JRC TECHNICAL REPORTS

Development of the EU Ecolabel Criteria and Revision of the EU Green Public Procurement Criteria for Cleaning Services

Preliminary Report

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December 2014

Joint
Research
Centre

European Commission

Joint Research Centre

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This publication is a Technical Report by the Joint Research Centre of the European Commission.

Table of Contents

List of Tables

List of Figures

List of Abbreviations

AHWG	Ad-hoc working groups
AISE	International Association for Soaps, Detergents & Maintenance Products
BAT	Best available techniques
BPR	Biocidal Product Regulation
CLP	Classification, Labelling and Packaging
DID	Detergents Ingredients Database
EFCI	European Federation for Cleaning Industries
EMAS	Eco-Management and Audit Scheme
EPD	Environmental product declarations
GDP	Gross domestic product
GPP	Green public procurement
I&I	Industrial and institutional
ILCD	The International Reference Life Cycle Data System
ILO	International Labour Organization
IPTS	Institute for Prospective Technology Studies
ISO	International Organisation for Standards
JRC	Joint Research Centre
LCA	Life cycle assessment
LEED	Leadership in Energy and Environmental Design
NACE	French abbreviation for "Statistical classification of economic activities in the European Community"
NMW	National minimum wage
OECD	Organisation for Economic Co-operation and Development
OHSAS	Occupational Health & Safety Advisory Services
PCR	Product Category Rules
PEF	Product Environmental Footprint
POPS	Persistent organic pollutants
PRODCOM	Products of the European Community
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
UNEP	United Nations Environment Programme
VDMA	Cleaning Systems Association
VOC	volatile organic compounds
WFBSC	World Federation of Building Service Contractors
WUR	weight utility ration

Terms and definitions

Terms	Definitions
All-purpose cleaners*	All-purpose cleaners comprising detergent products intended for the routine cleaning of floors, walls, ceilings, windows and other fixed surfaces, and which are either diluted in water prior to use or used without dilution. All-purpose cleaners shall mean products intended for indoor use in buildings which include domestic, commercial and industrial facilities.
Cleaning	'Cleaning' has the meaning defined by EN ISO 862. Cleaning preparation', intended for domestic all purposes cleaners and/or other cleaning of surfaces (e.g.: materials, products, machinery, mechanical appliances, means of transport and associated equipment, instruments, apparatus, etc.)
Cleaning accessories	'Cleaning accessories' refer to reusable cleaning goods, such as cloths, mop and water buckets.
Cleaning power equipment	'Cleaning power equipment' refers to tools used in cleaning that require energy to operate.
Cleaning products	'Cleaning products' refer to chemicals used in cleaning.
Cleaning services	'Cleaning services' refers to the commercial activities that generate revenue by maintain the cleanliness of a defined space or object at a desirable level. The focus of this project is on indoor activities performed regularly or periodically including the cleaning of commercial (e.g. offices, schools, shopping centres, hotels) or public/ institutional buildings (e.g. libraries, schools, museums, churches).
Cleaning supplies	'Cleaning supplies' refer to consumable, non-chemical cleaning goods, such as wipes, paper towels and disposable vinyl gloves.
EU Ecolabel	A voluntary method of environmental performance certification which identifies overall, proven environmental preference of a product or service within a specific product/service category based on life cycle considerations. There are three types of voluntary labels identified by ISO with the EU Ecolabel falling under the Type I category.
Floor cleaning	'Floor cleaning' refers to the daily and weekly cleaning of floors in commercial and public spaces using either dry or wet methods.
Glass/window cleaning	'Glass/window cleaning' refers to the cleaning of glass surfaces, including mirrors. In this project, 'glass/window cleaning' only refers to the cleaning of glass areas and windows.
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 life cycle when compared to goods, services and works with the same primary function that would otherwise be procured."
Routine cleaning products	'Routine cleaning products' refer to cleaning products that are used daily or weekly in cleaning. In this project, the scope of 'routine cleaning products' aligns with the product group definition of the EU Ecolabel for all-purpose cleaners and sanitary cleaners, which includes general purpose cleaners, window cleaners and sanitary cleaners.
Sanitary cleaners*	Sanitary cleaners comprising detergent products intended for the routine removal, including by scouring, of dirt and/or deposits in sanitary facilities, such as laundry rooms, toilets, bathrooms, showers and kitchens. This subgroup thus contains bathroom cleaners and kitchen cleaners.

Terms	Definitions
Sanitary cleaning	'Sanitary cleaning' refers to the maintenance of the cleanliness of sanitary facilities. Key cleaning tasks include cleaning sinks, toilet bowls and urinals, washing floor, emptying rubbish and sanitary bins and cleaning vertical surfaces.
Specialised cleaning products	'Specialised cleaning products' refer to cleaning products that are used for specific, non-regular cleaning tasks. In this project, it refers to any cleaning products that are excluded by the product group definition of the EU Ecolabel for all-purpose cleaners and sanitary cleaners.
Standard	A document established by consensus and approved by a recognised body that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context.
Surface cleaning	'Surface cleaning' refers to the daily and weekly cleaning of vertical surfaces, furniture (such as desks and chairs) and desk equipment (such as phones).
Type I Ecolabel	'Type I Ecolabel' is a voluntary multi-criteria-based, third party program that awards a license that authorises the use of environmental labels on products indicating overall environmental preferability of a product within a particular product category based on life cycle considerations. 'Type I Ecolabel' is defined by the ISO 14024 standard.
Window cleaners*	Window cleaners comprising specific cleaners intended for the routine cleaning of windows, and which are used without dilution.

*These definitions are part of the Comission Decision 2011/383/EU. The EU Ecolabel for all-purpose cleaners and sanitary cleaners are currently undergoing a revision process.

Executive summary

The objective of this project is to develop a new EU Ecolabel and revise the existing EU Green Public Procurement (GPP) criteria for professional cleaning services (hereafter referred to as cleaning services). This preliminary report investigates the market, operational and sustainability aspects of cleaning services, with a goal to develop a robust evidence base and prioritise key environmental and social issues to support the development of EU Ecolabel criteria and the revision of the EU GPP criteria.

The report consists of the following sections:

1. **Overview of report** – outlining the background and project process.
2. **Scope and definition** (Chapter 1) – outlining the main findings on the potential scope and the definition of cleaning services to be adopted by the EU Ecolabel for cleaning services (floor, sanitary, glass/windows and surface cleaning). Stakeholder feedback has been collected to facilitate the development of the scope.
3. **Market analysis** (Chapter 2) – The market analysis reviews different aspects of the cleaning service market including: global market overview, market structure, product consumption, key economic and social drivers and innovation trends.
4. **Technical and environmental analysis** (Chapter 3) – The technical analysis provides an overview of the characteristics for cleaning services. The four types of cleaning services included in the scope are characterised by their requirements on cleaning products, power equipment, supplies, accessories and activities. The environmental analysis reviews existing evidence to identify the main environmental impacts of cleaning services. This section looks at a variety of sources to ensure that the EU Ecolabel criteria focus on the most significant environmental impacts of cleaning services.
5. **Improvement potential** (Chapter 4) – This section provides an evaluation and prioritises improvement options which could assist the development of EU Ecolabel criteria for cleaning services, and reduce the sectors environmental and social impacts, by drawing on findings from the market and technical analysis.
6. **Proposal for scope and definition for Cleaning Services** (Chapter 5)

Overview of report

This preliminary report is intended to provide the background information for the revision of the EU GPP criteria and the development of a new EU Ecolabel for professional cleaning services.

The EU Ecolabel criteria and the EU GPP criteria form key voluntary policy instruments within the European Commission's Sustainable Consumption and Production and Sustainable Industrial Policy (SCP/SIP) Action Plan and the Roadmap for a Resource-Efficient Europe. The Roadmap seeks to move the economy of Europe onto a more resource efficient path by 2020 in order to become more competitive and to create growth and employment. The EU Ecolabel promotes the production and consumption of products with a reduced environmental impact along the life cycle and is awarded only to the best (environmental) performing products in the market, while EU GPP criteria are designed to enhance market opportunities for environmental products and services on the market.

An important part of the process for developing or revising Ecolabel criteria is the involvement of stakeholders through publication of and consultation on draft technical reports and criteria proposals and through stakeholder involvement in working group meetings. This document provides the background information required for the ad-hoc working groups meeting, scheduled to take place in January 2015.

This preliminary report addresses the requirements of the Ecolabel Regulations No 66/2010 for technical evidence to inform criteria revision. It consists of: an analysis of the scope, definitions and description of the legal framework (Chapter 1); a market analysis (Chapter 2); and an overview of existing technical lifecycle assessment studies, revealing the significant environmental impacts of cleaning services (Chapter 3). Combined with input from stakeholders, this information will be used to determine the improvement potential and focus for the EU Ecolabel development process (Chapter 4) and present an initial set of criteria proposals (Technical Report).

Background

The EU Ecolabel initiative is a policy instrument designed to encourage the production and use of more environmentally friendly products and services through the certification and specification of products or services which have a reduced environmental footprint. They form part of the European Commission's action plan on Sustainable Consumption and Production and Sustainable Industrial Policy adopted on 16th July 2008.

The EU Ecolabel is a voluntary scheme coordinated by the European Commission which is used to distinguish environmentally beneficial products and services. The EU Ecolabel is awarded through a process where an applicant has to demonstrate that the specified EU Ecolabel criteria for a particular product group are met. Successful applicants are then allowed to use the EU Ecolabel logo and advertise their product as having been awarded the EU Ecolabel.

The EU GPP is a voluntary instrument to encourage and assist Europe's public authorities to use their purchasing power to drive the adoption of environmentally friendly goods, services

and works to make an important contribution to sustainable consumption and production. It can help stimulate the demand for more sustainable goods and services which otherwise would be difficult to get onto the market. Green Public Procurement (GPP) is therefore a strong stimulus for eco-innovation.

To be a success, GPP needs clear and 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.

Purpose of this document

This document forms part of the stages of developing the criteria for the EU Ecolabel for cleaning services and the revision of EU GPP criteria. It encapsulates the activities and outputs resulting from research performed for the cleaning services sector. This report represents a first evaluation of likely areas for investigation as a result of stakeholder surveys, market analysis, technical analysis of the characteristics of different types of cleaning services and associated environmental and some social impacts. In doing so, it identifies key improvement opportunities for the different components (i.e. cleaning products, power equipment, accessories, supplies, practices and operational management) of cleaning services where EU Ecolabel criteria can be developed. The improvement opportunities identified are used to examine the comprehensiveness and appropriateness of the existing EU GPP criteria for cleaning services to evaluate the need of revision.

EU Ecolabel for cleaning services

The EU Ecolabel for cleaning services is a new EU Ecolabel. The criteria of this Ecolabel are developed with the aim to encourage cleaning service providers to take a life-cycle approach to improve the environmental and social performance of their operations. The EU Ecolabel criteria should provide a holistic coverage of all major components of cleaning services, including the chemicals and equipment used in cleaning activities, the delivery of cleaning operations and the general operation of a cleaning service company. This EU Ecolabel works in co-operation with the EU Ecolabel for all-purpose cleaners and sanitary cleaners to maximise synergy.

EU GPP criteria for cleaning services

The EU GPP criteria for cleaning products and services were developed in 2011. The criteria cover four main types of cleaning products (All-purpose cleaners, sanitary cleaners and window cleaners, hand dishwashing detergents, detergents for dishwashers and laundry detergents) and cleaning services, which refers to the carrying out of cleaning tasks. The EU GPP is a voluntary instrument that aims to drive substantial demand in sustainable cleaning products and services by utilising the purchase power of public authorities.

1 Product Group scope and definition

1.1 Objective

The purpose of this document is to present our initial research on what resources are available for defining and identifying the scope of the Cleaning Services product group for both the development of EU Ecolabel criteria and the revision of EU GPP criteria. This includes the consideration of existing EU Ecolabel criteria for cleaning products and EU GPP criteria, researches into existing ecolabel schemes and standards (including the relevant definitions, scope and criteria); analysis of relevant regulations and standards and also through analysis of the responses obtained to the questionnaire (sent out to potential stakeholders) within the period. It will also provide an initial overview from stakeholders regarding the definition and scope for Cleaning Services.

This draft document outlines the main findings on the potential definition and the scope to be further explored within the next steps of the project which will include market, technical and economic analysis based on Life Cycle Assessment and additional scientific evidence. Furthermore, the potential improvements and the best available techniques for the service provision are to be identified. Finally draft criteria will be developed together with the supporting technical documents.

1.2 Existing relevant product groups for cleaning services

Cleaning Services refer both to products used and services. In that context it is important to point out that a range of cleaning products are already covered by the EU Ecolabel criteria. These are dishwashers' detergents (domestic and industrial & institutional), laundry detergents (domestic and industrial & institutional), all-purpose cleaners and hand dishwashing detergents.

The product groups dishwashers' detergents (domestic and industrial & institutional) and laundry (domestic and industrial & institutional) criteria are currently being revised. The product groups all-purpose cleaners and hand dishwashing detergents are following this year. Common criteria for all these products are identified in Table 1. The links to the existing EU Ecolabel criteria for the full range of cleaning product groups can be found below.

- EU Ecolabel to all-purpose cleaners and sanitary cleaners (Commission Decision 2011/383/EU)
- EU Ecolabel to hand dishwashing detergents (Commission Decision 2011/382/EU)
- EU Ecolabel for laundry detergents (Commission Decision 2011/264/EU)
- EU Ecolabel to detergents for dishwashers (Commission Decision 2011/263/EU)

Table 1 overviews the criteria used in the EU Ecolabel for existing Cleaning Products. It indicates that there are significant overlap criteria for the different cleaning products types; with some exceptions where criteria are relevant to only one or two product categories (including fragrances, VOC, and dosage requirements). Criteria common across all product groups include toxicity to the aquatic environment, biodegradability, limitation of hazardous

substances, packaging, fitness for use, user instructions and information to appear on the EU Ecolabel.

Table 2 overviews the EU GPP criteria for cleaning products (All Purpose Cleaners, Sanitary cleaners, Windows cleaners) and Cleaning Services. Core criteria are similar among cleaning products and services for limited substances and packaging requirements. The comprehensive criteria are also identical among the distinct cleaning products and services although it comprehends a wide list on the limited substances (as for instance, limitation in the use of phosphorus, biocides and critical dilution volume). Also for the comprehensive criteria, packaging requirements are also considering the weight utility ration (WUR).

Table 1 Overview of the criteria used in the EU Ecolabel for existing Cleaning Products

Criterion	All Purpose Cleaners and sanitary cleaners	Hand dishwashing detergents	Laundry detergents (domestic)	Laundry detergents (Industrial and institutional)	Dishwashing detergents (domestic)	Dishwashing detergents (Industrial and institutional)
Total chemicals	--	--	--	--	Y	--
Dosage requirements	--	--	Y	Y	--	--
Toxicity to aquatic environment	Y	Y	Y	Y	Y	Y
Biodegradability	Y	Y	Y	Y	Y	Y
Substances	Y	Y	Y	Y	Y	Y
Fragrances	Y	Y	--	--	--	--
Corrosive	--	Y	--	--	--	--
Volatile Organic Compounds	Y	--	--	--	--	--
Phosphorus	Y	--	--	--	--	--
Packaging	Y	Y	Y	Y	Y	Y
Fitness for use	Y	Y	Y	Y	Y	Y
User instructions	Y	Y	Y	Y	Y	Y
Information on Ecolabel	Y	Y	Y	Y	Y	Y
Professional training	Y	--	--	Y	--	Y

Table 2: EU GPP criteria for the Products Groups All Purpose Cleaners, Sanitary cleaners, Windows cleaners and Cleaning Services

Product groups:	All Purpose Cleaners	Sanitary cleaners	Windows cleaners	Cleaning Services	All Purpose Cleaners	Sanitary cleaners	Windows cleaners	Cleaning Services
Criterion description:	**GPP (core criteria)**				**GPP (comprehensive criteria)**			
Excluded or limited substances:								
Substances of very high concern (Reach regulation)	✓	✓	✓	✓	✓	✓	✓	✓

Product groups:	All Purpose Cleaners	Sanitary cleaners	Windows cleaners	Cleaning Services	All Purpose Cleaners	Sanitary cleaners	Windows cleaners	Cleaning Services
Substances of very high concern (Hazardous statements or risk phrases)	--	--	--	--	✓	✓	✓	✓
Limited substances:								
Phosphorus	--	--	--	--	✓	✓	✓	✓
Biocides (no preservatives)	--	--	--	--	✓	✓	✓	✓
Biocides (others related with bioaccumulation)	--	--	--	--	✓	✓	✓	✓
Critical dilution volume (CDV)	--	--	--	--	✓	✓	✓	✓
Packaging requirements :								
Dosing instructions	✓	✓	✓	✓	✓	✓	✓	✓
No use spray with propellers	✓	✓	✓	✓	✓	✓	✓	✓
Triggers sprays sold apart	✓	✓	--	✓	✓	✓		✓
Weight utility ration (WUR)	--	--	--	--	✓	✓	✓	✓
Contract clauses:								
Regular report on name and quantity of products used	--	--	--	✓	--	--	--	✓
Regular training	--	--	--	✓	--	--	--	✓
Work instructions	--	--	--	--	--	--	--	✓
Nominated Facility manager	--	--	--	--	--	--	--	✓
Environmental friendly techniques	--	--	--	--	--	--	--	✓

1.3 Product group definition and scope: Overview on existing schemes

1.3.1 Definition of cleaning services in existing schemes and legislations

Only a small number of definitions and categorisations exist for cleaning services within existing schemes. This Section aims to provide a brief overview of different definitions and understandings.

Examples of definitions and scope taken from other existing initiatives for Cleaning Services are listed below and have been taken into consideration in the proposal for the Product Group definition.

Example 1

Standard***** cleaning: regarding regular or periodic tasks performed to keep an indoor space clean reported to an area (m2) of clean space per year.

*****_Standard cleaning: is performed regularly and frequently – on a day to day basis and up to once per month._

Source: Nordic Swan, Version 2.3, 17 March 2009 – 30 June 2016

Example 2

Professional cleaning services for public and private buildings (as offices, hospitals and schools) making use of machinery or equipment as (e.g. washing machines, trolleys). This covers all types of floor cleaning services including vertical surfaces, as windows if the area cleaned (m2) is < 20% of the total.

Measurement: 1m^2 of average representative cleaning area (1 year). The cleaning may be due in a daily basis, one or two times per week, but is fixed within a year.

Source: current Product Category Rules for professional Cleaning Services for Buildings, 2011:03 Version 1.2., valid until: 2016-05-20

Different ecolabelling and green procurement schemes group different products into the category Cleaning Services. A review of the available criteria for cleaning services, used in other initiatives, shows that in general **inside the scope** of cleaning services are all indoor activities typically refer to clean commercial, public, and industrial buildings – performed on a regular basis.

The revised existing national schemes set criteria for sustainable cleaning and some which are also applicable globally or European-wide. A summary is provided for some of the ***most relevant schemes*** for Cleaning Services (referring to GPP criteria and EU Ecolabel criteria) and identified as providing a good overview on the variety of views on the scope and definition. In these schemes the scope is identified and grouped.

Table 3 provides an overview of current schemes referring to Green Public Procurement. In updating the EU GPP criteria for cleaning products and services this document also reviews the most relevant sustainable procurement guidelines from: Australia; UNEP and Netherlands

as listed below. Green Public Procurement criteria are structured in core criteria, which represent a minimum requirement and a set of comprehensive criteria, which reflects higher environmental ambitions. The existing Cleaning Services criteria are structured as follows (also available in http://ec.europa.eu/environment/gpp/pdf/criteria/cleaning.pdf.

Criteria

- **Criterion #1:** Products used must **meet the relevant comprehensive criteria for cleaning products** (see below *****)
- **Criterion #2:** After the first six months of the contract, and thereafter at the end of every year of the contract, **a balance must be submitted by the contractor indicating the name and quantity of the cleaning products used**.
- **Criterion #3:** All **cleaning staff** employed in carrying out the service must be **regularly trained** for their various tasks. This training should cover cleaning agents, methods, equipment and machines used; waste management and aspects of health, safety and the environment.
- **Criterion #4:** The tenderer must demonstrate its capacity to carry out the service in an environmentally sound manner. This must include **evidence of the regular training of staff on health, safety and environmental aspects** of cleaning activities and **evidence of compliance with environmental and health and safety obligations**.
- **Criterion #5:** In agreement with the contracting authority, **precise work instructions** on environmental protection and on health and safety standards in carrying out the service shall be produced and displayed in the buildings in a way that they can be consulted by cleaning staff at any time.
- **Criterion #6:** A **facility manager**, foreman/forewoman or co-ordinator **should be nominated to organise and supervise the cleaning**. The appointed person should stay in contact with the contracting authority and be reachable during working hours. The facility manager, foreman/forewoman or coordinator **has to be sufficiently trained in the fields of occupational health and safety standards, application techniques and environmental issues**.
- **Criterion #7:** The contractor should **use reusable microfibre cloths where appropriate.**

** Cleaning agents must meet a range of minimum requirements relating to the exclusion of certain hazardous ingredients, the bioaccumulation of biocides, and the content of phosphorus and dosage recommendations.*

For detailed information see criteria for the all set of cleaning agents in http://ec.europa.eu/environment/gpp/pdf/criteria/cleaning.pdf.

Table 3 Revision of the existing schemes referring to GPP criteria for cleaning services

Name	Region	Type	User	Scope
Sustainable Procurement Guide: Cleaning Services	Australia	Guide	Industry/procurement	**In scope:** all indoor activities typically required to clean commercial and public buildings **Out of scope:** residential buildings; maintenance of exterior areas such as parking lots, grounds, or picnic areas; industrial cleaning e.g. manufacturing process cleaning
Local Governments for Sustainability for the United Nations Environment Programme (UNEP), Sustainable procurement guidelines for cleaning services (basic and advanced)	Global	Guideline	Local government	**In scope:** • The procurement of cleaning products and cleaning services for offices. • Aim to cover all chemical products likely to be used by cleaning staff for cleaning **Out of scope:** • Other cleaning products such as dish washing liquid or laundry detergents. It also does not include other products sometimes provided by cleaning contractors such as paper towels, toilet paper or bin liners.
Criteria for the Sustainable Public Procurement of Cleaning Services	Netherlands	Government procurement criteria	Government authorities	**In scope:** - Cleaning of facilities - Cleaning services for offices, schools and office equipment - Cleaning of office equipment - Cleaning of offices **Out of scope:** -specialised cleaning or sanitation services (such as window cleaning, sewer sanitation, carpet cleaning, cleaning following disasters, removal of graffiti, etc.).

The scope of these schemes and the user type varies significantly depending on the focus of the scheme. These schemes do not in general, with the exception of the Nordic Swan, include specific definitions for cleaning services but do provide specific scope of which services are included under the standard.

According to the analysis carried out we can say that the majority of schemes identified **focus on:**

Indoor activities performed regularly or periodically including the cleaning of commercial (e.g. offices, schools, shopping centres, hotels) or public/ institutional buildings (e.g. libraries, schools, museums, churches).

In respect to what is normally considered **out of scope** the same schemes reviewed include: **Industrial cleaning** (e.g. environmental remediation, manufacturing process cleaning); **special cleaning services** (e.g. carpet cleaning, window cleaning, upholstery cleaning, or mould remediation services) and **sanitation services** (e.g. sewer sanitation, carpet cleaning, cleaning after accidents/disasters, and removal of graffiti). In addition, the overview allow concluding that laundry, hand washing and dishwashing are services that do not fall under the definition and/or existing scope for cleaning services for current schemes.

Table 4 sums up the ecolabel schemes that include: The Australian Ecolabel Program; Green Seal standards (for Cleaning Services performed in commercial/institutional and residential, LEED (existing buildings) and Nordic Swan (cleaning services).

Table 4 Revision of the existing labelling schemes and standards for Cleaning Services

Name	Region	Type	User	Description/ definition	Scope
The Australian Ecolabel Program - Good Environmental Choice Australia Standard - Cleaning	Australia	Voluntary labelling standard	Members of the cleaning services sector	Standard specifies requirements for the use of chemicals and cleaning products by a cleaning service provider, as well as the systems that should be in place to support waste management and product procurement.	**In scope:** • Domestic (household) cleaning • Commercial cleaning (e.g., offices, schools, shopping centres, public buildings) • Window cleaning **Out of scope:** • Industrial cleaning (e.g., environmental remediation, manufacturing process cleaning)
GS-42 Commercial and Institutional Cleaning Services (Green Seal)	US	Standard	Product manufacturer and services provider	This standard is for cleaning service providers including in-house and external cleaning services including all indoor activities typically required to clean commercial, public and industrial buildings.	**In scope:** • Cleaning services for commercial or institutional buildings • Hotels, assisted living, hospitals, and similar properties • Dormitory, apartment, and similar properties' common/public areas **Out of scope:** • Services that clean residential properties or areas • Speciality cleaning services such as carpet cleaning, window washing, upholstery cleaning, or mould remediation services
GS-49 Residential Cleaning Services (Green Seal)	US	Standard	Product manufacturer and services provider	This standard establishes criteria for professional cleaning services of residential facilities, areas, or spaces.	**In scope:** • Services that clean residential properties or areas **Out of scope:** • Those included under G42

Name	Region	Type	User	Description/ definition	Scope
LEED for Existing Buildings: Operations & Maintenance Rating System (LEED-EBOM)	US	Certification programme	Building facility manager; cleaning service providers	The rating system encourages owners and operators of existing buildings to implement sustainable practices and reduce the environmental impacts of their buildings	Offices, retail and service establishments, institutional buildings (libraries, schools, museums, churches, etc.), hotels, and residential buildings of 4 or more habitable stories
Nordic Swan Ecolabel: Cleaning Services	Nordic countries	Ecolabel	Cleaning Service providers	Standard cleaning: regarding regular or periodic tasks performed to keep an indoor space clean reported to an area (m^2) of clean space per year	**In scope:** Standard cleaning means tasks that are necessary in order to keep an indoor space clean: regular cleaning and periodic cleaning covering maintenance of floors, collection of waste etc. are included in these tasks. **Out of scope:** specialist cleaning and window cleaning

1.3.2 Definition of cleaning services in statistics

The **NACE definition** of the cleaning industry in the REV. 2, section N, division 81, group 81.2., refers to "general cleaning of buildings" and "industrial cleaning activities" as well as some other activities carried out by cleaning contractors, such as waste management services, chimney sweeping, façade cleaning, or maintenance of areas around buildings. Below are identified the relevant categories:

NACE classification for general cleaning of buildings (code 81.21)

Activities Included

General (non-specialized) cleaning of all types of buildings, such as: offices, houses or apartments, factories, shops and institutions. General (non-specialized) cleaning of other business and professional premises and multiunit residential buildings. These activities are mostly interior cleaning although they may include the cleaning of associated exterior areas such as windows or passageways. Specialised cleaning activities, such as: window cleaning, chimney cleaning, cleaning of fireplaces, stoves, furnaces, incinerators, boilers, ventilation ducts, exhaust units, cleaning of industrial machinery; other building and industrial cleaning activities.

Activities excluded

Specialised cleaning activities, such as: chimney cleaning, cleaning of fireplaces, stoves, furnaces, incinerators, boilers, ventilation ducts, exhaust units.

NACE classification for other building and industrial cleaning activities (code 81.22)

Activities included

Exterior cleaning of buildings of all types, including offices, factories, shops, institutions and other business and professional premises and multiunit residential buildings; specialised cleaning activities for buildings such as window cleaning, chimney cleaning and cleaning of fireplaces, stoves, furnaces, incinerators, boilers, ventilation ducts and exhaust units; cleaning of industrial machinery; other building and industrial cleaning activities,.

Activities excluded

Steam cleaning and blasting and similar activities for building exteriors.

NACE classification for buildings mainly regards interior cleaning despite the fact that may also be included associated areas as windows or passageways. Excluded from NACE for buildings are the more specialised cleaning tasks taking place mainly indoors.

NACE classification for other building and industrial cleaning include exterior cleaning of building of all types. Excluded are steam cleaning and blasting for building exteriors.

Note: the definition of clean is not specified in any greater detail in the existing schemes, standards and NACE classification for Cleaning Services. The existing definitions are useful when looking at the scope. They in general match the scope found in existing schemes with a focus on indoor cleaning of buildings. Other services such as windows cleaning are defined separately.

1.4 Stakeholder feedback and analysis

Over 100 cleaning services supply chain stakeholders were contacted requesting their responses to a survey regarding the proposed scope and definition for cleaning services . In total 27 responses were received from stakeholders including: ecolabelling schemes, government or public administration departments, cleaning product manufacturers and suppliers, cleaning service providers, cleaning service procurers and industry bodies. Annex A includes the overview of all responses.

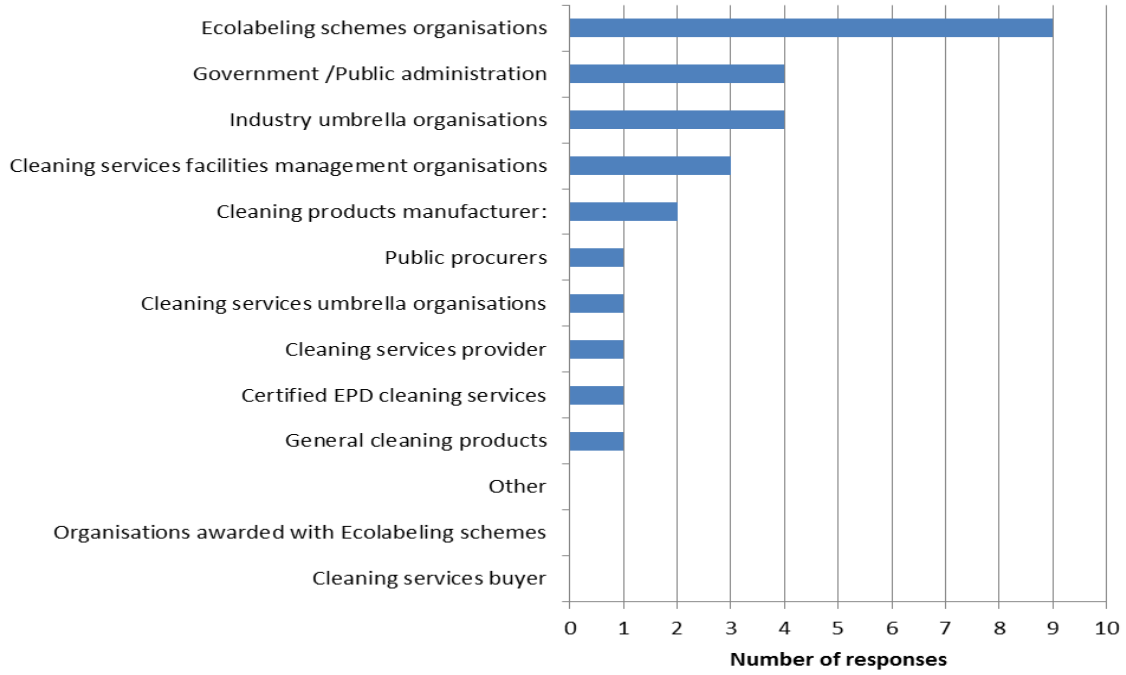


Figure 1 Organisation types that responded to the questionnaires in the survey

The following sections present stakeholder feedback on: the product group definition (section 1.4.1); product scope boundaries (section 1.4.2); boundaries for inclusion (section 1.4.3); and legislation, guidance and standards (section 1.4.4); and best practices (1.4.5).

1.4.1 Product group definition

A total of 21 organisations agreed with the proposed definition of the product group addressed in the survey. This constitutes an overall 78% of the total respondents. The PG is defined in the survey as follows:

Professional cleaning operations, performed regularly or periodically in order to keep an indoor space clean, and that can be performed manually or making use of machinery.

A small number of respondents (2 out of 24 responses) consider that the definition should also include 'disinfected' and 'well scented'. Two stakeholders also commented on the need for greater specificity on the definition of indoor spaces, which is defined in section 1.4.2.

For this purpose, the specific feedback relating to the scope (i.e. services and activities considered) that better support this definition are explored below.

1.4.2 Scope definition

1.4.2.1 Services to be considered

Figure 2 shows that 26 of 27 organisations agreed to include commercial building services within the scope of cleaning services. The definition of commercial buildings for the purpose of this survey is regular and periodic cleaning of offices, shopping centres and hotels. 25 of 27 organisations agreed to include institutional building services within the scope of cleaning services. Definition of institutional buildings for the purpose of this survey is regular and periodic cleaning of, for instance, schools, government buildings and hospitals. 19 of 27 organisations agreed to include residential building services within the scope of cleaning services.

Nine stakeholders highlighted that other activities may be considered inside the scope of cleaning services such as: train stations, airports, sports facilities, military barracks, museums and libraries.

