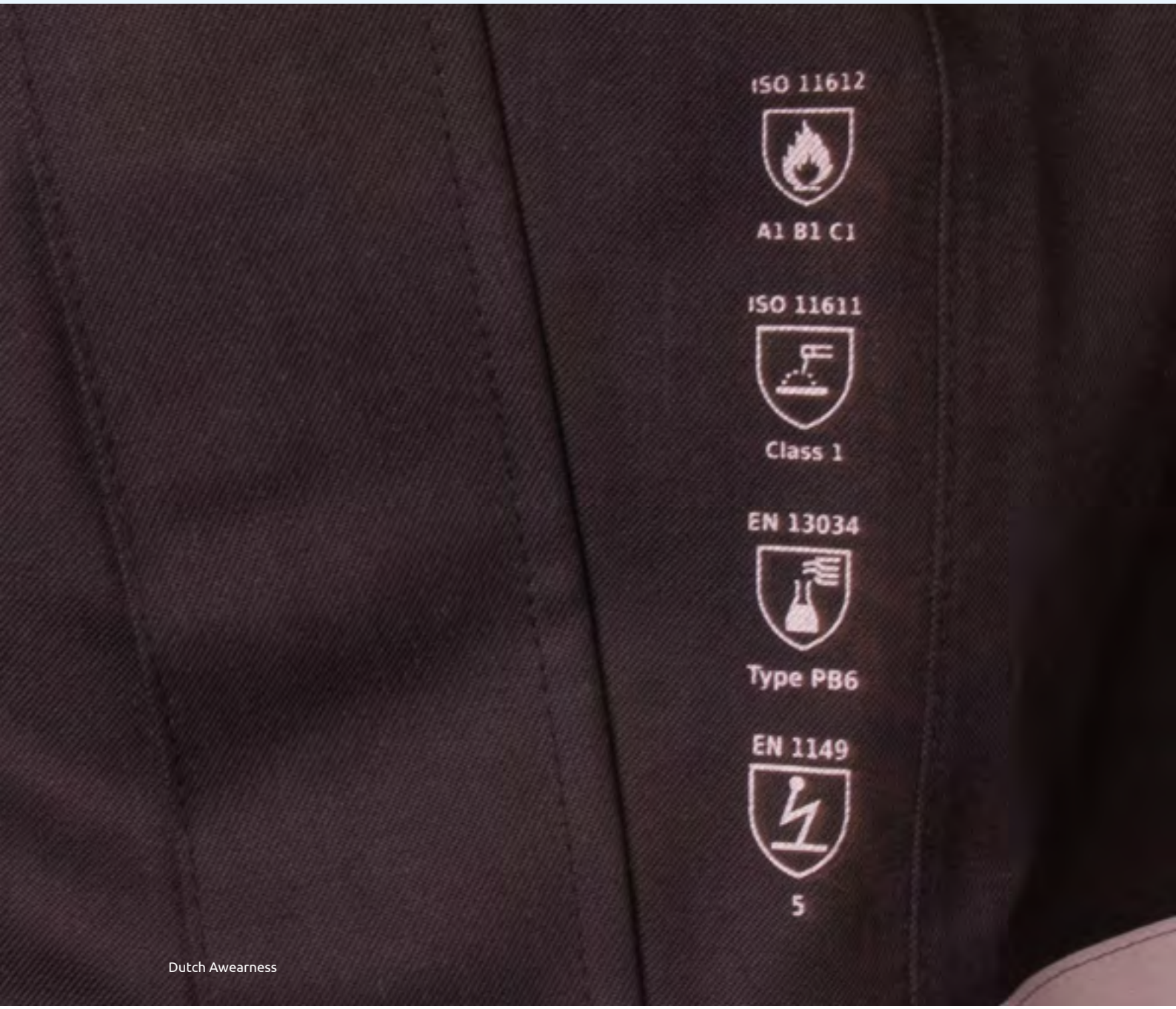
Rijkswaterstaat
Ministry of Infrastructure and the Environment

REBus Textiles
Sector report



Dutch Awearness

www.rebus.eu.com

Inhoud

The EU LIFE REBus (Resource Efficient Business Models) project[1] aims to reduce product consumption by demonstrating the commercial case for European businesses to change their business models. As a REBus partner, the Dutch Rijkswaterstaat has aligned these business models with public procurement budgets, asset management and legislation across a variety of procurement categories including textiles, furniture, ICT and electrical equipment, and construction.

