State of the art and current situation. Sustainability study on clothes and their use and handling in the existing health care system

By Karpenja T, Lindström M, and Löfgren C

MFF Deliverable D6.1
Overview

The project P6 has two tasks: one focusing on improving the environmental and sustainability aspects in the use of patient clothing, and a second with a focus on how design and comfort can result in positive psychosocial effects.

Current report covers the current situation in Sweden together with a literature survey on patient well-being and clothing performed within the project.

Furthermore, user requirements in public procurement and identification of the best criteria for material choice are discussed, from hospital and laundry and textile service company perspectives.
Table of content

1. State of the art and current situation ........................................... 4
   1.1. The situation today................................................................. 4
   1.2. Patient clothing and health.................................................. 5
2. Aim of studies.............................................................................. 8
3. Public procurement..................................................................... 8
   3.1. Green public procurement..................................................... 9
      3.1.1. Green public procurement – a powerful tool in Sweden.......... 10
3.2. Sustainable procurement (from green to sustainable procurement) ...... 11
4. The literature study and results .................................................. 12
   4.1. EU.......................................................................................... 12
      4.1.1. EU GPP for textiles................................................................. 14
      4.1.2. Key environmental and health issues for textiles.................... 15
      4.1.3. EU GPP Criteria for Textiles................................................. 16
      4.1.4. Relative environmental impact of textile fibres....................... 17
      4.1.5. Ecolabels, verification aspects and market concerns............... 17
      4.2. UK sustainable clothing action plan/ roadmap........................ 17
      4.2.1. Clothing today and what is “unsustainable” about it .............. 18
      4.2.2. Clothing tomorrow – “Sustainable” Clothing.......................... 20
   4.3. Sweden.................................................................................... 21
      4.3.1. SEMCO’s public procurement criteria for laundry and textile service companies 21
      4.3.2. Environmental ecolabel - The Nordic Ecolabel........................... 24
      4.3.3. Green public procurement - verification proposals ....................... 25
      4.3.4. Health care textiles – Guide lines........................................... 27
5. Public procurement of textile and laundry service – A case study .......... 29
5.1. Scope of the case study ........................................................................ 29
5.2. Municipality (A) .................................................................................. 31
5.3. Municipality (B) .................................................................................. 32
5.4. Municipality (C) .................................................................................. 32
5.5. Municipality (D) .................................................................................. 34
5.6. Municipality (E) .................................................................................. 35
5.7. Municipality (F) .................................................................................. 35
5.8. County council (H) .............................................................................. 36
5.9. Discussion ............................................................................................. 37
5.10. Challenges and possibilities in the Swedish green public procurement . 38
6. Identification of best criteria for textile material choice ......................... 40
6.1. Environmental impacts in washing process ....................................... 40
6.2. Textiles in hospital clothes .................................................................. 41
6.3. Expectations from introduction of new environmentally friendly materials.. 42
6.4. Selection of best criteria for material choice ....................................... 42
7. Conclusions ............................................................................................. 43
1. State of the art and current situation

Is it possible that design and material choice in patient clothing can affect how a patient responds to medical treatment and thereby shorten the hospitalisation time? This is a question that the project “Fashion for the public sector”, project 6 (P6) within the Mistra Future Fashion research programme, tries to answer. If the recovery time can be shortened there is a huge benefit for both society and the patient. The project has two different tasks: one focusing on improving the environmental and sustainability aspects in the use of patient clothing, and a second with a focus on how design and comfort can result in positive psychosocial effects.

This report covers the situation today in Sweden together with a literature survey on patient well-being and clothing, performed within the project.

1.1. The situation today

Patient clothing is a complex field, where the buyer differs from the end-user. Furthermore, there are three end-users: the patient; the hospital team (doctors and nurses); and the logistics and laundry company (or department). They all have different priorities: The buyer focuses on cost, the patient has today nothing to say, doctors and nurses want access to the patient’s body and clothing that is compatible with different equipment and hygiene requirements, and finally the laundry wants clothing that is easy to launder and repair.

The situation today in Sweden is diverse and different counties have different systems. There are even differences within the counties, between the different hospitals and care units. Roughly half of the counties take care of their patient clothing themselves, which means that they own the garments, wash them and take care of the logistics themselves. Some Swedish counties own the clothing but outsource the laundry service, while other counties outsource the whole service to companies that own, launder and distribute patient clothing. Some counties and private hospitals hire the clothing, including laundry, but deal with logistics and distribution themselves or use a third party to manage the logistics.

The current situation is an effect of structural changes. Until the 1970s, most hospitals owned their own textiles and had their own laundries. FMV (Swedish Defence Materiel Administration), which serves the Swedish military, started to experience overcapacity and offered to take care of public laundry. The laundry service became increasingly centralised, and when Swedish military service was not compulsory, less people did military service, there was overcapacity in the laundry market. The laundry services were privatised and new services became available. Counties were offered service solutions where they subscribed to clean clothing and textiles. A few hospitals have adapted to the full service offer, but there is still a strong influence from the old procurement system. The hospital continues to pay for the laundry service without owning or paying for the textiles. The laundries only get paid when the garments are delivered for
washing, and the whole investment is borne by the laundry company which includes the cost in the laundry charge.

The laundry service is a logistical challenge. In this report we will follow the Textilia facility in Rimbo which serves, among others, the Stockholm County. For the Stockholm County, they launder 100,000 items, corresponding to 38 tonnes, every day. The garment stock is distributed unevenly between the hospitals and most items are cycled fewer than ten times per year. This leads to capital being tied up and distributed stock that is difficult to control. The big laundries have chipped or tagged their items and track where they have been delivered, but the logistics on the part of the hospital are harder to control.

The laundries want to increase the number of cycles each garment makes per year. One way of doing this is to offer a full service: they deliver, distribute and control the stock, and do the laundry. In terms of clothing for medical staff, systems have been developed where all items are delivered in ”cassettes” that go into automated clothing dispensers from which employees can get up to five sets of clothing. In order to get more they must return the used items. This is possible as each person has a card with their personal size and model information, and each item is individually tagged. In these systems, the cycling periods are 1.5-2 times shorter, and much less capital is tied up.

1.2. Patient clothing and health

Different hospitals have different requirements, and even different departments at the same hospital have different needs. Different patient categories also have different needs. For example, new-borns and their mothers have different needs to someone who is recovering from surgery or someone in geriatric care.

A goal in patient care is to send patients home or to a recovery unit as soon as possible after treatment. This has led to a simplified outfit for patients – in extreme cases consisting only of underwear, trousers, a shirt and a gown – all designed to be as practical and efficient during emergency care and when dealing with and treating patients. At discharge, patients are supposed to be sent onward in their private clothes. However, many elderly patients arrive at the hospital without clothes (e.g. in night gowns), and in cases where relatives have not delivered private clothes for the discharge, patient garments will be used and will turn up as waste in the circulation system. For this reason, the laundries would like to introduce a “going home” kit of simpler quality, charged to the hospital or to the patient pays.

It is well known that environmental factors at the hospital play an important role in terms of the well-being of patients. Colours, art, green plants and the view from the windows have been reported to have a relaxing and anti-stressing effect, which is beneficial to recovery.

An important contribution was made in 1984 when Roger S Ulrich published “View through a window may influence recovery from surgery.” He and his colleagues have since published a

---

1 Bohman, Eva, 2012. Textilia AB, Personal communication.

series of studies carried out in hospital environments, showing that windows facing nature, plants and even pictures of nature have a relaxing effect on patients (Ulrich 1986, 1991 and 2001)\textsuperscript{3,4,5}. Relaxed patients respond better to treatment, and this leads to a faster recovery. When exposed to nature or images of nature, the patients reacted with lower blood pressure and a lower heartbeat frequency.

Patient clothing has been subject to research, but mainly from the hospitals’ point of view, in terms of being easy to handle, cheap and functional. Studies have very rarely been performed from the perspective of patients and their well-being. In contrast, there are a number of studies and publications on negative effects caused by the classic hospital gown. It does not cover the patient sufficiently and causes embarrassment and loss of dignity\textsuperscript{6}. Edvardsson published a study on the effect of wearing patient clothing in which patients and staff were interviewed. According to Edvardsson, “The phenomenon of ‘wearing patient clothing’ was found to consist of four themes: (1) being comfortable and cared for; (2) being depersonalised; (3) being stigmatised; and (4) being devitalised.” A balance must be struck between being a patient and a person, between comfort and practicality, and between depersonalisation and symbols of illness.

According to research conducted by the Institute of Social and Preventive Medicine, Lausanne, wearing ordinary clothes instead of a hospital gown did not significantly affect the length of hospital stay or the level of spontaneous physical activity. However, there is a trend towards increased spontaneous physical activity and shortening of hospital stays for patients wearing ordinary clothes. It was also concluded that wearing ordinary clothes is not associated with complications and could be included in post-operative programmes aimed at early function recovery\textsuperscript{4}. Wong\textsuperscript{6} has presented a design study on children’s hospital clothing, showing that it is possible to design clothing that increased satisfaction and the willingness to use the garments compared with traditional hospital clothing. Her clothes were popular with patients and

\begin{itemize}
\item \textsuperscript{6} Simone, Jennifer, (2000), Combining Robe and Gown, US. Patent No. 6032288.
\item \textsuperscript{7} Edvardsson, David. (2009) Balancing between being a person and being a patient—A qualitative study of wearing patient clothing. International Journal of Nursing Studies Volume 46, Issue 1, Pages 4-11, January 2009
\end{itemize}
appreciated by doctors and nurses, as they had access to the patients and could use all types of technical equipment without interference from the patient garments.

Apparel quality can be evaluated through either physical features (“What the garment is”) or performance features (“What the garment does”), according to Solinger (1988). The patient’s experience is a combination of these two. The fact that it is a patient garment tells you that you are in a hospital, while functionality, design and material choice affect comfort. There have been recent design studies on how to design a new gown.

Cho (2006) has designed a new gown based on interviews with nurses and patients, combined with extensive literature and patent studies on apparel quality and comfort. The comfort was evaluated in terms of functional comfort, physiological comfort and psychological comfort. The subjects were interviewed and one of the conclusions was that the aesthetic aspect should not be neglected.

In her master’s thesis, Jha (2009) performed an interview study with a large number of hospital employees on the role and function of patient gowns. Nurses mentioned in their interviews that it is well known that patients respond positively to pleasant clothes or their own clothes. It was noticed that patients appreciated having a new gown instead of one that had been worn and laundered several times. The purpose of the study was to collect information that could be used in the design of a new practical gown.

In 1999, Earley carried out a design study of one hundred personalised gowns for radiotherapy patients at the Queen Elizabeth Hospital in Birmingham. The project was not evaluated in a scientific way, but showed that it was possible to offer individual and unique gowns to patients and that these gowns were appreciated.