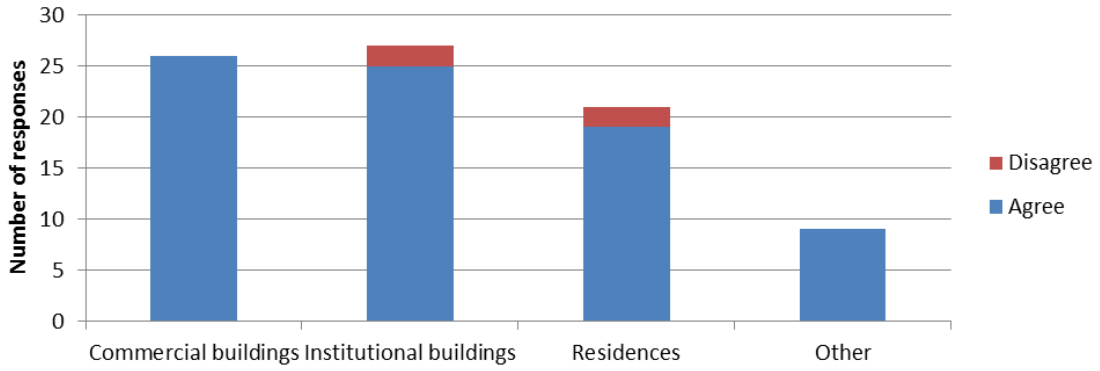


Figure 2 Services to be considered within scope of cleaning services product group

1.4.2.2 Operations to be considered

There is little difference in opinion over which operations should and should not be included (see Figure 3Figure 2**Error! Reference source not found.**). The operations floor, window, sanitary and carpets/upholstery cleaning were highlighted for inclusion. Stakeholders questioned if furniture surfaces such as door handles and escalators are included. The other cleaning operations highlighted for potential inclusion are: emptying and sorting waste; and cleaning of furniture surfaces such as door handles, escalators and lifts.

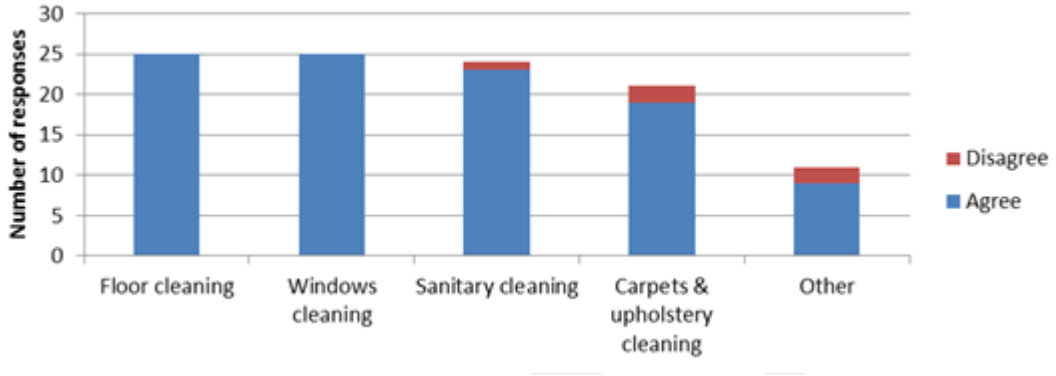


Figure 3 Operations to be considered within scope of cleaning services product group

1.4.3 Boundaries to be considered within the scope

Stakeholders were asked to identify which environmental issues should be included in the EU Ecolabel and EU Green Public Procurement criteria for cleaning services. This will constitute a first overview on the boundaries that may be regarded as important to consider in the EU Ecolabel criteria development and GPP revision. Nine large environmental issues were considered to be important to regard, they include the consumption of chemicals, water and energy, the type of cleaning products and materials purchased. In addition the production of liquid effluents and waste are also important. It is also consider to be relevant to include the machinery used, the way transportation is carried out (referring to cleaning products and personnel) and also the employment practices that more relate to the personnel labour conditions. Figure 4 presents the results obtained. There was over 65% agreement to include all of the below boundaries. Chemical use, employment practices and waste (including wastewater) had the highest level of agreement at over 90%. Whilst, waste (including wastewater) had 100% agreement only 18 out of 27 of stakeholders actively agreed with it.

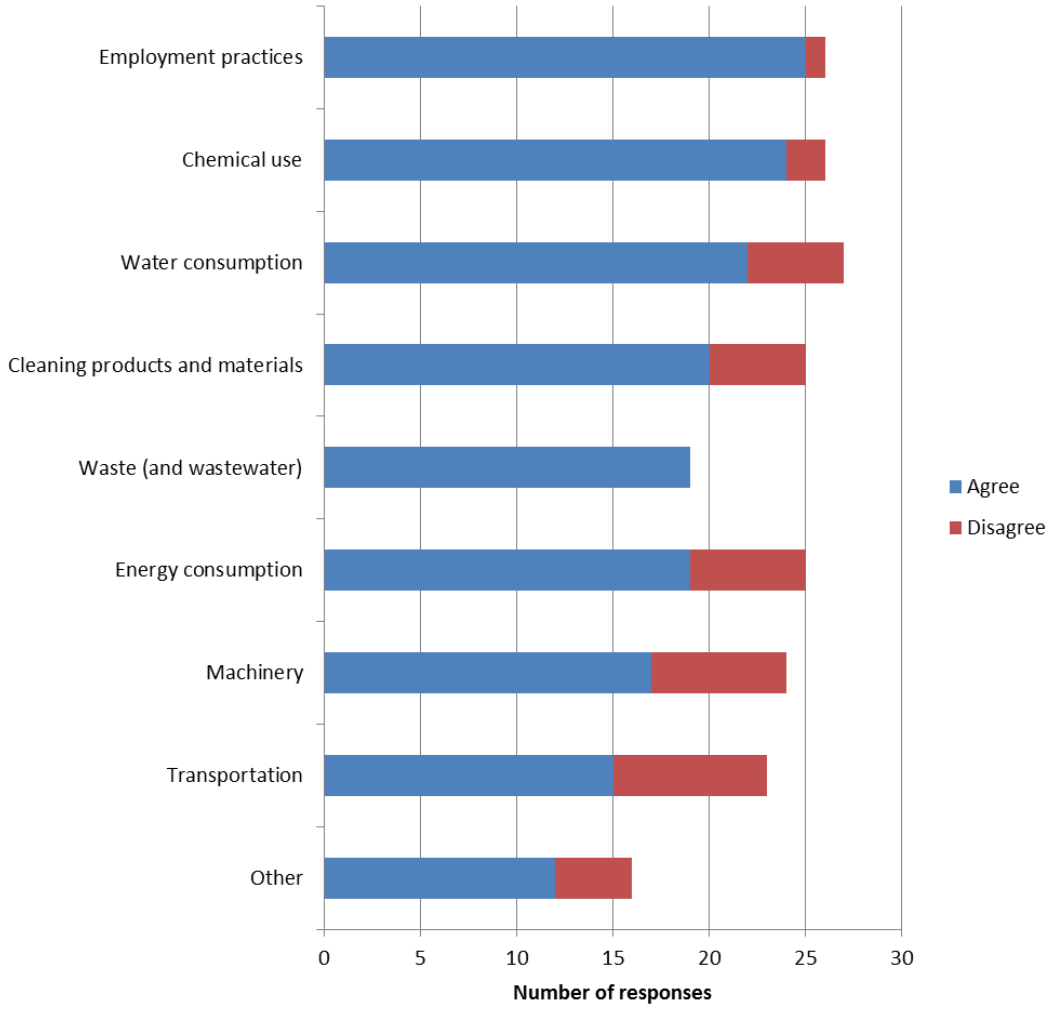


Figure 4 Preliminary view on boundaries for inclusion

Concerns from the stakeholders refer specifically to the fact that the inclusion of all the boundaries may be too detailed for the general product group and potentially difficult to measure. These specifically refer to machinery, transportation, energy consumption, cleaning products and materials and water consumption. For example, there were comments that varied national recycling systems would make inclusion of waste (and wastewater) difficult to specify. Similar comments were raised relating to energy consumption where varying machinery requirements average efficiency may be a barrier to development of standardised requirements.

The bar others include suggestions for boundaries to several other aspects as existence of EMAS and ISO 14001 certifications, staff aspects (as employment conditions, salary, knowledge/training, corporate social responsibility and working hours).

Existing schemes that are already in operation include the following boundaries: employment practices, transport and machinery. In relation to water consumption stakeholders believe specifying product concentration rather than water use abate any negative impacts on washing effectiveness by encouraging lower use of water. A more detailed review of issues addressed within existing initiatives in summarised in Table 5 below.

Table 5 Summary of criteria for existing schemes and standards

Criteria analysis	Criterion	Nordic Swan	Green Seal	The Australian Ecolabel Program	New Zealand Ecolabelling	UNEP Cleaning Products and Services
Cleaning products, equipment, accessories and supplies	Information on chemicals	Y	Y	Y	Y	Y
	Proportion of ecolabelled chemicals	Y	--	--	--	--
	Non-ecolabelled chemicals, hazard classification	Y	--	--	--	--
	Non-ecolabelled chemicals, substances that must not be present	Y	--	Y	--	--
	Use of ecolabelled products: Environmentally preferable cleaning products and supplies	Y	Y	--	--	Y
	Use of ecolabelled products: Drying- paper	Y	--	--	--	--
	Use of ecolabelled products: Hand towel rolls	Y	--	--	--	--
	Use of ecolabelled products: Soap	Y	--	--	--	--
	Use of ecolabelled products: Photocopying paper	Y	--	--	--	--
	Use of ecolabelled products: Washing machines	Y	--	--	--	--
	Use of ecolabelled products: Work clothes	Y	--	--	--	--
	Use of ecolabelled products: Cloths and mops	Y	--	--	Y	Y
	Use of ecolabelled products: Other product groups	Y	--	--	--	--
	Use of ecolabelled products: General services	Y	--	--	--	--
	Use of ecolabelled products: Laundry service	Y	--	--	Y	--
	Use of ecolabelled products: Car washes	Y	--	--	--	--
	Use of ecolabelled products: Printed matter	Y	--	--	--	--
	Description of supplies	--	Y	--	--	Y
	Trash can liner requirements	--	Y	--	--	--
	Cleaning supplies shall be purchased in quantities that minimise packaging waste	--	--	Y	Y	--
	Use of ecolabelled products: Certification and labelling requirements	--	Y	--	--	--
	Power equipment	--	Y	Y	Y	Y
	Requirements for products, supplies and equipment	--	Y	Y	Y	Y
	Maintain register of all chemicals and cleaning products used	--	--	--	Y	--

Criteria analysis	Criterion	Nordic Swan	Green Seal	The Australian Ecolabel Program	New Zealand Ecolabelling	UNEP Cleaning Products and Services
	Correct dosage/dilution	Y	Y	--	Y	
	Chemical consumption	Y	Y	--	Y	Y
	Reducing chemical waste/efficient use of chemicals	--	Y	--	--	--
	Appropriate technology	--	Y	--	Y	--
	Clean-up and disposal directions	--	Y	--	Y	--
	Area containment	--	Y	--	--	--
	Reducing Chemical use	--	Y	Y	--	--
	Use of products that are reusable, recyclable or have recycled content	--	--	--	Y	Y
	Use of microfibre cleaning equipment where appropriate	--	--	--	Y	Y
	Use of re-usable cloths, mop heads etc. in preference to disposable products	--	--	--	Y	Y
	Vacuum cleaner use/maintenance	--	Y	--	Y	Y
Transport	The proportion of Euronorm IV vehicles	Y	--	--	--	--
	Maximum consumption of fuel for transport purposes	Y	--	--	--	--
	Fleet management plan in place	--	--	--	Y	--
	Consider fuel efficiency of vehicles	--	--	--	Y	--
Waste	Reducing solid waste	--	Y	Y	--	--
	Purchasing	--	Y	--	--	--
	Reusable Materials	--	Y	--	Y	Y
	Recycling of Materials	--	Y	Y	Y	Y
	Minimum recycled content threshold of bags	--	--	Y	Y	--
	The packaging of cleaning products must not contain chlorinated plastics	--	--	Y	--	--
	Biodegradable bags	--	--	--	Y	--
	Collection criteria	--	Y	--	--	--
	Scheduling	--	Y	--	--	--
	Disposal	--	Y	Y	--	Y
	Recycling program	--	Y	--	--	--
	Recycling stations	--	Y	--	Y	--
	recycling collection	--	Y	--	Y	--
	Recycling inspection	--	Y	--	--	--
	Building management communications	--	Y	--	--	--
Operational management	Number of square metres cleaned	Y	--	--	--	--

Criteria analysis	Criterion	Nordic Swan	Green Seal	The Australian Ecolabel Program	New Zealand Ecolabelling	UNEP Cleaning Products and Services
	Energy management objectives and minimizing energy use	--	--	--	Y	--
	Staff directions & training in chemical use	--	Y	--	Y	--
	Bag/canister inspection	--	Y	--	Y	--
	Limiting worker exposure	--	Y	--		--
	Cleaning procedure requirements	--	Y	--	Y	--
	System for monitoring cleaning quality	Y	--	--	--	--
	Written work instructions	Y	--	--	--	--
	Customer information	Y	--	--	--	--
	Environmental Management System	--	--	Y	--	Y
	Sourcing suppliers in compliance with environmental legislation	--	--	Y	--	Y
	Employee training	Y	Y	Y	Y	Y
	Quality management requirement for the service provider	Y	--	Y	Y	Y
	Annual report	Y	--	--	--	--
	Documentation of the Ecolabel requirements/Procedural documentation	Y	Y	--	Y	--
	Marketing	Y	--	--	--	--
	Employee comments and suggestions	--	Y	--	--	--
	Communication with Management	--	Y	--	--	Y
	Notification of products used	--	Y	--	--	--
	MSDs	--	Y	--	--	--
	Site specific training	--	Y	Y	Y	--
	Formal written contract in place	--	--	--	Y	--
Social	The requirements of the authorities	Y	Y	Y	Y	Y
	Ethical requirements	Y	--	Y	--	Y

1.4.4 Feedback on legislation, guidance and standards

Organisations were asked to feedback on legislation, guidance and standards that are used in relation to cleaning services and products. A total of 55% of organisations stated that REACH regulation affected their business; 50% of organisations were affected by the CLP directive

and 45% affected by the detergent regulations. These organisations were required to conduct risk assessments and assess the impacts of their chemicals. Those affected stated that these initiatives increased administrative costs through paperwork, product reformulation, labelling or altered costs from suppliers.

1.4.5 Best practices related to Green Public Procurement

Only two organisations commented on what should be addressed to ensure best practice. Although we were aiming to provide an overview of the best environmental practices currently being undertaken stakeholders did not produce specific examples. Instead they referred to the following two areas to ensure development of best practice in cleaning services:

Chemical use:

Criterion #1: Products used must meet the relevant comprehensive criteria for cleaning products. *Cleaning agents must meet a range of minimum requirements relating to the exclusion of certain hazardous ingredients, the bioaccumulation of biocides, and the content of phosphorus and dosage recommendations.*

Employment practices:

Criterion #3: All cleaning staff employed in carrying out the service must be regularly trained for their various tasks. This training should cover cleaning agents, methods, equipment and machines used; waste management and aspects of health, safety and the environment.

In addition, although indoor cleaning may have the bulk of the market share; some specialist cleaning of manufacturing facilities will procure more cleaning products (spend on cleaning products will be high).

1.4.6 Main issues raised in the questionnaires

Overall the feedback on the draft scope and definition of cleaning services has been positive and although a small sample size it represents a range of stakeholders from Austria (1 respondent), Belgium (3 respondents), Cyprus (1 respondent), Czech Republic (1 respondent), Denmark (1 respondent), Estonia (1 respondent), Finland (1 respondent), France (3 respondents), Germany (3 respondents) , Italy (3 respondents) , Lithuania (1 respondent), Spain (4 respondents), Sweden (1 respondent), Switzerland (1 respondent) and UK (2 respondents).

The analysis above presents the comments to the proposed definition and scope whilst commenting on potential benefits and drawbacks of items included and excluded. Whilst the comments were varied due to the range of participants contacted one key theme emerges concerning the challenges for the development on an EU Ecolabel for cleaning services. One respondent stated that cleaning services do not conform to standardised criteria as it is the case with products, because each cleaning contract is different and specific to the

requirements of the client. In order to address this, one stakeholder suggested that the criteria would need to have a specific approach for certain services within the scope.

Regarding EU GPP criteria, 7 respondents refer that are experienced in using Green Public Procurement criteria within tender. However, only two respondents had experience of the EU GPP criteria. One respondent specified the criteria required in their tenders include: that cleaning products meet relevant comprehensive criteria; that cleaning staff must be regularly trained and that the contractor should use reusable microfibre cloths where appropriate. One respondent had used adapted EU GPP criteria and preferred to simplify the original criteria to ensure a larger number of suppliers applied for contracts. They stated that even with simplified criteria, suppliers met similar requirement to the original criteria and supplied ecolabelled cleaning products in any case.

1.5 Legislation, industry guidance, and standards used for cleaning products and services

1.5.1 Overview of relevant legislation, guidance and standards

A summary of relevant international and EU chemical regulations and how they link together is presented in **Error! Reference source not found.** International policy is translated into specific EU regulations as specified; in order to manage hazardous chemicals; control of the trans boundary movements of hazardous wastes; control on importation of hazardous chemicals; persistent organic pollutants (POPS); and classification and labelling of chemicals.

The most relevant legislation to cleaning products includes the Regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH); and two more specific regulations: the Detergent Regulation (DID regulation) and the EU Biocidal Product Regulation (BPR). Details on the legal and standards applicable can be found in Table 6 (Legislation, industry guidance and standards used for cleaning products), in Table 7 (Legislation, industry guidance and standards used for cleaning equipment) and in

Table 8 (Legislation, industry guidance and standards for cleaning services).

Table 6 provides a more detailed summary focussing on the relevant EU regulations and chemical regulations applying to cleaning products.

Table 7 provides a summary of regulations and directives that relate to equipment manufacturers; and

Table 8 provides a summary of directives pertaining to labour law which are relevant to cleaning services.

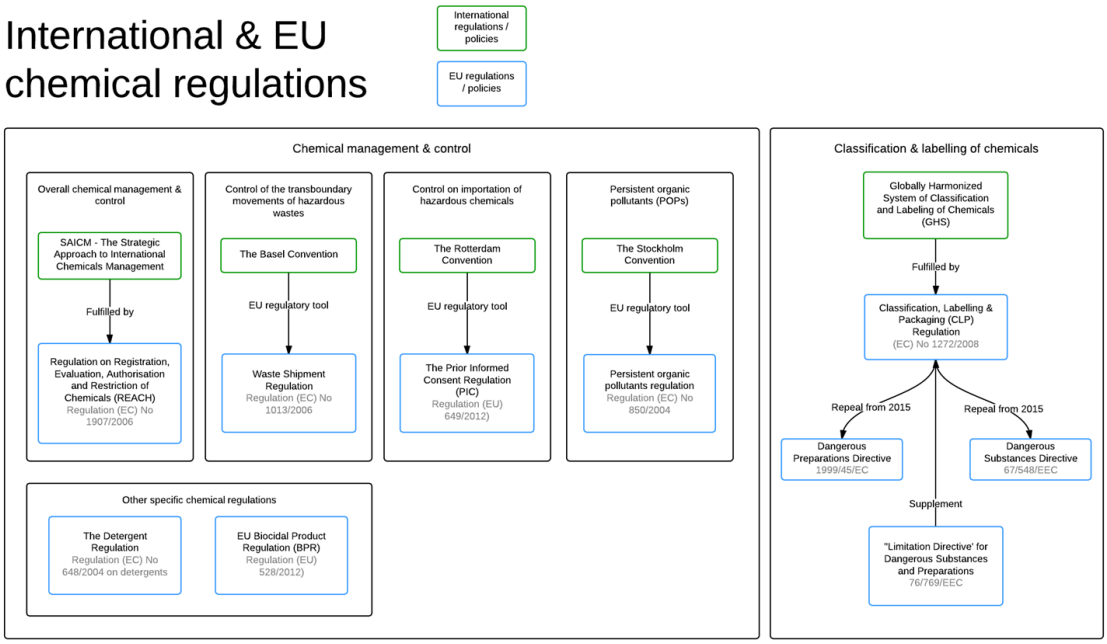


Figure 5 Summary of international and EU chemical regulations

Table 6 Legislation, industry guidance and standards used for cleaning products

Name	Region	Type	User	Description/ definition	Scope
Classification, Labelling & Packaging (CLP) Regulation (EC) No 1272/2008	European Commission	Regulation	Product manufacturer	Regulation on classification, labelling and packaging of substances and mixtures. Aligns previous EU legislation on classification, labelling and packaging of chemicals to the GHS (Globally Harmonised System of Classification and Labelling of Chemicals).	**In scope:** Substances and mixture
The Prior Informed Consent Regulation (PIC, Regulation (EU) 649/2012)	European Commission	Regulation	Product manufacturer	Administers the import and export of certain hazardous chemicals and places obligations on companies who wish to export these chemicals to non-EU countries. It implements, within the EU, the Rotterdam Convention on prior informed consent procedure for certain hazardous chemicals and pesticides in international trade.	**In scope:** (a) certain hazardous chemicals that are subject to the prior informed consent procedure under the Convention (the 'PIC procedure'); (b) certain hazardous chemicals that are banned or severely restricted within the Union or a Member State; (c) chemicals when exported in so far as their classification, labelling and packaging are concerned.

Name	Region	Type	User	Description/ definition	Scope
REACH - Regulation (EC) No 1907/2006	European Commission	Regulation	Product manufacturer	This legislation replaces the patchwork of many different directives and regulations which has developed historically and puts in place a comprehensive system for chemicals control in Europe.	**In scope:** In principle, REACH applies to all chemical substances; not only those used in industrial processes but also in our day-to-day lives, for example in cleaning products, paints as well as in articles such as clothes, furniture and electrical appliances.
"The Detergent Regulation" - Consolidated version of Regulation (EC) No 648/2004 on detergents	European Commission	Regulation	Product manufacturer	The Regulation includes provisions relating to: • Ultimate biodegradability requirements (both the level and methodologies used) for all surfactants (Anionic, Non-ionic, Cationic and Amphoteric) used in detergents; • The information to be provided to the consumer via the labelling of ingredients and websites; • The information to be held by manufacturers and to be supplied to Medical Professionals and competent authorities	**In scope:** Detergents
Persistent organic pollutants regulation Regulation (EC) No 850/2004	European Commission	Regulation	Product manufacturer	Complements earlier Community legislation on POPs and aligns it with the provisions of the international agreements on POPs.	**In scope:** Persistent organic pollutants (POPs). *They are unlikely to be found in cleaning products and relate to disease control, crop production, and industrial chemicals.*
Waste shipment regulation Regulation (EC) No 1013/2006	European Commission	Regulation	Product manufacturer and cleaning service provider	System for the supervision and control of shipments of waste within its borders and with the countries of the European Free Trade Association (EFTA), the Organisation for Economic Cooperation and Development (OECD) and third countries which are party to the Basel Convention.	**In scope:** All types of waste shipped.

Name	Region	Type	User	Description/ definition	Scope
EU Biocidal Product Regulation (BPR, Regulation (EU) 528/2012)	European Commission	Regulation	Product manufacturer	Concerns the placing on the market and use of biocidal products, which are used to protect humans, animals, materials or articles against harmful organisms like pests or bacteria, by the action of the active substances contained in the biocidal product.	**In scope:** Biocidal products

Table 7 Legislation, industry guidance and standards used for cleaning power equipment

Name	Region	Type	User	Description/ definition	Scope
COMMISSION REGULATION (EU) No 666/2013 of 8 July 2013 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for vacuum cleaners	European Commission	Directive	Equipment manufacturer	Establishes eco-design requirements for the placing on the market of electric mains-operated vacuum cleaners, including hybrid vacuum cleaners.	**In scope:** (a) wet, wet and dry, battery operated, robot, industrial, or central vacuum cleaners; (b) floor polishers; (c) outdoor vacuums.
COMMISSION DELEGATED REGULATION (EU) No 665/2013 of 3 May 2013 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of vacuum cleaners	European Commission	Directive	Equipment manufacturer	Establishes requirements for the labelling and the provision of supplementary product information for electric mains-operated vacuum cleaners, including hybrid vacuum cleaners.	**In scope:** (a) wet, wet and dry, battery operated, robot, industrial, or central vacuum cleaners; (b) floor polishers; (c) outdoor vacuums.
Directive 2006/42/EC on machinery	European Commission	Directive	Equipment manufacturer	The Directive has the dual aim of harmonising the health and safety requirements applicable to machinery on the basis of a high level of protection of health and safety, while ensuring the free circulation of machinery on the EU market.	**In Scope:** (a) machinery; (b) interchangeable equipment; (c) safety components; (d) lifting accessories; (e) chains, ropes and webbing; (f) removable mechanical transmission devices; (g) partly completed machinery

Name	Region	Type	User	Description/ definition	Scope
COMMISSION DELEGATED REGULATION (EU) No 665/2013 of 3 May 2013 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of vacuum cleaners	European Commission	Directive	Equipment manufacturer	Establishes requirements for the labelling and the provision of supplementary product information for electric mains-operated vacuum cleaners, including hybrid vacuum cleaners.	**In scope:** (a) wet, wet and dry, battery operated, robot, industrial, or central vacuum cleaners; (b) floor polishers; (c) outdoor vacuums.
DIRECTIVE 2006/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 12 December 2006 on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits	European Commission	Directive	Equipment manufacturer	The LVD ensures that electrical equipment within certain voltage limits both provides a high level of protection for European citizens and enjoys a Single Market in the European Union.	The Directive covers electrical equipment with a voltage between 50 and 1000 V for alternating current and between 75 and 1500 V for direct current.
Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment (WEEE)	European Commission	Directive	Equipment manufacturer	The purpose of this Directive is the prevention of waste electrical and electronic equipment (WEEE), and in addition, the reuse, recycling and other forms of recovery of such wastes so as to reduce the disposal of waste.	**In scope:** This Directive shall apply to electrical and electronic equipment falling under the categories set out in Annex IA provided that the equipment concerned is not part of another type of equipment that does not fall within the scope of this Directive. Annex IB contains a list of products which fall under the categories set out in Annex IA.

Name	Region	Type	User	Description/ definition	Scope
Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment Text with EEA relevance	European Commission	Directive	Equipment manufacturer	This Directive lays down rules on the restriction of the use of hazardous substances in electrical and electronic equipment (EEE) with a view to contributing to the protection of human health and the environment, including the environmentally sound recovery and disposal of waste EEE.	This Directive shall, subject to paragraph 2, apply to EEE falling within the categories set out in Annex I.
EN 60335-1:2012 Household and similar electrical appliances - Safety - Part 1: General requirements	European Committee for Electrotechnical Standardization (CENELEC)	Standard	Equipment manufacturer	http://www.cenelec.eu/dyn/www/f?p=104:110:3955537109444328::::FSP_ORG_ID,FSP_PROJECT,FSP_LANG_ID:67,22056,25.	-
EN 60335-2-67:2012 Household and similar electrical appliances - Safety - Part 2-67: Particular requirements for floor treatment machines for commercial use	European Committee for Electrotechnical Standardization (CENELEC)	Standard	Equipment manufacturer	http://www.cenelec.eu/dyn/www/f?p=104:110:469551887346886 9::::FSP_PROJECT:23202	-
EN 60335-2-68:2009 Household and similar electrical appliances - Safety - Part 2-68: Particular requirements for spray extraction machines for commercial use	European Committee for Electrotechnical Standardization (CENELEC)	Standard	Equipment manufacturer	http://www.cenelec.eu/dyn/www/f?p=104:110:426968944826314 6::::FSP_PROJECT:22136 .	-
BS EN 60335-2-69:2009 Household and similar electrical appliances. Safety Particular requirements for wet and dry vacuum cleaners, including power brush, for commercial use	British Standards Institute	Standard	Equipment manufacturer	BS EN 60335-2 deals with the safety of powered ride-on and walk-behind machines intended for commercial indoor or outdoor use for the following applications: – Sweeping – Scrubbing – Wet or dry pick-up – Polishing – Application of wax, sealing products and powder based detergents – Shampooing.	Household and similar electrical appliances. Safety Particular requirements for wet and dry vacuum cleaners, including power brush, for commercial use.

Name	Region	Type	User	Description/ definition	Scope
BS EN 60335-2-72:2009 Household and similar electrical appliances. Safety Particular requirements for automatic machines for floor treatment for commercial use	British Standards Institute	Standard	Equipment manufacturer	BS EN 60335-2-72 deals with the safety of powered ride-on and walk-behind machines intended for commercial indoor or outdoor use for the following applications: – Sweeping – Scrubbing – Wet or dry pick-up – Polishing – Application of wax, sealing products and powder based detergents – Shampooing	Household and similar electrical appliances. Safety Particular requirements for automatic machines for floor treatment for commercial use.
EN 60335-2-79:2012 Household and similar electrical appliances - Safety - Part 2-79: Particular requirements for high pressure cleaners and steam cleaners	European Committee for Electrotechnical Standardization (CENELEC)	Standard	Equipment manufacturer	http://www.cenelec.eu/dyn/www/f?p=104:110:3757649453920796::::FSP_PROJECT:23206	
BS EN 1829-1:2010 High pressure water jet machines. Safety requirements Machines	British Standards Institute	Standard	Equipment manufacturer		Cleaning equipment, Water, Jets, Pumps, Pressure equipment.

Table 8 Legislation, industry guidance and standards for cleaning services

Name	Region	Type	User	Description/ definition
CEN EN 13549:2001. Cleaning services. Basic requirements and recommendations for quality measuring systems `	Europe	standard	Cleaning services providers	Control system by each cleaning services can be inspected for quality.
DIN EN 13549, Cleaning services - Basic requirements and recommendations for quality measuring systems; German version EN 13549:2001, standard published 10/01/2001 by DIN-adopted European Standard	Germany	standard	Cleaning services providers	Control system by each cleaning services can be inspected for quality.

Name	Region	Type	User	Description/ definition
Directive 2003/88/EC of the European Parliament and of the Council of 4 November 2003 concerning certain aspects of the organisation of working time.	European Commission	Directive	Cleaning Service providers	This Directive lays down minimum safety and health requirements for the organisation of working time.
Council Directive 91/533/EEC of 14 October 1991 on an employer's obligation to inform employees of the conditions applicable to the contract or employment relationship	European Commission	Directive	Cleaning Service providers	The aim of the Directive is to provide employees with improved protection, to avoid uncertainty and insecurity about the terms of the employment relationship and to create greater transparency on the labour market.
Council Directive 94/33/EC of 22 June 1994 on the protection of young people at work	European Commission	Directive	Cleaning Service providers	Prohibit the employment of children (i.e. those under the age of 15 or still in full-time compulsory education).
Council Directive 1999/70/EC of 28 June 1999 concerning the framework agreement on fixed-term work concluded by ETUC, UNICE and CEEP	European Commission	Directive	Cleaning Service providers	The directive and the agreement on fixed-term work forbid employers to treat fixed-term workers less favourably than permanent workers.
Council Directive 97/81/EC of 15 December 1997 concerning the Framework Agreement on part-time work	European Commission	Directive	Cleaning Service providers	A Framework Agreement between Europe's employers and trade unions sets out to eliminate unjustified discrimination against part-time workers and improve the quality of part-time work.
Directive 2008/104/EC of the European Parliament and of the Council of 19 November 2008 on temporary agency work	European Commission	Directive	Cleaning Service providers	The Directive lays down the principle of non-discrimination, regarding the essential conditions of work and of employment, between temporary workers and workers who are recruited by the user company. The Directive ensures greater transparency and increases confidence in the temporary work sector. It thus improves protection for the workers concerned while giving greater flexibility to companies.
Directive 96/71/EC of the European Parliament and of the Council of 16 December 1996 concerning the posting of workers in the framework of the provision of services	European Commission	Directive	Cleaning Service providers	To guarantee that the rights and working conditions of a posted worker are protected throughout the European Union, and to avoid "social dumping" where foreign service providers can undercut local service providers because their labour standards are lower, the European Community law has established a core of mandatory rules regarding the terms and conditions of employment to be applied to an employee posted to work in another Member State.
Directive 2008/94/EC of the European Parliament and of the Council of 22 October 2008 on the protection of employees in the event of the insolvency of their employer	European Commission	Directive	Cleaning Service providers	2008/94/EC ensures payment of employees' outstanding claims in the event of employer insolvency. It requires Member States to set up an institution to guarantee the payments.

Name	Region	Type	User	Description/ definition
Council Directive 2001/23/EC of 12 March 2001 on the approximation of the laws of the Member States relating to the safeguarding of employees' rights in the event of transfers of undertakings, businesses or parts of undertakings or businesses	European Commission	Directive	Cleaning Service providers	The Directive regulating this issue (2001/23/EC) emphasises that the transfer of an undertaking does not in itself constitute valid grounds for dismissals.
Council Directive 91/383/EEC of 25 June 1991 supplementing the measures to encourage improvements in the safety and health at work of workers with a fixed- duration employment relationship or a temporary employment relationship	European Commission	Directive	Cleaning Service providers	An EU directive (91/383/EEC) ensures that fixed-term and temporary agency workers, who are more exposed to the risk of accidents at work and occupational diseases than other workers, have the same level of safety and health protection at work as other employees.
Council Directive 2000/43/EC of 29 June 2000 implementing the principle of equal treatment between persons irrespective of racial or ethnic origin	European Commission	Directive	Cleaning Service providers	Implements the principle of equal treatment between persons irrespective of racial or ethnic origin.
Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work			Cleaning Service providers	The object of this Directive is to introduce measures to encourage improvements in the safety and health of workers at work. To that end it contains general principles concerning the prevention of occupational risks, the protection of safety and health, the elimination of risk and accident factors, the informing, consultation, balanced participation in accordance with national laws and/or practices and training of workers and their representatives, as well as general guidelines for the implementation of the said principles.
Directive 89/654/EEC - workplace requirements	European Commission	Regulation	Cleaning Service providers	The European Union (EU) has set up a system for the supervision and control of shipments of waste within its borders and with the countries of the European Free Trade Association (EFTA), the Organisation for Economic Cooperation and Development (OECD) and third countries which are party to the Basel Convention.

1.6 Preliminary Results

1.6.1 Proposed definition for the Product Group

According to preliminary researcher and stakeholder feedback from the questionnaire, the PG definition proposed to take further is presented below. The extension to sanitization operations (e.g. cleaning of washrooms, bathrooms and toilets) aim to cover also the activities provided in the sanitary services taking place within indoor cleaning services.