This category report focusses on the opportunities and learnings from the REBus pilots relating to textiles and workwear in particular. The term 'workwear' in this report covers garments of simple and typically very durable construction such as Nurses' uniforms; career-wear such as suits, dresses, skirts, jackets and blouses worn in business environments; corporate casual-wear like knitted tops (polos, sweatshirts and knitwear) and jeans / chino style trousers or jog pants; uniforms which are typically highly durable and very good quality tailored outfits, e.g. for military and public service institutions; and, protective clothing as part of personal protective equipment (PPE).

1 Developing Resource Efficient Business Models – REBus. LIFE12 ENV/UK/000608 www.rebus.eu.com

1 Textile & workwear production in EU member states

General market

Textile fibres used in workwear fabric and garment manufacture are either natural fibres typically using cotton and wool; or, synthetic fibres including those from transformed natural polymers, synthetic fibres and fibres from inorganic materials. EU member states produce both types across the different manufacturing stages:

- The preparation or production of various textile fibres, and/or the manufacture of yarns.
- The production of knitted and woven fabrics.
- Finishing activities that give fabrics the visual, physical and aesthetic properties that markets demand. This includes bleaching, printing, dyeing, impregnating, coating, and plasticising.
- The transformation of those fabrics into products such as knitted or woven clothing and workwear, other textile products and technical or industrial textiles.

Southern European countries, e.g. Italy, Greece, and Portugal; some of the eastern European countries such as Romania, Bulgaria, and Poland; and, to a lesser extent, Spain and France, contribute more to total clothing production. In contrast, 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 use or export.

Some textile and clothing companies are vertically integrated with their own distribution networks, but the manufacturing and distribution sectors typically remain very different in their characteristics.

Production & consumption estimates

Reporting of EU textiles is by unit, so assumptions have to be made based on PRC Codes2 and average garment weights to estimate the overall tonnage of workwear produced and consumed within the EU.

This consumption estimate across the EU for 2015 is around 6.4 million tonnes of clothing, of which around 93,000 tonnes (ca 1.5%), was classified as occupational and/or industrial workwear. This is likely to be an underestimate due to the nature of different garment types, such as office uniforms, polo shirts etc, that are drawn from common stock.

The total value of clothing produced across the EU was €30.9 billion in 2015 with the value of workwear accounting for just under 5% (ca€1.5 billion). The top five producers (Spain, Italy, Germany, the United Kingdom and France) accounted for 57% (€17.5 billion) of this value and 37% (€550 million) of the total value of workwear produced.

Based on OJEU tendering (TED) for 2015 Table 1 estimates that around €8.6 billion of public procurement tenders for textiles and workwear were let.

Table 1 Textile and workwear 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**	

2 PROCOM Reporting codes for different garment types including occupational and industrial workwear.

Netherlands, Rijkswaterstaat

Report on opportunities for sustainable workwear (ECAP)

Rijkswaterstaat, as one of the partners in the European Clothing Action Plan (ECAP) has examined what it takes to make workwear circular, and what role the government can play in this process.

The results of this study are described in the European Workwear Report. In addition to all kinds of practical recommendations for making the textile sector more circular, the ECAP report also gives examples from Denmark, Poland and the Netherlands, such as recyclable clothing for the lock stewards at Rijkswaterstaat or the ministry of Defence which are REBus pilots. These examples demonstrate that reuse and a high-quality destination of the fibers can yield good business cases.