Patient clothing is a highly debated area, as can be seen from the abovementioned examples, and a great deal of research and development has been performed. However, this has almost always been from a practical and economic perspective. Patient clothing is used in a different way to private clothes; they are used intensively by several patients, handled by nurses and

---

9 Wong, Wing-kam Michelle. 2001. The development of garments for child patients of different ages in a hospital environment, Ph.D., Institute of Textiles and Clothing, The Hong Kong Polytechnic University, 2001


doctors, and laundered and sterilised under tough conditions.

2. Aim of studies

The first aim of this study is to deliver an overview and an inventory of today’s situation with public procurement in health care service, in Sweden and internationally.

Secondly, the user requirements and identification of the best criteria for material selection are investigated by answering the following questions:

- **How often** environmental, social and economic criteria are applied in public procurement of laundry and textile service?
- **What types** of requirements are requested by the purchasing bodies (municipalities and county councils responsible for public procurement of hospital clothes)?
- **What are the challenges** in fulfilling the green procurement requirements?

The latter part is a case study that examines public procurement of laundry and textile service for hospital clothes in Sweden.

3. Public procurement

Each year European public authorities spend about 20% of the EU Gross Domestic Product on the purchase of goods (e.g. office equipment, and building components; services, such as, transport services, and cleaning). It is a significant part of the Gross Domestic Product (GDP) and it is important to reduce the environmental impact caused by public sector consumption.

The environmental and sustainability aspects in the use of patient clothing represent one part of this. Public procurement can shape production and consumption trends and a significant demand from public authorities and will create or enlarge markets for environmentally friendly products and services. Procurement is a financial instrument. It can be used to achieve environmental and other public policy goals by local governments.

The sustainability measures may be the cheaper choice by using energy efficiency criteria. Certain priority may be given to products that not only meet the given functions but are also cheaper from a life cycle perspective. Environmental problems can’t be solved only through legislation and policy work but it need to be complemented with various market-driven efforts. Sustainable procurement has a number of advantages which makes it an important complement to existing policy instruments. The benefits include the following:

- Reducing the organisation’s environmental footprint
- Contributing to achieving set environmental quality
- Achieving targets on a local, regional and international level
- Providing cost saving opportunities for contracting authorities

---

Stimulating innovation
Increasing the availability of environmentally friendly products for consumers as larger volumes are likely to generate lower prices
Proactively preparing the market for new environmental regulations
Having spill-over effects on the private sector
Taking social responsibility into account

The procedure for public procurement is the process by which governmental departments or agencies purchase goods and services from the private sector. It takes place at both a national and regional level, and the process will usually be subject to specific rules, laws and policies covering how the relevant decisions are made.

Depending on local laws, the relevant government officials will have to follow a special system for procurement. This system could cover the way they advertise for suppliers, the grounds on which they choose a supplier, and the way in which they measure and enforce the requirements they put on the supplier. The usual aims of this kind of system will be to take advantage of competition between suppliers and to reduce the risk of corruption.

There are a number of different approaches to public procurement, and two historical policies from the United Kingdom illustrate the differences that can exist. The underlying principles of these two policies are used in various schemes around the world. The first policy, which was standard in the 1990s, was known as compulsory competitive tendering. In principle, this meant a local authority had to put purchasing decisions out to tender and then deal with whichever provider offered the lowest price. The main advantage of this was that it kept the authorities expenditure to a minimum. The main disadvantage was that there was a risk of suppliers providing a low-quality service because they needed to keep costs down.

The second policy, introduced in 2000 to replace compulsory competitive tendering, was the “best value” system. This extended the range of factors that local authorities had to take into account, effectively meaning they considered quality as well as cost. The main advantage of this is that it means there is a better likelihood of the products or services meeting the authority’s needs. The main disadvantage is that it makes the process considerably more complicated and bureaucratic, particularly as it can be tricky to produce quantifiable measures of factors which relate to quality.

Local public procurement policies are increasingly being affected by wider agreements and rules. For example rules agreed by the European Union mean member countries are not usually allowed to have procurement rules that require authorities to purchase from suppliers in their own country.

3.1. Green public procurement

Green Public Procurement (GPP) is defined in the Communication (COM (2008) 400) “Public procurement for a better environment” as a process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their whole life cycle when compared to goods, services and works with the same primary function that would

---

otherwise be procured. GPP is a voluntary instrument, Member States and public authorities can determine the extent to which they implement it.

Public authorities are the major consumers in Europe (equivalent to some 19% of the EU’s gross domestic product). By using public authority’s purchasing power to choose goods and services with lower impacts on the environment, they can make an important contribution to sustainable consumption and production.

Green purchasing is also influencing the market. By promoting and using GPP, public authorities can provide industry with real incentives for developing more green technologies and products. In some sectors, public purchasers command a large share of the market (e.g. public transport and construction, health services and education) and so their decisions have considerable impact\(^6\). By using their purchasing power to choose environmentally friendly goods, services and works, Europe’s public authorities can make an important contribution to sustainable consumption and production. Public authorities make sure that tax payers’ money is used effectively to ensure direct environmental benefits and to reduce negative environmental impacts.

Although Green Public Procurement 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 a success, GPP needs clear and measurable/verifiable environmental criteria for products and services. A number of European countries already have national criteria, and the challenge now, as GPP becomes more widespread, is to ensure that the criteria are compatible between Member States\(^7\).

Green Public Procurement (GPP) means that public authorities seek to procure goods, services and works with a reduced environmental impact throughout their life-cycle compared to goods, services and works with the same primary function that would otherwise be procured\(^8\). It can be a powerful tool providing a strong stimulus for eco-innovation, helping our efforts to make the EU a more resource-efficient economy and acting as a market driver for our eco-industries\(^9\).

### 3.1.1. Green public procurement – a powerful tool in Sweden

When public procurement processes involve environmental standards, they act as a powerful tool to achieve the Swedish environmental and climate objectives, since they stimulate the market for sustainable goods and services. This has been found to be difficult to achieve using traditional instruments.

---


\(^7\) [http://ec.europa.eu/environment/gpp/index_en.htm](http://ec.europa.eu/environment/gpp/index_en.htm)

\(^8\) [http://ec.europa.eu/environment/gpp/versus_en.htm](http://ec.europa.eu/environment/gpp/versus_en.htm)

Green public procurement has been used as an instrument of Swedish environmental policy for over ten years. The Swedish Environmental Protection Agency is responsible for monitoring and developing the instrument\(^20\).

![Diagram](image)

**Figure 1:** Procedure for the development and revision of GPP criteria, European Commission/Environment/GPP\(^21\).

### 3.2. Sustainable procurement (from green to sustainable procurement)

**Sustainable Public Procurement (SPP)** means that public authorities seek to achieve the appropriate balance between the three pillars of sustainable development - economic, social and environmental - when procuring goods, services or works at all stages of the project.

Many public authorities in the EU are implementing GPP as part of a broader approach to sustainability in their purchasing which also addresses the economic and social aspects\(^22\).

---


\(^{21}\) [http://ec.europa.eu/environment/gpp/gpp_criterion_procedure.htm](http://ec.europa.eu/environment/gpp/gpp_criterion_procedure.htm)

4. The literature study and results

The literature study covers situation with public procurement in EU, Sweden and also provides practical examples from the UK.

4.1. EU

In 2004, the Council and the European Parliament adopted two directives aimed at clarifying, simplifying and modernising existing European legislation on public procurement.


In contrast with the earlier EU Directives that are governing procurement, the 2004 Directives contain specific reference to the possibility of including environmental considerations in the contract award process, and at the same time ensuring the possibility of obtaining the best value for money for their contracts.

More detailed provisions in the Directive permit24:
- the inclusion of environmental requirements in technical specifications (Article 23(3)b);
- the use of eco-labels (Article 23(6));

---


• setting social and environmental conditions for the performance of contracts (Article 26);
• requiring economic operators to demonstrate they have met their environmental obligations (Article 27);
• requiring economic operators to demonstrate they can perform a contract in accordance with environmental management measures (Articles 48(2)f and 50); and
• applying award criteria based on environmental characteristics (Article 53).

The Directives thus offer a number of opportunities for GPP to be implemented, throughout the contract award process.

EU criteria are developed to help procurement professionals in those countries that do not have their own sustainability criteria.

---

**Figure 3 Green Public Procurement – target by the European Commission**

Sweden produces its own sustainability criteria, which are based on EU legislation, to provide practical and detailed advice to Swedish public sector purchasers.

Sustainability criteria for public procurement are developed in the EU GPP Advisory Group (EU Commission).

The public sector spends a lot of money every year on the goods and services needed to deliver public services. To achieve value for money (VFM) for the taxpayers, effectively managed procurements – properly planned and executed – are essential. Public procurement is the process whereby public sector organisations acquire goods, services and works from third parties. Public procurement includes much that supports the work of government and ranges from routine items (e.g. furniture or printed forms) to complex spend areas (e.g. construction).

---

26 [http://ec.europa.eu/environment](http://ec.europa.eu/environment)
4.1.1. EU GPP for textiles

The total market for textiles and clothing in the public sector is enormous, more than EUR 10bn. The products are used by e.g. firemen, policemen and railways and other public services in European countries. Public procurement has an important role to play with regard to protective textiles, representing 100% of the market for certain product groups.

Green Public Procurement (GPP) is a voluntary instrument. The document provides the EU GPP criteria developed for textiles. The Technical Background Report provides full details on the reasons for selecting these criteria and references for further information.

For each product / service group two sets of criteria are presented:

- **The core criteria** are those suitable for use by any contracting authority across the Member States and address the key environmental impacts. They are designed to be used with minimum additional verification effort or cost increases.
- **The comprehensive criteria** are for those who wish to purchase the best environmental products available on the market. These may require additional verification effort or a slight increase in cost compared to other products with the same functionality.

For the Core criteria products meeting either the requirements of the Öko-Tex Standard 100 label or the EU Ecolabel for textiles will comply with the specifications. Additionally award criteria have been included relating to the use of organically produced cotton and recycled fibres.

The Comprehensive criteria include production process and fibre-specific criteria taken from the requirements under the EU Ecolabel in the specifications, with the use of organically produced cotton, recycled fibres being encouraged in the award phase. Additionally there are fitness for use criteria which specify minimum requirements for colour fastness and dimensional stability. These should be verified with test results.

![EU GPP criteria levels](image)

**Figure 4. EU GPP Criteria for Textiles**

These criteria cover the following textile products:

---

Textile clothing and accessories: clothing and accessories (such as handkerchiefs, scarves, bags, shopping bags, rucksacks, belts etc.) consisting of at least 90% by weight of textile fibres;

Interior textiles: textile products for interior use consisting of at least 90% by weight of textile fibres. Wall and floor coverings are excluded;

Fibres, yarn and fabric: intended for use in textile clothing and accessories or interior textiles.

4.1.2. Key environmental and health issues for textiles

The key environmental impact of textiles focus on the impacts related to the production and processing of textiles, and/or possible health impacts related to the use of the products themselves.