Professional cleaning operations, performed regularly or periodically in order to keep an indoor space clean and sanitized, and that can be performed manually or making use of machinery

1.6.2 Proposed scope for the Product Group

The preliminary analysis of market segment data show that indoor cleaning has the bulk of the market share. Data from 2010 shows that offices constitute 50% of the cleaning industry market (EFCI, 2012).

The feedback also suggested inclusion of some more specialist cleaning services such as window cleaning and surface cleaning. Therefore it is recommended that this can be further explored in the first ad hoc meeting together with stakeholders. Table 9 identifies the services, operations and preliminary boundaries to be further considered within the development and revision of Cleaning Services. The proposed approach considers domestic/residential cleaning out of scope. This is mainly because commercial and institutional cleaning constitutes the largest market share of cleaning services provisions to market. This is also because some schemes (e.g. GS-49 Residential Cleaning Services (Green Seal)), consider domestic cleaning separately from commercial/institutional. However, this first approach maybe later revised in line with stakeholder opinions and further investigation on the eventual differences between domestic/residential and commercial cleaning practices.

Table 9 Initial proposed scope for Cleaning Services

In Scope (Services & operations)	Out of Scope (Services & operations)
Services: Indoor cleaning of commerical and public/institutional buildings	**Services:** Specialised/industrial cleaning Domestic/residential cleaning [a]
Operations: • Floor cleaning • Sanitary cleaning (cleaning of washrooms, bathrooms and toilets) • Glass[b]/windows cleaning • Surface cleaning	**Operations:** • Manufacturing processes • Environmental remediation • Exterior areas (e.g. parking lots, grounds) • Specialist (e.g. carpet cleaning, window washing (external), upholstery) • Sanitation services e.g. sewers, graffiti

In Scope (Services & operations)	Out of Scope (Services & operations)
Boundaries (preliminary): • Employment practices • Chemical use • Water consumption • Cleaning products and materials • Waste (and wastewater) • Energy consumption • Machinery • Transportation	

a) The proposed approach considers domestic/residential cleaning out of scope. This is because commercial and institutional cleaning constitutes the largest market share of cleaning services provisions to market. This is also because some schemes (e.g. GS-49 Residential Cleaning Services (Green Sea), consider domestic cleaning separately from commercial/institutional. Also, because what is consider by other schemes as domestic/residential cleaning may be excluded from the pre-defined scope (as for example the operations regarding chimney cleaning and cleaning of fireplaces. However, this first approach maybe later revised in line with stakeholder opinions and further investigation on the eventual differences between domestic/residential and commercial cleaning practices.

b) Due to the similarities in the function and products used for cleaning windows, glass cleaning is also covered within the scope of this project.

Table 10 summarises the key components of the different cleaning services. The characteristics of the four proposed cleaning services is studied in detailed in section 3.1.

Table 10 Summary of in-scope components of different cleaning services considered by the EU Ecolabel for cleaning services

Cleaning services	Business areas*	Component	Scope
Floor cleaning	Office, corridor and bathrooms	Key cleaning activities	Hard floor - vacuuming and washing; carpets - vacuuming
		Cleaning product	General purpose cleaners; floor cleaners**
		Cleaning power equipment	Commercial upright vacuum cleaners, carpet extractors, rotary floor machines, wet pick-up machines
		Cleaning accessories and supplies	Floor pads, wet mops, bucket, trolleys, brooms, brush, plastic shovel, plastic brush, vacuum bag
Sanitary cleaning	Bathrooms	Key cleaning activities	Cleaning sinks, toilet bowls and urinals, washing floor, emptying rubbish and sanitary bins, cleaning vertical surfaces
		Cleaning product	Sanitary cleaners including toilet cleaners (various forms) and cleaners with limescale removal function
		Cleaning power equipment	Restroom cleaning machines; pressure washers

Cleaning services	Business areas*	Component	Scope
		Cleaning accessories and supplies	Waste handling equipment (carts/receptacles), towels, facial tissue, toilet tissue, sponges, scouring pads
Glass/windows cleaning	Office, corridor and bathrooms	Key cleaning activities	Cleaning of internal windows, glass and mirrors
		Cleaning product	General purpose cleaners; glass/window cleaners; window washing concentrate
		Cleaning power equipment	N/A (manual cleaning only)
		Cleaning accessories and supplies	Reusable gloves; disposable gloves; water buckets; microfibre cloth rags and paper towels; sprayer bottle
Surface cleaning	Office and corridor	Key cleaning activities	Dusting and washing surfaces and furniture; maintenance of office and communication equipment; cleaning of contact points: handles, switches and phones; washing waste bins, wiping windowsills, dusting table legs and chairs
		Cleaning product	General purpose cleaners
		Cleaning power equipment	N/A (manual cleaning only)
		Cleaning accessories and supplies	Dusters; mops; disposable wipes

*The categorisation of business areas is based on the one used in the ADEME (2010) study, which is the main lifecycle assessment study used in the environmental analysis section of this report. The report investigated three main business areas: office, corridor and bathrooms. The cleaning activity scope of each business area can be found in Table 51.

** Require further stakeholder consultation on whether to include this product in the scope of this EU Ecolabel.

2 Market analysis

2.1 Market analysis overview

2.1.1 Global market overview

The World Federation of Building Service Contractors (WFBSC) estimates the cleaning industry generated total revenue of €39.6 billion worldwide in 2009 (WFBSC, 2010). This is based on available data provided by WFBSC members. The WFBSC by extrapolating the data for OECD members not covered in the sample, estimates that worldwide industry generated in 2009 a turnover of around € 63.4 billion ($86.3 billion). Due to the fact that emerging economies (such as China and India) are not captured by the figures, the values presented underestimate the size of the industry. This is because the values for these countries are not ready available. The WFBSC also estimated that nearly 4.5 million people are employed in cleaning in the WFBSC member countries listed in Table 11. In 2012, WFBSC made a global estimation across 38 countries, indicating that 17.2 million are employed in the sector across these countries (which include countries below and also additional countries within the EC, Asia and North and South America).

Table 11 Data from WFBSC members (WFBSC, 2010)

Country	Revenues (Euro)
Australia	€ 1 755 000 000
Belgium	€ 1 304 000 000
Brazil	€ 6 900 000 000
France	€ 10 000 000 000
Germany	€ 11 400 000 000
Japan	€ 26 000 000 000
New Zealand	€ 192 000 000
UK	€ 7 410 000 000
Taiwan	€ 621 000 000
TOTAL	**€ 39 608 680 000**
Extrapolated OECD total	**€ 63 400 000 000**

OECD members include: Australia; Austria; Belgium; Canada; Chile; Czech Republic; Denmark; Estonia; Finland; France; Germany; Greece; Hungary; Iceland; Ireland; Israel; Italy; Japan; Korea; Luxembourg; Mexico; Netherlands; New Zealand; Norway; Poland; Portugal; Slovak Republic; Slovenia; Spain; Sweden; Switzerland; Turkey; United Kingdom; and United States.

The procurement intelligence unit 2008 forecast estimates the contract cleaning services to worth € 111.9 billion in 2010. This demonstrates significant variability in global cleaning revenue data, most likely due to the varied structure and supply chain of the cleaning services market. European estimates do match global estimates (see section 2.1.2 for further details on the European market). It is therefore concluded that no accurate data is available on the global value of contract cleaning.

2.1.2 EU market overview

2.1.2.1 EU market structure at national level

Based on the European Federation for Cleaning Industries (EFCI) cleaning services industry turnover dataset for 2010 the total estimated turnover of the cleaning service industry in EU28 + Norway + Switzerland is **€ 65 billion** (EFCI, 2012). This figure is calculated as follow (see Annex A for full calculation detail):

The EFCI dataset provides cleaning services turnover for 19 out of 30 countries of the EU28+ Norway + Switzerland. In order to cover all the countries within the scope, the cleaning service industry turnover figures of the 19 countries (€62bn) with data available were compared against their corresponding GDP figures (€12 479bn, from World Bank, 2014) to calculate an average turnover-to-GDP ratio (0.5%). This ratio was then applied to GDP of the 11 other EU28 countries (€705bn) to estimate their total cleaning services turnover. The value calculated is €3bn.

Practices within the cleaning services industry are nationally variable (EFCI, 2010). Data indicates that the five largest national markets are **Germany, France, Italy, UK and Spain** (see Figure 6). These countries account for around 76% of total European turnover reported by EFCI (EFCI, 2012).

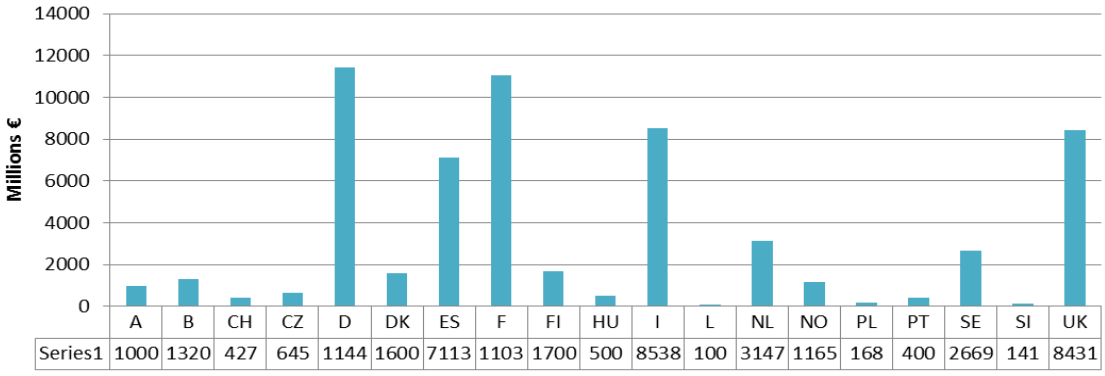


Figure 6 Cleaning services turnover by country (EFCI, 2012)

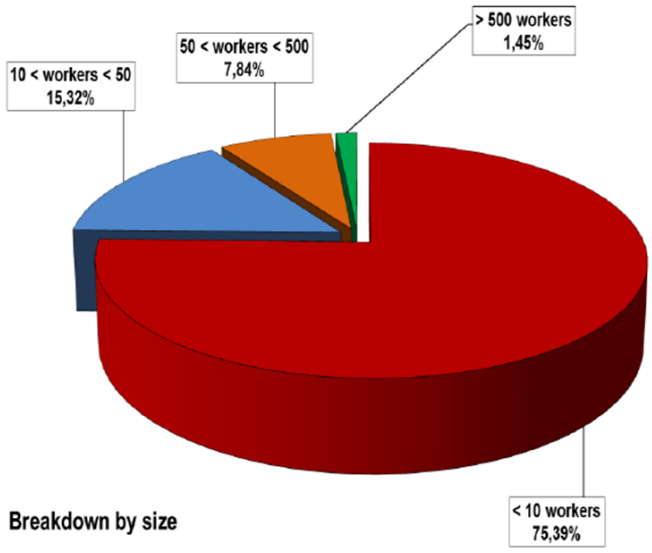
Based on the Eurostat the total estimated turnover of the cleaning service industry for 2010 is **€81 billion** for EU-27 (Eurostat, 2010). The country boundaries included in the scope of the Eurostat and EFCI datasets differ. Eurostat data has a larger country scope (list of countries are shown in Table 12). However, the EFCI data set provides more detail at the country and service level and is therefore relied upon in subsequent sections of the report. Based on the EFCI (2010) data, we can estimate cleaning contract services in scope of this research (offices, schools & leisure organisations, windows and receptions) constitute approximately **€ 38 billion**.

Table 12 List of countries considered by Eurostat and in the European Federation for Cleaning Industries survey

European countries (source: Eurostat)	EFCI (2010)
Belgium	Included
Bulgaria	Not included
Czech Republic	Included
Denmark	Included
Germany	Included
Estonia	Not included
Ireland	Not included
Greece	Not included
Spain	Included
France	Included
Italy	Included
Cyprus	Not included
Latvia	Not included
Lithuania	Not included
Luxembourg	Included
Hungary	Included
Malta	Not included
Netherlands	Included
Austria	Included
Poland	Included
Portugal	Included
Romania	Not included
Slovenia	Included
Slovakia	Not included
Finland	Included
Sweden	Included
United Kingdom	Included
Norway	Included
Switzerland	Included
Croatia	Not included
Turkey	Not included

2.1.2.2 EU market structure by company size and turnover

The cleaning industry structure in Europe is characterised by a large proportion of very small enterprises. According to Eurostat (Eurostat, 2010) there are 202,000 enterprises in Europe and about 75.4% of them employ less than 10 persons (EFCI, 2012) (see Figure 7). Large enterprises that employ over 500 people only constitute 1.45% of the total number of cleaning companies in Europe (EFCI, 2012). In Europe there has, however, been a rise of facilities management firms to cover activities beyond cleaning services (EFCI, 2012) which has led to some consolidations. The German market is an exception to this, as it has a higher number of large (7.5% of the total) and medium (19%) sized companies (EFCI, 2012).



No updated data available for Denmark, Poland, and Portugal

Figure 7 Breakdown of cleaning service in Europe by company size (EFCI, 2012)

Although the cleaning services industry is generally made up of small firms, 1.45% of the cleaning service companies with over 500 workers achieve almost half of the total turnover in the cleaning services industry (EFCI, 2012). Combining information from Eurostat (informing that there are 202,000 companies in Europe) and EFCI state (1.45% of companies provide half of total cleaning services turnover), it is possible to conclude that about 3000 companies are responsible for half of the EU turnover for cleaning services. Stakeholders consulted have commented that the way in which cleaning is performed varies considerably between these large cleaning services providers. This is due to differing national expectations of cleanliness, the use of subcontracted cleaning staff and high staff turnover rates, which influence the activities included and the types of standards followed.

The average turnover per company and for each country is shown in Figure 8. This data could be indicative of some countries being dominated by larger companies and also related to a country's GDP – costs of cleaning will be higher where living costs are higher. For example, the large share in Sweden may be due to the higher cost of cleaning service contracts. The European average turnover per firm in 2010 was 440 000 Euro (EFCI, 2012).

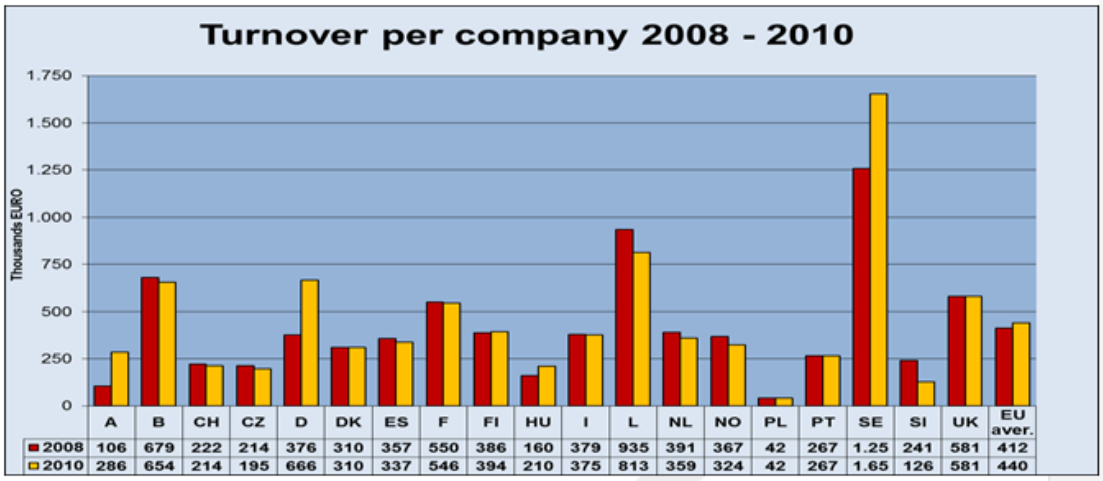
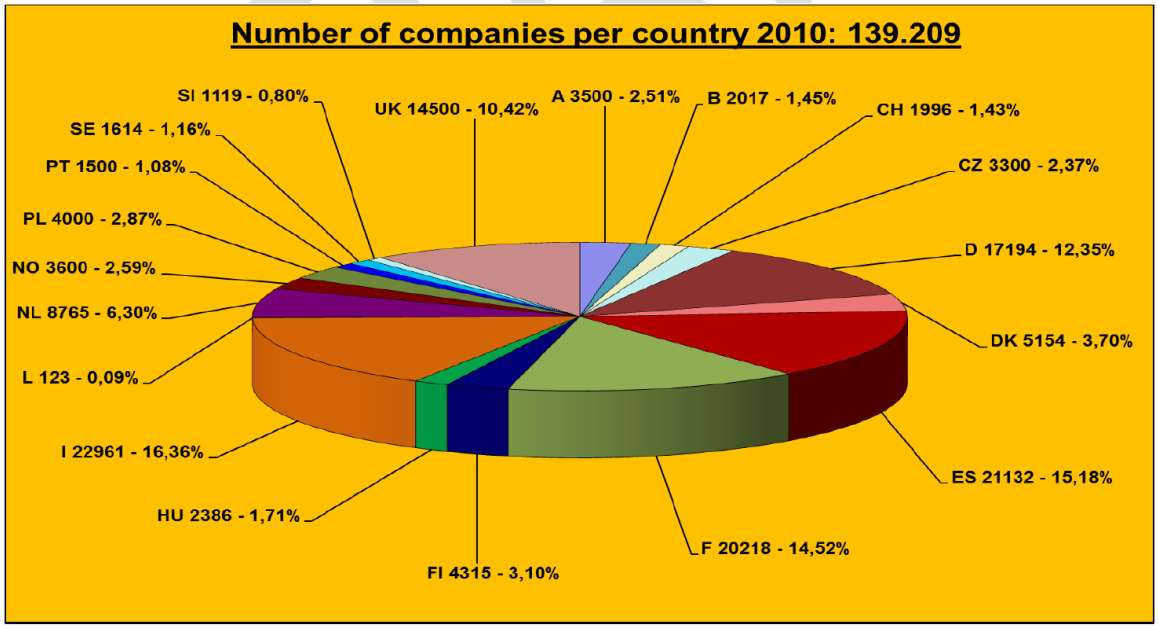


Figure 8 Variation in turnover by company and for each country (EFCI, 2012)

According to the EFCI (2012), there are a total of 139 209 cleaning service contractors (who are outsourced). Italy, Spain, France, Germany and UK account for 70% of this total in number of cleaning companies. In Italy, Spain and France a large number of individuals or small family businesses are registered as cleaning contractors. Figure 9 shows the distribution in 2010 of the number of companies among the members from the European Federation of Cleaning Industries.



No updated data available for Denmark, Poland and Portugal

Figure 9 Number of cleaning service contractors per country (EFCI, 2012)

A detailed list of the top cleaning service providers for different European countries is provided in Annex G (see Table 64) for five countries including Italy, Spain, France, Germany and UK.

2.1.3 Introduction to economic and social drivers

Key features and drivers in the sector include the expansion of **outsourcing; cost-led contracting and over-representation of part-time** (and very short part-time) employment. The sector is also particularly sensitive to **wage regulation** due to high labour costs. Economic drivers such as competitive pricing have led to innovation around **efficiency** which influences trends in **green cleaning**.

2.1.3.1 Competition on contract value

The key economic and social drivers of contract cleaning services over of recent years have been client demand for competitive valuing (Procurement Intelligence Unit, 2010). In the challenging economic environment, clients have become more demanding in relation to contract value and terms due to budget pressures. Many cleaning service providers have had to be proactive in negotiating contracts and providing services at an affordable cost to retain clients.

According to the WFBSC (2012) cleaning businesses have come under significant pressure to lower costs and provide greater value for money in the face of increasing competition. In some nations this has created tensions which have led to industrial action from employees that are unhappy about the focus that clients are placing on price at the expense of service quality. The economic downturn has had a number of impacts on the industry – it has slowed growth and led the industry to reduce in size in some countries. It has driven down profit margins for many businesses and placed more of an emphasis on efficiency. Clients appear to be placing an increasingly emphasis on which service provider can offer them the lowest price.

A further trend is a growth towards integrating cleaning services within a package of facilities management services; this is to increase efficiency in the industry. The market structure is further analysed in Section 2.2.

2.1.3.2 Political and legislative drivers: minimum wages and living wage

As labour costs make up the majority of cleaning service provider costs, the sector is particularly sensitive to minimum wage regulations. Changes in the minimum wage regulations affect the sector because the workforce consists mainly of unskilled workers. The national minimum wage (NMW) is now implemented in three-quarters of EU members, each setting their own rate reviewed annually. The remaining countries have minimum pay rates agreed through collective bargaining in their various employment sectors. The NMW is found in most countries across Europe except Austria, Cyprus, Denmark, Finland, Germany, Italy, Norway and Sweden. Sector agreements are also found in most European countries except the UK and Eastern Europe. Most of the countries that do not yet have a NMW in force (e.g. Germany) do have sector specific agreements (EFCI, 2014).

It is common to have a sector specific minimum wage in the cleaning services sector and this will usually be higher than the NMW (EFCI, 2014). Due to the high competition on cost for cleaning service contracts, these minimum wages are not always respected which leads to unfair competition in the market place. It is therefore important that adherence to specific minimum wage regulations is taken into account in development of social criteria for the EU Ecolabel to encourage that laws are respected within the industry.

The EU had suggested member states set a minimum pay rate of at least 60% of their average national wage (European Cleaning Journal, 2013). The levels actually set vary across the region and average out at 45% short of what is considered enough for people to subsist on without additional state support (European Cleaning Journal, 2013). However the idea of a wage linked to the true cost of living is now under discussion in many European countries. The living wage is voluntary for employers, not a legally enforceable minimum level of pay governments believe the market will bear. The UK has had the living wage since 2001 (European Cleaning Journal, September 2013Cleaning contractors face specific barriers to taking up the living wage due to a procurement situation biased towards price. Contractors submitting bids quoting the living wage can be at a disadvantage due to the tight margins associated with cleaning. However, when contractors are made aware of the benefits such as a more skilled workforce and lower staff turnover, they can become more supportive (European Cleaning Journal, 2013).

2.1.3.3 Efficiency and innovation

Competition on price has forced cleaning services to invest in new technologies to offer efficiency and cost reduction. Innovations on sustainability and efficiency in cleaning services are explored in greater detail in Section 2.3. Green cleaning has retained its importance in the market despite economic pressures to lower costs because it represents greater value to clients and continues to be regulated at the European level. As explored in Section 2.3 cleaning service providers increasingly use green chemicals products and paper with recycled content, in addition to a number of other innovations such as use of cleaning equipment for floor cleaning that reduces water and chemical use. Innovations are not only in the products purchased and equipment used, but also in the types monitoring and training programmes implemented which aim to improve efficiency and reduce cost.

2.2 Market structure

2.2.1 Market segmentation

Office cleaning dominates the cleaning services sector representing 50% of turnover within the cleaning industry. However, the value of office cleaning has steadily decreased by 8% since 1997, with an equivalent increase in specialised and related cleaning services. This suggests a greater diversification of activities in the cleaning industry. The segments in orange on Figure 10 (offices, schools & leisure and windows) represent those segments within the scope of cleaning services defined in this report. The proposed scope constitutes

62% of the total cleaning services market turnover. This 2010 data is based on survey data from EFCI members with a small margin of error related to incorrect classification of cleaning activities by some respondents.

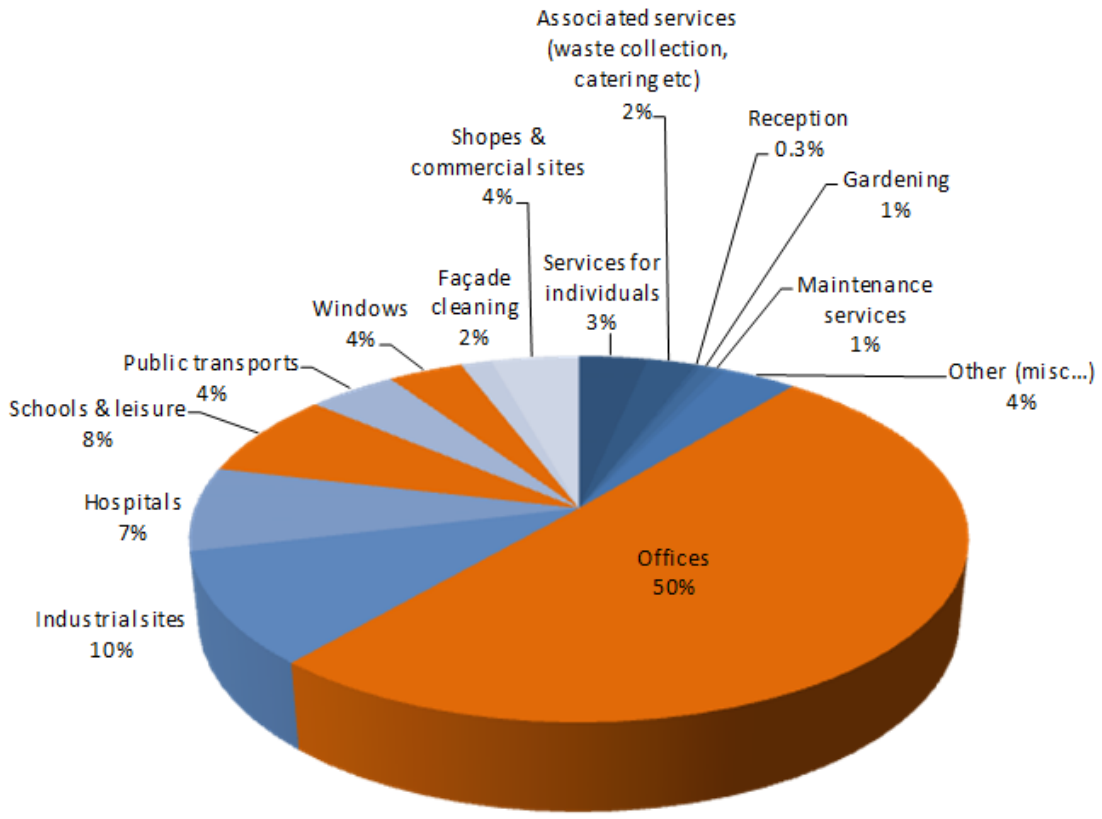


Figure 10 Breakdown of cleaning services market turnover (EFCI, 2012)

2.2.2 Cleaning services supply chain

Increasingly integrated facilities management contractors are used to manage all aspects of a building's operations, including cleaning services. Contract cleaning services are usually bundled with other facilities management service contracts. This helps companies reduce cost and offers a one-stop solution for such services. In cases where the service provider offering bundled services lacks expertise in special cleaning, these services are outsourced to a third party to cater to all demand in the industry. A model of the cleaning service supply chain is detailed in Figure 11 and described below. The arrow from cleaning product manufacturer to cleaning equipment manufacturer explains that equipment manufacturers can buy products such as detergents to fill their equipment before selling it as a whole unit.

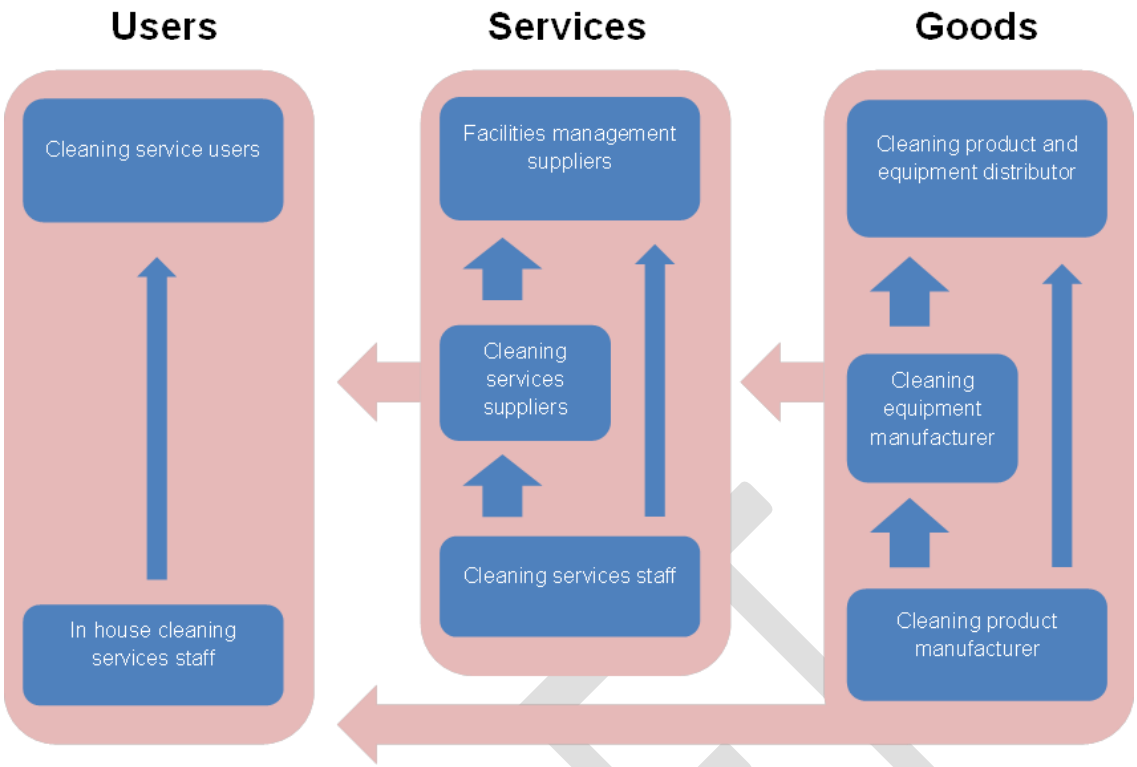


Figure 11 Cleaning Services supply chain outsourcing process

2.2.2.1 Cleaning services users

Firms may use existing staff and/or contracted cleaning services to maintain a building. This varies dependent on the type, scale and level of training required to perform the tasks. For example, an irregular cleaning task such as a foodstuffs spillage may be performed by existing staff and more routine daily floor cleaning may be performed by contracted staff. As such cleaning service users may source the necessary goods: directly from manufacturers; through distributors; or rely on contractors to use their own goods.

2.2.2.2 Cleaning service providers

If a cleaning service provider is externally contracted, then services may be provided as complete integrated facilities management (e.g. ISS, Sodexo and Hectas). For example, building management and security and cleaning services may be provided within the same contract. Alternatively, cleaning services may be provided which include staff and equipment or just provide staff (e.g. through temporary agencies such as Brook Street). Firms that provide each, or all, of these options may choose to source the necessary goods: directly from manufacturers, through distributors (e.g. Acdopro) or, rely on customers to supply their own goods.

2.2.2.3 Cleaning goods providers

Some indication of the main manufacturers of cleaning goods in Europe who provide products specifically to I&I cleaning service providers is obtained from a list of members of the industry body AISE, who have signed up to the AISE Sustainability Charter (see section 2.3.1 on ecolabels for details).

Annex H: Table 65 provides an overview of all AISE members signed to the Sustainability Charter who are either manufacturers or distributors and that only supply to I&I cleaning service providers. No market share or size data is provided, but an indication of size can be gained from the countries of operation. Only a few of these companies operate across a number of countries (many are country specific).

2.2.3 Consumption of Cleaning Products, Equipment and other Accessories

This section aims to understand general trends in the types of products, equipment and accessories being used for cleaning service (more specifically for office cleaning within public or institutional or private buildings). A list of typical cleaning products and equipment includes cleaning products, power equipment and other accessories (e.g. paper and plastics). A categorisation of cleaning products and equipment demonstrates significant diversity in the market. Annex B lists the products, power equipment, supplies and accessories and paper and plastic, normally used within cleaning services activities identified under the scope of this project (see Annex B). The window and sanitary cleaning are mainly manual operations and floor cleaning uses powered equipment (e.g. sweeping systems and vacuum cleaners).

2.2.3.1 Consumption of cleaning products (chemicals)

In 2012 cleaning product sales for the commercial sectors value at € 6.5 billion based on A.I.S.E membership data in EU 27 plus Norway and Switzerland (A.I.S.E., 2013). Table 14 provides the percentage share of the commercial sub-sectors in relation to product and equipment sales; indicating that **building care** (which relates to the Cleaning Services product scope e.g. office cleaning, floor cleaning, surface cleaning, bathroom cleaning) accounts for **14% of cleaning product and equipment sales in Europe** (€ 886 million).

Table 13 Value of product and equipment sales per segment (A.I.S.E 2013)

Breakdown of I&I	Percentage share	Million euros	AISE (2013)
Technical Cleaning	28%	1822	
Kitchen & Catering	23%	1518	
Food & Beverage	17%	1128	
Building care	14%	886	**Includes** cleaning and maintenance products, *general purpose cleaners, façade cleaning, floor care, sanitary cleaners, abrasive cleaners, sanitizing cleaners, air conditioners hygiene and surface disinfectants (hospital, sanitary, general, wipes).*
Laundry	10%	642	
Other	8%	539	

The estimated consumption volume of professional cleaning product of EU28, Norway and Switzerland is **590 000 tonnes**. This value is estimated by A.I.S.E based on the market value of the building care services. A.I.S.E has calculated this by applying a conversion factor of €1.5 of market value to 1kg of professional cleaning products (A.I.S.E, 2014). This estimate provided by A.I.S.E has been sense-checked against another estimate calculated using a bottom-up approach. An Italian dataset provided by Italian association of manufacturers - Afidamp, has been used as the basis of the extrapolation. The estimate calculated by this method suggests that 1kg of professional cleaning products is equivalent to €1.6 of market value. The estimate is very close to the conversion ratio used by A.I.S.E, confirming the A.I.S.E estimate. Annex C contains further details on the method and assumptions used to formulate the estimation.