ECAP report

GEA

2 Circular procurement and workwear

Circular procurement provides the opportunity 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 cost savings, reduced environmental impacts and improving social wellbeing. There are many examples and some, such as service-based models, are already common in many EU member states for certain workwear items. There are broadly three types:

take-back – specifying suppliers and /or manufacturers to take-back workwear at end of use so that they can either be reused, repurposed or recycled more effectively than going into general textile collection schemes;

buy & sell on – these models can create revenue streams by incorporating arrangements for the purchasing body to sell-on workwear at end of use either for reuse or recycling; and,

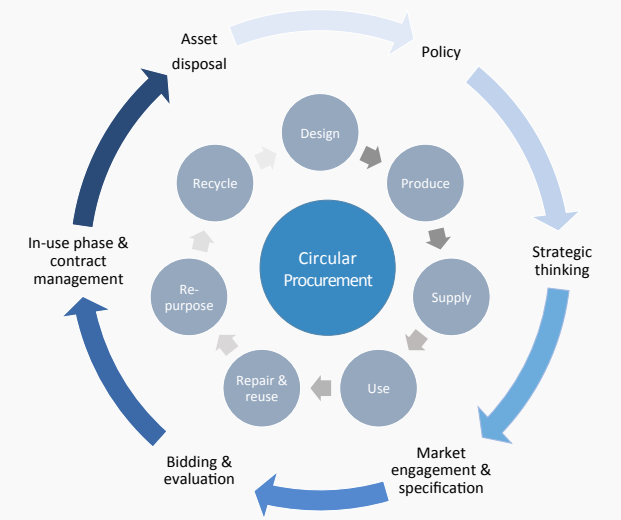
servicisation - product service system (PSS) models, like leasing, can be relevant to workwear where in-use impacts and end-of-(first) life pathways can have a big influence of the overall environmental impacts. Product-service systems however are not by definition sustainable[3]. PSS can include incentives for sustainable practices, but this needs to be organised and specified in the right way during procurement. Details on what is needed to ensure sustainability within the services are required to maximise their potential.

Adopting any one of these models doesn't guarantee that it will create a truly circular outcome. It is therefore the role of the procurement exercise to include suitable criteria that encourages and ensures a more circular outcome. For example, many uniform contracts have secure take-back and destruction requirements. These might involve incineration, with or without energy recovery. Destruction however could be achieved by de-fibering garments enables fibres to be recycled back into closed loop garments or equivalent textile grade products, as the REBus pilots showed.

The potential for textiles in general, and workwear clothing in particular, to be circular in production and consumption is very high. However this requires a degree of demand-pull, e.g. through procurement actions to address all parts of the textiles lifecycle chain (Figure 1).

If it is considered in a circular way, the procurement cycle can be proactively used to influence key areas in product design and manufacture, use and disposal. The inner loop of Figure 1 shows a simplified process cycle, in this case, for workwear. It highlights the key stages for embedding circular thinking and decisions within the product and procurement cycles. Each stage is complex particularly with production and distribution typically being on a global scale. A key element of circular thinking in procurement is embedding thinking and action by the relevant stakeholders in each stage of the cycle. The following sections provide some guidance, evidenced by examples from the REBus pilots.

Figure 1 Embedding circular thinking within the material and procurement cycles



3 10FYP SPP Working Group 3a 2015 Using Product-Service Systems to Enhance Public Procurement. UNEP Technical Paper

3 Key themes

The key themes below set out the direct learning from the REBUs pilots. They do not necessarily a complete picture of the circular and REBM options available. They focus on the challenges and outcomes the pilots faced in live procurement trials.

Rethinking the need

» **Key internal stakeholders:** policymakers, budget holders, finance teams, central and bi-lateral purchasing bodies and teams, asset managers

» **Key external stakeholders:** brands, suppliers, service and rental businesses, financers

Government is both a consumer and a significant influencer – through legislative, fiscal and regulatory mechanisms; and, through purchasing power. The heterogeneous nature of workwear stakeholders, as well as the extended supply chain they cover, is currently a barrier to closing product and material loops in workwear. Developing roles, e.g. the Category Plan Manager in the Netherlands, and procurement processes that facilitate bringing these diverse 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.