The recommended core and comprehensive criteria for textiles are set out below. The GPP criteria are designed to reflect the key environmental risks. This approach is summarized in the following table:

<table>
<thead>
<tr>
<th>Key Environmental Impacts</th>
<th>GPP Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air pollution, ozone formation (smog), bioaccumulation or food chain exposure and hazardous effects on aquatic organisms or the increased growth of undesirable aquatic organisms which can degrade water quality, due to the inappropriate use of certain pesticides and fertilisers in the production of fibres, and substances used during the processing of fibres and final textile products</td>
<td>Purchase organically produced textiles</td>
</tr>
<tr>
<td>Negative impact on the occupational health of users due to residues of certain substances harmful to human health</td>
<td>Purchase textiles which can be reused for their original purpose or purchase textiles that contain recycled fibres</td>
</tr>
<tr>
<td>Avoidance of early failure and consequent waste of textiles by promoting colour-fast fabrics that do not shrink during use</td>
<td>Purchase textiles with a reduced use of environmentally harmful substances in production</td>
</tr>
<tr>
<td></td>
<td>Purchase textiles with lower residues of substances harmful to human health</td>
</tr>
<tr>
<td></td>
<td>Purchase textiles which meet the minimum requirements for colour fastness and dimensional stability</td>
</tr>
</tbody>
</table>

Figure 5 Key environmental impacts, EU GPP Criteria for Textiles\(^28\).

A great variety of material types are used in today’s textile industry, some naturally grown, and some synthetically produced. Both the production/cultivation and then the processing of such materials are highly varied and consequently have a variety of different potential impacts.

Intensive agriculture, many different processing techniques, considerable amounts of water and the energy used in the processing of different materials in the textile production chain all

---

those activities together contributes to the total environmental impact of textiles. By limiting the amount of virgin fibres used and recycling more is a useful way to limit the different impacts\(^{29}\).

The most important environmental impacts:
- The arise from the use of pesticides during the production process of cotton as well as from the amount of water discharged and the chemical load it carries as a result of textile processing.
- Energy consumption, air emissions and solid waste.

The most direct approaches for reducing the environmental impacts of textiles is to use recycled fibres, re-use textiles or use organic production methods. The most important health concerns for end users.
- The use of potentially carcinogenic or sensitizing substances in textiles

Important activities that contribute to the environmental impacts of textile fibres:
- Fertilisers and pesticides
- Substances used in the processing of textiles
- Water and energy use
- Recycled fibres

### 4.1.3. EU GPP Criteria for Textiles

Purchase of textile products with low levels of toxic substances, with a preference for fibres and products with a low environmental impact during production and made from fibres produced with a minimum of pesticides.

**Specifications:** For products made from cotton or other natural cellulosic fibres, the final product shall not contain more than 0.05 ppm (parts per million) of each of the following substances. The total sum content of the following substances shall not exceed 0.75 ppm\(^{29}\):
- Pesticides
- Dyes classified as sensitising/allergenic, carcinogenic, mutagenic or toxic to reproduction
- Arylamines
- Flame retardants
- Pentachlorophenol and tetrachlorophenol
- Phthalate softeners
- Formaldehyde
- Heavy metals
- Colour fastness and dimensional stability

**Award criteria:** Additional points will be awarded in proportion of:
- Organically produced cotton or other natural fibres
- Recycled fibres

For the Organically produced cotton or other natural fibres the tenderers must indicate the proportion of cotton or other natural fibres used in the final product by weight deriving from organic production\(^{30}\) (the origin of the fibre must be produced in compliance with Regulation (EC) No 834/2007). For the recycled fibres the tenderers must indicate the proportion of the

product by weight made of recycled fibres, i.e. fibres originating only from cuttings from textile and clothing manufacturers or from post-consumer waste\(^\text{30}\) (textile or otherwise). To verify this, the supplier must provide evidence of the origin of the fibres used.

### 4.1.4. Relative environmental impact of textile fibres

A report commissioned by Defra in the UK in April 2010 has used life cycle assessment to determine the relative environmental impacts of textile fibres using the indicators of energy use, water use, greenhouse gas emissions, waste water and direct land use\(^\text{30}\):

**Table 1 The relative environmental impacts for textile fibres, EU GPP Criteria for Textiles**

<table>
<thead>
<tr>
<th>Decreasing environmental impact</th>
<th>Energy use</th>
<th>Water use</th>
<th>Greenhouse gases</th>
<th>Waste water</th>
<th>Direct land use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acrylic</td>
<td>Cotton</td>
<td>Wool</td>
<td>Nylon</td>
<td>Wool</td>
<td>Wool</td>
</tr>
<tr>
<td>Nylon</td>
<td>Silk</td>
<td>Natural bast fibres</td>
<td>Regen. cellulosic</td>
<td>Regen. cellulosic</td>
<td>Regen. cellulosic</td>
</tr>
<tr>
<td>Polyester/PTT</td>
<td>Regen. cellulose (viscose, Modal)</td>
<td>acrylic</td>
<td>Polyester</td>
<td>acrylic</td>
<td>polyester</td>
</tr>
<tr>
<td>PLA/Cotton/Lycocell/Wool</td>
<td>Hemp</td>
<td>Wool</td>
<td>Lyocell</td>
<td>Hemp</td>
<td>Lycocell</td>
</tr>
<tr>
<td>Wool Natural bast fibres (wool, hemp, flax)</td>
<td>Natural bast fibres</td>
<td>natural bast fibres</td>
<td>natural bast fibres</td>
<td>natural bast fibres</td>
<td>natural bast fibres</td>
</tr>
<tr>
<td>Natural bast fibres</td>
<td>Wool</td>
<td>Natural bast fibres</td>
<td>Natural bast fibres</td>
<td>Natural bast fibres</td>
<td>Natural bast fibres</td>
</tr>
<tr>
<td>Polyamide</td>
<td>Viscose</td>
<td>Natural bast fibres</td>
<td>Viscose</td>
<td>Natural bast fibres</td>
<td>Natural bast fibres</td>
</tr>
<tr>
<td>Acrylic</td>
<td>Hemp</td>
<td>Viscose and Modal</td>
<td>Modal</td>
<td>Natural bast fibres</td>
<td>Natural bast fibres</td>
</tr>
<tr>
<td>Velvet</td>
<td>Cotton</td>
<td>Flax</td>
<td>Hemp</td>
<td>Viscose</td>
<td>Flax</td>
</tr>
<tr>
<td>Ramie</td>
<td>Lyocell</td>
<td>Hemp</td>
<td>Viscose and Modal</td>
<td>Hemp</td>
<td>Modal</td>
</tr>
<tr>
<td>Jute</td>
<td>PLA</td>
<td>Viscose</td>
<td>Natural bast fibres</td>
<td>PLA</td>
<td>Jute</td>
</tr>
<tr>
<td>Lyocell</td>
<td>hemp</td>
<td>Natural bast fibres</td>
<td>Natural bast fibres</td>
<td>Wool</td>
<td>Lyocell</td>
</tr>
</tbody>
</table>

### 4.1.5. Ecolabels, verification aspects and market concerns

There are currently over 400 EU Ecolabeled textile products on the market but not all will be relevant for contracting authorities. By contrast there are almost 60,000 labeled by Öko-Tex\(^\text{30}\):

- Öko-Tex does not include criteria relating to production processes, and is solely concerned with end user toxicity
- The criteria for the EU Ecolabel and Öko-Tex regarding end user toxicity differ slightly, with the EU Ecolabel criteria being stricter
- The verification of environmental criteria relating to production processes can be challenging
- The supply of organically produced natural fibres such as cotton, linen and wool is currently limited

### 4.2. UK sustainable clothing action plan/ roadmap

This chapter is an example of how sustainable clothing initiative is implemented in the UK, through The Action Plan for the Sustainable Clothing Roadmap.

About 2 million tonnes (value £23 billion) of clothing are purchased per annum in the UK, with the fast/discount fashion sector (characterized by low cost, short lifetime garments) making up one-fifth of the domestic market.

This UK roadmap aims at clothing, with its significant environmental and social footprint across its supply chain which is exacerbated by high consumption levels, in particular in the

developed world. 90% of UK clothing is imported, many of the significant impacts are therefore occurring overseas as well as in the UK.

The Sustainable Clothing Roadmap in UK aims to improve the sustainability of clothing, by gathering evidence on the environmental, social and economic impacts, building on existing initiatives and by co-ordinating action by key clothing supply chain stakeholders.

The Action Plan for the Sustainable Clothing Roadmap focus on the following five key areas to improve the sustainability performance of clothing:

1. Improving Environmental Performance across the Supply Chain:
   a) Sustainable Design
   b) Fibres and Fabrics
   c) Maximising Reuse, Recycling and end of life management
   d) Clothes Cleaning

2. Consumption trends and behaviour
3. Awareness, media, education and networks
4. Creating market drivers for sustainable clothing
5. Instruments for improving traceability along the supply chain (ethics, trade and environment).

The roadmap action plan will be successful if it stimulates the clothing and fashion industry to take increasing actions in the five key areas, where it can be most effective. The clothing roadmap is one of ten roadmaps being trialed on a range of products in priority areas under the UK government actions on Sustainable Consumption and Production.

**4.2.1. Clothing today and what is “unsustainable” about it**

The clothing industry is a high value sector, globally worth over £500 billion, employing approximately 26 million people and supporting a significant number of economies and individual incomes around the world. This economic success story also has a significant adverse environmental and social “footprint” across its global lifecycle.

The environmental impacts involved in the manufacture of clothing vary a lot. For example, cotton growth involves significant water use, toxicity from fertiliser, pesticide and herbicide use, whereas production of synthetic fibres involves the generation of GHG emissions from the processing of fossil fuels.

For all fibres the dyeing and finishing processes can involve heavy water use resulting in hazardous waste from pre-treatment chemicals. In the use phase, the energy consumed in laundering during the water heating and air heating in the tumble drying also have significant environmental impacts31.

---

Small actions in one part of the world can have big consequences in others.

There is no simple straightforward answer on how to tackle clothing sustainability issues and government alone cannot not provide a solution. Instead, the concept of the Sustainable Clothing Roadmap process is about bringing together relevant sector expertise to understand the full picture and develop co-ordinated action.