The A.I.S.E market value and volume data is the most reliable estimate of professional cleaning product consumption available publicly. However it does not provide product type level data. To estimate the consumption of professional cleaning products by product type, the Afidamp dataset was used as a proxy. Table 14 shows the estimated consumption of professional cleaning products by product type based on the proportion data.

Table 14 Professional cleaning product consumption in EU28 + Norway + Switzerland by product type (based on 2012 data provided by Afidamp)

	Total apparent consumption				Cleaning services ecolabel scope			
Product type	Volume (tonnes)	% breakdown provided by Afidamp	Value (Million €)	% breakdown provided by Afidamp	Floor	Sanitary	Window	Surface
Detergents	383 106	65%	495	56%	y	y	y	y
Dewaxer	21 769	4%	42	5%				y
Emulsions/Floor wax	20 598	3%	63	7%	y			
Sanitizer/disinfectant	75 564	13%	124	14%		y		y
Air freshener	10 488	2%	31	3%		y		
Other products	78 473	13%	132	15%	Not specified			
Total	**590 000**		**886**					

Note that the consumption estimate breakdown by product type is only indicative due to the lack of data which enable a comparison to the real proportion at the EU level. There is evidence to suggest there are substantial variations between countries. An industry source from Germany suggests that sanitary cleaners and surface cleaners each constitute 30% of

the total tonnage of cleaning products consumed in Germany. Stakeholder comments highlighted that product use varies across cleaning locations with general surface cleaners dominating office cleaning and schools primarily relying on sanitizers.

Professional cleaning product production in the EU can be estimated from the consumption figures provided by A.I.S.E. This can be done by applying an adjustment factor to the consumption data to take into account the impact of export.

The export adjustment factor is calculated by comparing the total EU27 production figure of cleaning products (include both domestic and commercial cleaning products) that are associated to professional cleaning activities with the corresponding apparent consumption figure. A selection of 22 PRODCOM product groups is used for the calculation of this factor. Annex D contains further details on the method and assumptions used to formulate the estimation.

It is assumed that the selected PRODCOM product groups are representative of products used for professional cleaning services. The calculated export adjustment figure is 1.1. By applying this factor to the consumption figures, it is estimated that the EU produces about **649 000 tonnes** of professional cleaning products, or equivalent of about **€974 million**. Note that PRODCOM data is for EU27, which excludes Croatia, Norway and Switzerland. Although this is inconsistent with the scope of the A.I.S.E data, the market value of cleaning service industry of EU27 presents over 90% of the EU28, Norway and Switzerland total market value. Therefore the minor inconsistency in data scope would not have a significant impact on the result of the calculation. Annex D contains further details on the method and assumptions used to formulate the estimation.

Some data is available for USA. According to a 2010 survey of USA cleaning product distributors (96% based in USA), **27% of sales in the cleaning service sector are from chemicals** (Sanitary Maintenance Magazine & ISSA, 2013). These distributors sell predominantly to contract cleaners (14.5%), industrial (including manufacturing plants/food processing/utilities warehouses) (14.6%), educational institutions (13.7%) and health care (14.9%).

The **main types of product sold** under this category are listed below. All of these are potentially relevant to the scope of the product group (cleaning services for commercial and institutional spaces). Although this data is based on a US survey, it is indicative of the types of products and equipment sold to cleaning service providers.

Chemicals - resilient & **hard floor chemicals** (stripper /neutralizers /seals /finishers /restorers /spray buffs /etc.), **cleaners & degreasers** (glass/wall) and **disinfectants & sanitizers** (bowl, porcelain, counter, other surfaces) constitute 48.9% of cleaning product market in USA (Sanitary Maintenance Magazine & ISSA, 2013)

2.2.3.2 Equipment consumption

The Cleaning Systems Association (VDMA) in Europe represents 20+ members all over the Europe in the cleaning machine manufacturing industry. **The companies that VDMA represents have a total value of around € 1 billion and VDMA estimates that their members represent 85% of the EU cleaning machine manufacturers** (VDMA, 2014).

However, the members of VDMA represent mainly floor cleaning machine manufacturers. There are high levels of function-driven product differentiation in the floor cleaning machine market (e.g. walk-behind machine, stand-on machine, vacuuming machine, spray wash machine).

Preparatory research by the European Commission on vacuum cleaners (European Commission, 2009) provides a detailed market analysis of vacuum cleaner use in the EU. This is mainly applicable to the domestic market. However it is understood that vacuum cleaners used for the domestic and professional cleaning markets will be similar. Information on sales of non-domestic vacuum cleaners is available resulting from a project questionnaire survey (see Table 15).

Table 15 Sales (volume in unit) of non-domestic vacuum cleaners for 2006 (EC, 2009)

	Total	Upright with bag	Upright bagless	Cylinder with bag	Cylinder - bagless	Wet/dry	Centralised	Tub *
France	115,000 (a) 70,000 (b)							
Germany	230,000 (a) 90,000 (b)							
Italy	20,000 (a) 10,000 (b)							
Spain	10,000 (a) 10,000 (b)							
Poland	30,000 (a) 10,000 (b)							
Scandinavia	40,000 (a) 30,000 (b)							
UK	1,000,000	50,000				40,000	1000	750,000
EU25	**700,000 (a)** **300,000 (b)**							
Total EU27	**1,300,000**							

(a) = vacuum cleaners, (b) = wet/dry vacuum cleaners

*Tub includes both bagged and bag-less systems

There is no accurate data available detailing cleaning equipment consumption in Europe. However, anecdotal evidence from stakeholders suggests the volume of equipment sales is considerably smaller than product sales due to their longer lifespan.

The Italian association of manufacturers – Afidamp, has provided a cleaning equipment production dataset for 2012. For power cleaning equipment, the total EU28, Norway and Switzerland production value is estimated to be **€3 billion** using the Italian dataset (See Annex E). Note that this estimate includes equipment produced for export as well. The following tables (Table 16 and Table 17) show the breakdown of the power cleaning equipment production value by service (Table 16) type and by product group (Table 17).

Table 16 Power cleaning equipment production value by service type (Estimate based on Afidamp, 2014)

Service type	Percentage	Production value
Floor cleaning	97%	€2 870 million
Window cleaning	3%	€102 million

Table 17 Power cleaning equipment production value by product group (Estimate based on Afidamp, 2014)

Product group	Percentage	Production value
Floor cleaning washer-driers	37%	€1 086 million
High pressure cleaner	22%	€658 million
Vacuum cleaner/ liquid	19%	€571 million
Sweepers (road sweepers not included)	12%	€346 million
Steam generator	5%	€157 million
Mono-brush	3%	€86 million
Mono-brush for moquette	2%	€66 million

Some data is available for USA. According to a 2012 survey of USA cleaning product distributors (96% based in USA), **7. 1% of sales in the sector are from power equipment** (Sanitary Maintenance Magazine & ISSA, 2013). Although this data is based on a US survey, it is indicative of the types of products and equipment sold to cleaning service providers. The **main types of equipment sold** under this category are included below.

- **Power equipment** - automatic scrubbers, vacuums, replacement parts, powered floor machines such as polishers and burnishers, carpet extractors and restroom cleaning machine constitute 94.4% of powered cleaning equipment market in USA (Sanitary Maintenance Magazine & ISSA, 2013)

2.2.3.3 Cleaning accessories and supplies

It is estimated that the total value of cleaning supplies production in the EU28, Norway and Switzerland is **€572 million**. The Italian association of manufacturers - Afidamp - has provided a cleaning equipment production dataset for 2012. The EU total cleaning supplies production estimate is calculated by scaling up the Italian data according to Italy's relative GDP proportion to the total EU GDP (Annex E provides details on the calculation methods for this estimate). Note that this estimate includes cleaning supplies produced for export as well. Table 18 and Table 19 show the breakdown for the cleaning accessories and supplies production value, respectively, by cleaning service type and by product group. The importance of equipment in floor cleaning is again highlighted (floor cleaning is the main contributor to cleaning equipment sales both manual and powered equipment). NOTE: refer that number of units (cleaning accessories and supplies) are not ready available.

Table 18 Cleaning accessories and supplies production value by cleaning service type (estimate based on Afidamp, 2014)

Service type	Percentage	Production value
Floor cleaning	76%	€433 million
Window cleaning	14%	€80 million
Sanitary cleaning	10%	€59 million

Table 19 Cleaning accessories and supplies production value by product (estimate based on Afidamp, 2014)

Product group	Percentage	Production value
Trolleys and accessories	40%	€227 million
Textiles (e.g.mop, cloths, gazes frames)	26%	€148 million
Accessories (e.g. mop wringers, buckets, frames)	20%	€117 million
Window cleaning (all)	14%	€80 million

According to a 2012 survey of USA cleaning product distributors (96% based in USA), **54.4%** of sales are for **paper and plastics, 8.1% supplies and accessories** and **3.4% other janitorial products** (Sanitary Maintenance Magazine & ISSA, 2013). The **main types of product and equipment sold** under this category are included below.

- **Supplies** - gloves, matts & matting, cloth rags, floor pads, wet mops, window washing accessories (buckets, holsters, etc.), microfibre products and mopping equipment constitute 62.8% of cleaning product market in USA (Sanitary Maintenance Magazine & ISSA, 2013)
- **Paper and plastics** - towels/facial tissue/toilet tissue constitute 51% of cleaning product market in USA (Sanitary Maintenance Magazine & ISSA, 2013).

2.2.4 Public procurement and sustainability

Data provided by EFCI in 1997 shows that the **market share of public tendering** in the industrial cleaning sector has risen significantly in many Member States in recent years. In the countries where data was collected, **public procurement constituted an average of 33% of total turnover in the sector**. It is estimated by EFCI that in 1997, public authorities in six European countries (Belgium, France, Portugal, Spain, the Netherlands and the United Kingdom) alone contracted out the equivalent of 5.8 billion EUR of industrial cleaning services.

According to EFCI (1999), there are two main types of cleaning service systems for public procurement: activity and quality based cleaning system. An activity-based cleaning system is characterised by specifying what cleaning operations must be carried out, on what surfaces and how often. This is a frequency-based system. Programmed Cleaning is an example of an activity based cleaning systems. Under such a system, a cleaning programme is assigned to each individual room. Requirements, such as the frequencies with which a room needs to be

cleaned per week, how often the floor and inventory needs to be cleaned thoroughly and how many times superficial cleaning of the floor and inventory needs to be carried out, are specified by the programme. Quality based cleaning systems specify the level of quality that the procured cleaning services are required to deliver. The contracting organisations provide only requirement on the level of quality and the cleaning services providers can decide how the requirement can be achieved. Under such a system, it is acceptable not to clean a surface that is clean if the required quality is maintained. Depending on the cleaning requirement, EFCI (1999) suggests that it is valuable to combine a frequency-based system (for example for work operations for "sensitive surfaces") with a quality based cleaning system.

The way that the public sector procure cleaning services has also evolved significantly. Several examples mainly related to GPP show that quality and sustainability considerations are becoming more important in the cleaning service procurement process. The different components of cleaning service procurement and/or the influence of sustainability considerations are highlighted below:

Procurement tender preparation – All kinds of public departments and organisations require cleaning services, from theatres to police departments. Procurement tenders can be prepared by a government department's internal procurement team (European Commission, 2014c), or by city councils. In some cases, external stakeholders are involved the procurement process. The procurement of cleaning services for three city theatres in Luxembourg had a strong focus on sustainability and it was prepared by two representatives from the theatre, a lawyer and a member of the Environmental Protection Office. The example from Luxembourg city suggested the importance of stakeholder involvement as well as relevant departments and personnel of the city council in the preparation phase of the procurement process (ICLEI, 2012).

Research and analysis for the development of the procurement tender also have important implications on how cleaning services will be carried out in the future. The city of Reykjavík, Iceland commissioned an external 'needs analysis' to understand essential level of cleaning activities. The analysis showed that cleaning frequency could be reduced by 50% and have identified sustainability improvement recommendation such as cleaning during office hours to reduce costs and energy use (ICLEI, 2012). These insights were used in the final procurement tender subsequently to specify efficiency cleaning requirements.

Cleaning locations - The type of cleaning location varies significantly. The procurement contract can be for the cleaning services of a single office building as well as for multiple locations (e.g. over 60 kindergartens in a city) (ICLEI, 2012).

Procurement criteria – Sustainable cleaning service procurement shares the same objective of maintaining the cleaness of a site with any other typical cleaning service procurement. However sustainable cleaning service procurements have a stronger focus on environmental performances and efficiency. The following examples highlight some procurement requirements for cleaning services:

- **Cleaning products** – Sustainable cleaning service procurement practice usually require the use of environmentally friendly and healthy cleaning products, with specific restrictions on the presence of harmful/toxicity chemicals or chemicals with large environmental impacts, caused by e.g. volatile organic compounds, perfumes, dyes and surfactants. Some procurement tenders recognised the use of ecolabel cleaning products (European Commission, 2009c), procurer might also ask bidder to

supply samples of each proposed cleaning product for testing on banned substance (European Commission, 2014b). The budget implications of using sustainable/ecolabelled cleaning products is estimated to be insignificant. The City of Luxembourg estimates that cleaning products represented only 3-8% of total cleaning contract value (European Commission, 2014b). The additional cost of using cleaning products with a lower environmental impact/ecolabel instead of traditional products is estimated to be marginal.

- **Performance efficiency** – Operational aspects that affect cleaning performance efficiency such as cleaning techniques and cleaning frequencies can be specified by a sustainable cleaning service procurement tender (ICLEI, 2012).
- **Cleaning equipment, accessories and supplies** –An example, from eight cooperating municipalities of the Dutch region Gooi en Vechtstreek shows in a procurement tender requirements for the use of micro fiber technology in a number of specific parts of the cleaning program (European Commission, 2009b).
- **Dosing and dosing device** – Sustainable tenders might have requirements on dosing and on the use of dosing devices. The Estonian Police and Border Guard Board tender for cleaning services required all products to be delivered with clear dosing instructions and a mechanical dosing device was required to be provided wherever necessary (European Commission, 2014c).
- **Waste generation and disposal** – Waste disposal is a service required by both traditional and sustainable cleaning service procurement. Sustainable procurement can have specific requirements on waste disposal methods and also waste generation reduction (European Commission, 2009b).
- **Environmental management system** – Sustainable procurement tenders might require in their selection criteria the compliance of environmental management certifications such as EMAS, ISO14001 or other evidence of equivalent environmental management measures (ICLEI, 2012; European Commission, 2014b).

Award criteria – Traditional cleaning service procurement tenders focus entirely on value. A survey carried out on behalf of EFCI and UNI-Europa in 1999 showed that in the vast majority of countries cleaning contracts are awarded on the basis of the lowest price tender (EFCI, 1999). Sustainable cleaning service procurement includes cleaning quality, performance efficiency and environmental impacts into the equation. Sustainable cleaning service procurement can allocate 15-60% of the points to good environmental practices (ICLEI, 2012; European Commission, 2009c).

Benefit of procuring sustainable cleaning services

In addition to environmental benefits, which are discussed in the later parts of this report, examples have shown that sustainable cleaning services can realise significant cost savings. The market analysis and final results of the Estonian Police and Border Guard Board example shows that there are no significant cost implications for a sustainable cleaning service in Estonia (European Commission, 2014c). The City of Reykjavík example demonstrates an even greater cost saving. The two sustainable cleaning service contractors managed to cut cost by 50%, result in a total annual saving of US$770 000.

Another benefit is that by encouraging the use of ecolabelled products in tenders, sustainable cleaning service procurement can drive market share for both green services and green products. The City of Reykjavík example discovered that before the program was implemented, few alternatives for green cleaning services were available on the market. The tender awarded points for ecolabelled products, which challenged the cleaning service providers to make their service more sustainable. This led to a significant increase in the supply of green products and services on the market in Reykjavík.

Challenges of procuring sustainable cleaning services

The biggest challenge is the availability of sustainable cleaning products and services on the market. Therefore an analysis of market opportunities has been shown as crucial element in defining the ambitious level of requirements in tenders.

2.3 Market penetration of sustainable cleaning products and services

There is no a vast amount of information ready available at national level for the market penetration of professional cleaning products. Estimates at country level were, so far, identified for UK and Germany. Information from one stakeholder estimated the UK sustainable product market of between 0.7 and 1.4 %; for the whole cleaning product market (I&I and domestic). A rough estimation for Germany, obtained through one stakeholder, suggest that the use of ecolabelled cleaning products (I&I) within commercial cleaning services is about 3-5%.

In summary, whilst there is widespread support for sustainable cleaning products and services there is a significant disparity between: charter sign ups, self-reported figures from suppliers and actual market demand.

2.3.1 Ecolabels for cleaning products

No specific data was available addressing the sales of sustainable cleaning products or services. However, the number of signatories to charters (e.g. AISE Sustainable Cleaning Charter) or voluntary schemes (e.g. EU Ecolabel or Nordic Swan) can indicate some market support for sustainable products and services.

The AISE data does demonstrate significant support for sustainability in cleaning product manufacturers at least from a commitment perspective, though it is noted that the AISE Sustainability Charter is not as stringent a standard as the EU Ecolabel or Nordic Swan but aims to ensure a minimum standard is applied to the majority of the cleaning products market.

One such charter from The International Association for Soaps, Detergents and Maintenance Products (A.I.S.E.) estimates that cleaning product manufacturers and distributors signed up to their Sustainable Cleaning Charter scheme represent **85% of the industry's volume**

output in Europe (A.I.S.E. 2013). This Charter applies mainly to household product manufacturers serving the domestic market; though also includes suppliers for the I&I (non-domestic) market.

No specific data has been provided on the proportion of this volume comes from I&I products used for building care. Out of the 216 cleaning product manufacturer members who have signed up to the AISE charter, 146 members provide only to the household sector indicating the majority provide only to the household sector. The remaining 23 provide products solely to the I&I sector, and 47 provide to both household and I&I. Therefore 32% of members also provide to the I&I sector.

According to Ecolabel work plan 2011 – 2015, a total 2,192 products for all purpose cleaners and cleaners for sanitary facilities were awarded with the EU Ecolabel as of January 2014. This is the third largest category products awarded with EU ecolabel. Information on the number of ecolabelled all-purpose cleaner by country can be found in Figure 12 **Error! Reference source not found.**. This indicates France to have the highest number of ecolabelled All Purpose Cleaners (58% of the overall APC for Europe).

Nordic Swan, the official ecolabel of the Nordic countries founded in 1989, had awarded about 2,100 ecolabel licenses by the end of 2012. About two thirds (1386) of these are site specific services, which include cleaning services (Nordic Ecolabelling Annual Report 2012).

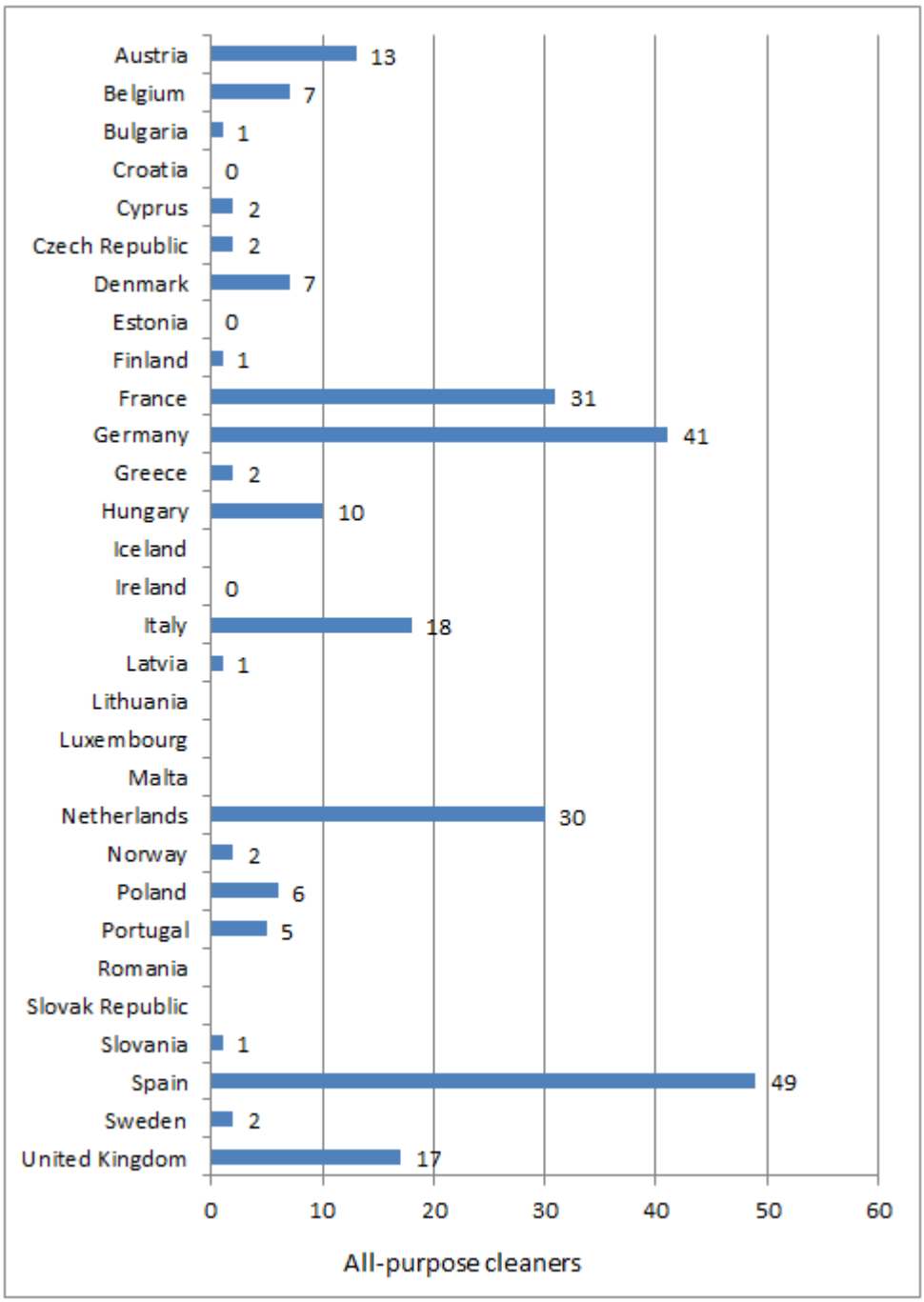


Figure 12 Split of All Purpose Cleaners EU Ecolabel by country as of September 2014 (compiled from ECAT, 2014)

2.3.2 Ecolabels for cleaning accessories and supplies

Several accessories are used as subsidiary materials during the cleaning service operations. These make use of a list of materials as, for example, paper products, plastic bags, gloves, microfibres, waste handling equipment, cloth rags, protective clothing, absorbents, floor pads, mops, brooms, brushes and windows accessories (e.g. buckets, squeegees). Some of these accessories may be found in the market as ecolabel products, others not. In the following are

presented the product groups strictly related with the ones in use within cleaning services and that may be found as ecolabel products.

In the EU ecolabel the following categories of products can be award with ecolabel: tissue paper, textile products, soaps (ECAT, 2014). Detailed data is not available for the majority of specific products used within cleaning services, however, information for tissue paper is available and thus the number of ecolabelled tissue paper by country can be found in Figure 13. The findings are that Italy has the largest number of ecolabelled Tissue Paper. Annex F also include details for the product groups marketed with EU ecolabel. However, this should be considered as indicative for the purpose of our study, because no information on the detailed figure regarding the share of paper products that is used within the cleaning services activities is available.

Further research was performed on other existing ecolabel schemes (as e.g. Nordic Swan, NS, 2014). In this scheme the following categories of products can be award with ecolabel: Fabric cleaning products containing microfibres, textiles, skins and leather. Sanitary Products and Tissue paper. However, no information is available regarding the number of ecolabelled products used within the cleaning services activities. There are no ecolabels which apply specifically to other cleaning accessory supplies, such as gloves, mops, cloth rags and brooms.

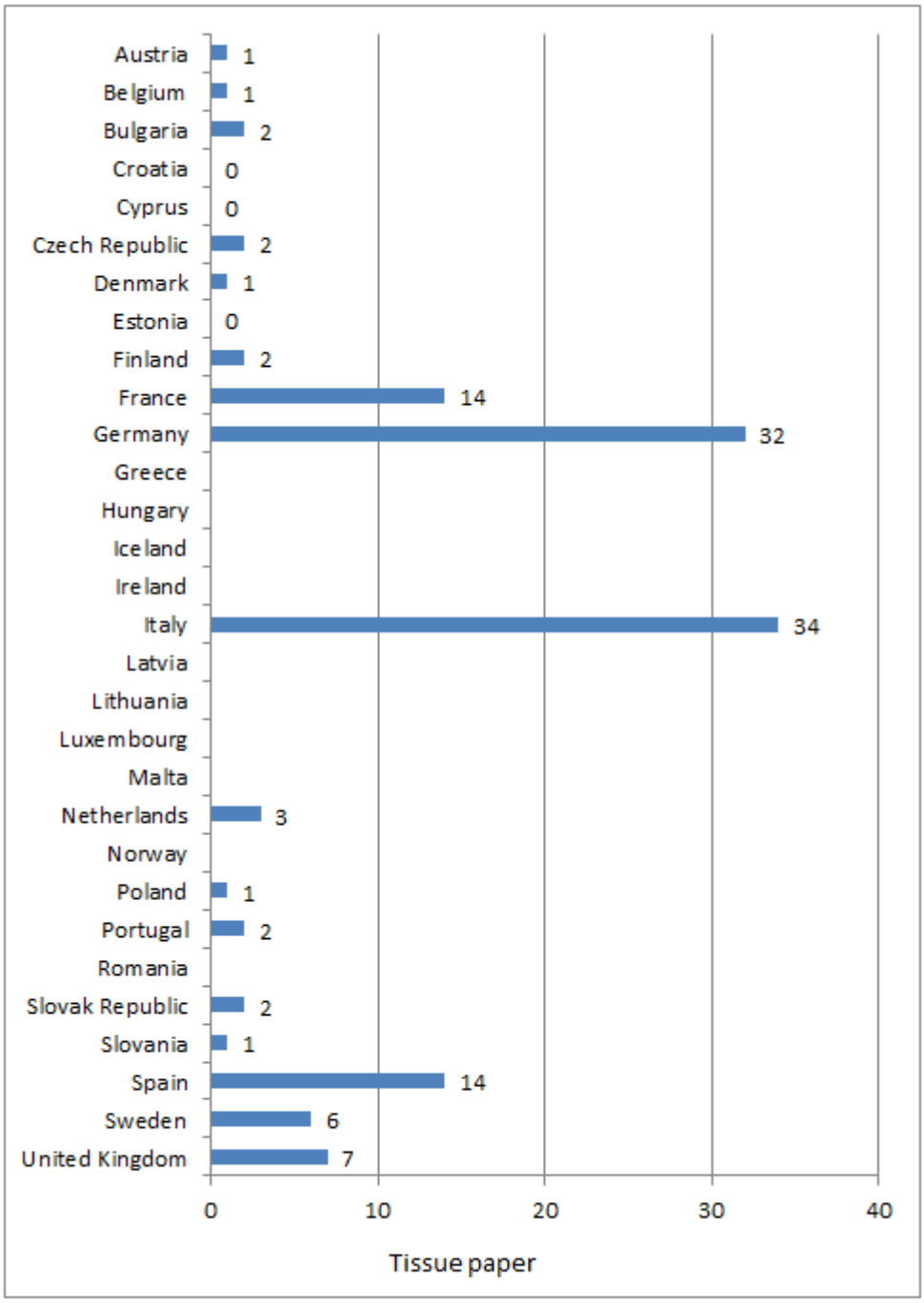


Figure 13 Split of Tissue Paper EU Ecolabel by country as of September 2014 (compiled from ECAT, 2014)

2.3.3 Ecodesign requirements and energy labelling for cleaning services equipment

The Ecodesign Directive sets minimum energy performance requirements for energy-related products, including vacuums cleaners. The labelling directive sets the performance categories for energy labels.

Commercial vacuum cleaners fall under the Commission Regulation (EU) No 666/2013 of 8 July 2013 (ecodesign) and Commission Delegated Regulation (EU) No 665/2013 of 3 May

2013 (energy labelling). Ecodesign and labelling requirements for vacuum cleaners entered into force in July 2013. The ecodesign requirements will enter into force in two stages; 2014 and 2017. From the second tier, requirements on emissions and motor lifetime are introduced. The energy labelling regulation applies from 1 September 2014 and 1 September 2017. The provisions include minimum requirements on energy efficiency, cleaning performance and dust re-emission.

No data has been found on uptake/penetration of labelled vacuums or other cleaning equipment in the cleaning services sector. Moreover, no other relevant energy-using equipment has so far been subjected to the ecodesign requirements or energy labelling directive.

2.4 Cleaning services innovations

This section summarises the key reasons behind sustainable practices in the cleaning service industry and explores the current trends on sustainability and innovation.

2.4.1 Key drivers for sustainable practices

Many cleaning companies now have environmental policies and goals in place. The primary drivers behind this are likely to be a combination of regulatory and voluntary compliance pressure and market demand. Through desk-based research and interviews with industry stakeholders, the following key drivers for sustainable practices in the cleaning services industry have been identified:

- **Saving opportunities** – sustainable and efficient operation practices often lead to tangible cost and resource saving opportunities.
- **Government policies** – the inclusion of sustainability requirements in government public procurement criteria of cleaning services is a key driver.
- **Standards** – voluntary sustainability standards, such as LEED, are becoming more popular.
- **Market demand** – general increase in awareness on sustainability issues raises the requirements on product and service sustainability performance. One stakeholder interview noted purchasing products with an ecolabel has become a strong way to demonstrate green credentials. Companies recognise that using sustainable cleaning product would improve the perception and marketability of the company as a whole. The competitive advantages of more sustainable products and services are becoming increasingly apparent in the market.

2.4.2 Key innovations

Sustainability and innovation are intricately interrelated. In order to operate and grow more sustainably, the industry as a whole must do things differently on product as well as system level. In the following tables (Table 20 to Table 21) a non-exhaustive list on innovation is made available regarding specifically operational innovation trends (Table 20) and product and equipment innovation trends (Table 21).

Table 20 Operational innovation trends (stakeholder feedback from phone interviews, May 2014)

Innovation	Description
Staff training to improve awareness and efficiency	Cleaning companies are putting more resources on improving the quality of their frontline staff. In particular, companies provide training on cleaning product dosage, product application and disposal best practices, especially on using products from other contractors/suppliers. Colour coding can be used to help promote safety, facilitate training and result in more effective cleaning in the professional cleaning industry. Color-coding has proven to be effective as it helps overcome language barriers and helps cleaning professionals identify which products and tools should be used to clean what surfaces, which are to be used together, and in some cases, which are to be used for which cleaning task.
Simplifying product diversity	Overuse of specialised products increases the operational burden of clean companies. They increase the probability of incorrect use – as there is a large variety in the types of cleaning products. This also has significant management and administrative implications on that staff that are responsible for HSE and ISO standards. They may struggle to ensure standards are adhered to for large number of products. Cleaning companies now actively simplify their cleaning product inventory to reduce operational complexity.
Increased use of machinery	Increased mechanisation in the cleaning services industry has led to an increase in cleaning quality and efficiency (this means a reduction in use of chemicals and water, as correct dosages are applied)
Monitoring system improvement	Cleaning and facility management companies are improving the ways they monitor their cleaning practices. One key area of focus is to improve the monitoring of use rates of cleaning products.
Social responsibility	Cleaning services companies are paying strong attentions to social responsibility issues such as working conditions, working hours and minimum wage compliance.

Table 21 Product and equipment innovation trends

Innovation	Description
Low chemical / chemical-free cleaning products	Reducing the chemical content of clean products to address health and safety issues. For example, chemical-free floor pads and solvent-free metal polish have been developed; lowering of VOC continues to be a priority for product R&D. Electrolyzed water, which separates tap water into positive and negative streams that attract soils and render harmful bacteria inert, have emerged.
Concentration and dosage	Concentration and dosage, including solid cleaners, is the main area of innovation. Concentration of product has been a priority for a number of years in particular with glass cleaners that are particularly dilute. High concentration products must be accompanied by correct dosing.
Logistics and transport innovations	On-site cleaning product production can lower the concentration of chlorinated compounds. For example, Ecolab's Hydris system produces low toxicity chemicals on-site. This system reduces packaging and transport impacts. Onet, has trained its 3,200 employees in the skills of 'ecodriving' by using a simulator specially purchased for this purpose. Toutenet has opted for purely electrical transport. The use of such vehicles, combined with a careful planning and scheduling of all its business trips, has enabled this company to make savings of 90 per cent to its travel budget.
Environmental concerns	The development of renewable biodegradable builders used in cleaning products that can replace STPP [a)] (sodium tripolyphosphate, regarded a significant cause of eutrophication) is still a priority.
Lifecycle thinking	Dr. Christopher Helt, Research Associate of The Sustainability Consortium, suggested in an interview that there are an increasing number of innovative products that focus on every aspect of sustainability, from raw material extraction to packaging and end of life and disposal.
Efficient equipment and accessories	Microfibre cloths, machinery and specialist mops to reduce water consumption. Battery-powered machinery. Hybrid sweepers and stick vacuums that offer portability and convenience with less power. Cordless commercial backpacks are light and powerful enough for routine vacuuming without taxing the wearer. Cordless, handheld wet/dry vacs that can be used to quickly address spots and spills. Another developing industry innovation is employee-powered equipment (where machinery is powered through human energy) Move towards eco-systems; energy and cleaning efficiency; use of less energy and water, lower noise and recyclability of plastic components; Enlarge durability and increasing of spare parts to be replaced. Low phthalates in components is also envisaged.
Innovation specific to floor cleaning	Digital technology-enabled – internal computer installed on floor cleaning machines, enabling functions such as location tracking, battery monitoring, efficiency monitoring. Battery – batteries within older cleaning machines do not last the full lifetime of the machine, and have to be replaced annually. New machines with better battery technology have batteries that last for the entire lifetime of the machine Efficient use of water, chemical and energy – VDMA are developing a certification scheme related to the efficiency of floor cleaning machine. The biggest difficulties are to 1) define what is clean and 2) develop tests that are repeatable. One thing they do is to measure the gloss of the cleaned tiles.