The REBUs pilots have demonstrated the importance of early market engagement to understand the current a future potential for circular workwear products. Market engagement should address the design phase to encourage more circular products. For example, encouraging a 'cradle to cradle' approach that includes design for reuse and recycling, lifetime optimisation, increasing re-purposing and recyclability at end-of-life and designing with recycled fibres. This also provides the opportunity to identify and specify the use of lower impact fibres, fabrics and designs in workwear.

Lessons

- Addressing the culture of the organisation is important if you want to stimulate re-use within the company, e.g. wearing garments that aren't new.
- All the EU LIFE REBus and Dutch Green Deal Circular Procurement pilots have demonstrated the importance of collaboration, e.g. internally between budget holders, procurement and users; and externally with the supply chain. Communicating circular procurement policy through market engagement not only identifies what is currently available, it also helps accelerate innovation and scales up supply to deliver what is potentially available.
- Larger organisations like GEA, in the Netherlands, have shown they can increase functional lifetimes of workwear by identifying and assessing internal reuse options before purchasing new products.

Netherlands, Rijkswaterstaat

Lock Stewards workwear

The 2 year lease contract for the Rijkswaterstaat Lock Stewards circular workwear is a first for the Dutch national government. This REBus pilot by the Rijkswaterstaat shows that it is possible to develop a high, circular package workwear, which the environment will play an even greater role in orders and procurement.

The pilot also developed a track and trace system (Circular Content Management System) that provides insights into the entire production process and the associated environmental impact by scanning the QR code in the clothing.

Factsheet, case study and article

Sourcing and design

» **Key internal stakeholders:** policymakers, users, central and bi-lateral purchasing bodies and teams

» **Key external stakeholders:** product designers, brands, fibre & fabric producers, workwear manufacturers and finishers, trade bodies and academia

The options for influencing production of fibres and yarns may appear limited but supply chain initiatives have shown potential to reduce energy, chemical and water use. These can overcome geographical and cultural differences across extended global supply chains, broaden the scope for improved transparency and help promote innovation. Figure 2 shows the lifetime impacts across a range of garments and textile materials and the impact of materials choice on lifetime energy consumption. The Rawicz Hospital, Poland procured an alternative cellulose yarn produced from the pulp of eucalyptus tree for uniforms provides one example of the role procurement can play in encouraging new and lower impact products and materials[4].

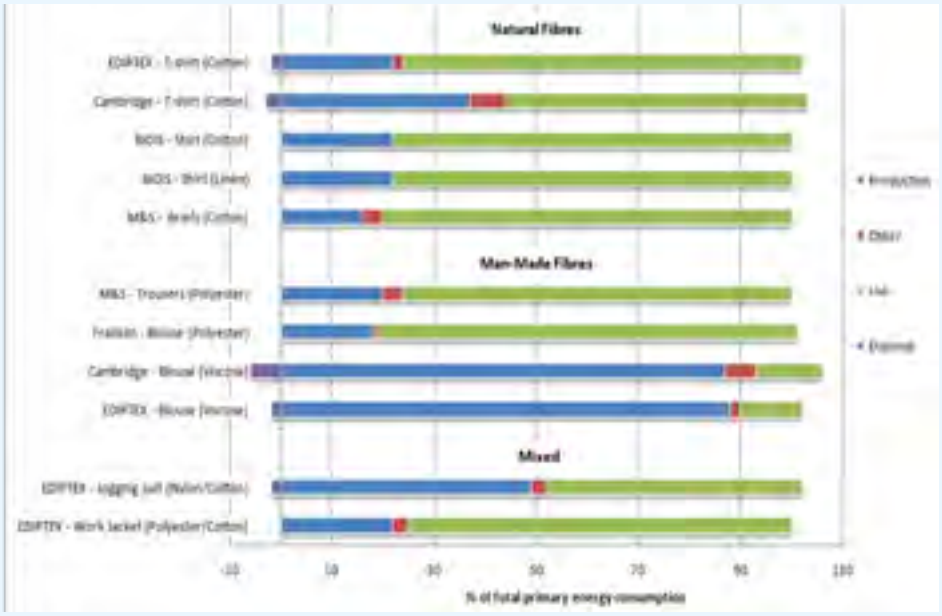
Branding, garment design and material choices within public sector workwear mean that lifetime optimisation, in particular, is often low. Re-branding and design choices can account for around 50% of all replacement needs. Although a lack of R&D budgets can inhibit innovation, extending contracts from the typical 4 years to 6 years, can provide sufficient incentive to encourage innovation in design and material choice. Labelling and branding create significant obstacles for increasing reuse so including requirements to address these through procurement technical specifications can help extend product lifetimes through reuse as Herning municipality found in Denmark[5].