Defra and other organisations have commissioned a number of evidence projects to help inform all roadmap members and the wider clothing sector, and identify potential actions.
### Table 2 Environmental and social impacts across the life cycle of clothing

<table>
<thead>
<tr>
<th>Life cycle stages</th>
<th>Environmental impacts</th>
<th>Social impacts</th>
</tr>
</thead>
</table>
| Raw materials growth, acquisition and processing | - Resource consumption  
- GHG emissions  
- Air/water pollution & toxicity  
- Soil degradation/contamination  
- Biodiversity/land use  
- Solid and hazardous waste | - Worker rights  
- Worker health and safety  
- Poverty alleviation  
- Community health  
- Community impacts |
| Fibre production (natural and synthetic)  | - GHG emissions  
- Air/water pollution & toxicity  
- Soil degradation/contamination  
- Biodiversity/land use | - Worker rights  
- Worker health and safety  
- Poverty alleviation  
- Community health  
- Community impacts |
| Clothing production and garment assembly  | - GHG emissions  
- Air/water pollution & toxicity  
- Soil degradation/contamination  
- Biodiversity/land use | - Worker rights  
- Worker health and safety  
- Poverty alleviation  
- Community health  
- Community impacts |
| Packaging                                 | - Solid and hazardous waste                                |                                                        |
| Distribution                              | - GHG emissions                                            |                                                        |
| Retail                                    | - Solid and hazardous waste                                |                                                        |
| Use                                       | - Resource consumption  
- GHG emissions                                          |                                                        |
| End of life management                    | - GHG emissions  
- Solid and hazardous waste                                |                                                        |

### 4.2.2. Clothing tomorrow - “Sustainable” Clothing

Ideally this is clothing that maximises positive and minimises negative environmental, social and economic impacts along its supply and value chain. To be able to achieve this, the roadmap has three steps. Evidence will be gathered and a platform will be provided for extensive discussions with stakeholders on the key environmental and social impacts of clothing and where actions will be most effective taking existing initiatives into account.

The key environmental and social impacts of clothing have been identified and where actions will be most effective. An actions plan for stakeholders in their respective areas has been provided and will be implemented.
4.3. Sweden

Public procurement of European Union is a huge market estimated to ca. 8000 billion SEK, whereas the Swedish share accounts for 510-608 billion SEK, making up ca. 15-18.5% of the Swedish GDP. In Sweden, there are over 5000 purchasing organisations. Around 1-2% of the direct public procurement agreements are made with suppliers located abroad.

The diagram below shows how often different public procurement criteria or tools are used in general, by the Swedish governmental authorities, municipalities, county councils and governmental companies:

![Diagram showing guidelines/tools as support in environmentally friendly public procurement, %]

Figure 7 Does your organisation use any of the mentioned above tools as support for green public procurement (multiple choice answers)?

Many organisations apply the Swedish Environmental Management Council (SEMCO) criteria (60%) in public procurement. Around 57% of organisations use support and guidelines from other authorities and organisations. Procurement support guidelines (55%) are followed by criteria from environmental labelling criteria (53%) etc.

The Swedish Environmental Management Council (SEMCO) criteria and the Nordic Ecolabel criteria are the most frequently used criteria in the public procurement of textile and laundry service, as was observed in the current study.

4.3.1. SEMCO’s public procurement criteria for laundry and textile service companies

Sweden produces its own sustainability criteria, which are based on EU legislation, to provide practical and detailed advice to Swedish public sector purchasers.

The relevant Swedish Environmental Management Council (SEMCO) criteria for public procurement of textile and laundry service are:\(^{35}\):

- SEMCO’s procurement criteria for laundry and textiles service
- SEMCO’s procurement criteria for textiles and leather

Both documents contain similar requirements on chemicals and are often cross-referenced.

The criteria documents are no longer updated to the latest version after certain period of time. Instead, each criterion in the criteria document has now its personal identification number and is updated by SEMCO when relevant. For example, the criteria ‘Bioaccumulation of substances contained’ has an identification number MSR-10326.

**Laundry and textile services** i.e. the hiring of textiles and washing of hired textiles, or washing of own textiles/goods, has different environmental considerations. It is environmental considerations connected to the extraction of raw materials for washing chemicals and textiles, the manufacturing of washing chemicals and textiles (such as water and chemical use), the washing process (energy use, chemical use, water consumption), and the use of fossil fuels in distribution.\(^ {36}\)

Energy use impacts the environment through global warming, acidification and eutrophication. Chemical use can impact the environment through ecotoxicity and human toxicity.

Wastewater can contain contaminants from the textiles (e.g. heavy metals from industrial washing) and residues from washing chemicals. Many plants can still make great improvements in environmental areas by optimizing their consumption of energy, water, chemicals, etc.

The criteria for the Laundry and textile services are divided into four groups:

- Chemicals
- Energy use and water consumption
- Acquisition of textiles
- Distribution

---

\(^{35}\) [www.msr.se](http://www.msr.se)

\(^{36}\) SEMCO’s procurement criteria for laundry and textile services, [www.msr.se](http://www.msr.se)
**Swedish GPP criteria levels**

- Basic
- Advanced
- Spearhead

- Chemicals used in the washing process
- Energy use and water consumption of the laundry
- Distribution
- Acquisition of textiles during the contract period

Figure 8 The Swedish GPP criteria levels, SEMCO's procurement criteria for laundry and textile services\(^{37}\).

*Chemicals used in the washing process*
These criteria are intended for the procurement of laundry and textile services (previously called laundry services), i.e. the hire and washing of hired textiles or the washing of own textiles/goods\(^{37}\):

<table>
<thead>
<tr>
<th>Qualification requirement:</th>
<th>Supplier’s systematic environmental initiatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical specification:</td>
<td>Bioaccumulation of substances contained</td>
</tr>
<tr>
<td></td>
<td>Health risks of substances contained</td>
</tr>
<tr>
<td></td>
<td>Environmental hazard of the product</td>
</tr>
<tr>
<td></td>
<td>Allergenic product</td>
</tr>
<tr>
<td></td>
<td>Allergenic substance</td>
</tr>
<tr>
<td></td>
<td>Unscented</td>
</tr>
<tr>
<td></td>
<td>Limitations of specific substances/substance groups</td>
</tr>
<tr>
<td></td>
<td>Laundry’s wastewater treatment</td>
</tr>
<tr>
<td></td>
<td>Phosphorus content of washing chemicals</td>
</tr>
</tbody>
</table>

*The energy use and water consumption of a laundry*
These criteria are intended for the procurement of laundry and textile services (previously called laundry services), i.e. the hire and washing of hired textiles or the washing of own textiles/goods:

<table>
<thead>
<tr>
<th>Qualification requirement:</th>
<th>Supplier’s systematic environmental initiatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical specification:</td>
<td>The energy use of a laundry</td>
</tr>
<tr>
<td></td>
<td>The water consumption of a laundry</td>
</tr>
<tr>
<td></td>
<td>Climate gas emissions</td>
</tr>
</tbody>
</table>

*Acquisition of textiles during the contract period*

These criteria are intended for the procurement of laundry and textile services (previously called laundry services), i.e. the hire and washing of hired textiles or the washing of own textiles/goods:

<table>
<thead>
<tr>
<th>Qualification requirement:</th>
<th>Supplier’s systematic environmental initiatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special contract terms:</td>
<td>Colouring agents</td>
</tr>
<tr>
<td></td>
<td>Flame retardants</td>
</tr>
<tr>
<td></td>
<td>Alkylphenol ethoxylates (APEO)</td>
</tr>
<tr>
<td></td>
<td>Perfluorinated substances</td>
</tr>
<tr>
<td></td>
<td>Formaldehyde</td>
</tr>
<tr>
<td></td>
<td>Softening agents</td>
</tr>
<tr>
<td></td>
<td>Antibacterial substances</td>
</tr>
<tr>
<td></td>
<td>Metal contents in pre-treated leather and skins</td>
</tr>
<tr>
<td></td>
<td>Environmentally appropriate textile fibres</td>
</tr>
<tr>
<td></td>
<td>Environmentally appropriate cotton production</td>
</tr>
<tr>
<td></td>
<td>Social responsible production</td>
</tr>
</tbody>
</table>

_Distribution_

These criteria are intended for the procurement of laundry and textile services (previously called laundry services), i.e. the hire and washing of hired textiles or the washing of own textiles/goods38.

<table>
<thead>
<tr>
<th>Qualification requirement:</th>
<th>Supplier’s systematic environmental initiatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special contract terms:</td>
<td>Heavy vehicles (total weight over 3.5 tonnes)</td>
</tr>
<tr>
<td></td>
<td>Light trucks (total weight max 3.5 tonnes)</td>
</tr>
<tr>
<td></td>
<td>Eco-driving</td>
</tr>
<tr>
<td></td>
<td>Climate requirements - renewable portion of fuel</td>
</tr>
</tbody>
</table>

### 4.3.2. Environmental ecolabel – The Nordic Ecolabel

The _environmental labelling criteria_ relevant for the current study are issued by Nordic Ecolabelling (in Swedish: Svanen) for the following categories:

- Textiles, hides/skins and leather (latest version - Version 4.0, valid between 12 December 2012 – 31 December 2016)

A textiles service that has fulfilled the Nordic Ecolabel criteria is among the most environmentally-sound on the market. It reduces continually its energy and water usage and uses more environmentally-sound chemicals in its washing processes.

At present, 21 laundries/textiles services are certified according to the Nordic Ecolabelling in Sweden39.


39 [http://www.svanen.se/Portaler/Laundries/](http://www.svanen.se/Portaler/Laundries/)
4.3.3. Green public procurement – verification proposals

This chapter summarizes a number of verification schemes (e.g. EU-Ecolabel) that are most frequently proposed as verification documents in the SEMCO’s criteria procurement criteria for laundry and textile service.

The advantage of using such established verification schemes is that these compile different requirements set by laws and regulations and allow easy communication in terms of verification document in public procurement:

<table>
<thead>
<tr>
<th>Verification scheme</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Svanen</td>
<td>Nordic Ecolabelling in English. Demonstrates that a product is a good environmental choice. The “Swan” symbol, as it is known in Nordic countries, is available for 65 product groups. The Swan checks that products fulfill certain criteria using methods such as samples from independent laboratories, certificates and control visits. It has criteria for textile service; and criteria for textiles, hides/skins and leather. <a href="http://www.nordic-ecolabel.org/">http://www.nordic-ecolabel.org/</a></td>
</tr>
<tr>
<td>GOTS</td>
<td>The Global Organic Textile Standard (GOTS) was developed with the aim to unify the various existing standards and draft standards in the field of eco textile processing and to define world-wide recognized requirements that ensure organic status of textiles, from harvesting of the raw materials, through environmentally and socially responsible manufacturing up to labelling in order to provide a credible assurance to the end consumer. Processors and manufacturers shall be enabled to supply their organic fabrics and garments with one certification accepted in all mayor selling markets. <a href="http://www.global-standard.org">http://www.global-standard.org</a></td>
</tr>
<tr>
<td>Bra Miljöval</td>
<td>&quot;Good Environmental Choice&quot; in English. This label focuses on fairly widely used products and services that have a major impact on the environment. The Nature Conservancy began with campaigns for unbleached paper, mercury-free batteries, and environmentally-adapted laundry detergent and has expanded to several other products such as textiles (however, not for textile and laundry service). <a href="http://www.naturskyddsforeningen.se/">http://www.naturskyddsforeningen.se/</a></td>
</tr>
<tr>
<td>Öko-Tex 100</td>
<td>The Oeko-Tex Standard 100 is a globally uniform testing and certification system for textile raw materials, intermediate and end products at all stages of production. The certification covers multiple human-ecological attributes, including harmful substances which are prohibited or regulated by law, chemicals which are known to be harmful to health, but are not officially forbidden, and parameters which are included as a precautionary measure to safeguard health. <a href="https://www.oeko-tex.com/en/manufacturers/manufacturers.xhtml">https://www.oeko-tex.com/en/manufacturers/manufacturers.xhtml</a></td>
</tr>
</tbody>
</table>
within the following areas: laundry and textile service, textile materials, textile handling, standards for health care textiles etc. The handbook refers to health care provider and supplier of health and textile service and supplier of textile service to health care. [http://www.sis.se/en/health-care-technology/hospital-equipment/sis-tr-112011](http://www.sis.se/en/health-care-technology/hospital-equipment/sis-tr-112011)