STPP is widely used in regular and compact laundry detergents (powder, liquid, gel, tablets), automatic dishwashing detergents (powder, liquid, gel, tablets), toilet cleaners, and surface cleaners, and provides a number of functions including sequestration of "water hardness" enabling surfactants to function effectively, pH buffering, dirt emulsification and prevention of deposition, hydrolysis of grease, and dissolving-dispersing dirt particles (Hera project, 2003).

2.4.2.1 Example innovation: window cleaning

The latest innovations on window cleaning focus on mechanization. Specialised remote controlled and automated cleaning machines for different scales of window cleaning

have been developed in recent years. Small, automatic window cleaning machines such as Winbot developed by Ecovacs have been designed for office/domestic scale window cleaning. For high rise window cleaning, the Sky Pro High Pressure Window Washing System and the HighRise™ window cleaning system are two examples of large scale window cleaning machine that can be operated from roof top or on the ground.

These window cleaning machines have a number of advantages over the conventional manual window cleaning, namely:

- Significant reduction of labour cost (can be as high as 70%-80% reduction)
- Lower requirements on cleaning chemical use
- Can be operated safely from roof top or ground for high rise window cleaning

These cleaning machines are just starting to enter the market. The window cleaning industry is still dominated by traditional manual cleaning.

2.4.3 Barriers to sustainability

A number of barriers have been identified through discussion with stakeholders.

- There is little standardisation of cleaning services practices.
- Cleaning done in-house could be more significant than by contractors leading to a greater volume of product used due to less efficient techniques.
- Wastewater releases to the aquatic environment without treatment is consistently a significant environmental impact stated by stakeholders.

2.5 Limitations of the study

A lack of detailed market data for cleaning products and services means that a number of assumptions have been made during this market analysis. These are outlined in the appropriate sections of this report. Contacts with several stakeholders have meant we could confirm market data values, identify some trends and make assumptions based on their observations. However, the interviews have not enabled the project team to obtain exact information on the procurement volumes, neither for individual companies, nor for the total EU 28 market, as usually such information is not collected at these levels.

Specific limitations are noted below and these include data gaps:

- **Limited global market data** on cleaning services has been found; more detailed data is available from European sources. Global data does not fit with European data and the European data is more reliable.
- Market data is possible to split by cleaning service sub-sector (e.g. office cleaning, industrial cleaning) but **limited data is available at a granular level**; e.g. to compare the split between floor, sanitary and window cleaning.

- **Procurement volumes of cleaning products, power equipment, cleaning accessories and supplies** in the EU are not available to a detailed level and therefore rough estimates were considered, rechecked and extrapolated for equipment consumption based on country level data from Italy.
- **Estimates for the market share** of some of the larger cleaning service providers has been inferred from some public data (e.g. for ISS) but no specific data has been found that is up to date and European-wide.

2.6 Preliminary findings

There are a number of observations to be made following this market analysis of the cleaning services sector:

- **Market structure** – the EU cleaning services market constitutes of a large number of small companies (with <10 staff). The breakdown by size shows that 75% of the companies have less than 10 workers. However, the large cleaning companies are accounted for almost half of the total cleaning service industry turnover in the Europe. On a national level, the five largest national markets are Germany, France, Italy, UK and Spain, and they are account for around 76% of total European cleaning industry turnover. Moreover, the same set of countries account for 70% of the total number of cleaning company members of EFCI. In Italy, Spain and France a large number of individuals or small family business are registered as cleaning contractors.
- **Market value of cleaning services and products** – The cleaning service industry of EU28 + Norway + Switzerland is estimated to be € 65 billion. The value of products used in commercial cleaning activities are estimated to € 886 million, equivalent to 590 000 tonnes of cleaning products. For power cleaning equipment, the total EU28, Norway and Switzerland production value is estimated to be €3 billion. The total value of cleaning accessories and supplies (as e.g. mops, clothes) production in the EU28, Norway and Switzerland is estimated to be €572 million.
- **Labour costs** account for majority of spend by cleaning service providers – for this reason issues relating to labour are significant and thus not to be neglected for the EU Ecolabel criteria development (together with products, equipment and accessories used).
- **Minimum wage** – a significant impact and driver in cleaning services due to diversity of regulations in Europe including National Minimum Wage and sector minimum wage. Unfair competition arises when cleaning service providers do not adhere to relevant legal standards. The Living Wage is also now debated in some countries and this affects cleaning service contractors.
- **Training in product use** – this is a difficult issue to tackle in uniform way due to product and company diversity. Larger firms are more likely to have funds to implement training and are more capable of implementing these standardised practices; which also helps them to compete on price due to increased efficiency of products and equipment. However, a larger share of the market is composed by small firms.

- **Trend in sustainable cleaning products and services** - The uptake by the market of sustainable cleaning products is successful among the currently awarded EU Ecolabel product groups. In the U.S., the use of green cleaning product can be over 60% for some cleaning products group. There is no data on the market value or trend of sustainable cleaning services publicly available for the current services provisions.

3 Technical and environmental analysis

3.1 Technical analysis of cleaning services

The technical analysis provides an overview of the characteristics for professional cleaning services, which includes surface, floor, sanitary and glass/windows cleaning.

The following sections provide details on each type of cleaning service, and cover:

- Composition of chemicals used
- Type of equipment and supplies required
- Estimates of the resources required for cleaning e.g. chemical and water use for $1m^2$ of flooring or energy use for vacuuming.

The findings derived from the technical analysis will be used, in conjunction with the market data to identify improvement potentials in Chapter 4. The analysis will also help identify any gaps in the LCA studies found.

3.1.1 Technical analysis of cleaning products used for cleaning services

The formulation and use of cleaning products is a major aspect of cleaning services and have are directly linked to the environmental and social sustainability of cleaning services. As part of the research and analysis process of developing an EU Ecolabel for cleaning services, the focus of this report is on the application of cleaning products. Information on the formulation of cleaning products is provided as supporting information and sets an environmental and social impacts context for cleaning services. For a detailed analysis and criteria for sustainability in relation to the formulation of cleaning products, refer to the "all-purpose cleaners and sanitary cleaners" Ecolabel technical background report and Commission Decision 2011/383/EU).

The key objective of this section is to define the scope of cleaning products in relation to the EU Ecolabel for cleaning services and their roles in different types of cleaning tasks. The environmental and social implications of cleaning product applications are discussed in the second section of this report. The improvement potential related to the use of cleaning products in professional cleaning services will be explored in the next chapter (Chapter 4 – Improvement Potential) of the EU Ecolabel development process.

Cleaning products used in professional cleaning services can be categorised into two main groups – 1) routine cleaning products and 2) specialised cleaning products. The specialised cleaning products are currently excluded from the scope of the "all-purpose cleaners and sanitary cleaners" EU Ecolabel product group.

Routine cleaning products **– are used daily or weekly and regarded as routine cleaning products. This definition and scope aligns with the "All-purpose cleaners and sanitary cleaners" EU Ecolabel and product group (see**

1) Table 22), which comprises of the following:

- **General purpose cleaners** - detergents intended for routine cleaning of indoor hard surfaces such as walls, floors and other fixed surfaces.
- **Window cleaners** - cleaners intended for routine cleaning of windows.
- **Sanitary cleaners** - detergents intended for the routine removal, (including by scouring) of dirt and/or deposits in sanitary facilities, such as laundry rooms, toilets, bathrooms, showers and kitchens.

2) Specialised cleaning products –are used for performing specific, non-regular cleaning tasks.

The criteria for EU Ecolabel for all-purpose cleaners, sanitary cleaners and windows cleaners (CD 2011/383/EU), currently under revision, considers within the scope the routine cleaning products abovementioned. During the 1st AHWG for this EU Ecolabel, cleaning products used in non-routine cleaning will be proposed to be kept out of the scope.

Table 22 Routine cleaning products considered in the cleaning services EU Ecolabel

Product type/name	Main function	Alignment with the scope of cleaning services EU Ecolabel			
		Floor	Surface	Sanitary	Glass /window
General purpose cleaners	Detergent products intended for routine cleaning of hard surfaces such as walls, floors and other fixed surfaces. General purpose cleaners shall mean products intended for indoor use in buildings which include domestic, commercial and industrial facilities.	√	√		√
Glass/Window cleaners	Specific cleaners intended for the routine cleaning of windows.				√
Sanitary cleaners	Detergent products intended for the routine removal, including by scouring, of dirt and/or deposits in sanitary facilities, such as laundry rooms, toilets, bathrooms, showers and kitchens. This subgroup contains bathroom cleaners and kitchen cleaners.			√	

Although some specific ingredients for glass, bathroom and floor cleaners have been identified to serve a particular purpose, (e.g. alcohol degreasing agents in glass cleaners, sanitising agents in bathroom cleaners, bleach for toilets and strippers and waxes for floors), there is much similarity in the substances used in the main generic cleaning products (all purpose for floors and surfaces, and specific glass and sanitary cleaners). According to International Association for Soaps, Detergents

and Maintenance Products (AISE), the materials used in cleaners and detergents sold to the industrial and institutional (I&I) sector are around 90% the same as those used in the domestic sector, with identical toxicity characteristics (CSES and Oxford Research, 2012).

The key differences are in the concentration and dosage: products supplied to the professional sector can be highly concentrated for maximum efficiency because users often have sophisticated dose control systems to ensure correct dilution during use (CSES and Oxford Research, 2012). Other differences include the use of more alkaline products which reduces the impact in disposal, and they can be more hazardous to workers; but exposure is reduced through correct information and training (CSES and Oxford Research, 2012). Packaging impacts are reduced for industrial and institutional products as they are usually sold in bulk, concentrated and have greater reuse/refill options (CSES and Oxford Research, 2012).

Detergents (both I&I and domestic) contain a number of chemical ingredients such as surfactants (surface active agents) as main cleaning functional ingredients, as well as minor ingredients including colourants, preservatives, oxidising, alkaline and Volatile Organic Compounds (VOCs).

Surfactant is a key ingredient that can be found commonly in cleaning product. Although surfactants are mainly produced from fossil fuels, there are also a number of cleaners that use surfactants derived from plant oils (e.g. palm or coconut oil). In this case the reduction of CO_2 emissions and energy is replaced by larger amounts of solid waste and also issues of land use in agriculture (CSES and Oxford Research, 2012).

The main environmental impacts associated with cleaning service products are in **raw material production, use, end of life and packaging** stages, and include (ADEME, 2010; CSES and Oxford Research, 2012):

- **Raw materials** used in the manufacture of the product and packaging (which contributes to resource depletion, e.g. petrochemical use in surfactants), energy use and pollution from production.
- **Air pollution and health** in use (e.g. allergenic substances such as dyes or perfumes).
- **Water consumption** in use (e.g. for dilution) and for rinsing.
- **Energy consumption** for heating water for diluting floor cleaners (there are trends in the industry towards cleaners performing effectively with room temperature water. These products are mainly prevalent in the I&I sector).
- **End of life** ecotoxicity and eutrophication impacts from waste water discharge.

The end of life stage of cleaners is of particular concern from an environmental impact perspective. The discharge of cleaners and/or their prepared solution following their use can have an impact on the environment through toxicity of the aquatic environment, wastewater loading, air pollution and subsequent treatment, resource consumption and disposal of packaging materials (CSES and Oxford Research, 2012). In most cases, the wastewater is treated in municipal waste water treatment plants. Many of these plants remove phosphates and nitrates from the waste water. However, treated wastewater effluent containing low concentrations of substances originating from detergents can still be and are often released into lakes, rivers and the marine waters. Most of the surfactants are relatively toxic to aquatic organisms. Their biodegradability varies according to their

carbon chain structure, but under European Regulation 648/2004, detergents now have to meet certain biodegradability requirements to remain on the market (CSES and Oxford Research, 2012).

Table 23 provides an overview of the main types of substances used in different cleaning products, their chemical composition, properties and key environmental impacts. This table provided the main ingredients used in the formulations for the cleaning products. It allows to understand the potential environmental impacts associated with the use of different types of cleaning products in cleaning services. The table summarises and presents the following aspects:

- Major chemicals used by the cleaning product in-scope
- The cleaning functions of each chemical as a component of a cleaning product
- Specific environmental impacts associated with each type of chemcial

Table 23 Cleaning products and their properties, including chemical composition, function, application and their key environmental and health impacts (data from ADEME, 2010; Defra, 2008; A.I.S.E. / Cefic, 2009)

Substance	Chemistry	Properties and function	Application	Environmental and health impacts	Relevance to product scope	Composition (%) in products that are in scope of the EU Ecolabel for APC and sanitary cleaners		
						General purpose	Window	Sanitary
Anionic and ionic surfactants (surface active agents)	Lipophilic (affinity with grease) Hydrophilic (affinity with water)	Wetting agent, foam and dispersion Surfactants are the active ingredients in cleaning products which provide the foaming and emulsification	Main constituent of detergents	• Toxicity • Eutrophication	Main ingredient for surface, floor and sanitary cleaners (including general purpose cleaners)	1-10	0.1-0.2	1-20
Alkylphenol ethoxylates (APEs)	Class of non-ionic surfactants	Once used in high volumes (particularly nonylphenol and, to a lesser extent, octylphenol ethoxylates, NPEs and OPEs) in I&I applications	Main constituent of detergents (now severe restrictions in place)	• Biodiversity - Biodegradation releases alkylphenols which can disrupt hormones in fish (an oestrogenic effect)	Once used in high volumes in I&I detergents – now severe restrictions in place; this substance must not be present in the Ecolabel-compliant APC	5-15	2	
Citric acid	Organic acid	Descaling and chelating agent	Constituent of most detergents	None	All Purpose, floor, sanitary, glass cleaners	1-10		5-15

Substance	Chemistry	Properties and function	Application	Environmental and health impacts	Relevance to product	Composition (%) in products that are in scope of the EU Ecolabel for APC and sanitary cleaners		
Polycarboxylates	Polycarboxylates used in detergent products comprise two types of polymers: homopolymers of acrylic acid (P-AA) and copolymers of acrylic/maleic acid (P-AA/MA).	Polycarboxylates are used as ingredients and additives providing a range of properties such as sequestration /complexation, anti-redeposition and dispersion	Constituent of low phosphate and phosphate-free detergents	• Poorly biodegradable • Low toxicity and can be removed by treatment	All-purpose cleaners	0-2		1-5
Alkali bases e.g. ammonium hydroxide	Minerals	Degreaser e.g. ammonium hydroxide is an ingredient cleaning agent, including many window cleaning formulas	Constituent of detergent and degreasers	• Increase pH	Floor, glass and surface cleaners	0-10	0-11	
Fragrance	Perfumes are used at low levels (<1%) in cleaning products	Fragrance to improve smell	Constituent of some detergents	• Poorly biodegradable • Bioaccumulative • Allergic reaction (skin or respiration)	Found in all cleaners – surface, floor, window, sanitary	<1	<1	0-5
Colourants		Enhance appearance of surface cleaned	Constituent of some detergents	• Potential carcinogenic materials can be released when degrades	Found in floor and surface cleaners	0-0.1	0-0.2	<1
Preservatives	Most frequently identified were phenoxyethanol, methylparaben, sodium benzoate, propylparaben and methylchloroisothiazolinone /methylisothiazolinone	Used to control bacterial spoilage	Constituent of most liquid cleaners and some dry products	• As with biocides and disinfectants, preservatives must be approved under the Biocidal Products Directive	Found in all cleaners – surface, floor, window and sanitary	<0.5	<1	<0.5
Solvents e.g. glycol ether, ethanol, Isopropyl alcohol	Includes alcohols	Degreasers Used as solvents to help remove oils, fats and grease	Constituent of detergent degreasers	• Adverse health effects from VOCs	Glass cleaning		5-20	

3.1.2 Accessories and supplies common to all types of cleaning (general supplies)

The main types of supplies and accessories used within cleaning services are listed in Table 24. These include protective clothing and gloves, cleaning rags and packaging. Many of these items are disposed of after single use, but certain items are reusable or recyclable, which could reduce the overall environmental impact.

There are a number of environmental aspects to consider for cleaning equipment and supplies, these are:

- Consumption of raw materials in the production of the products.
- Consumption of materials and consumables in use (e.g. microfibre textiles allow the user to minimise use of water and detergents)
- Washing (e.g. cloths).
- Packaging impacts.
- End of life of the product.

Table 24 Summary of common cleaning supplies and equipment for general cleaning (ADEME, 2010)

Classification	Description	Properties and function	Materials	Typical weight	Lifetime and End of Life
General cleaning supplies and accessories	Reusable gloves	Strong material for reuse	Acrylic	100g	Multiple use; disposal
	Disposable gloves	Lightweight	Latex	20g	Single use; disposal
	Microfibre products (mops, clothes etc.)	Chemical resistance, anti-static effect, dry efficiency	Polyester fibres (80%) Polyamide fibres (20%)	60g	300 washes are possible for durable types
	Cloth rags (not microfibre)	Used for cleaning (sanitary, surface)	Cotton, polyester, polymide	30g	Multiple use; disposal
	Paper towels	Cleaning vertical surfaces	Plain paper	2.4g	Single use; disposal
	Protective clothing/ equipment	Durability; breathable	Cotton	600g	Estimated lifetime: 2 years

Classification	Description	Properties and function	Materials	Typical weight	Lifetime and End of Life
	Rubbish bags	Used in waste collection and transportation	LDPE	84g	Single use; disposal
	Packaging	Empty cans containing cleaning products (20l)	HDPE	1kg	Reusable/recyclable
	Sprayer bottle	Holds 750ml of cleaning product	HDPE	33g	Reusable/recyclable

3.1.3 Cleaning service tasks: duration and average product consumption

3.1.3.1 Regular tasks for cleaning

Cleaning of commercial or public buildings, including offices, generally takes place on a daily basis; though certain tasks may be performed weekly. Specific tasks relevant to surface, floor, sanitary and glass cleaning are provided in the relevant sections below.

3.1.3.2 Duration of professional cleaning tasks

As a result of the level of part-time work, the average duration of work in the cleaning industry is relatively low, and is estimated to be **23 hours per week** (EFCI, 2012). In Germany, the average duration of work has decreased (from 20 to 15 hours) and in Belgium (from 21 to 19 hours), while it has increased in Spain (from 25 to 28 hours) and Finland (from 21 to 30 hours) (EFCI, 2012).

Some assumptions on average hours of work and the areas cleaned are provided (based on data from companies in France, taken from ADEME, 2010) (see Figure 14);

- Average hours of work of agent/day – 5 hours
- Average hours of work of agent/week – 25 hours
- Average hourly rate – 180 m^2/hour
- Average daily rate of cleaning- 900 m^2/day
- Weekly average rate – 4050 m^2/week
- Average rate of office cleaning – 1 m^2/min (60 m^2/hour)
- Average rate of sanitary cleaning – 1 m^2/1.5 min (40 m^2/hour)
- Average rate of corridor cleaning – 1 m^2/0.35 min (171 m^2/hour)

Cleaning services are predominantly performed outside the usual periods of occupation of the premises. This is particularly true for office cleaning, but also applies to commercial premises or buildings with public access (EFCI, 2012). On an EU-average, cleaning services are performed either early in the morning (24%) or in the late afternoon / beginning of the evening (38%).

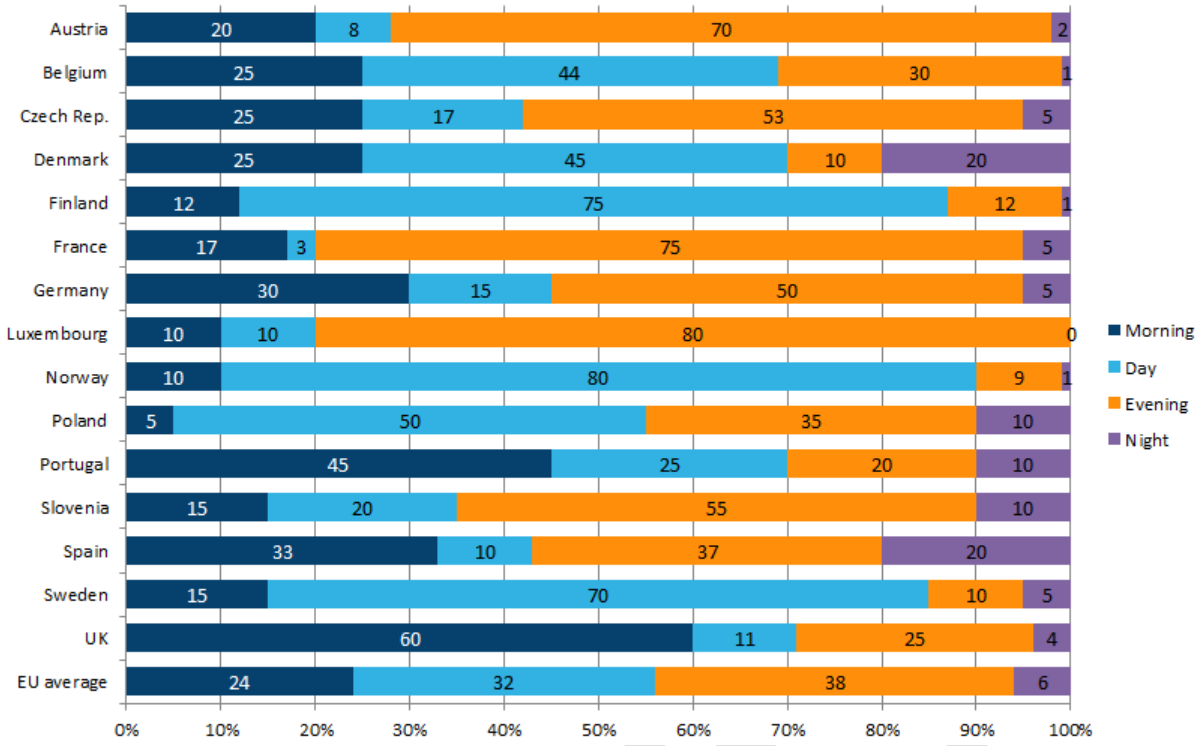


Figure 14 Cleaning period distribution by country

3.1.3.3 Consumption of cleaning products

Kapur et al. (2012) estimate the amount of cleaning products needed to clean an office space (based on the green cleaning pollution prevention calculator) are listed in

Table 25 (USEPA, 2011). These figures are based on the U.S. market and may not fully represent the European situation, but is the most robust information identified and as such has been used as a proxy for Europe. The consumption rates are based on kg/year for the cleaning of 100 000sq ft. (9 290 m^2) of office space (50% hard floor area and 50% carpeted area).

Table 25 Cleaning product consumption

Product	Kg/year
General purpose	79.5
Glass cleaner	88.1
Bathroom cleaner	109
Bleach	79.5
Total consumption	**356**

3.1.3.4 Packaging associated with cleaning products

In general, the larger the container size, the lower the percentage packaging weight per product. Ecosi (2012) provides example material declarations for different packaging formats (Table 26), used by the cleaning sector, which are applicable to I&I products. The most common packaging material used is high density polyethylene (HDPE) (Kapur et al., 2012; ADEME, 2010). ADEME (2010) provides average weights and compositions of some packaging sizes.

Table 26 Packaging materials (Ecosi, 2012; ADEME, 2010)

Pack size	Actual weight (ADEME, 2010)	Composition % (Ecosi 2012)			
		Mixture	Plastics	Cardboard	Wood
0.75L	33g	85	6.9	3.4	4.6
1L	---	87.7	6	2.6	3.7
10L	---	92	4.8	---	3.2
20L	1 kg	91.3	4.7	---	4
50L	---	90.7	4.6	---	4.7
200L	---	91.3	3.9	---	4.8

3.1.4 Technical analysis of cleaning service operations: floor cleaning

3.1.4.1 Key characteristics

Floor cleaning includes daily and weekly cleaning in commercial and public spaces using either dry or wet methods. Manual or mechanised equipment is used and is dependent on the scale of operation. Routine floor cleaning activities, per type of floor, are detailed below.

Hard floors:

- Vacuuming
- Washing (manual and mechanic)

Carpets:

- Vacuuming

The non-routine floor cleaning tasks, per type of floor that are detailed below. They make use of more specialised products.

Hard floor:

- Scraping of persistent dirt

Carpets:

- Spray extraction (mechanical carpet cleaning that sprays water into the carpet, and simultaneously vacuums the used solution back again to free embedded soiling and particles)
- Scrubbing for stain and soil removal
- Wet shampoo cleaning

In the product scope report (Chapter 1), carpet cleaning was indicated as falling under specialised cleaning. However, more recent evidence suggests that this activity may be considered a routine cleaning service activity and could be considered as a cleaning floor operation in this study. This will be discussed further with stakeholders.

3.1.4.2 Chemicals used in floor cleaning

General purpose cleaners are the regularly used for daily floor cleaning, and consist mainly of water and surfactants but can also contain anti-corrosion agents, dyes and fragrances. All-purpose cleaners for floors are alkaline detergents made up mainly of surfactants. Table 27 shows the typical cleaners used for regular floor cleaning and the main chemical constituents.

Table 27 Example chemical products for floor cleaning (% chemical by weight) (CSES and Oxford Research, 2012; A.I.S.E. / Cefic, 2009)

Routine floor cleaning products	Floor type	Composition (%)
General purpose cleaners	Hard floor	Anionic surfactants (1-10%) Ionic surfactants (1-10%) Soaps (1-5%) Citric acid (1-10%) Polycarboxylates (0-2%) Colourants (0-0.1%) Fragrances (<1%) Hydrotypes (0-0.5%) Preservatives (<0.5%) Alkalinity sources (0-10%) Water (balance to 100%)
Floor cleaners	Hard floor	Anionic surfactants (1-10%) Ionic surfactants (1-10%) Soaps (1-5%) Citric Acid (1-10%) Polycarboxylates (0-2%) Colourants (0-0.1%) Fragrance (<1%) Hydrotypes (0-0.5%) Preservatives (<0.5%) Alkalinity sources (0-10%) Water (balance to 100%)

For specialised floor cleaning products, potent degreasers and acidic detergents which act as descalers, may be used. Floor strippers can also be used to completely remove persistent soil and debris on hard floors. They are ammoniacal surfactant preparations containing glycol ethers (solvents). Table 28 lists specialised floor cleaning products.

The removal of stubborn, oily dirt requires specialised floor cleaning products (Ullmann's, 2012b). Wet processes and dry processes can be used, depending on whether the dirt has been removed immediately along with the cleansing solution (wet process) or after the carpet has been allowed to dry (dry process). The dry processes are further subdivided into shampooing and powder cleaning, whereas the wet process is known as spray extraction or steam cleaning. Shampooing is accomplished by applying a dilute water solution of carpet cleaner directly to the surface. Typically, a machine containing rotating brushes is used, which ensures the production of heavy foam which is worked into the carpet. Excess foam is removed. After the carpet dries (which may require several days), the shampoo residue is removed by vacuuming (Ullmann's, 2012b).

Table 28 Example of specialised floor cleaning products (Ecosi, 2012; Ullman's, 2012a and 2012b; Kapur, 2012)

Specialised floor cleaning products	Floor type	Composition (%)
Detergent descaler (floors)	Hard floor	Anionic surfactant Citric acid
Floor strippers	Hard floor	Surfactant (2-10) Ammonia (1-3) Phosphate (2-8) Glycol ether (5-20) Perfume in a water solution
Shampoo	Carpet	Surfactant (5-20) Polymer (2-8) Sequestering agent (0-2) Solvent (0-20) Perfume (present) Preservative (present)
Spray extraction cleaner	Carpet	Surfactant (2-30) Sequestering agent (2-30) Preservative (present)
Cleaning powder	Carpet	Surfactant (1-10) Solvent (0-25) Carrier material (15-60) Perfume (present) Preservative (present)

3.1.4.3 Equipment and supplies for floor cleaning

Most mechanised equipment used in by the cleaning services sector is used for cleaning floors. This includes vacuums for s, power sweepers, automatic scrubbers and floor polishers. Common manual cleaning equipment and supplies includes mops and brushes. A variety of trolleys, buckets and 'supporting' equipment is also used. A detailed list of floor cleaning equipment is provided in

Table 29. Specific data on the average composition of vacuum cleaners is provided in Table 30.

Table 29 Example equipment for floor cleaning (Cleanlink, 2010; ADEME, 2010)

Classification	Description	Properties/ functions	Materials	Weight (kg)*	Energy use*
Powered equipment	Commercial upright vacuum cleaners	Dry suction	Electric motor; bulk plastics can form up to 50% of the weight of the average vacuum cleaner. Other important materials include ferro- and non-ferro metals. Other materials are mixed (see Table 30)	11kg (European Commission, 2009b)	1100W (European Commission, 2009b)
	Carpet extractors	Remove dirt from carpet spraying a mild detergent into the carpet and vacuuming waste water		16kg (Numatic 2014a)	1200W (Numatic 2014a)
	Rotary floor machines	Removal of persistent dirt		26kg (Numatic 2014b)	1000W (Numatic 2014b)
	Wet pick-up machines	Wet and dry suction		9.5kg (Viking-direct.co.uk, 2014)	1380W (Viking-direct.co.uk, 2014)
Floor cleaning supplies and accessories	Floor pads	Floor pads with different aggressiveness serve different functions, from scrubbing to burnishing	Abrasives, resins and fibres	N/A	N/A
	Wet mops (all types, except microfibre)	Wet cleaning of floors; soaking up liquids	Coarse strings or yarn, cloths, sponges, plastic	N/A	N/A
	Bucket	15l for holding water and detergent solutions; used with mop	Polypropylene	0.6kg	N/A

Classification	Description	Properties/ functions	Materials	Weight (kg)*	Energy use*
	Trolleys – large	Strong frame, corrosion resistant, easy to clean	Polypropylene (80%) Aluminium (20%)	10kg	N/A
	Trolleys – small	Strong frame, corrosion resistant, easy to clean	Polypropylene (80%) Aluminium (20%)	5kg	
	Metal trolley	Strong frame, corrosion resistant, easy to clean, durable	Chrome steel	N/A	
	Brooms	Dry sweeping	Wood/plastic, vegetable fibres	Wood/plastic – 800g; fibres – 50g	
	Brooms	Wet sweeping	Aluminium shaft – metal frame, textile fringe (polyester or cotton)		
	Brush	Scrubber brush	Body Polypropylene (80%); polymide hair (20%)	1kg	
	Plastic shovel	Dry sweeping	Polypropylene	100g	
	Plastic brush	Dry sweeping	Body Polypropylene (80%); PVC hair (20%)	160g	
	Vacuum bag	9l	Paper/ cardboard/ rubber	61g	

*N/A - Not available.

An ecodesign study on vacuum cleaners (European Commission, 2009b) provides detailed material consumption information for two main types of commercial vacuum cleaners:

- **Canister** - A cleaner with the cleaning head separated from the vacuum generator (fan) and soil storage facility, usually by means of a flexible hose. The dirt is normally removed using suction power only. This type of cleaner is better suited to cleaning above floor level e.g. upholstery and stairs. It may however, also be used for cleaning carpets and floors.

- **Upright** - A cleaner with the cleaning head forming an integral part of or permanently connected to the cleaner housing, the cleaning head normally being provided with an agitation device to assist dirt removal and the complete cleaner being moved over the surface to be cleaned by means of an integral handle. It is suited to cleaning carpet and floor areas.

Canister and upright vacuum cleaners can be grouped into two main types (EUnited, 2013):

- Dry vacuum cleaners – dirt removal for hard floors and carpets.
- Upright brush-type vacuum cleaners - remove difficult dirt from carpet fibres.

Table 30 Average material compositions of vacuum cleaner types (European Commission, 2009b)

Materials	Unit	Commercial canister	Commercial upright
Bulk plastics	g	5.9kg	5kg
TecPlastics	g	0g	1.49kg
Ferro metal	g	1.45kg	1.31kg
Non-ferro metal	g	2.25kg	711g
Coating	g	0g	0g
Electronics	g	0g	20g
Miscellaneous	g	1.59kg	2.07kg
Total weight	g	11.17kg	10.60kg

3.1.4.4 Case examples for manual and mechanised floor cleaning

As floor cleaning methods can be so varied, a number of scenarios are illustrated below, including chemical, dilution and machinery energy use. These are predominantly for hard floors.