Opportunities also exist to specify levels of recycled content in new garments, helping to create a demand for recycled fibres. The EU LIFE REBus and ECAP pilots are trialling requirements for between 20-25% recycled fibres in certain product categories.

4 Introducing innovation procurement methods: Rawicz County Hospital, Poland. LCB-HEALTHCARE Procuring better building solutions Case Study, 2014

5 New circular business models: focus on purchases, work clothing and the textile service industries. SPP Regions Case Study. Herning Denmark, 2014

Figure 2 Percentage contributions of each product phase to the overall energy consumption



Source: Mistra Future Fashion – Review of Life Cycle Assessments of Clothing. MISTRA/Oakdene Hollins 2010

Lessons

- The annual replacement of lock stewards workwear provided an opportunity for the Dutch Rijkswaterstaat to develop a circular procurement model. A market collaboration exercise was crucial in establishing the potential and enabled a two year leasing model to be developed with the aim of 100% circularity – recycling lock stewards polo shirts back into new polo shirts for the next season.
- Circularity of the rainwear fabric material was possible thanks to a 100% recyclable polyester fabric. The pilot found that degree of recycling varies from garment and that the clothes for the next life could not be produced completely from the material of the clothes used. Other fibres were required although these could also recycled material. More 'open loop' options also included the recycled fibres from the workwear garments being made into bags.

Purchasing and supply

» **Key internal stakeholders:** budget holders, central and bi-lateral purchasing bodies and purchasing teams, users

» **Key external stakeholders:** brands, suppliers, service and rental businesses, financers

Reducing wastage is an important aspect of purchasing. Not just in terms of cost savings but also the associated carbon and environmental impacts of making, and in the case of some uniforms, having to destroy unused stock. In terms of purchasing and use, over-ordering can account for around 13% of stock. Clothing allocations are often based on entitlement rather than need, so stock is either not allocated or allocated but not used. This reduces the overall functional lifetimes if items are not tracked or collected for reuse.

Lessons

- The EU LIFE+ REBus project has shown that realising the benefits from procuring more circular products is hindered less by policy and more by existing processes and financial structures, e.g. separate capital, operational and waste disposal budgets.
- The Dutch Category Plans6 have enabled a broad sectoral approach to improving circularity of products and therefore a framework in which REBMs can be encouraged. As the production and supply chain is both complex and extended (often global), a 'Chain Director' or champion can help steer the market engagement and circular procurement options.
- Dura Vermeer in the Netherlands learnt through their pilot project that starting with complex garments was not the best approach in hindsight. Identifying 'Quick Wins' is an easier first step. For example, starting with a few simple product types and/or focus on some early gains such as specifying recycled content levels, considering servicisation rather than ownership, improving collection of reuse, recycling as part of the procurement. The Dutch MOD took a similar approach by piloting recycled content in a small towel and overall contract to test the benefits before expanding to a larger procurement for uniforms.
- Procurers tend to make very detailed technical specifications. When procuring in a more circular way, specifying recycled fibres in functional specifications can speed up innovation. Also additional consideration has to be given in the decision process to sustainability and quality in line with Most Economically Advantageous Tendering (or EMVI in Dutch). This enables a Best Price Quality Ratio to balance price with quality and other whole life benefits from more circular products.
- Increasing circularity in workwear requires the purchaser to consider total life cycle costs of garments and not just least cost as Section highlighted.