<table>
<thead>
<tr>
<th>Guide to buying terms for the chemical content in textiles, clothing, leather, goods and shoes.</th>
<th>The Textile Importers’ Association in Sweden (Textilimportörerna), Edition 6 of January 2013. This guide has been issued by The Textile Importers’ Association in Sweden (Textilimportörerna) to facilitate for importing companies to comply with the chemical legislation and recommendations in force in the fields of textiles, clothes, leather goods and shoes.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue Sign®</td>
<td>The bluesign® standard brings together the entire textile manufacturing chain to jointly reduce the ecological footprint of a responsibly acting textile industry. Instead of focusing on finished product testing, the bluesign® standard analyzes all input streams – from raw materials to chemical components, to resources – with a sophisticated “Input Stream Management” process. <a href="http://www.bluesign.com/">http://www.bluesign.com/</a></td>
</tr>
<tr>
<td>IFRA Code of Practice</td>
<td>International Fragrance Association (IFRA) Code of Practice Dec06. To encourage the compliance of fragrance manufacturers and their products and practices with all relevant legislation – national or international – and with applicable industry codes as well as to promote the highest standards of conduct and safety in the fragrance industry, worldwide <a href="http://www.ifraorg.org/en-us/code-of-practice#Upzou7mA3g4">http://www.ifraorg.org/en-us/code-of-practice#Upzou7mA3g4</a></td>
</tr>
<tr>
<td>EU-Ecolabel</td>
<td>A voluntary scheme designed to encourage businesses to market products and services that are kinder to the environment and for European consumers - including public and private purchasers - to easily identify them. <a href="http://ec.europa.eu/environment/ecolabel/index_en.htm">http://ec.europa.eu/environment/ecolabel/index_en.htm</a></td>
</tr>
</tbody>
</table>

An example of how different environmental schemes can be applied as verification documents in complying with the SEMCO’s criteria at different levels (A, B, S) is given below⁴⁰.

**Table 4 Examples of verification of sustainability criteria for publicly procured textiles**

<table>
<thead>
<tr>
<th>Requirements in criteria document</th>
<th>Example of verification (B=fulfills base criteria; A=fulfills advanced criteria; S=fulfills spearhead criteria)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Öko-Tex 100</td>
<td>B</td>
</tr>
<tr>
<td>Svanen EU-Ecolabel Bra Miljöval GOTS Blue Sign Leverantörs-försäkran</td>
<td></td>
</tr>
<tr>
<td>Colouring agents (advanced criteria to be used together with base criteria)</td>
<td>B</td>
</tr>
<tr>
<td>Flame retardants</td>
<td>B</td>
</tr>
<tr>
<td>Alkylphenol</td>
<td>-</td>
</tr>
</tbody>
</table>

etoxylates (APEO) | - | - | B | B | B | B

It shall be noticed however that the table above should not be used as a cause of expulsion. Once the content of a verification document does not contain sufficient information, it shall be complemented with other relevant documentation.

4.3.4. Health care textiles – Guide lines

The guide is intended primarily for administrators of textile issues for healthcare and textile service company operations and supplier of textile services to healthcare. Health care textiles – Guide line (in Swedish: Textilhandboken) provides information on textile management for healthcare providers in the following areas41:

- Laundry and textile supply
- Textile materials
- Textile Management
- Standards for hospital textiles
- Certification / CE
- Environmental aspects

![Figure 9 Washing cycle of clothes in health care, Textilhandboken.42.](image)

---

41 Textilhandboken – Avsedd för textilier inom vård och omsorg, SIS, Swedish Standards Institute.

42 Textilhandboken – Avsedd för textilier inom vård och omsorg, SIS, Swedish Standards Institute.
Below are some examples of aspects in the guide line that are relevant for current study:

**Laundry and textile supply:**
- Circulation
- Garment System
- Custom system
- Targeted systems
- Standard on health-care textiles
- Supply Services
- Quality rating
- Staff wear
- Storage
- Waste

**Textile materials:**
- Fiber materials
- Mixed materials
- Treatments that improve fabric properties

*Textiles have certain functions to perform,* such as look, feel, comfort, protection, durability, washability / hygiene and safety. The target to achieve the function, the fibrous material properties such as right-tolerance design and manufacturing interact in a positive manner:

**Textile Management:**
- Washing Quality Levels
- Washing Purity
- Fabric smoothness
- Seam smoothness

**Laundry methods:**
All standardized mixed woven fabrics and cotton textiles are constructed of material that is suitable for water-washing. Machine wash is the most common laundry method and it gives good purity.

Dirty laundry from healthcare to be washed at a high temperature to reduce the risk of spreading infection. The disinfection of dirty laundry must undergo should be done by the laundry in the washing machine water heated to 70 °C and kept there for at least ten minutes:
- Machine wash
- Wash at temperatures not less than 70 °C
- Wash at temperatures lower than 70 °C
- Bleaching
- Stain Removal
- Softener Treatment

**Aftertreatment:**
- Tumble drying
- Hot steam air treatment
- Mangle
5. Public procurement of textile and laundry service – A case study

The aim of the case study was to analyse current situation with public procurement of laundry and textile service for hospital clothes in Sweden.

The research questions were as following:

- How often environmental, social and economic criteria are applied in public procurement of laundry and textile service in Sweden?
- What kind of sustainability requirements are requested by the purchasing bodies (municipalities and county councils responsible for public procurement of hospital clothes)?
- What are the challenges in fulfilling the green procurement requirements?

5.1. Scope of the case study

The scope of the case study was defined as following:

- To Analyse the current situation at the laundry and textile service company Textilia45
- To study textiles and laundry service for hospitals, health care centers, dental clinics, special clinics etc.
- To study tender documents that the Swedish municipalities County Councils used for public procurement of textile and laundry services in year 2012

The findings are clarified in details in the upcoming chapters in terms of specific environmental and in some cases social requirements requested to be fulfilled by the suppliers of laundry and textiles services that want to participate in the public procurement processes. Economic requirements are also presented where these were stated in the tender documents.

![Figure 10 Actors involved in the value chain of the case study.](image)

Below is the summary of the case study findings.

---

45 [http://www.textilia.se/](http://www.textilia.se/)

29
Table 5 Case study summary for environmental criteria applied by 8 different municipalities and county council in public procurement of laundry and textile services in Sweden.

<table>
<thead>
<tr>
<th>No.</th>
<th>Purchaser</th>
<th>Purchased product / service</th>
<th>Year</th>
<th>Are environmental criteria used in the purchasing process?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The municipality (A)</td>
<td>Laundry and leasing of working clothes (trousers and tunics)</td>
<td>2012</td>
<td>Yes. Criteria for <strong>chemicals used in the washing process</strong> according to SEMCO: a) With additional requirements for whitening and colouring agents and perfumes and b) Excluding criteria for supplier’s systematic environmental initiatives and Laundry’s wastewater treatment. Criteria for <strong>energy use and water consumption of a laundry</strong> according to SEMCO.</td>
</tr>
<tr>
<td>2</td>
<td>The municipality (B)</td>
<td>Hire-, laundry-, distribution of articles (towels, blankets and other) - a system service</td>
<td>2012</td>
<td>Yes. At least SEMCO’s criteria at basic level with direct reference to SEMCO’s website (no separate document containing selected environmental criteria). Verifications to be attached to the tender document.</td>
</tr>
<tr>
<td>3</td>
<td>The County Council (C)</td>
<td>Laundry and textile service (personnel and patient clothes, among others)</td>
<td>2012</td>
<td>Yes. Same as Municipality A for <strong>chemicals used in the washing process</strong>. <strong>Distribution criteria</strong>: Euroclass II, eco-driving, fuel consumption. <strong>Acquisition of textiles</strong>: organic chemicals, formaldehyde, heavy metals, other metals.</td>
</tr>
<tr>
<td>4</td>
<td>The municipality (D)</td>
<td>Hire of clothes and circulation laundry (trousers, jumpers, polo shirt etc.)</td>
<td>2012</td>
<td>Yes. Without referring to SEMCO’s criteria, Selected criteria with verification by Ökotex 100, Nordic Environmental Labelling, EU-Ecolabel, Good Environmental Choice, GOTS, Blue Sign or similar.</td>
</tr>
<tr>
<td>5</td>
<td>The municipality (E)</td>
<td>Laundry and textile service (bed linen, trousers, towers, other)</td>
<td>2012</td>
<td>Yes. SEMCO’s criteria on <strong>Textile and laundry service</strong> and <strong>Textiles and leather</strong>, at basic level, with direct reference to SEMCO’s website. <strong>Textile Handbook SIS-TR 11:2011</strong>.</td>
</tr>
<tr>
<td>6</td>
<td>The municipality (F)</td>
<td>Laundry service (bed linen, towels, clothes, other)</td>
<td>2012</td>
<td>Yes. The SEMCO’s criteria for <strong>Textile and laundry service</strong> used in large scope.</td>
</tr>
<tr>
<td>7</td>
<td>The County Council (G)</td>
<td>Laundry and textile service</td>
<td>2011</td>
<td>Yes. The SEMCO’s <strong>basic</strong> criteria for acquisition of textiles, including the <strong>advanced</strong> criteria for based on The Nordic Ecolabelling and The Good Environmental Choice. Criteria for laundry processes and goods transportation are not available in this study.</td>
</tr>
<tr>
<td>8</td>
<td>The County Council (H)</td>
<td>Sustainable textile service (towels and bed linen)</td>
<td>2012</td>
<td>Yes. <strong>Acquisition of textiles during the contract period</strong> according to SEMCO’s criteria, at basic level (also advance criteria with direct reference to the Nordic Ecolabelling and the Good Environmental Choice, including ecological cotton, production processes and finished products). <strong>Criteria on laundry processes and Transportation of goods</strong> (documents N/A).</td>
</tr>
</tbody>
</table>
5.2. Municipality (A)

**Purchased product/service:**
- Laundry and textile service (working clothes and leasing of working clothes – trousers and tunics – 227 person/year)
- The tender document contains both environmental and social criteria.