Table 31 Scenarios for floor cleaning (ADEME, 2010)

		Mechanised cleaning		
Cleaning type	**Manual floor cleaning**	**Floor washing**	**Scrubbing**	**Vacuuming**
Objective	Remove loose dirt, stains, marks on hard or soft floors (thermoplastics, PVC, tile etc.)	Remove by mechanical action (brushing) combined with chemical action (detergent)	Remove loose dirt	Retrieve loose dust or liquid from hard floors and carpets
Cleaning products used	Neutral (alkali) all-purpose detergent diluted with water	All purpose detergent or detergent-disinfectant for sanitary areas	Acid detergent	*N/A*
Normalisation unit	Floor cleaning for 1 m^2			
Ratio chemical to water	1:50-200 (Futures-supplies.co.uk, 2014)	1:50-200 (Futures-supplies.co.uk, 2014)	*N/A*	*N/A*
Chemical use	0.5-2ml	1-10ml	*N/A*	*N/A*
Water use	100ml	200-500ml	*N/A*	*N/A*
Energy use	Energy to heat water	*Not applicable*	Est. 66Wh (Nilfisk, 2010)	26Wh (ERM, 2007)
Packaging materials	0.1-0.2g (based on 20l single use HDPE can)	0.2-1g (based on 20l single use HDPE can)	Negligible	Negligible when normalised to cleaning of 1m^2 floor (600g for a upright vacuum cleaner, accounts for about 10-20% of the weight)
Wastewater	0.7 kg Assumed all product ingredients and water are disposed down drain	Assumed all product ingredients and water are disposed down the drain; except where machinery recycles water	Assumed all product ingredients and water are disposed down the drain; except where machinery recycles water	*N/A*
Equipment	Cotton/ Polyethylene (PE) mop head, flat wash brush, fringes, trolley: durable product – per m^2 impact negligible Vinyl gloves: 100g Garbage bag: 84g	Low speed rotary floor machine or auto scrubber, disc or brush, truck wash brush flat mop, fringes, possibly mixed vacuum	Low speed buffing machine, black disk or hard brush, mixed vacuum, broom, flat brush	Vacuum cleaner, brush vacuum
Lighting	461 Wh	461 Wh (assume the same as manual cleaning)		
Transport	20.5 pkm	20.5 pkm (assume the same as manual cleaning)		

3.1.5 Technical analysis of cleaning service operations: sanitary cleaning

3.1.5.1 Key characteristics

Sanitary facilities, such as communal bathrooms, get dirty very quickly and general cleaning occurs on a daily basis (weekdays in a commercial office). Maintaining the cleanliness of sanitary facilities poses some specific cleaning challenges, including:

- Diversity of surfaces to clean, such as porcelain fixtures, stoneware or synthetic resin, metal chrome fittings, tiled floors and walls.
- Risk of microbiological contamination for users and cleaning machines.
- Lime scale due to water hardness.

The following are routine sanitary cleaning activities for a commercial property (ADEME, 2010):

With a detergent-sanitiser the cleaner will, on a daily basis (weekdays):

- Empty rubbish and sanitary bins.
- Cleaning vertical surfaces, points of contacts and distributors.
- Cleaning sinks, bathtubs, shower trays and shower heads.
- Cleaning the outer surface of toilets with cloths or wipes, and the inside of the bowl with a brush.
- Washing the floor (mainly manual cleaning with a mop).

Regular weekly tasks include:

- Descaling toilet bowls, sinks, urinals and shower trays.
- Thorough cleaning of wall tiles.
- Wiping radiators, convectors and chrome surfaces.
  Lime scale removal.

3.1.5.2 Chemicals used in sanitary cleaning products

Most routine sanitary cleaning products are detergents used for the removal, including scouring, of dirt and deposits in sanitary facilities, and may also contain descalers. Liquid and powder toilet cleaners, and alkaline products containing bleach (hypochlorite) are also commonly used. Toilet cleaners are used to remove calcium and rust deposits from porcelain surfaces - acidic preparations are effective agents for this purpose. Products containing bleach (hypochlorite) are often used for cleaning toilet bowls even though they are not able to remove calcium deposits (Ullmann's, 2012b). Bleach is now banned in many European countries due to its impact on health/respiration and the danger it poses when mixed with other chemicals. Table 32 provides details of the average composition of different types of sanitary products.

Table 32 Example chemicals in sanitary cleaning products (A.I.S.E. / Cefic, 2009)

Routine sanitary cleaner	Composition (%)
Liquid toilet bowl cleaners	Anionic surfactants (5-20%) Ionic surfactants (5-20%) Citrates (0-5%) Polycarboxylates (1-5%) Fragrance (0-5%) Colourants (<1%) Preservatives (<0.5%) Phosphonates (0-5%) Water (balance to 100%)
Solid toilet bowl cleaners	Anionic surfactants (15-30%) Ionic surfactants (15-30%) Soaps (1-5%) Citric acid (5-15%) Citrates (0-5%) Sodium Sulphate (0-60%) Fragrance (0-5%) Colourants (<1%) Preservatives (<0.5%) Phosphonates (0-5%) Water (balance to 100%)
Acidic toilet bowl cleaners	Anionic and ionic surfactants (1-10%) Citric acid, hydrochloric acid, sulfamic acid (10-15%) Fragrance (<1%) Colourants (<1%) Water (balance to 100%)
Toilet bowl cleaners (thick bleach)	Anionic surfactants (1-2%) Ionic surfactants (1-2%) Soaps (1-2%) Fragrance (<1%) Colourants (<1%) Chlorine-based bleaching agents (1-5%) Viscosity controlling agents (<1%) Water (balance to 100%)
Toilet cleaners - with limescale removal function (Toilet cleaner with descaling function is consider within the scope of the all-purpose cleaners EU-Ecolabel)	Anionic surfactants (0-10%) Ionic surfactants (0-10%) Formic acid, phosphoric acid, sulfamic acid (5-15%) Polycarboxylates (0-2%) Fragrance (0.1-2%) Colourants (0-0.02%) Preservatives (<0.5%) Phosphonates (1-5%) Water (balance to 100%)

3.1.5.3 Sanitary cleaning equipment and supplies

Cloths, paper towels and cleaning gloves are often used for sanitary cleaning. Most activities are undertaken manually, but mechanised equipment when larger scale cleaning is required. Table 33 provides an overview of equipment and supplies used in sanitary cleaning.

Table 33 Example equipment and supplies for sanitary cleaning (Sources: ADEME, 2010)

Classification	Description	Properties /function	Materials	Weight (kg)
Power equipment	Restroom cleaning machines (including pressure washers)	Soil removal by high pressure spraying and vacuuming	Electric motor; bulk plastics	Variable (e.g. restroom cleaning machine 55kg with accessories (Kaivac, 2014))
Equipment and supplies for sanitary cleaning	Waste handling equipment (carts/receptacles)	Waste handling	Bulk plastics and/or metal	Variable (e.g. a plastic 50l large swing top bin weighs 1.43 kg (Amazon, 2014))
	Towels/facial tissue/toilet tissue	Drying surfaces / wastewater removal	Paper	2.4g/paper towel
	Sponges and scouring pads	Carry cleaning solution and a tool for scrubbing surfaces to remove soil	Sponge: cellulose wood fibres or foamed plastic polymers (polyester and PVA); scouring pad: synthetic fibre	24g

3.1.5.4 Case study example for sanitary cleaning

A case example is included below for sanitary cleaning, including chemical use and dilution.

Table 34 Case example for sanitary cleaning (ADEME, 2010)

Cleaning type	Washroom cleaning
Objective	Clean and disinfect floors, sinks and toilet areas
Cleaning products used	General purpose detergent containing disinfectant
Normalisation unit	Washroom cleaning – e.g. for 1m² of floor area
Ratio chemical to water	For toilet bowl – undiluted For floors and walls - 1:50 (Futures-supplies.co.uk, 2014)
Chemical use	2ml
Water	Hot water 100ml (Multiple selected LCA studies, such as ADEME (2010), Kapur et al. (2012) and APC EU Ecolabel study (2014), have suggested that hot water is used for diluting concentrated cleaning products.),
Wastewater	Assumed all product ingredients and water are disposed down toilet
Packaging materials	5g/L of product (based on 20L HDPE can)
Equipment	Mop, bucket, cloth, tissue

In addition, descaler sprays are used for removing lime scale (undiluted, manual with cloth). Toilet paper and paper towels are replenished along with hand soaps and sanitisers. Despite the fact that there is no clear recommendation for this, the data indicates that where a diluted solution is used, the dilution rate could be 1:50 (Futures Supplies, 2014).

3.1.6 Technical analysis of cleaning service operations: window/glass cleaning

3.1.6.1 Key characteristics

Internal window and glass cleaning includes regular cleaning of internal glass areas (excluding external windows, which not in scope). The service is likely to be manual rather than mechanised.

3.1.6.2 Window/Glass cleaning products

All-purpose and window cleaners are used in routine glass and window cleaning. Window cleaners are used without dilution. Both types of cleaners are considered by the all-purpose cleaners and sanitary cleaner EU Ecolabel.

Specialised glass and window cleaners include detergent descalers and degreasing agents. Window cleaners must not leave residue on glass surfaces and as such products are composed almost exclusively of liquid with small amounts of surfactants. Two types of window cleaners are available – those in a plastic bottle equipped with a sprayer or spray pump and are ready to use, and concentrate, which must be diluted with water before use. The compositions of the two types of window cleaners are shown in Table 35. In addition, more generic all-purpose cleaners are sometimes used.

Table 35 Example chemicals used in windows/glass cleaning (Ecosi, 2012; European Commission, 2009a; Ullmann's, 2012a and 2012b; A.I.S.E. / Cefic, 2009)

Routine glass/window cleaners	Composition (%)
General purpose cleaners	Anionic surfactants (1-10%) Ionic surfactants (1-10%) Soaps (1-5%) Ethylene glycol butyl ether (0-5%) Alkylphenol ethoxylates (5-15%) Citric acid (1-10%) Polycarboxylates (0-2%) Sodium carbonate (1-10%) Sodium hydroxide (0-5%) Fragrance (<1%) Colourants (0-0.1%) Preservatives (<0.5%) Water (balance to 100%)
Window cleaner	Anionic and ionic surfactants (0-1%) Alkylphenol ethoxylates (APEs) (2%) Alkali bases e.g. ammonium hydroxide (0-11%) Fragrance (<1%) Colourants (0-0.2%) Preservatives (<1%) Solvents e.g. glycol ether, ethanol, isopropyl alcohol (5-20%)
Window washing concentrate	Solvents: ethanol, isopropyl alcohol (0-10%) Ammonium hydroxide (0-1) Surfactants (0.1-0.2) Colourants (0-0.2%) Fragrances (<1%)

3.1.6.3 Glass cleaning accessories and supplies

Cloths are the most common supply used for cleaning windows/glass and is carried out manually. Table 36 provides a summary of the supplies used (for detailed information of these products see Table 24).

Table 36 Key accessories and supplies for glass cleaning (manual) (Cleanlink, 2010; ADEME, 2010)

Classification	Product name
Glass cleaning supplies and accessories	Reusable gloves
	Disposable gloves
	Water buckets
	Microfibre products (mops, clothes, etc.)
	Non-microfibre products (cloth rags, paper towels, etc.)
	Sprayer bottle

3.1.6.4 Case study example for window/glass cleaning

Table 37 provides a case example for window/glass cleaning required for $1m^2$.

Table 37 Case example for window/glass cleaning (European Commission, 2012, ADEME 2010, Kapur et al., 2012, APC Ecolabel study (2014) and Ullman's (2012b))

Cleaning type	Glass cleaning
Objective	To dissolve, soften and loosen dirt adhering to glass
Cleaning products used	Glass cleaner alcohol, but often a neutral liquid detergent diluted in water. Sprays are used undiluted; they are sprayed onto the surface and wiped clean with a cloth
Normalisation unit	$1m^2$
Ratio chemical to water when diluted	1:8 (Kapur et al.,2012)
Chemical use	No information
Water use	No information
Wastewater	Assumed the product constituents disperse in the indoor air environment and/or adhere to the paper towels used for cleaning (Koehler & Wildbolz, 2009.)
Packaging materials	33g per 750ml bottle
Equipment and supplies	Wide bucket: durable product – per m2 impact negligible Microfibre cloths can be used without the need for chemicals, or combined with a plant-based (ecolabelled) chemical Cotton cloths: 38g Vinyl gloves: 100g Rubbish bag: 84g
Lighting	461 Wh
Transport	20.5 pkm

3.1.7 Technical analysis of cleaning service operations: surface cleaning

3.1.7.1 Key characteristics

The cleaning activities that take place in an office do not generate heavy soiling. However, dust can accumulate quickly on work surfaces. This dust is both unsightly, detrimental to the health of people who work in offices and a source of possible disturbance in the functioning of computers (ADEME, 2010). Typical surface cleaning tasks include (ADEME, 2010):

Regular (daily) tasks:

- Dusting and washing (wet wipe) surfaces and furniture.
- Maintenance of office and communication equipment.
- Cleaning of contact points: handles, switches and phones.

Weekly tasks:

- Wash waste bins if necessary.
- Wiping windowsills.
- Dusting of table legs and chairs.

No non-regular surface cleaning tasks were identified. Stakeholder consultation should help identify any further surface cleaning activities in the project scope.

Surface cleaning methods usually involve wet wiping and washing, using:

- A mop and bucket containing a detergent solution.
- Sweeping with a broom and/or pan and brush, or
- Spraying a solution and wiping with a cloth.

3.1.7.2 Chemicals used in surface cleaning

Most chemicals required for surface cleaning are found in all-purpose cleaners. Detergents consist mainly of water, basic salts and surfactants but also sometimes anti-corrosion agents, dyes and fragrances. Table 38 shows the typical types of cleaners used for surface cleaning and their main chemical constituents.

Table 38 Example chemical products for surface cleaning (European Commission, 2009a; Cleanright, 2014; Kapur, 2012)

Surface care products	Composition (%)
General purpose cleaners	Anionic surfactants (1-10%) Ionic surfactants (1-10%) Soaps (1-5%) Ethylene glycol butyl ether (0-5%) Alkylphenol ethoxylates (5-15%) Citric acid (1-10%) Polycarboxylates (0-2%) Sodium carbonates (1-10%) Sodium hydroxide (0-5%) Fragrance (<1%) Colourants (0-0.1%) Preservatives (<0.5%) Water (balance to 100%)-

3.1.7.3 Equipment and supplies specific to surface cleaning

Cleaning equipment used for cleaning surfaces is normally undertaken manually, using e.g. cloths, dusters and wipes (Table 39). Single use supplies, such as wipes, have high raw material and end-of-life impacts due to their short product lifecycle. These products are often not recycled and are mainly incinerated or disposed to landfill. The proportion of landfill disposal varies significantly between countries (ERM, 2007).

Table 39 Example supplies for surface cleaning (Cleanlink, 2010; ADEME, 2010)

Classification	Equipment	Properties and function	Materials	Weight (kg)	Waste/End of life
Cleaning supplies and accessories for surface cleaning	Dusters and mops	Removing dust from different types of surfaces	Different types of plastic (e.g. polypropylene for duster head); fibres (dust mop head)	Duster – 100g Dust mop - 500g	Multiple use; disposal
	Disposable wipes	Cleaning furniture and vertical surfaces	Polyester fibre (50%) Viscose fibre (50%)	5.7g	Single use; disposal

3.2 Environmental analysis of cleaning services

The main requirement of the EU Ecolabel is that criteria should be based on scientific evidence and should focus on the most significant environmental impacts during the whole life cycle. The purpose of this report is to respond to this requirement by using the best available scientific evidence to identify the environmental impacts (hotspots) in the life cycle of cleaning services.

3.2.1 Overview of Life Cycle Assessment studies on Cleaning Services

As the first step, relevant Life Cycle Assessment (LCA) and improvement potential for cleaning services literature was identified and reviewed for the robustness (e.g. methodology, data quality and age) and compliance with the ISO standards for life cycle assessments (ISO 14040 and 14044).

This section presents an overview of these existing LCA studies, together with an initial screening and categorisation according to the following criteria:

- **Subject of the studies:** The analysed products should have representative features of the cleaning services product group, sub-categories, technologies or specifications.
- **Time-related coverage of data:** This refers to the year the inventory data for analysis is based on; studies should ideally be less than 4 years old.
- **Comprehensiveness and robustness:** Which environmental impacts are considered in the study? Impact categories should be comprehensive, ideally reflecting the European Commission's Product Environmental Footprint (PEF) or recognised LCA methodologies, and scientifically robust when considered against the evaluation provided in the JRC's ILCD Handbook. Studies should also be cradle-to-grave.
- **Reliability:** Information on data quality and studies should ideally be subject to an external critical review. Detailed information on data sources and data quality requirements are described in Section 3.2.4.6.

Table 40 provides an overview of the cleaning services LCA screening results, including product sub-categories, which will inform criteria development for the cleaning services EU Ecolabel. In total, eight studies were reviewed. They either focus cleaning service impacts as a whole and regard identical or similar services to those considered in the project scope (floor, glass/window, sanitary, surface cleaning) or focus on specific aspects of cleaning services such as products used for cleaning.

The followings Product Category Rules (PCR) are relevant to cleaning services, and were also considered:

- Assessment of the environmental performance of cleaning services.
- Assessment of the environmental performance of cleaning inox trolleys.

- Assessment of the environmental performance of floor cloths, dusters and similar cleaning cloths.

Two Environment Product Declarations (EPDs) associated with these PCRs were reviewed to sense check the quality of LCA studies:

- These are Ecosi (2012) – detergents and washing preparations, and
- Consorzio Soligena (2011) – cleaning inox trolleys PCR.

The PCR for floor-cloths, dusters and similar cleaning cloths has no related EPDs.

Table 40 Overview of selected LCA studies related to cleaning services

Product sub-category	Source	Title/subject	Functional unit	System boundary	Time related coverage	Study type	Impact assessment	Reliability		Results
								Data quality	External critical review?	Impact hotspot summary
Cleaning of buildings	ADEME (2010)	"Eco-design cleaning service tertiary environment and health for the creation of an Ecolabel": Synthesis of the study and recommendations for the exploitation of results	In the tertiary sector: Corridors: Keep 1m^2 clean for a year, Offices: Keep 1m^2 clean for a year, and Bathrooms: Keep 1m^2 clean for a year	Cradle to grave	2008-2010	LCA	CML 2001, IPCC, WMO, LCI data (Ecoinvent 2) & Cumulative Energy Demand	Completeness and representativeness	Internal working group review	Recurring hotspots: Waste; Floor cleaning (dust); and Floor (manual) & toilet cleaning.
Cleaning of buildings	Kapur et al. (2012)	Comparative life cycle assessment of conventional and Green Seal-compliant industrial and institutional cleaning products	Annual cleaning of 100,000 ft2 of office space	Cradle-to-grave	2003-2012	LCA	ReCiPe 2008 Midpoint (hierarchist perspective) impact assessment methodology	Short description	Critical review and peer review pre-publication	Conventional products were the most dominant impacts across 13 indicators, Green Seal-compliant products were dominant across 5 indicators of which, conventional product hotspots: Packaging and distribution. Green Seal-compliant product hotspots: Product formula.
Cleaning equipment	Consorzio Soligena (2011)	Environmental Product Declaration for Cleaning Services: Microrapid System	Hospital: 1m2 kept cleaned for a period of 1 year	Cradle to grave	2009	EPD	Compliance with the General Programme instructions for EPD, by PCR 2011:03, by ISO 14025 and ISO 14040 standards	Short description	PCR review; Independent verification of the declaration and data according to ISO 14025: External Third party verifier	Energy consumption of machines, water consumption and other consumables (chemicals and cloths), waste of consumables

Product sub-category	Source	Title/subject	Functional unit	System boundary	Time related coverage	Study type	Impact assessment	Reliability		Results
								Data quality	External critical review?	Impact hotspot summary
I&I cleaning products	Ecosi (2012)	EPD for Detergents and cleaning products of Ècosì	1kg of detergent (liquid) packed	Cradle to grave	2011	EPD	Environmental Product Declarations, version 1.0, 2008-02-29; IPCC - Intergovernmental Panel on Climate Change - 2007 v.1.02; LCA: ISO 14040:2006 and14044:2006; Product Category Rules PCR 2011:10 "Detergents and washing preparations" version 1.0, UN CPCCode 35322 dated 2011-08-30.	Short description	PCR review Independent verification of the declaration and data according to ISO 14025: External Third party verifier; Accreditation	General trend of upstream (ingredients) impacts greatest across all 5 indicators. Core and downstream vary between mid- and least impact stages.
I&I cleaning products	AISE (2014)	ASP substantiation dossier: Professional building care products (dilutable interior, floor, glass and sanitary cleaners)	Not specified	Cradle to grave	Not specified	LCA	CML 1992 baseline method	Not specified	The industry experts, represented in the ASP Task Force, confirmed for the professional building care sector the relevance of a Life Cycle Assessment study which has been carried out for household dilutable liquid formats	1. Chemical ingredients 2. Packaging material 3. Wastewater

Product sub-category	Source	Title/subject	Functional unit	System boundary	Time related coverage	Study type	Impact assessment	Reliability		Results
								Data quality	External critical review?	Impact hotspot summary
I&I cleaning products	Koehler & Wildbolz (2009)	Comparing the Environmental Footprints of Home-Care and Personal-Hygiene Products: The Relevance of Different Life-Cycle Phases	One typical application: liquid soap - one-time hand washing; toilet-care product - one-time toilet flushing; and window cleaner - cleaning a small window (area 0.12m2)	Cradle to grave	Not specified	LCA	IPCC global-warming potential (GWP) with a 100-year time frame, cumulative-energy demand (CEDfossil), Eco-indicator 99 (EI99) methodology (hierarchist perspective), USEtox model and IMPACT2002+	Not specified	Peer review for publication: Environ. Sci. Technol. 43, 8643–8651	1. Use phase 2. Production stage - chemical production, packaging production and product manufacturing Some exceptions for soap bars and toilet cleaners: Toilet: Use phase and end of life Bar: Production and use phase
I&I cleaning products	ERM (2007)	Life Cycle Assessment of Tissue Products Final Report	EUR folded toilet tissue - one year of office washroom use by 50 men and 50 women in an image conscious UK business EUR roll toilet tissue - one year of bathroom use in an average Dutch household EUR commercial wipers – 1,000 kg of absorbed kitchen spills (750kg water, 250kg oil), over the course of one year in a hygiene conscious European chain restaurant operation	Cradle to grave	2007	LCA	CML 2001 (CML spreadsheet version 2.02, September 2001)	No overall data quality ISO standard data quality requirements applied to main data sources	Critical review: according to ISO 14040 and 14044 prepared for Kimberly-Clark by Walter Klöpffer (Chair), Mary Ann Curran and Jim Bowyer December 2007	Product design and manufacture

Product sub-category	Source	Title/subject	Functional unit	System boundary	Time related coverage	Study type	Impact assessment	Reliability		Results
								Data quality	External critical review?	Impact hotspot summary
Household & I&I cleaning equipment	European Commission (2009)	Work on Preparatory Studies for Eco-Design Requirements of EuPs (II) Lot 17 Vacuum Cleaners TREN/D3/390-2006	EU vacuum cleaners for: domestic/household use and similar usage by laymen in a commercial or institutional environments such as shops, hospitals, offices and hotels for removal of settled dust on carpets and dry hard floors. Because of their specialist application it is not sensible to include industrial vacuum cleaners, for example, on construction sites or in factories.	Cradle to grave	2005	LCA	MEEUP methodology	Some assumptions provided by stakeholders; an EC Ecodesign report - assumed to be relevant and reliable	Internal working group review	Energy use, process water, GHG, acidification - use phase is the only hotspot Non-hazardous waste – production and use phase are both hotspots Hazardous waste - end-of-life Persistent organic pollutants POPs emissions, heavy metal – production, use and end-of-life Particulate matter – distribution, use and end-of-life

3.2.2 Evaluation of the comprehensiveness of the LCA studies

A thorough quality review has been conducted for each of the selected LCA studies and the results are provided in the following sections. In this section, the comprehensiveness of the selected LCAs in terms of their impact category coverage is evaluated against the European Commission's Product Environmental Footprint (PEF) methodology impact categories (see Table 41). Additional impact categories not used in the PEF are also listed. The LCA assessed cover floor, glass/windows, sanitary and surface cleaning services and provide a broader range of impact categories.

Table 41 List of impact categories covered by the reviewed LCA studies. Analysis of the alignment of these with the impact categories from the PEF method

Source	ADEME (2010)	Kapur et al. (2012)	Ecosi (2012)	Consorzio Soligena (2011)	AISE (2014)	Koehler & Wildbolz (2009)	ERM (2007)	European Commission (2009)
Product sub-category	Cleaning of buildings	I&I cleaning products	I&I cleaning products	I&I cleaning products	Professional building care products	I&I cleaning products	I&I cleaning products	Household & I&I cleaning equipment
Scope	Cleaning in tertiary sector (commercial building spaces)	General-purpose, glass, and restroom (sanitary) cleaning products	Surfaces detergent, detergent descaler (bathroom, glass, and floors), surface disinfectant (x2), detergent for hard surfaces, all purpose detergent for surfaces and glass (x2), and all-purpose detergent	Microrapid system used in hospital cleaning - hospitals are not in scope but trolley could be used elsewhere	Professional building care products (dilutable interior, floor, glass and sanitary cleaners) - relevant to product scope though based on domestic products	Four products (**toilet-care, bath, kitchen and window cleaners**) analyses with different scopes were performed for Western European conditions	Cradle-to-gate analysis was based on 1kg of commercial wipes	Cradle-to-grave analysis investigates the entire product life cycle of vacuum cleaners
Project scope alignment								
Floor cleaning	√	√	√	√	√	---	---	√
Sanitary cleaning	√	√	√	√	√	√	---	---
Surface cleaning	√	√	√	√	√	---	√	---
Window cleaning	√	√	√	√	√	√	---	---
PEF impact category alignment								
Climate Change	√	√	√	√	√	√	√	√
Ozone Depletion	√	√	√	√	√	√	√	√

Source	ADEME (2010)	Kapur et al. (2012)	Ecosi (2012)	Consorzio Soligena (2011)	AISE (2014)	Koehler & Wildbolz (2009)	ERM (2007)	European Commission (2009)
Ecotoxicity for aquatic fresh water	√	√	---	---	√	√	---	---
Human Toxicity - cancer effects	√	√	---	---	√	√	√	---
Human Toxicity – non-cancer effects	√	√	---	---	√	√	√	---
Particulate Matter / Respiratory Inorganics	---	√	---	---	---	√	---	---
Ionising Radiation – human health effects	---	√	---	---	---	√	---	---
Photochemical Ozone Formation	√	√	√	√	√	√	√	√
Acidification	√	√	√	√	√	√	√	√
Eutrophication – terrestrial	---	---	---	---	---	---	---	---
Eutrophication – aquatic	√	√	√	√	√	√	√	√
Resource Depletion – water	---	√	---	---	---	---	---	√
Resource Depletion – mineral, fossil	√	√	---	---	---	√	√	---
Land Transformation	---	√	---	---	---	---	---	---

Source	ADEME (2010)	Kapur et al. (2012)	Ecosi (2012)	Consorzio Soligena (2011)	AISE (2014)	Koehler & Wildbolz (2009)	ERM (2007)	European Commission (2009)
Other impact categories not covered by PEF	Ecotoxicity - soil, cumulative energy demand, waste stream (kg), recycled waste (kg), consumption of products with risk phrases, consumption of substances implemented with risk phrases	Terrestrial ecotoxicity, marine ecotoxicity, agricultural land occupation, urban land occupation, metal depletion, cumulative energy demand	Non-renewable and renewable resource use (material and energy), waste generation (non- hazardous waste and hazardous waste), water consumption, direct electricity consumption (during manufacturing phase)	Waste	No others	Land use	Water consumption, energy consumption and solid waste	Waste generation (hazardous and non-hazardous)

3.2.3 Selection of comprehensive LCA studies for further analysis

Key requirements for selecting LCAs for further analysis (see section 3.2.4) was that they should be recent, ideally **not more than four years old** and cover **at least 5 different impact categories** to ensure a broad focus. Furthermore, the impact categories investigated in the LCA studies should, as far as possible, be prescribed by the PEF methodology (as previously analysed in Table 41). The LCA studies had to provide **at least 5 of the same impact categories listed in the PEF guide (EC/JRC, 2012).** A further consideration of the PEF methodology for each impact category allowed for further comparison of the studies shortlisted for analysis.

3.2.3.1 LCA studies selected for further analysis

The following studies met the selection criteria. Detailed analyses, including the LCA findings, are presented in Section 3.2.4.

Cleaning services:

- **ADEME (2010)**: An LCA of cleaning services in 1) hospitals and 2) offices. Indicators developed by the Institute of Environmental Sciences (CML) at Leiden University were used. Results are differentiated by life cycle phases from cradle to grave (covering upstream, core and downstream processes as per the Product Category Rules (PCR)). The study requirements imply that all data used is reliable and representative of the cleaning services sector in France. Primary data was collected between December 2008 and September 2009. Data refers to the methods and technologies applied during cleaning activities. The primary inventory data used was retrieved from a real case situation and focus on the supplies, accessories, cleaning products and energy used. A list of 17 supplies (e.g. cloths, gloves, plastics bags, mops heads), 11 accessories (e.g. broms, mops, trolleys, buckets), cleaning products (floor, sanitary, surface and windows) and the energy and water uses within cleaning services (use phase and road transport) were collected and analysed.

Cleaning products, accessories and supplies:

- **Kapur et al. (2012):** A comparative LCA of conventional and Green-seal compliant industrial and institutional cleaning products. The scope of the study was cradle to grave, and included the energy and material resources required for the production of raw material and packaging components, use and final disposal. The ReCiPe 2008 Midpoint (hierarchist perspective) impact assessment methodology was used. General-purpose, glass and restroom (sanitary) cleaning products were assessed.
- **Ecosi (2012):** A cradle to grave EPD (environmental product declaration) study of various cleaning products used in offices and schools. The products relevant to the scope of this study include floor, surface, sanitary and window cleaning of buildings, such as: surface detergents, detergent descaler (bathroom, glass, floors), surface disinfectant (2 types), detergents for hard surfaces, all purpose detergents for surfaces and glass (2 types), and all-purpose detergents. The environmental impact analysis was completed using the

methodology defined for Environmental Product Declarations and is based on ISO 14040-44.

- **Consorzio Soligena (2011):** An EPD of the Microrapid trolley system in hospitals, which uses a trolley, and a pre-defined amount of water and cleaning detergent to cover a larger area, cutting down water use and detergents and the discharge of pollutants. Although this study applies to hospital cleaning, the results are considered transferable to general cleaning services. The results of the study focused on cradle to gate impacts (upstream and core processes only, including extraction and production of raw materials, production of electricity, transport of products to the cleaning site, use of machinery for service performance, equipment maintenance and wastewater treatment).
- **AISE (2014):** The cleaning products manufacturers association produced a dossier on professional cleaning products, based on an LCA of domestic cleaners for interior, floor, glass and sanitary cleaners. The study includes cradle to grave impacts (raw materials, packaging, transport, use and end of life).
- **Koehler & Wildbolz (2009):** A comparative LCA of home care and personal hygiene products, which is considered by AISE (AISE, 2014) as good proxies for understanding the environmental impacts of I&I cleaning products. The study is cradle to grave.
- **ERM (2007):** A cradle to grave LCA of tissue products (including toilet tissue and hand towels). These products are used in sanitary cleaning activities, and therefore useful for this study.

Cleaning equipment:

European Commission (2009b): This study investigated vacuum cleaners as part of the Eco-design Requirements of EuPs. It covered 6 types of domestic and commercial vacuum cleaners and looked at product and EU level cradle to grave impacts.

3.2.3.2 Supplementary evidence on environmental impacts

The following references did not meet the selection criteria outlined above. However, they are potentially useful for this project and are considered as supplementary evidence:

1. **Product LCA**

- **Procter & Gamble (2006)** - a cradle to grave LCA which compares a lower temperature washing liquid with previous versions of the same product in an average home clothes wash in a washing machine in France. The findings highlight the impact of product formulation and dosage in the use phase.
- **Procter & Gamble (2004)** – a cradle to grave LCA of three kitchen cleaning products: wipes, spray and liquid household cleaner in a bottle. An important driver for this study was

the increased pan-European concern related to solid waste generated by disposable household products. The functional unit was 'product use for 1 year of surface cleaning for one household (floors excluded)'. The study calculated and compared the energy, carbon, waste and total environmental (multi-metrics) footprints of the three products.

2. **Product Category Rules (PCR)** (PCR, 2014)

PCRs define the rules and requirements for Environmental Product Declarations (EPDs). Two PCRs associated with cleaning services have been used to develop an EPD (incl. LCA). These were reviewed as a secondary source to check the quality of LCA studies identified above. The following PCRs are relevant to cleaning services:

- **Assessment of the environmental performance of cleaning services** (UN CPC 853). Developed by Falpi, part of the Soligena Group – a consortium made up of qualified and recognised Italian professional cleaners, in co-operation with Ècosì. This PCR was used to develop the EPD for detergents and cleaning products (Ècosì, 2012), one of the selected LCA studies.
- **Assessment of the environmental performance of cleaning inox trolleys**, a sub-set of UN CPC 4993 (other transport equipment and parts thereof). Developed by Falpi, in co-operation with the Centre for the Development of Product Sustainability (CE.Si.S.P). EPD for cleaning services: Microrapid System (Consorzio Soligena, 2011), one of the selected LCA studies and complies with this PCR.
- **Assessment of the environmental performance of floor cloths, dusters and similar cleaning cloths** (UN CPC 2719). Developed by CE.Si.S.P. No EPD was identified using this PCR.

3.2.4 Detailed analysis of the selected LCA studies

The setting and quality of the selected LCA studies are analysed in detail below and investigate different aspects:

1. ***Base parameters of the selected studies***

The following sections provide a detailed analysis on each of the selected LCA studies.

2. ***Quality assessment of the methods***

Findings show that the number of LCA studies concerning cleaning services activities is scarce. Only one study was identified. All the other LCA studies provided environmental impact assessments of different aspects of cleaning services such as, cleaning products, accessories or supplies. By

assessing all of these studies, together with the analysis of similar ecolabelling schemes for Cleaning Services, a broader picture of the environmental hotspots for cleaning services could be determined.