GEA

6 Example of the categoryplan Textiles of the Dutch Government

Netherlands

Market Collaboration

This pilot under the Dutch Green Deal brought together a number of businesses - Alliander, Dura Vermeer, TBI and Croon to focus on the sustainability of corporate clothing. The target agreed is that by 2017 40% of the purchased company clothing will be circular.

The pilot required an assessment of current market potential and, not surprisingly, it found the market for circular workwear to be in its infancy. It found that for multi-standard clothing there are currently no circular solutions available. This resulted in lack of transparency in costs and risks.

It also highlighted the importance of encouraging market shifts through demand pull – using procurement as the mechanism. One solution, instigated by Dura Vermeer was to initiate a 3 year supply contract (and optional 3 year extension) with the 40% circular target embedded. This enables the market to move in steps and innovate with the confidence, knowing the level of demand over time.

Factsheet Dura Vermeer, TBI Croon , Alliander, case study and article

Use and asset management

» **Key internal stakeholders:** asset managers (internal and/or outsourced), users, budget holders

» **Key external stakeholders:** suppliers, servicing contractors (e.g. washing, ironing and repair) and rental businesses

Better information about care and maintenance, e.g. product care labels, can help improve lifetime optimisation by users. This could be provided through the procurement exercise along with the products. Thinking about circular materials can encourage consideration of take-back at end of life and the procurement exercise has the opportunity to ensure adequate collection of used garments. Service-based models already exist in commercial workwear and there is good potential for servicisation models to be extended.

These can often replace ownership with rental and leasing models and also potentially include maintenance elements like laundering, care and repair.

Lessons

- Getting the back garments from users is often quite difficult. Employees will typically wash and store them at home, often disposing of items through household waste streams instead of returning them when their perceived or actual functional life is reached. Track and trace systems like those instigated in the Rijkswaterstaat lock stewards pilot are therefore useful logistical tools, not just for security reasons but also traceability and stock control.
- Simple guidance on care and maintenance, including washing instructions will help improve the longevity of items. Figure 2 shows the importance of this in terms of reducing the energy consumption of the use phase.

Asset disposal and waste management

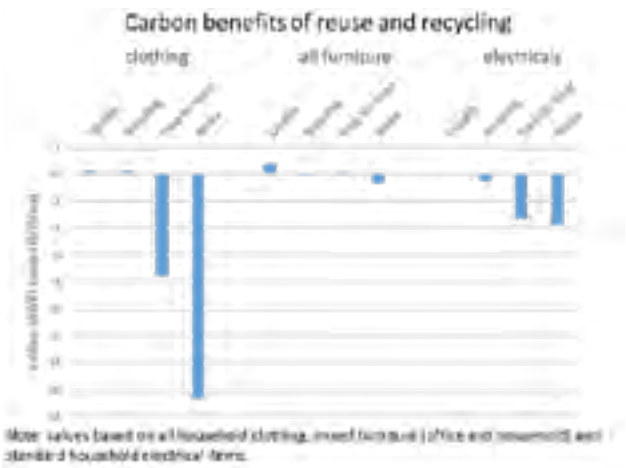
» **Key internal stakeholders:** users, asset managers (internal and/or outsourced)

» **Key external stakeholders:** collection services, service and rental businesses, reuse and recycling businesses, NGO's (e.g. fairwear), charity & third sector organisations, regulators

A significant portion of discarded textile and clothing is still sent to landfill or to energy recovery from waste (EfW) despite workwear often being of a higher quality specification than consumer equivalents. At best, general clothing collection for reuse is around 50% so the potential for greater reuse collection is high. Whilst some public sector services require secure disposal of items at end of life, too little fibre is re-used and recycled (less than 3%). Figure 3 shows the significant carbon reduction impacts of reuse compared to recycling and landfill.

Security, safety & health and certification priorities can limit options for reuse but options are still available for improving circularity through better design, lifetime optimisation (e.g. through reuse and repair) and ensuring recycling at end of life.

Figure 3 Net carbon impacts of different disposal routes for selected product groups



Source: compiled from Benefits of Reuse Tool (WRAP, 2015)

Lessons

- Alternatives to incineration, such as de-labelling, de-fibering can save costs as the Dutch MOD pilot has suggested. In the U.K., the Police Service Northern Ireland agreed to surplus uniforms being dyed and then sold for reuse rather than incinerated[7].

