothing Solo Recycling Ltd Soul Glo Clothing Source Trading UK Textile Collections Textraders The Manacare Foundation The Pilgrim Company The Vintage Clothing Company Traid Trashy Flowers Trueword Limited UK Recycling Ukpremier Vr Clothing Wayside Wellington Textiles West Country Clearance Ltd Worn Again
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www.ecap.eu.com