**Environmental criteria:**

**Criteria for chemicals used in the washing process:**
- Verification documents for supporting environmental information shall be delivered to the purchaser on request

**Ingoing substances according to SEMCO’s (Swedish Environmental Management Council) criteria for textile and laundry service:**
- Ingoing substances used in the washing process must be avoided in accordance with the Swedish Chemical Agency regulations KIFS 1994:12\(^{44}\) (including amendments thereof) or the Directive 67/548/EEC\(^{45}\) (including amendments thereof).
- Exception for Perchloroethylene according to Swedish EPA regulations NFS 2001:11\(^{46}\).
- Substances contained in products used in the washing process must not be bioaccumulative in KIFS 1994:12 (including amendments thereof).
- Products used in the washing process must not be classified with the risk phrases and hazard statements according to KIFS 2005:71 KIFS 1994:12 (including amendments thereof) or Directive 1999/45/EC\(^{47}\) (including amendments thereof). Valid for 1) environmental hazard of the product and 2) allergenic substances.
- Readily biodegradable tensides, according to the applicable OECD guidelines 301 A-F\(^{48}\).
- Alkylphenol ethoxylates, LAS, EDTA must not be included in products used in the washing process. Limited level of phosphonite and NTA (max. 0.15 g/kg of laundry).
- Products containing active chlorine or organic chlorine for bleaching must not be used. **Exception:** Bleaching of heavily contaminated spots.

**Additional criteria (not listed in SEMCO’s criteria):**
- Whitening agents must not be added
- Colouring agent must not be used. **Exception:** Colouring agents can be used when motivated by safety reasons
- Products used in the washing process must not contain perfumes; alternatively perfumes must be produced according to IFRA-normative\(^{49}\).

**The energy use and water consumption of a laundry:**

**Energy use of a laundry:**
- The laundry’s total annual electricity and fuel consumption, measured as kWh/kg laundry, must not exceed 2.8 kWh/kg laundry (textiles for hospitals), according to the Nordic Ecolabelling for Textile

---

\(^{44}\) The Swedish Chemical Agency regulations KIFS 1994:12 on the classification and labelling of chemical products.


\(^{48}\) For the OECD guidelines 301A-F see the OECD website: [www.oecd-ilibrary.org/content/package/chem_guide_pkg-en](http://www.oecd-ilibrary.org/content/package/chem_guide_pkg-en)

\(^{49}\) International Fragrance Research Association, ‘Code of Practice’. 
Services, version 1.1\textsuperscript{50}.

Water use of a laundry:
- The laundry's annual water consumption (L/kg laundry) must not exceed 18 L/kg laundry, according to the Nordic Ecolabelling for Textile Services, version 1.1.

Social criteria:
- No discrimination on gender, ethnicity, handicap or sexual issues.
- No child work according to The United Nations Convention on the Rights of the Child
- Punishment in terms of a fine according to 1962:38\textsuperscript{51} on public insurance

Economic criteria:
Not stated in the current tender document.

5.3. Municipality (B)

Purchased product/service:
- Hire-, laundry-, distribution of articles (towels, bed linen, other)
- The tender document contains environmental criteria and no social criteria.
- Economic criteria are mentioned in terms of their importance in the evaluation process

Environmental criteria:
- At least SEMCO's criteria for textile and laundry service, at basic level, with direct reference to SEMCO (no separate document containing environmental criteria).
- Verifications shall be attached to the tender document.

Social criteria:
Not stated in the current tender document.

Economic criteria:

The tender document contained the following tender evaluation scheme (total is 100%):
- 60% price (scale 1-5, from highest to lowest price)
- 20% function (scale 1-5 for purchased system functioning in relation to criteria requirements)
- 10% quality (scale 1-5 for quality assurance system (ISO 19001 or similar))
- 10% environment (scale 1-5 for environmental management system (ISO 14001 or similar))

This implies that the procured service price is the dominant decision factor (60% of totally 100%).

5.4. Municipality (C)

Purchased product/service:
• Laundry and textile service (personnel and patient clothes, among others)
• The tender document contains environmental criteria and no social criteria.

Environmental criteria:

• Purchased service must be driven according to criteria for laundry and textile service, and criteria for textile and leather that are described in the attachment of the tender document
• Acquired textiles under the procurement period and textiles included into the procured laundry and textile service must not contain substance nonylphenol ethoxylates.

Criteria for chemicals used in the washing process:

Ingoing substances:
• Same criteria requirements as for Municipality (A)
• Verifications shall be provided on request (Nordic Ecolabelling license, textile service version 1.1 or similar)

Distribution:
• In implementation of the transport assignments, light trucks (total weight max 3.5 tonnes) must fulfil the requirements for the Euroclass II (Directive 96/69/EEC\textsuperscript{52} for light trucks and Directive 94/12/EC\textsuperscript{53} for passenger cars).
• In the implementation of the transport assignment, heavy vehicles (total weight over 3.5 tonnes) must fulfill the requirements for the Euroclass II (Directive 91/542/EC\textsuperscript{54} and Directive 96/1/EC\textsuperscript{55}).
• In the performance of transports within the assignment, drivers must have been trained in €œ-driving (at least have been started training within 6 months from the procurement period start, new drivers to be trained under the procurement period).
• The supplier must systematically monitor fuel consumption during the contract period.

Acquisition of textiles during the procurement period:
Basic requirements based on ÖkoTex and The Textiles Importer’s Guide to bying terms for the chemical content\textsuperscript{56}. These contain of the must-requirements and include environmental requirements for finished products:
• Organic chemicals
• Heavy metals (lead, cadmium)
• Other metals (nickel, chrome)
• Formaldehyde
• Verifications shall be provided on request (Öko-Tex Standard 100 version 1-2005 or later; license Good Environmental Choice 1996 or later or other).

Social criteria:

Not stated in the current tender document.

Economic criteria:

Not stated in the current tender document.

---

\textsuperscript{52} \url{http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:1996L0069:19961121:EN:PDF}
\textsuperscript{56} \url{http://www.textileimporters.se/pdf/ReGuide.pdf}
5.5. Municipality (D)

Purchased product/service:
- Laundry and textile service (personnel and patient clothes among others).
- The tender document contains environmental criteria and no social criteria.

Environmental criteria:

**Hire of clothes and circulation laundry:**
- Producer Responsibility for packaging materials\(^{57}\) must be followed, including agreement with REPA.
- Environmental certification must be communicated.
- Basic requirements of Öko Tex and The Textiles Importer’s Guide to buying terms for the chemical content must be followed.
- Systematic environmental work must be described (E.g., according to ISO 14001, EMAS or similar).
- Colouring agents that are potentially allergenic (in concentrations higher than 50 mg/kg); flame retardants (dekaBDE, HBCDD); perfluorinated substances PFOA (in concentrations higher than 0.1 mg/kg) must not be present in products (verified with Öko-tex 100, Nordic Environmental Labelling, EU-Ecolabel, Good Environmental Choice, GOTS, Blue Sign or similar).
- Alkylphenol ethoxylates (APEO) must not be present in products in concentrations higher than 100 mg/kg
- Limited levels of formaldehydes (verified with Öko-tex 100, Nordic Environmental Labelling, EU-Ecolabel, Good Environmental Choice, GOTS, Blue Sign or similar).
- For offered products that are intended to be used for children, the sum of the softening agents must not exceed 0.1 weight/weight % (1000 mg/kg).

As a whole, the environmental criteria are selected by the purchaser is an own compilation of the requirements with reference to different ecological certification schemes.

Economic criteria:

A so called added value-model is applied on the received tenders, as a part of an evaluation scheme:
- Tenders are evaluated in respect to the economic factor.
- Other factors that influence decision are: clothes outlook, colour/colour combinations, comfort and practicality (e.g. pockets, their position on clothes, their amount etc.).
- Each service supplier will be invited to the procurer in order to demonstrate their clothes to be procured.

Specific requirements for clothes:
- Cotton and polyester for trousers, t-shirts and piqué
- Polyester for jackets

Social criteria:

Not stated in the current tender document.

5.6. Municipality (E)

Purchased product/service:
- Laundry and textile service (bed linin, trousers, towels, other)
- The tender document contains environmental criteria and no social criteria.

Environmental criteria:

- SEMCO’s criteria for Textile and laundry service and criteria for Textiles and leather, at basic level, with direct reference to the SEMCO webpage (no separate attachment containing environmental criteria in the tender document).
- Textile handling according to Textile handbook, SIS-TR 11:201158.

Economic criteria:

The tender document contained the following tender evaluation scheme:
1. Qualification (requirements on company)
2. Examination (requirements on product or service)
3. Evaluation (assessment of the criteria specified in tender document)

The most economically beneficial tender is preferred by the purchaser, basing on the following weighted criteria:
- 70% price
- 30% delivery safety

Social criteria:

Not stated in the current tender document.

5.7. Municipality (F)

Purchased product/service:
- Laundry service (bed linin, towels, clothes, other)
- The tender document contains environmental and social criteria.

Environmental criteria:

- The SEMCO’s criteria for Textile and laundry service used in a large scope

Below the list of criteria that are adopted in a modified manner in the procurement document is given:
- Distribution, light trucks of Euroclass III (new vehicles - Euroclass V and Euroclass IV in the sensitive areas where the risk of not following environmental quality normatives is high.
- Distribution, heavy vehicles of Euroclass III (new vehicles - Euroclass IV)
- Distribution, eco-driving, maximum 12-month delay in eco-driving training from the start of the contract period.
- Distribution, climate requirements – renewable portion of fuel. The supplier must carry out at least 25% of the transports with renewable fuels during the contract period.

Since the SEMCO’s criteria for textile and laundry service was used to a large extent, it was decided to also analyse the SEMCO’s criteria that were not listed in the procurement document:

- Climate gas emissions (from laundry)
- Alkylphenol ethoxylates (APEO) in textiles
- Antibacterial substances in textiles
- Environmentally appropriate textile fibres/cotton production
- Organic production of natural plant-based fibres

It was observed that all of these criteria are advanced-level criteria, whereas the criteria ‘organic production natural plant-based fibres is the spearhead-level criterion.

**Social criteria:**

**Goods delivered must be produced under conditions consistent with the following:**

- The working environment legislation that is applicable in the country of production,
- Minimum age (ILO core convention nr. 138)
- The worst forms of child labour (ILO core convention nr. 182)
- Forced labour or abolition of forced labour (ILO core convention nr. 29 and 105)
- Equal Remuneration (ILO core convention nr. 100)
- Discrimination (Employment and Occupation) (ILO core convention nr. 111)
- Freedom of Association and Protection of the Right to Organise Convention; and Right to Organise and Collective Bargaining Convention (ILO core convention nr. 87 and 98)

The purchaser is connected to SKL Kommentus Inköpscentral⁵⁹, which is a purchasing body that works with coordination of procurement for municipalities, counties and regions. SKL can perform controls of ethical & social criteria implementation.

**Economic criteria:**

Not stated in the current tender document.

### 5.8. County council (H)

**Purchased product/service:**

- Laundry service (bed linin, towels, clothes, other)
- The tender document contains environmental and no social criteria.

**Environmental criteria:**

Acquisition of textiles during the contract period:

- The SEMCO’s basic criteria for colouring agents, flame retardants, perfluorinated substances, formaldehyde, softening agents (excl. DIBP, DHNUP, bis (2-methoxyethyl) phthalate), antibacterial substances.
  - Verification suggestions: The Nordic Ecolabelling or Öko-Tex 100 or The Good Environmental Choice or EU-Eco-label or similar.