- The degree of recycling possible varies as workwear covers a wide variety of garment types, materials and uses. However, fully circular garments are achievable using 100% recycled fibres. The Dutch MOD pilot for towels achieved 36% recycled content. Adopting more resource efficient business models can address issues of both quality and volume where dedicated arrangements for collection are factored into the procurement exercise.

7 Dyeing to dispose of. WRAP information Sheet, 2014

Ministry of Defence

4 Replication scale-up potential

The REBus and Green deal textiles pilots in the Netherlands have demonstrated that circular procurement of textiles, and workwear in particular, is not only possible but that it is practical and delivers on national circular economy goals as well as reducing environmental impacts.

Starting small (e.g. the Rijkswaterstaat Lock Stewards) or low risk (e.g. Dutch MOD towels and overalls procurement) can help initiate the first steps and build internal case for scale-up into higher volume and larger value contracts. The Dutch MOD is now extending its circular procurement approach to uniforms from the initial pilot (see factsheet).

If workwear collection and reuse was increased by 15% across Europe it would potentially save 7,000 tonnes of textiles from landfill or incineration, equivalent to a CO_2eq savings of around 72,500 per year. If the increase was 30% this would be 14,000 tonnes diverted from landfill and 145,000 tonnes of CO_2eq respectively. Public procurement of textiles also includes other textile items such as bedding linen and towels as well as workwear. The impacts and scale-up potential are therefore conservative in their estimates.

If the workwear pilot impacts from REBus were to be scaled up across all of the EU member states, based on annual consumption estimates the impact reduction8 would be in the region of:

- 1.5 million tonnes of greenhouse gas (GHG) emissions savings;
- 280,000 million cubic metres of water savings; and,
- €17 million net financial benefit (GVA).

In terms of scaling up the benefits across the whole REBus project[9], would result in the following annual benefits at the EU level:

- 184 million tonnes direct material savings plus 172 million tonnes material diverted (e.g. reuse);
- 154 million tonnes of greenhouse gas (GHG) emissions savings; and,
- €324 billion net financial benefit (GVA).

The EU JRC study 'Environmental improvement potential of textiles (IMPRO-Textiles) European Commission, JRC, June 29, 2014' estimates an apparent textile consumption of 9,547,000 tons in the EU 27 in 2007. The environmental benefit was extrapolated by applying the CO2 and material savings per ton found in this case study to the total EU quantity (9.55 million tonnes).. This can only be true if the potential for recollection and the composition of textiles in the EU 27 resembles that of the case study. For a more reliable estimate we need data on more case in a wider range of countries.

Factsheets Dutch pilots Circular Textile

- Rijkswaterstaat (Dutch waterways, public works and environment authority.
- Dura Vermeer, TBI Croon , Alliander
- Ministry of Defence
- GEA
- Municipality of Utrecht
- Meerlanden
- University Medical Centre Utrecht

8 Based on extrapolation of 93,000 tonnes of workwear consumption across EU27 and impacts from Monitoring resource efficient business models: REBUS cases. Rijkswaterstaat Bedrijfsinformatie, 2016

9 Categories covered include construction, textiles, food, ICT and furniture.

Colophon

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Photo credits: Dura Vermeer, Defensie, GEA

REBus

REBus (Resource Efficient Business Models) is a project financed by EU Life+ with the goal of gaining knowledge about the potential of circular business models and investigating whether they can deliver the target of 15% savings in resources and costs. The project is partially being implemented in Great Britain and partially in the Netherlands.

In the Netherlands, REBus is working with other governments and progressive companies to explore models that make circular procurement possible within five industries: IT, office furniture, construction, textiles and catering. By conducting pilot projects, REBus is learning more and more about what is needed for circular procurement.

REBus also applies the knowledge gained in new pilot projects and stimulates participants to share their knowledge. With the intended ripple effect, a project such as REBus will not longer be necessary over time. More information: www.rebus.eu.com


Dura Vermeer