The quality criteria are in line with the set of criteria imposed for a study to be selected as key supporting literature (i.e. **not more than four years old**, provide at least 5 different impact categories and **at least 5 of the same impact categories listed in the PEF guide**). However, it is decided that a quality assessment to rank the LCA studies is not adequate and meaningful due to the small number of identified studies.

3.2.4.1 Base parameters of the selected LCA studies

The following base parameters were considered:

- Goal and scope
- Functional units and system boundaries
- Cut off criteria
- Allocation
- Data quality requirements and data sources
- Impact categories and assessment methods
- Assumptions

The products investigated in each of the selected LCA studies are outlined in Table 42. The focus of the 8 selected studies ("Products/service investigated") is investigated and how the focus relates to the scope of this study has been identified (see Characterisation). ADEME (2010) is the only source that focuses on cleaning services, whereas the remaining studies look at products used as part of a cleaning service.

Table 42 Description of parameters investigated and their characterisations

Product /service	Studies	Title	Products/service investigated	Characterisation
Cleaning of buildings	ADEME (2010)	"Eco-design cleaning service tertiary environment and health for the creation of an Ecolabel": Synthesis of the study and recommendations for the exploitation of results	Cleaning in tertiary sector (commercial building spaces)	Tertiary sector includes: offices, town halls, housing associations and other commercial sites. Each site investigates: floor, surface and bathroom cleaning

Product /service	Studies	Title	Products/service investigated	Characterisation
I&I cleaning products	Kapur et al. (2012)	Comparative life cycle assessment of conventional and Green Seal-compliant industrial and institutional cleaning products	Conventional and Green Seal-compliant industrial and institutional cleaning products	General-purpose, glass and restroom cleaning products. Model products of GS-37-compliant, conventional concentrate, and conventional ready-to-use versions of each cleaning product were evaluated
I&I cleaning products	Ècosì (2012)	EPD for detergents and cleaning products of Ècosì	Detergents and cleaning products used for: offices, companies, schools, catering, food and laundry in various packing formats and sizes	Products relevant to scope: surfaces detergent, detergent descaler (bathroom, glass, floors), surface disinfectant (two types), detergent for hard surfaces, all purpose detergent for surfaces and glass (two types), and all-purpose detergent
I&I cleaning equipment	Consorzio Soligena (2011)	Environmental Product Declaration for Cleaning Services: Microrapid System	Specific cleaning services system using a trolley called the Microrapid system used in building cleaning	The system is used in hospitals but is considered a suitable proxy for trolley cleaning services in general building cleaning
Professional building care products	AISE (2014)	ASP substantiation dossier: professional building care products (dilutable interior, floor, glass and sanitary cleaners)	General professional building care cleaning products	The LCA is based on a study of a general household dilutable liquid cleaner. Industry experts, represented in the ASP TF, confirmed this was acceptable for the study scope
I&I cleaning products	Koehler & Wildbolz (2009)	Comparing the Environmental Footprints of Home-Care and Personal-Hygiene Products: The Relevance of Different Life-Cycle Phases	Liquid soap, toilet and window cleaner products. Cradle to gate and grave analyses	Products relevant to scope: toilet and window cleaner in one typical application
I&I cleaning products	ERM (2007)	Life Cycle Assessment of Tissue Products Final Report	Bathroom and kitchen tissue products	Products relevant to scope: bathroom tissue, washroom towels, facial tissue, folded and kitchen roll towels
Household & I&I cleaning equipment	European Commission (2009)	Work on Preparatory Studies for Eco-Design Requirements of EuPs (II) Lot 17 Vacuum Cleaners TREN/D3/390-2006	Domestic and commercial vacuum cleaners	Lifecycle impact (per product) - 2005 annual data - 8 year life; 6 product types: Canister - domestic Canister - commercial Upright - domestic Upright - commercial Battery - cordless

3.2.4.2 Goal and scope

The goal and scope of the selected studies are described in Table 43. The selected LCA studies had to be based on the ISO standards for life cycle assessment (ISO 14040 and 14044), which takes into account the environmental impacts of products and services from cradle to grave. All of the selected LCA studies have cradle to grave coverage of lifecycle impacts i.e. from raw material extraction to end of life. Aspects covered by the scope, i.e. the boundaries of the studies, vary significantly between studies.

Table 43 Goal and scope of the studies

Product /service	Studies	Title	Goal	Scope	Study type
Cleaning of buildings	ADEME (2010)	"Eco-design cleaning service tertiary environment and health for the creation of an Ecolabel": Synthesis of the study and recommendations for the exploitation of results	Achieve a study of cleaning services used in the tertiary sector to identify good environmental practices that subsequently use relevant criteria for the creation of an ecolabel cleaning services	A traditional LCA from cradle to grave	LCA
I&I cleaning products	Kapur et al. (2012)	Comparative life cycle assessment of conventional and Green Seal-compliant industrial and institutional cleaning products	Compare the environmental impacts of I&I cleaning products that are compliant with the Green Seal standard with conventional products	A traditional LCA from cradle to grave	LCA (comparative analysis)
I&I cleaning products	Ècosì (2012)	EPD for detergents and cleaning products of Ècosì	Assess environmental impacts of I&I cleaning products made by Ècosì	A streamlined LCA from cradle to grave	LCA/EPD
I&I cleaning products	Consorzio Soligena (2011)	Environmental Product Declaration for Cleaning Services: Microrapid System.	Assess environmental impacts of I&I cleaning service by Microrapid system	A streamlined LCA from cradle to grave	LCA/EPD
Professional building care products	AISE (2014)	ASP substantiation dossier: Professional building care products (dilutable interior, floor, glass and sanitary cleaners)	Assess environmental impacts of professional building care products to inform the A.I.S.E. Task Force, in charge of setting the ASP criteria for professional building care products	A traditional LCA from cradle to grave	LCA

Product /service	Studies	Title	Goal	Scope	Study type
I&I cleaning products	Koehler & Wildbolz (2009)	Comparing the Environmental Footprints of Home-Care and Personal-Hygiene Products: The Relevance of Different Life-Cycle Phases	An in-depth life-cycle assessment of nine home-care and personal-hygiene products was conducted to determine the ecological relevance of different life-cycle phases and compare the environmental profiles of products serving equal applications	A traditional LCA from cradle to grave	LCA
I&I cleaning products	ERM (2007)	Life Cycle Assessment of Tissue Products Final Report	Determine the environmental performance of tissue products manufactured by the client and the environmental trade-offs associated with the use of virgin fibres and recycled fibres in tissue products	A traditional LCA from cradle to grave	LCA
Household & I&I cleaning equipment	European Commission (2009)	Work on Preparatory Studies for Eco-Design Requirements of EuPs (II) Lot 17 Vacuum Cleaners TREN/D3/390-2006	The methodology for ecodesign was developed to allow investigating whether and which ecodesign requirements are appropriate for products under the Ecodesign Directive In accordance with Annexes 1 and 2 of the Ecodesign Directive, the methodology allows investigation of all stages of the life cycle of products, all environmental aspects as well as technical and economic issues	A streamlined LCA from cradle to grave	LCA

3.2.4.3 Functional units and system boundaries

According to ISO 14040/44, the functional unit refers to a quantified performance of a product system for use as a reference unit in LCA studies. The system boundary describes which processes are taken into account in the LCA analysis and which processes are not. The choice of functional unit is key to the LCA and focuses the entire study. However, it is important to note that some functional units are not totally clear or consistent between studies and vary significantly between selected studies, see

Table 44. The ambiguity and inconsistency of functional units between studies makes it difficult to compare the results.

Table 44 Functional units and system boundaries

Product /service	Studies	Title	Functional unit/s	System boundary
Cleaning of buildings	ADEME (2010)	"Eco-design cleaning service tertiary environment and health for the creation of an Ecolabel": Synthesis of the study and recommendations for the exploitation of results	Corridors: Keep 1m^2 clean for a year Offices: Keep 1m^2 clean for a year Bathrooms: Keep 1m^2 clean for a year	Cradle to grave
I&I cleaning products	Kapur et al. (2012)	Comparative life cycle assessment of conventional and Green Seal-compliant industrial and institutional cleaning products	Annual cleaning of 100,000 ft^2 of office space	Cradle-to-grave
I&I cleaning products	Ècosì (2012)	EPD for Detergents and cleaning products of Ècosì	1kg of detergent (liquid) packed	Cradle to grave
I&I cleaning products	Consorzio Soligena (2011)	Environmental Product Declaration for Cleaning Services: Microrapid System	1 m^2 kept cleaned in a period of 1 year	Cradle to grave
Professional building care products	AISE (2014)	ASP substantiation dossier: Professional building care products (dilutable interior, floor, glass and sanitary cleaners)	Not specified	Cradle to grave
I&I cleaning products	Koehler & Wildbolz (2009)	Comparing the Environmental Footprints of Home-Care and Personal-Hygiene Products: The Relevance of Different Life-Cycle Phases	One typical application: liquid soap - one-time hand washing; toilet-care product - one-time toilet flushing; and window cleaner - cleaning a small window (area 0.12m^2)	Cradle to grave
I&I cleaning products	ERM (2007)	Life Cycle Assessment of Tissue Products. Final Report	EUR folded toilet tissue - one year of office washroom use by 50 men and 50 women in an image conscious UK business EUR toilet roll tissue - one year of bathroom use in an average Dutch household EUR commercial wipers – 1000kg of absorbed kitchen spills (750kg water, 250kg oil) over the course of one year in a hygiene-conscious European chain restaurant operation	Cradle to grave
Household & I&I cleaning equipment	European Commission (2009)	Work on Preparatory Studies for Eco-Design Requirements of EuPs (II) Lot 17 Vacuum Cleaners TREN/D3/390-2006	Lifecycle impact (per product) - 2005 annual data - 8 year life	Cradle to grave

3.2.4.4 Cut-off criteria

According to the ISO 14040/44:2006 and the ILCD Handbook, cut-off criteria should be documented in any LCA study, the reasons should be stated and the effect of cut-off decisions on results should be estimated. The cut-off criteria for the 8 selected studies are given in

Table 45. Of the 8 studies, on 1 covered cut-off criteria and the impacts on the LCA results. This implies that the sensitivities of the elements excluded from the scope of the studies cannot be assessed or estimated.

Table 45 Cut-off criteria

Product /service	Studies	Title	Cut-off criteria	Estimation of the cut-off
Cleaning of buildings	ADEME (2010)	"Eco-design cleaning service tertiary environment and health for the creation of an Ecolabel": Synthesis of the study and recommendations for the exploitation of results.	Exclusions: Wholesale electrical equipment: Manufacturing and end of life; Staff commuting; Washing machine: Raw materials, manufacturing and distribution.	Not specified
I&I cleaning products	Kapur et al. (2012)	Comparative life cycle assessment of conventional and Green Seal-compliant industrial and institutional cleaning products	Raw materials are included in this study. No data was collected from product manufacturers on manufacturing, so production of cleaning products (i.e. mixing and making of final product) was not included in this study	This ends up being a conservative assumption which would favour conventional products as it is anticipated that there are more processing inputs (e.g. energy, water) and outputs (e.g. waste) to make the more dilute products
I&I cleaning products	Ècosì (2012)	EPD for Detergents and cleaning products of Ècosì	According to *PCR CPC CODE 35322* the building of a production site, infrastructure, production of manufacturing equipment, other capital goods and personnel activities are not included The manufacturing and the electricity of automatic dispensers (used just for some products) have been excluded	Not specified
I&I cleaning products	Consorzio Soligena (2011)	Environmental Product Declaration for Cleaning Services: Microrapid System	Transport of people and machinery was not included as they stay onsite Downstream processes in PCR have been measured in qualitative terms	Not specified
Professional building care products	AISE (2014)	ASP substantiation dossier: Professional building care products (dilutable interior, floor, glass and sanitary cleaners)	Not specified	Not specified

Product /service	Studies	Title	Cut-off criteria	Estimation of the cut-off
I&I cleaning products	Koehler & Wildbolz (2009)	Comparing the Environmental Footprints of Home-Care and Personal-Hygiene Products: The Relevance of Different Life-Cycle Phases	The production of the technical equipment itself was disregarded as it was considered of minor relevance	Not specified
I&I cleaning products	ERM (2007)	Life Cycle Assessment of Tissue Products Final Report	The manufacture, maintenance and decommissioning of capital equipment, such as buildings or machines, were not included Litter was excluded	Not specified
Household & I&I cleaning equipment	European Commissi on (2009)	Work on Preparatory Studies for Eco-Design Requirements of EuPs (II) Lot 17 Vacuum Cleaners TREN/D3/390-2006	Not specified	Not specified

3.2.4.5 Allocation

The results of our analysis show that only three of the selected studies documented any allocation rules (see Table 46). The use of allocation can alter the results of an LCA as different methods are used, but allocation is necessary when a process produces multiple outputs. It is difficult to judge whether no allocation has been conducted, or if it has not been documented. Therefore, a comprehensive conclusion on the appropriateness of allocation methods cannot be reached.

Table 46 Allocation applied

Product /service	Studies	Title	Allocation parameter
Cleaning of buildings	ADEME (2010)	"Eco-design cleaning service tertiary environment and health for the creation of an Ecolabel": Synthesis of the study and recommendations for the exploitation of results.	Allocation of cleaning services to the functional unit (1m^2) was carried out using specific formulas calculated using primary data and assumptions for: cleaning trolleys, bin bags, transportation, lighting and work wear
I&I cleaning products	Kapur et al. (2012)	Comparative life cycle assessment of conventional and Green Seal-compliant industrial and institutional cleaning products	The allocation procedures for recycling of packaging materials, as per the ISO 14044 (ISO 2006)
I&I cleaning products	Ècosì (2012)	EPD for Detergents and cleaning products of È Così	Not specified
I&I cleaning products	Consorzio Soligena (2011)	Environmental Product Declaration for Cleaning Services: Microrapid System	Not specified

Product /service	Studies	Title	Allocation parameter
Professional building care products	AISE (2014)	ASP substantiation dossier: Professional building care products (dilutable interior, floor, glass and sanitary cleaners)	Not specified
I&I cleaning products	Koehler & Wildbolz (2009)	Comparing the Environmental Footprints of Home-Care and Personal-Hygiene Products: The Relevance of Different Life-Cycle Phases	Not specified
I&I cleaning products	ERM (2007)	Life Cycle Assessment of Tissue Products Final Report	Allocations used for all multiple output processes follow the ISO 14044 (2006) and ISO 14049 (2000) for: paper recycling - number of lives before it becomes tissue paper, primary forest wood outputs, secondary forests wood outputs, primary pulp, waste paper recovery, de-inked pulp, North American tissue products, European tissue products and integrated mills water use
Household & I&I cleaning equipment	European Commission (2009)	Work on Preparatory Studies for Eco-Design Requirements of EuPs (II) Lot 17 Vacuum Cleaners TREN/D3/390-2006	Not specified

3.2.4.6 Data quality requirements and sources

The time-related, geographical, technological representativeness and data sources, including primary and secondary data of the selected LCA studies are summarised in Table 47. The screening process used study and data date, geographical source, primary and secondary data sources and type of technology the data represents. The studies have reasonable time coverage with 2005 being the earliest year data was taken from. Most studies also include or focus on Europe or a country in Europe, except Kapur et al. (2012) which focused on North America. AISE (2014) does not provide any geographical information for the data it uses. Technological data is not provided in two of the selected studies; other studies use data for current technology, which are considered to be good representations of the current cleaning practices. For data sources, most selected LCA studies use primary data, except AISE (2014) and Koehler & Wildbolz (2009). The use of primary data is considered to be sufficient. Five out of 8 studies use Ecoinvent as a secondary data source, which is a good, consistent and transparent source.

Table 47 Data quality requirements

Product	Studies	Title	Time-related representativeness	Geographical representativeness	Technological representativeness	Data sources of primary data	Data sources of secondary data
Cleaning of buildings	ADEME (2010)	"Eco-design cleaning service tertiary environment and health for the creation of an Ecolabel": Synthesis of the study and recommendations for the exploitation of results	2008-2009	France	Data refers to the methods and technologies applied by cleaning activities currently underway	Data from French cleaning services market	Ecoinvent v 2.0
I&I cleaning products	Kapur et al. (2012)	Comparative life cycle assessment of conventional and Green Seal-compliant industrial and institutional cleaning products	2003-2012	North America	Current technological mix of the products sold in the North American market	Specific data for raw materials from the products studied; manufacturing final product excluded	Ecoinvent v 2.2

Product	Studies	Title	Time-related representativeness	Geographical representativeness	Technological representativeness	Data sources of primary data	Data sources of secondary data
I&I cleaning products	Ècosì (2012)	EPD for Detergents and cleaning products of Ècosì	2011	Italy	Current mix of products used in offices, companies, schools, catering, food and laundry in various packing formats and sizes	In the core module the "specific" data are used and are collected on site In the upstream module the data are based on a supply- chain from Ècosì and are "specific" and "selected generic". For end of life treatment in the downstream module, data are based on technique scenarios Vehicle types and the distances are based on real data provided by suppliers.	Ecoinvent v 2.2

Product	Studies	Title	Time-related representativeness	Geographical representativeness	Technological representativeness	Data sources of primary data	Data sources of secondary data
I&I cleaning products	Consorzio Soligena (2011)	Environmental Product Declaration for Cleaning Services: Microrapid System	2009	Italy	The service described necessarily envisages the combination of the products, manufactured entirely in Italy (by Falpi Srl and ÈCOSÌ) Srl), the use of machinery, tools, supplies and the application of specific procedures for cleaning, sanitation, security and control, considered in the hospital G.B. Morgagni – L. Pierantoni in Forli, in which the cleaning service is performed every day	Collected on site from an Italian hospital	ELCD, Plastics Europe, IISI, EAA and Boustead Model 4.4.
Professional building care products	AISE (2014)	ASP substantiation dossier: Professional building care products (dilutable interior, floor, glass and sanitary cleaners)	Not specified	Not specified	Not specified	No primary data	Not specified
I&I cleaning products	Koehler & Wildbolz (2009)	Comparing the Environmental Footprints of Home-Care and Personal-Hygiene Products: The Relevance of Different Life-Cycle Phases	Not specified	Western European markets	Not specified	No primary data	Ecoinvent (2008), technical handbooks and literature sources describing current production technologies

Product	Studies	Title	Time-related representativeness	Geographical representativeness	Technological representativeness	Data sources of primary data	Data sources of secondary data
I&I cleaning products	ERM (2007)	Life Cycle Assessment of Tissue Products Final Report	2007	US or European market	State of the art technologies	Client suppliers and from client's own mills (financial year 2006/07)	Ecoinvent (2005)
Household & I&I cleaning equipment	European Commission (2009)	Work on Preparatory Studies for Eco-Design Requirements of EuPs (II) Lot 17 Vacuum Cleaners TREN/D3/390-2006	2005	EU 27	Vacuum cleaners: Canister domestic, canister commercial, upright domestic, upright commercial, battery/cordless	Questionnaires and workshops, manufacturers commercial data	Eurostat – PRODCOM, MTP, Mintel, National Household Budget Surveys & various websites

3.2.4.7 Impact categories and assessment methods

Table 48 shows the impact categories used (not including the specific method) in the selected 8 studies against the European Commission's Product Environmental Footprint (PEF) methodology impact categories. Additional impact categories not used in the PEF are also listed. Impact category coverage is very good for Kapur et al. (2012), Koehler & Wildbolz (2009), ADEME (2010), AISE (2014) and ERM (2007), covering over 8 impact categories. Consorzio Soligena (2011), Ècosì (2012) and European Commission (2009) have relatively narrower impact category coverage, covering only 5 to 6 impact categories. Nevertheless, they cover more than 5 of the PEF impact categories, considered to be a good approach to a wide coverage on impact categories.

Table 48 Impact categories and assessment methods

Source	Kapur et al (2012)	Koehler & Wildbolz (2009)	ADEME (2010)	AISE (2014)	ERM (2007)	Ècosì (2012)	Consorzio Soligena (2011)	European Commission (2009)
Product sub-category	I&I cleaning products	I&I cleaning products	Cleaning of buildings	Professional building care products	I&I cleaning products	I&I cleaning products	I&I cleaning products	Household & I&I cleaning equipment
Scope	General-purpose, glass, and restroom (sanitary) cleaning products	Two product analyses with different scopes were performed for Western European conditions	Cleaning in tertiary sector (commercial building spaces)	Professional building care products (dilutable interior, floor, glass and sanitary cleaners) - relevant to product scope though based on domestic products	Cradle-to-gate analysis was based on 1kg of final product	Surfaces detergent, detergent descaler (bathroom, glass, floors), surface disinfectant (x2), detergent for hard surfaces, all purpose detergent for surfaces and glass (x2), and all-purpose detergent	Specific cleaning services system called the Microrapid system used in hospital cleaning - hospitals are not in scope but trolley could be used elsewhere	Cradle-to-grave analysis investigates the entire product life cycles
Impact assessment method	ReCiPe 2008 Midpoint	IPCC global-warming	CML 2001, IPCC, WMO, LCI data	CML 1992 baseline method	CML 2001 (CML spreadsheet	Environnemental Product Declara	Compliance with the General	MEEUP methodology

Source	Kapur et al (2012)	Koehler & Wildbolz (2009)	ADEME (2010)	AISE (2014)	ERM (2007)	Ècosì (2012)	Consorzio Soligena (2011)	European Commission (2009)
	(hierarchist perspective) impact assessment methodology	potential (GWP) with a 100-year time, Fossil cumulative-energy demand (CEDfossil) according to Frischknecht et al., Eco-indicator 99 (EI99) (hierarchist perspective), USEtox model, IMPACT2002+ method	(Ecoinvent 2) & Cumulative Energy Demand		version 2.02,September 2001)	tions, version 1.0, 2008-02-29; IPCC - 2007 v.1.02 LCA: ISO 14040:2006 and 14044:2006 Product Category Rules PCR 2011:10 "Detergents and washing preparations" version 1.0, UN CPC Code 35322 dated 2011-08-30	Programme instructions for EPD, by PCR 2011:03, by ISO 14025 and ISO 14040 standards Calculation method - Boustead Model version 4.4	
Climate Change	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ozone Depletion	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ecotoxicity for aquatic fresh water	Yes	Yes	Yes	Yes	---	---	---	---
Human Toxicity - cancer effects	Yes	Yes	Yes	Yes	Yes	---	---	---
Human Toxicity – non- cancer effects	Yes	Yes	Yes	Yes	Yes	---	---	---
Particulate Matter / Respiratory Inorganics	Yes	Yes	---	---	---	---	---	---

Source	Kapur et al (2012)	Koehler & Wildbolz (2009)	ADEME (2010)	AISE (2014)	ERM (2007)	Ècosì (2012)	Consorzio Soligena (2011)	European Commission (2009)
Ionising Radiation – human health effects	Yes	Yes	---	---	---	---	---	---
Photochemical Ozone Formation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acidification	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Eutrophication – terrestrial	---	---	---	---	---	---	---	---
Eutrophication – aquatic	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Resource Depletion – water	Yes	---	---	---	---	---	---	Yes
Resource Depletion – mineral, fossil	Yes	Yes	Yes	---	Yes	---	---	---
Land Transformation	Yes	---		---	---	---	---	---
Other impact categories	Terrestrial ecotoxicity, marine ecotoxicity, agricultural land occupation, urban land occupation, metal depletion, Cumulative	Land use	Ecotoxicity - soil, cumulative energy demand, waste stream (kg), recycled waste (kg), consumption of products with risk phrases,	No others	Water consumption, energy consumption and solid waste	Non- renewable and renewable resource use (material and energy), waste generation (not hazardous waste and hazardous waste), water	Waste	Waste generation (hazardous and non-hazardous)

Source	Kapur et al (2012)	Koehler & Wildbolz (2009)	ADEME (2010)	AISE (2014)	ERM (2007)	Ècosì (2012)	Consorzio Soligena (2011)	European Commission (2009)
	Energy Demand		consumption of substances implemented with risk phrases			consumption, direct electricity consumption (during manufacturing phase)		

3.2.4.8 Assumptions

Whilst modelling, a series of data assumptions were made and are summarised in Table 49. The use phase assumptions on rates and cleaning surfaces for ADEME (2010) are given in Table 50.

Overall, assumptions are well-documented, however, AISE (2014) provides no information at all. ADEME (2010) gives full assumption information including use phase. The EPD sources (Ècosì, 2012 and Consorzio Soligena, 2011) use PCRs to set some of the assumptions which are common to EPDs for similar products. The other LCA sources are generally good at reporting assumptions, although the European Commission (2009) provides less information. The good availability of assumptions has allowed us to conclude that there are significant differences on assumptions used between the studies which need to be taken into account when comparing the different studies.

Table 49 Assumptions made

Product	Studies	Title	Production	Distribution	Use	EOL
Cleaning of buildings	ADEME (2010)	"Eco-design cleaning service tertiary environment and health for the creation of an Ecolabel": Synthesis of the study and recommendations for the exploitation of results.	For water-based products: deionised water completes the composition Raw material and manufacturing essential oils are similar to European rapeseed oil Raw materials and manufacture of anionic surfactants are similar to sodium sulphate Raw materials and manufacturing agents' non-anionic surfactants are considered to be similar to an ethoxylated alcohol	Distribution of materials, products and consumables from manufacturer to the site are excluded due to lack of data	See Table 50	Waste from the clean-up is considered according to the household waste stream - representative of the French situation (53% incineration and 47% landfill) End of life cleaning products are not taken into account in the analysis
I&I cleaning products	Kapur et al. (2012)	Comparative life cycle assessment of conventional and Green Seal-compliant industrial and institutional cleaning products.	Water in the product formula was assumed to be tap water	Assumed that the finished product gets transported a total distance of 1600km from manufacturing facility in the Midwest region of USA to a final point of use on the East Coast A diesel-powered combination truck LCI dataset from USLCI	Assumed that the dilution ratio of a conventional product was less than the GS-37 requirement Dilution factors available in report	Assumed that wastewater generated as a result of cleaning (except for glass cleaning products) undergoes significant dilution after it is discharged into a combined sewer Packaging material not recycled was assumed to be

Product	Studies	Title	Production	Distribution	Use	EOL
				database was used for modelling		sent to landfill. The Ecoinvent LCI data on disposal of polyethylene in sanitary landfill was considered in the LCA model
I&I cleaning products	Ècosì (2012)	EPD for Detergents and cleaning products of Ècosì	According to PCR CPC CODE 35322 the building of a production site, infrastructure, production of manufacturing equipment, other capital goods and personnel activities are not included The manufacture and electricity used byautomatic dispensers (used just for some products) was excluded	Calculated as a fixed 100km distance by 20-28t lorry	Not specified	Waste scenarios from the Italian wastes report: Plastic - 28.4% recycled; 30.3% incinerated; 41.3% landfilled Cardboard - 69.7% recycled; 8.1% incinerated; 22.2% landfilled Wood - 53.8% recycled; 7% incinerated; 39.2% landfilled
I&I cleaning products	Consorzio Soligena (2011)	Environmental Product Declaration for Cleaning Services: Microrapid System	Not specified	Not specified	As far as the down-stream processes included in the reference PCR are concerned, their impact was measured qualitatively in accordance with the instructions provided for the PCR	FALPI SRL has chosen to manufacture almost entirely recyclable products, and for stainless steel trolleys has created a withdrawal service for end-of-life products: customers participating in this service can agree the delivery of their trolleys with resellers and dealers, and FALPI SRL will provide for their withdrawal and reuse the trolley components. The Microrapid trolley is made using almost entirely recyclable materials (92% of the overall trolley weight), except the wheels
Professional building care products	AISE (2014)	ASP substantiation dossier: Professional building care products (dilutable interior, floor, glass and	Not specified	Not specified	Not specified	Not specified

Product	Studies	Title	Production	Distribution	Use	EOL
		sanitary cleaners)				
I&I cleaning products	Koehler & Wildbolz (2009)	Comparing the Environmental Footprints of Home-Care and Personal-Hygiene Products: The Relevance of Different Life-Cycle Phases	The production of technical equipment was disregarded because it was considered of minor relevance	For sales and distribution, truck and train transport from manufacturing sites to wholesale and retail stores were derived using data from manufacturing industries and a retailer For product storage only, energy use was taken into account, occupied storage areas were disregarded	Missing data on product use were gathered in laboratory tests. Home transport from the supermarket was incorporated in the use phase . Mobility studies and the Swiss consumer-price index were used to calculate an average shopping distance and test sensitivities	For the product EOL, LCI data were calculated for wastewater treatment and disposal of primary, secondary and tertiary packaging material. Incineration of packaging in municipal-waste plants with energy recovery was chosen as a base case. System expansion was applied to account for recovered heat and electricity using light fuel oil boilers for heat supply and the European electricity-supply mix as reference systems. Open-loop recycling of plastic packaging and landfilling of all product packaging was investigated as alternative waste-management scenarios
I&I cleaning products	ERM (2007)	Life Cycle Assessment of Tissue Products Final Report.	The data supplied for all the pulp types was confidential. For the range of chemicals used by the different processes, fuels and electricity, Ecoinvent datasets were used. Most data in Ecoinvent is for European production, yet ERM assumed that technology levels between North America and Europe are very similar and therefore the use of these data are deemed appropriate for the study. In some cases, some inputs in the pulp production did not have an Ecoinvent dataset available. In these cases, ERM used proxy datasets from the Ecoinvent database. ERM believes that these proxy data are suitable for the study, and will have very limited effect on the results	Road (lorry) transport - assumed average vehicle load and diesel fuel consumption. Sea transport - assumed average vehicle load and diesel fuel consumption	The number of uses of the office paper before it is recycled into tissue paper is assessed. When office paper is recycled into tissue paper it is not recycled again. Ideally, office paper fibres should be recycled into office paper a number of times before they are transformed into tissue paper. In the present study, six lives were assumed	For landfill, the decomposition of biomass is assumed to take place within the time boundaries of the study (100 years). The gas generation phase associated with waste in landfill is considered to be complete within this timeframe. Due to uncertainties and lack of knowledge surrounding the proportion of the biogenic carbon in the tissue paper that will be degraded, we will assume, initially, that 100% of the biogenic carbon within the tissue is degraded to CO_2 and CH_4 within this timeframe. This

Product	Studies	Title	Production	Distribution	Use	EOL
						assumption was tested through sensitivity analysis as a result of published research undertaken into the degradation of paper under anaerobic conditions. Volatile organic compounds (VOC) emissions associated with the production process for each product were based on information on the volatile fraction of the chemicals and usage rates. European tissue mills do not monitor VOC emissions. Therefore these were estimated assuming adhesives emit 1.0E-3 kg VOC/kg of adhesive applied. Household waste disposal - Both the landfill and incineration of tissues do not include energy generation (methane and electricity production). In the study it is assumed (based on data provided by the client) that drying recycled fibres involves higher energy consumption than drying virgin fibres
Household & I&I cleaning equipment	European Commission (2009)	Work on Preparatory Studies for Eco-Design Requirements of EuPs (II) Lot 17 Vacuum Cleaners TREN/D3/390-2006	The assessment has made assumptions on the following inputs: Bill of materials - average material compositions for different vacuum cleaner types are used Manufacturing waste - primary scrap production during sheet metal manufacturing Packaging - packaged product volume	Not specified	Use phase - made assumptions on lifetime, use rate and energy consumption	Not specified

Table 50 Use phase assumptions on rates and cleaning surfaces from ADEME (2010) (supplementary for Table 49)

Assumptions rates, surfaces		Source
Number of tertiary weeks cleaning	48	Collection
Number of weeks hospital cleaning	52	Collection
Number of hours of work by an agent / day (when not specified)	5 hours/day	Collection
Number of hours of work by an agent / week (when not specified)	22.5 hours/week	Stakeholder data: average 20-25h
Average rate of cleaning	300-350m^2/h (10s/m^2)	Stakeholder data
Average daily rate used in modelling	3 m^2/minute	Stakeholder data
Average hourly rate used in modelling	180 m^2/hour	x60
Average daily rate used in modelling	900 m^2/day	x5
Weekly average rate used in modelling	4050 m^2/week	22.5 hours/week, 180 m^2/h
Average rate office cleaning	1min/m^2	Stakeholder data
Average rate sanitary cleaning	1.5 min/m^2	Stakeholder data
Average rate corridor cleaning	0.35 min/m^2	Stakeholder data
Living single room hospital	23m^2	Collection
Surface double room hospital	46m^2	Collection

3.2.5 Results of the selected LCA studies

3.2.5.1 Cleaning services

The results presented in this section are from ADEME (2010) which looked at the impacts associated with cleaning services (floor, sanitary and glass/windows cleaning) and considered the cleaning products, equipment and supplies used in current cleaning activities. LCAs for three types of commercial business areas – offices, corridors and bathrooms - were conducted for five different locations. The alignment between the scope of this study and this EU Ecolabel development project is presented in Table 51.

Table 51 The scope of ADEME (2010) and its alignment with the pre-defined scope of the cleaning services EU Ecolabel

ADEME (2010) – scope (business areas)	Cleaning services EU Ecolabel scope			
	Floor cleaning	Sanitary cleaning	Surface cleaning	Glass/window cleaning
Offices	√		√	√
Corridors	√		√	√
Bathrooms	√	√		√

Table 52 summarises the environmental and health (illustrated by a human toxicity indicator) impacts of cleaning services for different business areas. There are considerable differences between impact values for each indicator and area. This variability results from differences in cleaning mode (type/activities) such as auto (self - internal) or external (outsourced) cleaning and the completeness of data.