- The advanced criteria based on the ecolabel criteria, The Nordic Ecolabelling and The Good Environmental Choice:
  - These applies for ecological cotton, production processes and finished products
  - Towels and bed linen
  - Colouring agents
  - Alkyl phenol ethoxylates,

⁵⁹ [http://www.sklkommentus.se/inkopscentral/supportsider_1/om_oss_1](http://www.sklkommentus.se/inkopscentral/supportsider_1/om_oss_1)
Ecological textiles (at least 85% natural plant-based fibres in the products harvested ecologically\(^6\); natural fibres must one of the IFOAM certified programmes and be monitored by a supervisory body within the EU, or by a supervisory body approved as equivalent to EU monitoring, according to EC Regulation 834/2007 on organic production.

Laundry:
- Washing of hospital textiles at 70°C at least 10 minutes.
- Attachment N/A

Transportation of goods:
- Attachment N/A

**Social criteria:**

Not stated in the current tender document.

**Economic criteria:**

Not stated in the current tender document.

5.9. **Discussion**

It has been observed in the performed case study that the SEMCO’s environmental criteria are frequently used by the Swedish municipalities and county councils in procurement of the laundry and textile services. Municipalities as purchasing bodies are often concise in their requirements.

The most common way of applying SEMCO’s environmental criteria in public procurement by municipalities and county councils is inserting the relevant SEMCO’s criteria into a tender document. This is also a recommended way of introducing the environmental criteria into tender documents, according to SEMCO\(^6\). The option of referring to the SEMCO’s website without listing the environmental criteria of concern in a tender document makes it harder for suppliers of laundry service to understand what type and level of criteria shall be fulfilled\(^6\).

It was observed that in most of the studied cases, the municipalities and county councils require fulfilment of the SEMCO’s criteria procurement for textile and laundry service at basic level.

SEMCO’s criteria, in contrast to the Nordic Ecolabelling criteria, are intended for public procurement purposes and therefore can be applied directly by procuring organisations (without the need of adopting the criteria). The Nordic Ecolabelling licence for Textile Service is frequently proposed as verification scheme for fulfillment of the SEMCO’s criteria for laundry and textile services.

Suggestions for verification of environmental information vary from tender to tender. The Nordic Ecolabelling and the Good Environmental Choice are the most common verification suggestions.

The importance of price (an economic criterion) was described by 2 of 8 procuring organisations. The price issue was introduced in those tender documents as a part of evaluation process. It was stated that the economic factor constitutes to 60-70% of the final decision of the purchasing organisations (municipalities and county councils). The remaining 30-40% is related to delivery safety, comfort, practicality issues etc.

---


\(^{61}\) Personal communication with SEMCO, November 2013.
Social criteria were stated by 2 of 8 procuring organisations in the analysed tender documents. The criteria to be fulfilled by service suppliers are directed towards textiles producers. These cover such issues as discrimination, child labour and other issues stated in the core ILO conventions. The measures include punishment of the service suppliers once they fail to control their respective producers of textile.

The social criteria related to textile production are of importance since most of textiles are produced abroad in the countries with higher risk for poor working conditions than in Sweden. For example, cotton is mainly harvested in China, India, and Pakistan, while the textiles made of cotton are often produced in Pakistan^62.

The Swedish laundries are T-labelled by the Swedish Laundry Organisation (in Swedish: Sveriges Tvätteriförbund). The labelling scheme implies control of quality, working conditions, environment etc.\(^63\) The license can be issued in two respective groups: 1) Laundry and Textile service Group and 2) Chemicals and Water Group.

5.10. Challenges and possibilities in the Swedish green public procurement

According to the investigation performed by the Swedish Environmental Agency, the major challenges with green public procurement processes in general are: lack of knowledge on how to set environmental requirements (ca. 64%), complicated rules/legislation (52%), longer time required in procurement process (36%)\(^3\), see Figure 11.

Furthermore, as can be seen below, 21% of respondents in the investigation believed that the availability of tools for green public procurements would promote the environmental requirements to a larger extent. Other factors that received more attention are support needed from the upper management (15%), good examples/practices (13%) and access to environmental competence (10%), see Figure 12.

![Challenges in green public procurement](chart.png)

Figure 11 What are the largest obstacles for green public procurement at your organisation (multiple choice question)?\(^3\)

---

^62 Personal communication with Textillia, December 2012.

^63 [http://www.tvatteriforbundet.se/](http://www.tvatteriforbundet.se/)
Factors influencing introduction of environmental requirements in larger extent, %

<table>
<thead>
<tr>
<th>Factor</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other</td>
<td>5%</td>
</tr>
<tr>
<td>Access to environmental competence</td>
<td>10%</td>
</tr>
<tr>
<td>Stronger support from the upper management</td>
<td>15%</td>
</tr>
<tr>
<td>Support in formulating environmental requirements</td>
<td>20%</td>
</tr>
<tr>
<td>Good examples</td>
<td>25%</td>
</tr>
<tr>
<td>Information about environmental impact of products</td>
<td>20%</td>
</tr>
<tr>
<td>Available tools for environmentally friendly procurement</td>
<td>15%</td>
</tr>
<tr>
<td>Information about environmental issues in public procurement regulations</td>
<td>10%</td>
</tr>
</tbody>
</table>

Figure 12 Above all, what do you believe will make your organisation to use environmental requirements to a larger extent?35

Several initiatives that can simplify the public procurement process that takes into account social issues of suppliers abroad were identified in the case study:

- **An international initiative:** Business Social Compliance Initiative (BSCI) – a business-driven initiative for companies committed to improving working conditions in the global supply chain. The BSCI Code of Conduct is built on the most important international Conventions protecting workers’ rights, notably the ILO Conventions and recommendations. All BSCI companies commit to implement the Code in their supply chains. To optimize the BSCI process, audit results are shared in a common database among BSCI’s participants – helping to avoid multiple audits along with unnecessary costs and time spent for companies and the suppliers.64

- **A Swedish initiative:** SKL Kommentus Inköpscentral (in English: SKL Commentus Purchasing Centrum) is performing controls of ethical & social criteria at manufacturing factories around the world (e.g. China, Malaysia, Pakistan etc.), on behalf of municipalities and county councils. The basis for controls are ILO:s eight core conventions, The United Nations Convention on the Rights of the Child (Article 32) and environmental and safety requirements.65 The outcome of the controls is revision reports upon request by municipalities and county councils.

Recommendations on how to proceed with green public procurement in Sweden can be efficiently summarized with the conclusions from the seminar ‘Substitute more!’ held this year by Ecolabelling Sweden (in Swedish: Miljömärkning Sverige AB) – a non-profit state-owned company responsible for the Nordic Ecolabelling (in Swedish: Svanen), National Substitution Group and SEMCO66:

- Apply SEMCO’s environmental criteria, The Substitution lists (e.g. for substitution of hazardous substances in the health care sector) for green public procurement. Think about how many working efforts can be saved when using the Nordic Ecolabel (Svanen) as a verification document in a public procurement process.

64 http://www.bsci-intl.org/
65 http://www.sklkommentus.se/inkopscentral/kalendarium_1/etiska_och_sociala_krav/uppfoljandekon troll-etiska-sociala-krav
There is a need for more manufacturers that offer wider range of environmentally marked products to the health care. This will make the green public procurement easier.

Purchaser needs more education and information about green public procurement. Here belongs information about how the law on public procurement functions, and that it is possible to pose environmental requirements in public procurement already today.

It is needed to become more efficient in reaching the users (both health care personnel and patients).

It is possible to reach the politicians and decision-makers easier once the benefits of the green public procurement are emphasized. The politicians and decision-makers need support basis to operate – e.g. concrete numbers that suppliers can assist with. It is needed to put green health care higher on agenda of politicians.

6. Identification of best criteria for textile material choice

This chapter discovers the most relevant criteria for choice of textiles. The focus of the investigation lies on the industrial use phase, which is washing of hospital clothes. The criteria are selected according to the scope and extent of environmental impacts.

6.1. Environmental impacts in washing process

Laundry and textile services, i.e. the hiring of textiles and washing of hired textiles, or washing of own textiles/goods, have environmental considerations connected to:

- Extraction of raw materials for washing chemicals and textiles,
- Manufacturing of washing chemicals and textiles (such as water and chemical use),
- Washing process (energy use, chemical use, water consumption), and
- Use of fossil fuels in distribution.

Energy use impacts the environment through global warming, acidification and eutrophication. Chemical use can impact the environment through ecotoxicity and human toxicity.

Wastewater can contain contaminants from the textiles (e.g. heavy metals from industrial washing) and residues from washing chemicals. Many plants can still make great improvements in environmental areas by optimizing their consumption of energy, water, chemicals, etc.

Life cycle analyses of clothes and washing machines indicate that the use phase is often the most energy demanding phase in those products life cycles, sometimes with even higher energy demand than in the production and distribution phases. According to many Life Cycle Assessment (LCA) studies, energy use is the only and largest environmental aspect at laundries. Energy consumption during the use phase (the activities that laundries can influence themselves) is the largest share of the total energy consumption.

67 http://www.msr.se/en/Procurement/SEMCO-Procurement-criteria/Services/Laundry-and-textile-services/
69 Svanen, Textilservice Version 2.1, Baggrund for miljömaerkning, 2010-12-07.
6.2. Textiles in hospital clothes

Hospital (user) perspective:

Textiles intended for hospital clothes are mostly made of polyester and cotton fibre blends. Due to multiple-use of hospital clothes, it is required that the textiles that hospital clothes are made of are durable and can last after numerous laundry cycles.

In the case study performed, it has been observed that the hospitals ask for:
- Textiles that are environmentally certified
- More personnel clothes with details (e.g. shape, position and number of pockets)
- More coloured textiles
- More comfort

Laundry and textile supplier perspective:

There are many different eco-labelled articles are available to choose from for hospitals (users). But the ordering volumes per each article are too low today (e.g. 200-300 of each article). This leads to the situation where laundry and textile services need to buy in two-year volumes of each article at once, which can make the cost of eco-labelled textiles 30% more expensive as of traditional textile alternatives.

Decisions on public procurement of eco-labelled articles are taken by politicians at municipal level. Once the decision is taken, the municipalities must follow it.

Therefore, it can be recommended that less number of different eco-labelled articles is chosen in the green public procurement of hospital clothes, which are in turn ordered in larger volumes per each article. In this case the eco-labelled articles can be purchased by laundry and textile services in larger volumes and at a better price for hospitals!

It can be argued that production of smaller series of items has positive impact on humans (e.g. hygiene) but not for the environment since the smaller series productions imply more transportation, longer transportation distances etc.

Recommendation: Public procurement of less number of eco-labelled articles ordered in larger volumes

Other crucial aspects in meeting the Swedish environmental criteria for laundry and textile service are the types of ecological textiles and their availability on the market.

It is challenging to fulfill the environmental criteria once municipalities and county councils order hospital clothes made of cotton or containing cotton – the material, which is known for its larger environmental impact. Therefore, the need for a wider range of environmentally friendly textiles for the health care market has been identified. Here, the ecological alternatives to ecological cotton could have the promising market potential and make the procuring process easier.

Even if cotton is ecologically certified (which implies lower environmental impact from cotton harvesting and handling), it is still challenging for laundry and textile service companies to fulfill the environmental criteria. The scenario, where a laundry and textile service company switches entirely to the textile made of 100% ecological cotton will result in increase of energy and water consumption in the washing process. This is due to the fact that cotton material (either ecological or not) requires longer drying time and absorbs more water during washing.
Currently, there are no fabrics available on the market that consists of ecological mix of cotton and polyester that are well-suited for hospital clothes. Therefore, only 100% ecological cotton is used as the only ecological option in the assortment, with its respective challenges in the washing process.

**Recommendation: More types of ecological textiles and their increased availability on the market**

According to Textilia, the proposed mixed alternative to cotton, for hospital clothes is:

- 25% ecological cotton – 25% polyester – 50% modal/tencel®

Articles manufactured from the mix of recycled cotton/virgin cotton/polyester is a good alternative as well. As a whole, textiles made of recycled fibres are seen as an attractive option, while new environmentally friendly materials are on the way to take shares on the market.

### 6.3. Expectations from introduction of new environmentally friendly materials

It is expected that innovative and environmentally friendly textiles will bring a number of benefits to the industrial use phase - laundry and textile service.

Novel environmentally friendly textiles are mostly interpreted as a mixture of materials in a textile. Monomaterials such as ecological cotton have become of less interest due to the environmental concerns in harvesting, production and industrial use phase.

The advantages of mixture of materials in a textile are summarized as following:

- Require less water in production of a mixed textile materials as compared to 100% cotton
- Require less energy in drying of clothes made of mixed textile materials as compared to 100% cotton
- Must withstand washing in 70°C during 10 minutes
- Must withstand many washing cycles
- New cellulose fibres as a component in textile materials are expected to take shares from cotton

One of such expectations is reduced drying time of clothes. For instance, the material blend of TENCEL® and polyester is claimed to dry up to 25% faster compared to standard fabrics. This will lead to energy savings and reduction in processing costs.

Another expected benefit is of perceptual character - a comfort feeling, which is essential for the acceptance by the wearers. The comfort perception is related to the origin of textiles. The higher the share of synthetic fibres, the more comfort is lost in a garment. In the TENCEL® example, its 35%-combination with polyester would increase the wearing comfort, in particular the moisture absorption (that is claimed to be doubled compared to performance of standard fabrics).

### 6.4. Selection of best criteria for material choice

Below, the criteria for textile material choice are summarized, from an industrial user perspective.

Important environmental aspects in the washing process are the following:

- Energy use (including drying)

---

70 Personal communication with Textilia, November 2013
• Water consumption
• Use of chemicals
• Durability

These criteria can clearly demonstrate performance of different materials in the industrial washing process and analyse the environmental benefits/disadvantages of one or another material in question. In addition, the reduced consumption of energy, water and chemicals will help laundry and textiles service to fulfil the environmental criteria as efficient as possible.

Recycling of hospital clothes was also identified as an emerging issue.

The criteria will be validated in practice in the upcoming work of P6 related to life cycle data inventory.

7. Conclusions

• Procurement - an overview

Procurement is a financial instrument. It can be used to achieve environmental and other public policy goals by local governments. Public procurement is the process by which government departments or agencies purchase goods and services from the private sector. The process will usually be subject to specific rules, laws and policies covering how the relevant decisions are made.

Green Public Procurement (GPP) is defined in the Communication “Public procurement for a better environment” as a process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their life cycle.

Sustainable Public Procurement (SPP) means that public authorities seek to achieve the appropriate balance between the three pillars of sustainable development - economic, social and environmental - when procuring goods, services or works at all stages of the project.

• Procurement in EU for textiles

The European Commission has developed common EU GPP criteria for Textile (and for a range of other products and services). GPP is a voluntary instrument. Comprehensive and core environmental purchasing criteria are proposed.

The total market for textiles and clothing in the public sector in EU is enormous. Public procurement has an important role to play with regard to protective textiles, representing 100% of the market for certain product groups.

For each product / service group two sets of criteria are presented. The core criteria are those suitable for use by any contracting authority across the Member States and address the key environmental impacts. The comprehensive criteria are for those who wish to purchase the best environmental products available on the market. For the Core criteria products meeting either the requirements of the Öko-Tex Standard 100 label or the EU Ecolabel for textiles will comply with the specifications.

• Swedish procurement system

Green public procurement has been used as an instrument of Swedish environmental policy for over ten years. The Swedish Environmental Protection Agency is responsible for monitoring and developing the instrument.

• Swedish procurement system – textile
Sweden produces its own sustainability criteria for textiles, which are based on EU legislation, to provide practical and detailed advice to Swedish public sector purchasers.

The relevant Swedish Environmental Management Council (SEMCO) criteria for public procurement of textile and laundry service are:
- SEMCO’s procurement criteria for laundry and textiles service and
- SEMCO’s procurement criteria for textiles and leather.

The criteria for the Laundry and textile services are divided into four groups
1. Chemicals
2. Energy use and water consumption
3. Acquisition of textiles
4. Distribution

Each group are divided into two parts Qualification requirement and Technical specification/ Special contract terms.

Sweden also has a Guide which is intended primarily for administrators of textile issues for healthcare and textile service company operations and supplier of textile services to healthcare. Health care textiles – (in Swedish: Textilhandboken) – it provides information on textile management for healthcare providers in the following areas:
- Laundry and textile supply
- Textile materials
- Textile Management
- Standards for hospital textiles
- Certification / CE
- Environmental aspects

• Practical application of environmental issues in public procurement (the UK)

In UK sustainable clothing initiative is implemented. The Sustainable Clothing aims to improve the sustainability of clothing, by gathering evidence on the environmental, social and economic impacts, building on existing initiatives and by co-ordinating action by key clothing supply chain stakeholders.

The Action Plan for the Sustainable Clothing Roadmap focus on five key areas to improve the sustainability performance of clothing:
1. Improving Environmental Performance across the Supply Chain
2. Consumption trends and behaviour
3. Awareness, media, education and networks
4. Creating market drivers for sustainable clothing
5. Instruments for improving traceability along the supply chain

• Swedish case study on public procurement of hospital clothes

It has been observed in the performed case study that the SEMCO’s procurement criteria for laundry and textiles service are frequently used by the Swedish municipalities and county councils. Suggestions for verification of environmental information vary from tender to tender. The Nordic Ecolabelling and the Good Environmental Choice are the most common verification suggestions.

According to the investigation performed by the Swedish Environmental Agency, the major challenges with green public procurement processes in general are: lack of knowledge on how to set environmental requirements (ca. 64%), complicated rules/legislation (52%), longer time required in procurement process (36%).
Social and economic criteria are practiced to a limited extent.

With regard to social issues, it has been identified that the purchasing organisations set requirement on textile producers, which laundry and textile service companies shall comply with and control in their supply chain. The Swedish initiative ‘SKL Commentus Purchasing Centrum’ can perform controls of ethical & social criteria at manufacturing factories around the world, on behalf of municipalities and county councils. An international initiative Business Social Compliance Initiative (BSCI) is a business-driven initiative for companies committed to improving working conditions in the global supply chain.

The price issue was introduced in few tender documents as a part of tender evaluation process. It was stated that the economic factor constitutes to 60-70% of the final decision of the purchasing organisations (municipalities and county councils). The remaining 30-40% are related to delivery safety, comfort, practicality issues etc.

Below is the summary of the most interesting findings on how to proceed with green public procurement in Sweden and make the process easier:

- Verification schemes such as the Nordic Ecolabelling (in Swedish: Svanen) is an efficient way to comply with the environmental requirements set in public procurement process.
- There is a need for more manufacturers that offer wider range of environmentally marked products to the health care.
- Purchaser needs more education and information about green public procurement. Here belongs information about how the law on public procurement functions, and that it is possible to pose environmental requirements in public procurement already today.
- It is needed to become more efficient in reaching the users (both health care personnel and patients).
- It is possible to reach the politicians and decision-makers easier once the benefits of the green public procurement are emphasized. The politicians and decision-makers need support to operate – e.g. concrete numbers that suppliers can assist with. It is needed to put green health care higher on agenda of politicians.

- User requirements – hospitals

Textiles intended for hospital clothes are mostly made of polyester and cotton fibre blends. There is an increased demand for environmentally certified textiles, more details in personnel clothes (e.g. pocket number, shape, and position), and more coloured and comfortable textiles.

- User requirements – laundry and textile service companies

Public procurement of less number of eco-labelled articles ordered in larger volumes is recommended. It was concluded that production of smaller series of items has positive impact on humans (e.g. hygiene) but not for the environment since smaller series productions imply more transportation, longer transportation distances etc.

More types of ecological textiles and their increased availability on the market is another important recommendation. Currently, there are no fabrics on the market that consist of ecological mix of cotton and polyester that are well-suitable for hospital clothes. Therefore, only 100% ecological cotton is used as the only ecological option in the assortment, with its respective challenges in the washing process (e.g. longer drying time). According to Textilia, the proposed mixed alternative to cotton that most likely would be a viable option for hospital clothes is:

25% ecological cotton – 25% polyester – 50% modal/tencel®
Textile articles manufactured from the mix of recycled cotton/virgin cotton/polyester are a good alternative as well. As a whole, textiles made of recycled fibres are seen as an attractive option, while new environmentally friendly materials are on the way to take shares on the market.

- **Best criteria for material choice (industrial use)**

The criteria for textile material choice are summarized from an industrial user perspective.

Important environmental aspects in the washing process are energy use, water consumption, use of chemicals and textiles durability.

These criteria can clearly demonstrate performance of different materials in the industrial washing process and analyse the environmental benefits/disadvantages of one or another material in question. In addition, the reduced consumption of energy, water and chemicals will help laundry and textiles service to fulfil the environmental criteria as efficient as possible.

Recycling of hospital clothes into new textiles for hospital clothes was also identified as an emerging issue since most of the clothes today are sent to incineration in Sweden today. New advanced recycling technology could make it possible to recycle the clothes to a larger extent.
Mistra Future Fashion is an interdisciplinary research program funded by The Swedish Foundation for Strategic Environmental Research, Mistra, with 40 MSEK over four years. The program started in 2011 and is hosted by SP Technical Research Institute of Sweden.

The goal is to encourage a systematic change of the Swedish fashion industry that contributes to a sustainable development of the industry and society. The program consists of eight projects which investigate new business models, design and innovative materials, sustainable consumption and customer behavior as well as policy issues. The partners involved in program include; H&M, Myrorna, Södra, I:Collect and Stockholms Läns Landsting.

Read more at
www.mistra.org
www.mistrafuturefashion.com