Table 52 Environmental and health impacts associated with different business areas (ADEME, 2010)

Cleanliness in 1m² business area for 1 year			
Impact indicator	**Offices**	**Corridors**	**Bathrooms**
Depletion abiotic resources (kg Sb eq)	0.38 - 0.90	0.43 - 1.91	1.75 - 5.11
Air acidification (kg SO_2 eq)	0.28 - 0.43	0.27 - 1.15	0.85 - 2.08
Eutrophication (kg PO4 3- eq)	0.03 - 0.11	0.04 - 0.20	0.26 - 0.64
Depletion of ozone stratospheric (mg CFC-11 eq)	2 - 9	2	14 - 72

Cleanliness in 1m² business area for 1 year			
Human toxicity (kg 1,4-DB eq)	26 - 119	33 - 114	116 - 376
Ecotoxicity freshwater (kg 1,4-DB eq)	19.4 - 98.6	23.6 - 130	120 - 549
Ecotoxicity soil (kg 1,4-DB eq)	0.63 - 2.63	0.66 - 2.47	3.72 - 19.8
Creation of tropospheric ozone (g C_2H_4)	12 - 22	14 - 51	63 - 141
Climate change GWP 100a (kg CO_2 eq)	49 - 112	56 - 225	222 - 749
Total energy consumption (MJ eq)	1110 - 5010	1450 - 4570	5750 - 19600
Total water consumption (litres)	1210 - 9410	1810 - 15900	77400 - 214000

Overall, across all sites assessed, maintaining cleanliness of toilets has more of an impact than cleaning corridors. Maintaining cleanliness in hallways (especially where floor cleaning equipment is used) has more impacts than cleaning offices. This difference is explained by several factors:

- *The number of cleaning activities*: sanitary cleaning involves more actions than cleaning corridors and offices, so a greater amount of products and equipment are used.
- *Cleanliness requirements*: are greater in bathrooms than in office areas or corridors.
- *Characteristics of areas*: corridors are high-traffic areas that require more regular use of mechanical and specialist cleaning such as steam cleaning. Steam cleaning is understood as an operation that is not carried out regularly/routinely. This may explain why the cleaning of corridors has a larger overall impact than offices.

3.2.5.1.1 Cleaning service environmental hotspots for different business areas

This section provides a summary of environmental hotspots associated with the cleaning activities performed in offices, corridors and bathrooms.

Offices

Cleaning services covered by office cleaning in ADEME (2010) are **surface cleaning, floor cleaning** and **glass cleaning.** Table 53 presents a summary of the environmental hotspots for office cleaning. The use of cleaning products is not identified as an environmental hotspot for offices (see Table 33). The reasoning behind that is not provided in the study. However in ADEME (2010) a comparative analysis among different activities under cleaning is evaluated and thus the reasoning may be due to the fact that it is not used in a large amount, and therefore not considered in ADEME (2010) as an environmental hotspot.

Table 53 Environmental hotspots for the cleaning of offices

Cleaning activities	Corresponding environmental hotspots
Floor cleaning (dust)	▪ Electricity for carpet cleaning ▪ Manufacturing of thermoplastic mop head with disposable gauze
Floor cleaning (manual)	▪ Manufacture and washing / drying reusable mop heads
Furniture cleaning	▪ Cotton cloths manufacturing
Supplies and equipment	▪ Raw material and manufacturing of bin bags and disposable vinyl gloves
Waste	▪ Leachate from landfilled waste and incineration residues

Corridors

Cleaning services covered by corridor cleaning in ADEME (2010) are **floor cleaning, surface cleaning** and **glass/window cleaning.** Table 54 is a summary of the environmental hotspots for corridor cleaning.

Table 54 Environmental hotspots for the cleaning of corridors

Cleaning activities	Corresponding environmental hotspots
Floor cleaning (dust)	• Manufacturing of thermoplastic mop head with disposable gauze
Floor cleaning (mechanical)	• Electricity and water consumption of the scrubber • Manufacture of detergents
Floor cleaning (manual)	• Manufacture and washing/drying of reusable mop heads
Floor cleaning (heat cleaner)	• Production of cleaning discs for Scrubber/floor cleaner
Furniture cleaning	• Manufacture of cotton cloths
Supplies and equipment	• Raw material and manufacturing of bin bags and disposable vinyl gloves
Waste	• Potential leachate from landfilled waste and incineration residues buried

Bathroom

Cleaning services covered by bathroom cleaning in ADEME (2010) are **sanitary cleaning, glass/window cleaning** and **floor cleaning.** Table 55 presents a summary of the environmental hotspots for the cleaning of bathrooms.

Table 55 Environmental hotspots for the cleaning of bathrooms

Cleaning activities	Corresponding environmental hotspots
Floor cleaning (manual)	• Hot water production • Manufacture and washing /drying reusable mop heads
Furniture cleaning	• Manufacture of cotton cloths
Toilet and sink cleaning	• Water consumption for flushing and agricultural step of essential oil production • Drying cloths • Disposable vinyl gloves manufacturing and toilet flushing • Manufacture of bathroom cleaning products • Manufacture of paper towels
Supplies and equipment	• Raw material and manufacturing of bin bags
Waste	• Leachate from landfilled waste and incineration residues

In summary, two main conclusions are drawn:

- The ADEME (2010) study covers the full scope of the EU Ecolabel for cleaning services. However, different cleaning services are being grouped and analysed in a way that that do not allow identifying the environmental hotspots of individual cleaning services.

- Within the cleaning activities carried out in bathroom cleaning, floor cleaning appears to be most impactful due to 1) the use of hot water, 2) energy use of cleaning equipment and 3) the manufacturing and use of equipment and supplies, such as mops. Bathroom cleaning is different from sanitary cleaning. Bathroom cleaning is the system boundary set by ADEME (2010) and as explained above, it includes sanitary cleaning, surface cleaning and floor cleaning.

Table 56 summarises the environmental hotspots identified by this study against the cleaning services categorisation of this EU Ecolabel study:

Table 56 Summary of environmental impact hotspots identified by the ADEME study against the service categorisation of the EU Ecolabel for cleaning services

The scope of EU Ecolabel for Cleaning services	Environmental hotspots	Relative impact in comparison to other types of cleaning services
Floor cleaning	• Electricity for carpet cleaning • Electricity and water consumption of the scrubber • Manufacture of detergents • Manufacturing of thermoplastic mop head with disposable gauze • Manufacture and washing / drying reusable mop heads • Production of cleaning discs for Scrubber/floor cleaner • Hot water production	High
Sanitary cleaning	• Water consumption for flushing and agricultural step of essential oil production • Drying cloths • Disposable vinyl gloves manufacturing and toilet flushing • Manufacture of bathroom cleaning products • Manufacture of paper towels	High
Glass/window cleaning	• Cotton cloths manufacturing	Low
Surface cleaning	• Cotton cloths manufacturing	Low
General - operations*	• Raw material and manufacturing of bin bags and disposable vinyl gloves	Affect all types of cleaning services
General – solid waste**	• Leachate from landfilled waste and incineration residues	

*General refers to environmental hotspots that apply to all types of cleaning services.

**To clarify, solid waste refers to solid waste that generated by the client site, not by the delivery of cleaning services. However, very often it is cleaning service providers' responsibility to collect and arrange the disposal of solid waste. Therefore they have an important role in ensuring the efficiency and appropriateness of waste disposal.

3.2.5.2 Cleaning products

Table 57 provides a summary of the concluding remarks on cleaning services and their environmental impacts. The key environmental attributes identified are:

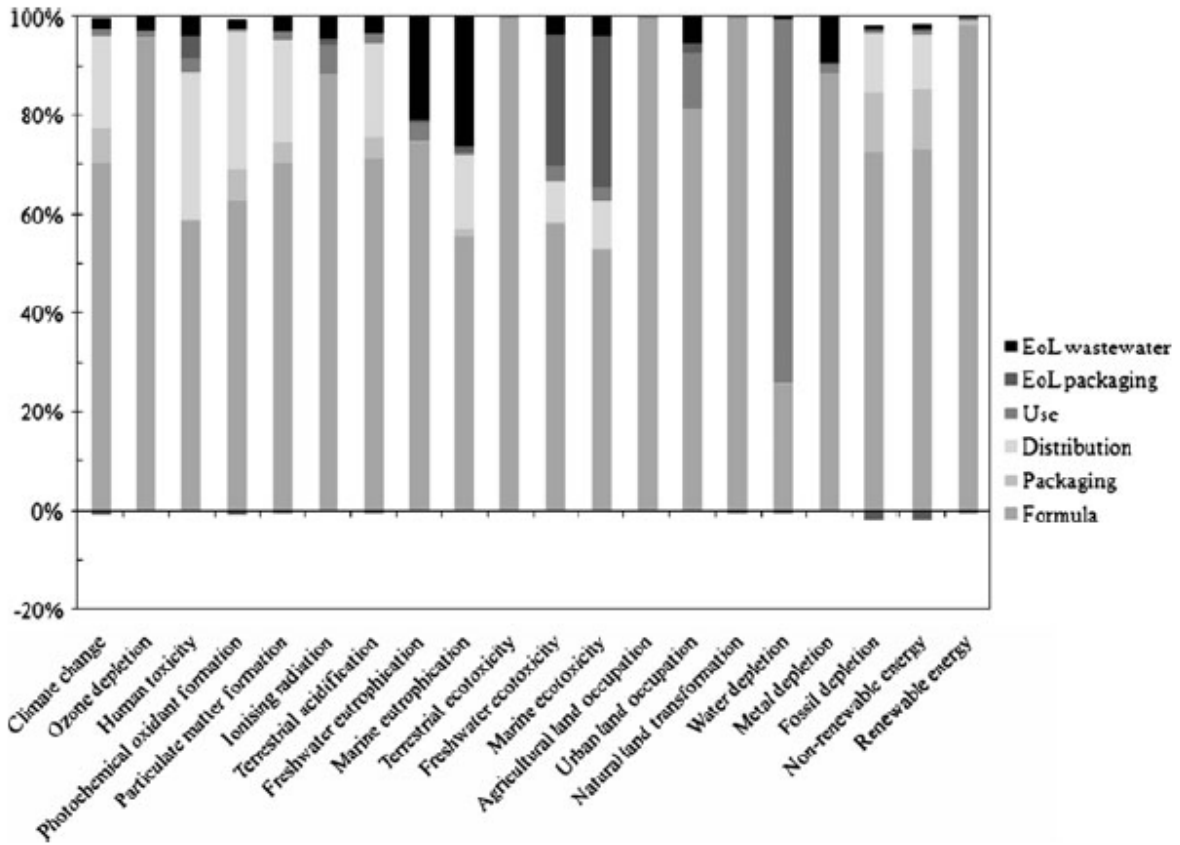
- **Raw material production** - a major environmental hotspot for most of the impact categories for cleaning products and is related to product formulation.
- **Energy and water use** - major environmental hotspots associated with the use of cleaning products, and predominantly the use of hot water for product dilution and rinsing.
- **Product packaging –** a significant hotspot, especially for ready-to-use products which have a relatively larger environmental impact per unit of product than concentrated products.
- **Product transportation** – a significant contributor to air pollution and fuel consumption.
- **Product use** - is an important life cycle stage for a number of impact categories, notably climate change, eutrophication, eco- and human toxicity.

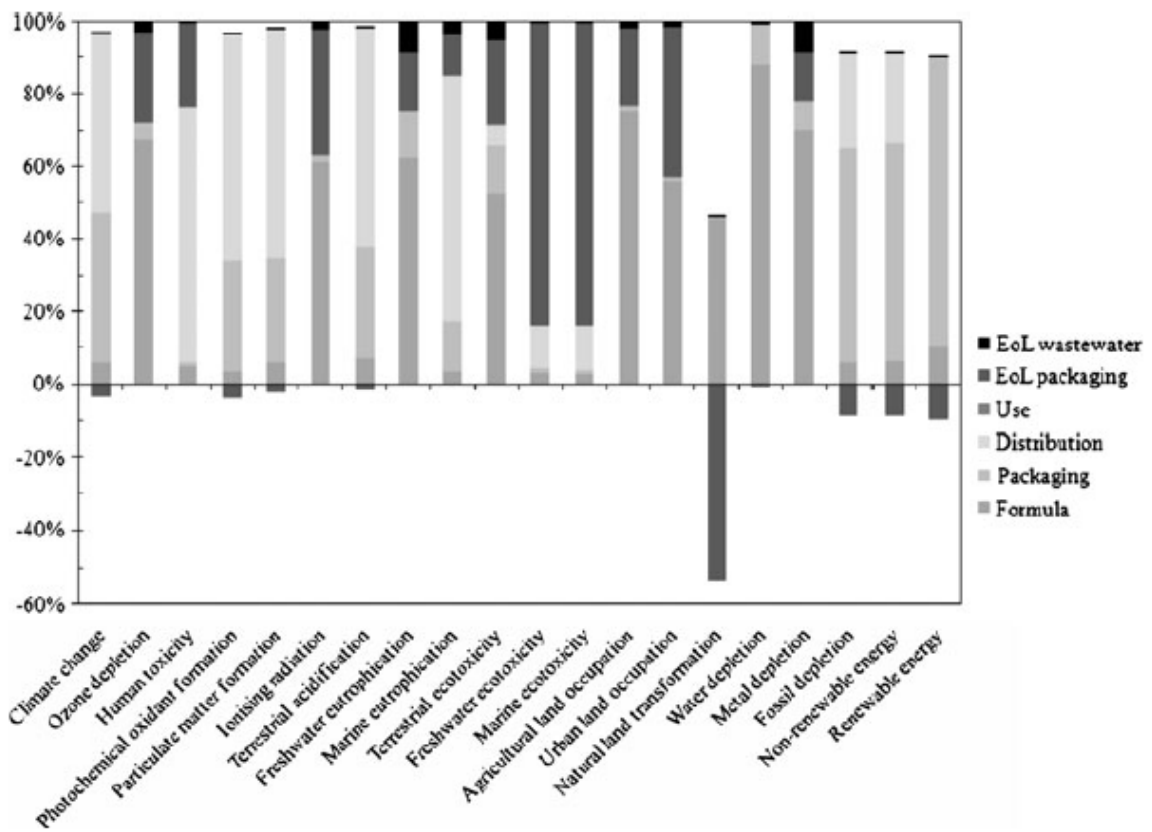
Table 57 A summary of the environmental hotspots for cleaning services identified in the reviewed LCA studies

Source	Products	Related cleaning service area	Environmental hotspots
Kapur et al. (2012)	This study examines and compares four types of general-purpose cleaning products: 1. Green Seal-compliant (glucoside-based) 2. Green Seal-compliant	Surface, glass/window, sanitary, floor cleaning	**Concluding remarks:** • Green Seal cleaning products appear to have lower impacts across most of the impact categories. Their hydrogen-peroxide based products show a lower impact for 15 indicators, while the glucoside-based show a lower impact for only 2 indicators. • Product formulation is the main contributor to all environmental impact categories. • Conventional ready-to-use cleaning products have the highest environmental impact performance. • Conventional products (concentrate) were lowest for natural land transformation. • Primary packaging and transportation of finished products were the major contributors to the

Source	Products	Related cleaning service area	Environmental hotspots
	(hydrogen peroxide-based) 3. Conventional ready-to-use 4. Conventional concentrated		impacts for conventional products, especially ready-to-use. **Green Seal-compliant products:** Figure 15 shows a breakdown of life cycle impact assessment results, by life cycle stage, for Green-Seal compliant general purpose cleaning products (glucoside-based formula). This formulation was here further explored due to the fact that the report only provides a bar chart for this formula. When compared to conventional products the Green Seal-compliant products (glucoside-based) were better for 5 indicators: • Ozone depletion • Terrestrial ecotoxicity • Agricultural land occupation • Urban land transformation • Natural land transformation **Conventional products (RTU):** Figure 16 shows a breakdown of life cycle impact assessment results, by life cycle stage, for conventional ready-to-use general purpose cleaning products. When compared to Green-Seal general purpose cleaners they higher environmental impacts for 13 impact indicators: • Climate change • Human toxicity • Photochemical oxidant formation • Particulate matter formation

Source	Products	Related cleaning service area	Environmental hotspots
			• Ionizing radiation • Terrestrial acidification • Freshwater eutrophication • Marine eutrophication • Freshwater ecotoxicity • Marine ecotoxicity • Water depletion • Metal depletion • Fossil depletion

Source	Products	Related cleaning service area	Environmental hotspots
			 **Figure 15 Breakdown of life cycle impact assessment results by life cycle stage for compliant general purpose cleaning product**

Source	Products	Related cleaning service area	Environmental hotspots
			 **Figure 16 Breakdown of life cycle impact assessment results by life cycle stage for conventional RTU general purpose cleaning product**

<table>
<tr><th>Source</th><th>Products</th><th>Related cleaning service area</th><th>Environmental hotspots</th></tr>
<tr><td>Ècosì (2012)</td><td>The products covered in this environmental declaration are: detergents and cleaning products used for: “cohabitation” (offices, companies, schools), “catering”, “food” and “laundry” in various packing formats and sizes</td><td>Floor, surface, glass/window, sanitary cleaning</td><td>Results show a general trend of upstream (ingredients) impacts which are greatest across 5 indicators. Table 58 is an example result for one of the products investigated in the study.

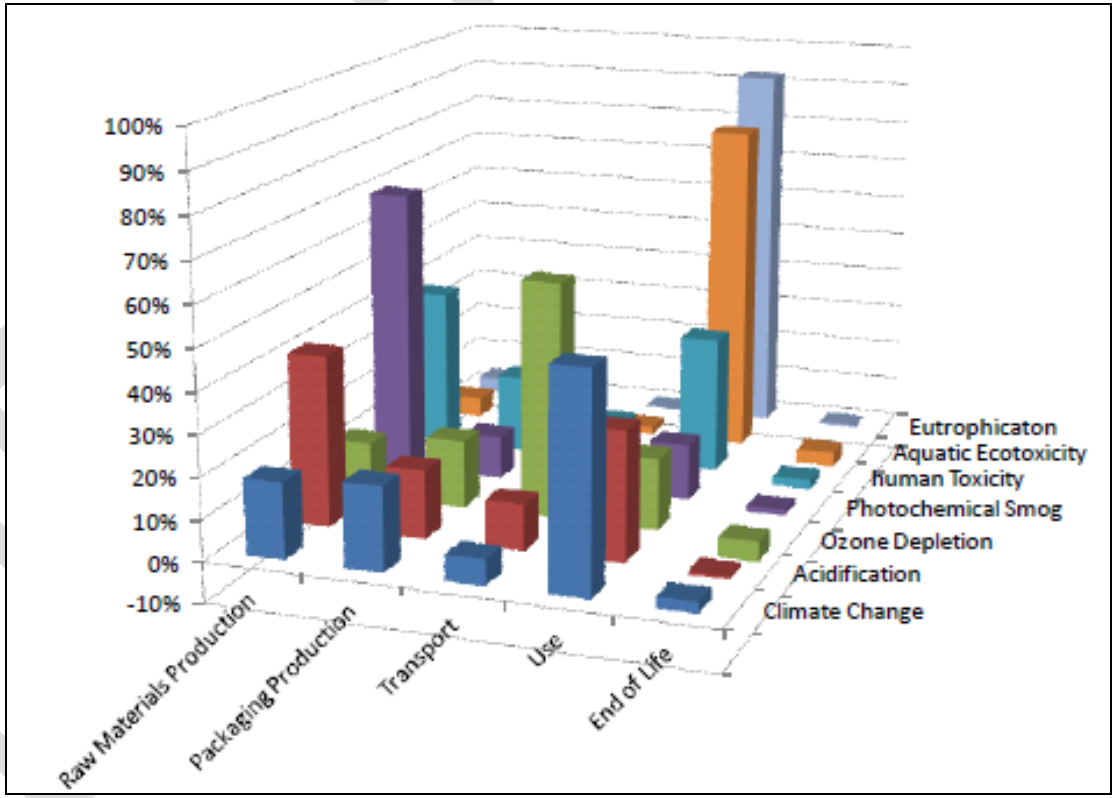
<table>
<tr><th colspan="10">ANCH’IO</th></tr>
<tr><th rowspan="2">IMPACT CATEGORY</th><th rowspan="2">UM</th><th colspan="4">1l</th><th colspan="4">10l</th></tr>
<tr><th>TOT.</th><th>UP.</th><th>CORE</th><th>DOWN.</th><th>TOT.</th><th>UP.</th><th>CORE</th><th>DOWN.</th></tr>
<tr><td>GLOBAL WARMING (GWP100)</td><td>g CO_2 eq</td><td>567.67</td><td>346.22</td><td>91.29</td><td>126.16</td><td>449.67</td><td>274.16</td><td>92.61</td><td>82.90</td></tr>
<tr><td>OZONE LAYER DEPLETION (ODP)</td><td>g CFC-11 eq</td><td>0.00</td><td>0.00</td><td>0.00</td><td>0.00</td><td>0.00</td><td>0.00</td><td>0.00</td><td>0.00</td></tr>
<tr><td>PHOTOCHEMICAL OXIDANT FORMATION</td><td>g C_2H_4 eq</td><td>0.58</td><td>0.50</td><td>0.04</td><td>0.05</td><td>0.48</td><td>0.41</td><td>0.04</td><td>0.04</td></tr>
<tr><td>EUTROPHICATION</td><td>g PO_4^{---} eq</td><td>0.93</td><td>0.54</td><td>0.06</td><td>0.33</td><td>0.69</td><td>0.39</td><td>0.07</td><td>0.23</td></tr>
<tr><td>ACIDIFICATION</td><td>g SO_2 eq</td><td>1.64</td><td>1.18</td><td>0.19</td><td>0.27</td><td>1.30</td><td>0.90</td><td>0.19</td><td>0.21</td></tr>
</table>
Table 58 Environmental impacts of a surface detergent product for ordinary cleaning</td></tr>
<tr><td>A.I.S.E. (2014)</td><td>Household dilutable liquid cleaners.

Due to the similarities in product formulations, industry experts confirmed the relevance of this LCA study for the professional building care sector.</td><td>Floor, surface, glass/window, sanitary cleaning</td><td>The most important factors in the Life Cycle Assessment for dilutable liquid cleaners are as follows:

• Raw material production of cleaning products is a significant environmental hotspot. By concentrating or compacting professional building care products, the use of chemical ingredients is reduced and this delivers significant savings in energy (hence CO_2) and waste, as well as delivering substantial savings in freight as more product can be carried per truck.

• Packaging production is another significant environmental hotspot. By reducing packaging material or even avoiding it by using return or refill systems, the environmental impact of a product can be reduced. However, solidity and stability of packaging material has to be ensured.

• The use of cleaning products is the dominant contributor of climate change, human toxicity, aquatic</td></tr>
</table>

Source	Products	Related cleaning service area	Environmental hotspots
			ecotoxicity and eutrophication impacts. • Transportation is a significant impact hotspot for air pollution.  **Figure 17 The environmental impact of using Liquid Household Cleaner differentiated per life cycle phase.**

Source	Products	Related cleaning service area	Environmental hotspots
Koehler & Wildbolz (2009)	• Household-cleaning agents (kitchen, window and bathroom cleaners) • Detergents (liquid and powder detergents, detergent booster) • A toilet-care product	Surface, glass/window, sanitary cleaning	This work results in a carbon footprint for household cleaning products. The report does not provide any data of the result and the interpretation in the text is not directly linked to the graphics made available (which is not very helpful for the purpose of interpretation the data is neither provided). The concluding remarks provided by the study are: • Carbon and energy footprints are heavily affected by the use phase with average contributions of 50-75% to the carbon footprint and 45-75% to the total cumulative energy demand (with some exceptions for the application of soap bars and toilet cleaners). This is mainly due to the energy use associated with heating water for product dilution and cleaning. • The production stage of all products covered by the study, which comprises raw-chemical production, packaging fabrication and finished product manufacturing, accounts for an average share of 15-30% of the life-cycle carbon footprint and 20-55% of the total environmental footprint. • For detergents, environmental impacts caused by consumer use are mainly driven by warm water use, which accounts for 90-99% of the use-phase for the carbon footprint. • Home transport (by car (6 km)) for ready-to-use household cleanershas the largest life-cycle contribution to all environmental indicators (40-50%). • The use and end-of-life phases for toilet cleaners contribute the most to the carbon footprint (42% and 47% respectively), while production is less significant (10% of the carbon footprint).

3.2.5.3 Cleaning equipment and supplies

Table 59 provides a summary of the concluding remarks on cleaning equipment and supplies and their environmental impacts. The key environmental attributes identified are:

- Use is a key impact area in the product lifecycle for both manual supplies and powered and equipment. For manual supplies, such as cloths, wipes and paper towels water consumption is a significant environmental hotspot. For powered machines, environmental impacts are mainly related to energy consumption, but water consumption can be a key factor for water-using machines.
- For both manual cleaning supplies and powered equipment, solid and liquid waste generated from use also has a significant eutrophication impact.
- Manual cleaning supplies, especially disposable products, produce significant environmental impacts in the manufacturing stage. The impacts are associated with the use of raw materials and energy consumption during the manufacturing process.

Table 59 LCA studies results and summary for environmental hotspots of cleaning equipment and supplies

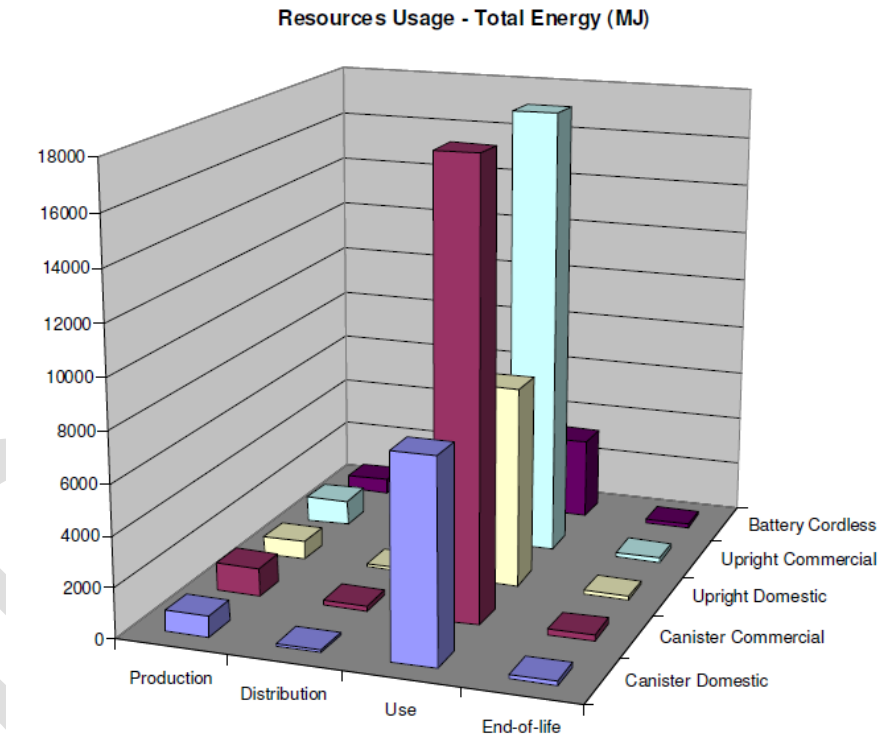
Source	Products	Related cleaning service area	Environmental hotspots
ADEME (2010)	Several powered and manual cleaning equipment and were taken into account , such as: • Cotton cloths • Gauze • Mop heads • Bin bags • Floor cleaning machines (e.g. vacuum cleaners, low speed rotary floor machines or auto	Floor, surface, glass/window, sanitary cleaning	Powered and manual cleaning equipment and supplies were assessed in the context of commercial cleaning services for three different business areas of commercial buildings. The following environmental hotspots were identified: **Power equipment** • Energy consumption in use **Mop heads** • Manufacturing of thermoplastic mop heads with disposable gauze • Manufacture and washing / drying of reusable mop heads • Water and energy use (for heating water) associated with the use of mops for cleaning floors **Other supplies (e.g. bin bags, paper towels and disposable vinyl gloves)** • Raw material and manufacturing

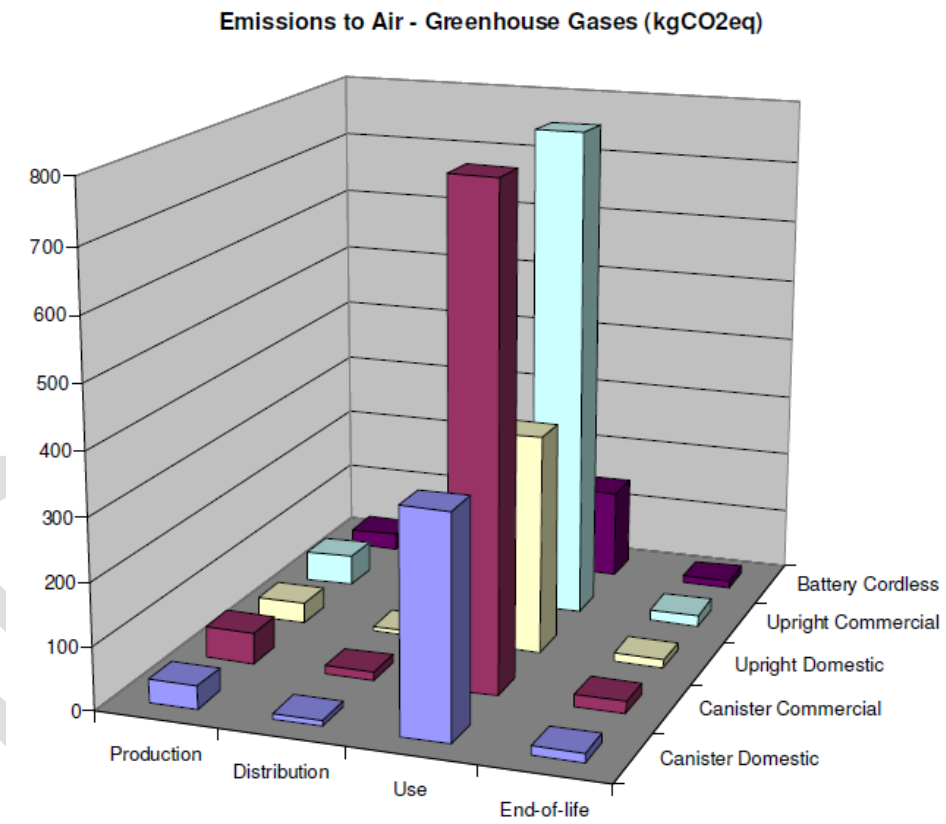
Source	Products	Related cleaning service area	Environmental hotspots
	scrubbers)		
Consorzio Soligena (2011)	The Microrapid system, consists of the following components: • Microrapid trolley without using liquid bottles (no free water and detergent solutions) • Microfibre cloths (Microrapid-mop) • 2 containers with 30 pre-impregnated mops	Floor, surface, glass/window, sanitary cleaning	The following conclusions on environmental hotspots were identified: • The largest impact is derived from cleaning service performance rather than from the production of the machines, trolleys and accessories needed. • The core module (including electric energy production, extraction and production of raw materials for consumables, transportation, service performance machinery use and maintenance, wastewater treatment, waste production and transport) presents the largest impact for all categories. The reason for this larger impact is due to machine energy consumption, water consumption and other consumables (detergents, surfactants, cloths) used to carry out the service. • With regard to waste production, the larger contribution is associated with the packing of consumables used.
ERM (2007)	Tissue products: • Bathroom tissue • Washroom towel • Facial tissue	Surface, sanitary cleaning	The LCA showed that based on the relative contribution and observed importance in the normalised results, the environmental impacts of global warming, acidification, resource depletion and human toxicity along with information on water consumption and solid waste should be considered in decision making regarding tissue design using both virgin and recycle fibres. Three scenarios were calculated for each bathroom tissue:

Source	Products	Related cleaning service area	Environmental hotspots
	• Kitchen towel • Toilet tissue (folded) • Toilet tissue (roll) • Commercial wipers		• Scenario A, where the product has a high share of virgin fibres; • Scenario B, where the product has the highest share of recycled fibres and where environmental burden is attributed to the previous life of the paper before it is collected and processed into recycled pulp; and • Scenario BB, the same product as Scenario B but where the recycled paper is free of environmental burden up until it is collected and processed into recycled pulp. Results of the LCA indicate that across impact categories related to the burning of fossil fuels, e.g. global warming, acidification and abiotic resource depletion, products with high virgin fibre content offer lower environmental impacts than those with high recycled fibre content. In the specific situation when waste paper comes free of environmental burden, folded toilet tissue with recycled fibre (produced in integrated de-inking mills) offers a comparable or better performance to virgin fibre products in the same impact categories. The comparisons between recycled and virgin fibre for water use and solid waste are less straightforward. Water use tends to be lower for high virgin fibre tissue than those with a higher recycled fibre content , where impact is attributed to previous lives. However, the results showed that the specific scenarios where waste paper comes free of burden the water consumption decreases significantly and goes below the water consumed for some of the virgin products (kitchen towel, folded toilet tissue, roll toilet tissue). Virgin fibres are favoured for bathroom and facial tissue, and washroom towels. Although, there is a difference between the two fibre types, , of more than 10%) for bathroom and fold toilet tissue, and washroom and kitchen towels. This means that the best fibre type for bathroom tissue and washroom towels is virgin, and recycled for kitchen towels and folded toilet tissue. For facial and toilet roll tissue, and commercial wipes it does not make a significant difference which fibre type is used. Although no fibre type is clearly favoured recommendations were provided on how to reduce the

Source	Products	Related cleaning service area	Environmental hotspots
			environmental impact associated for each type: Recycled fibres: • Source fibres from integrated de-inking operations to eliminate the need for thermal drying of the fibre (dry lap) or long distance transport of high water content materials (wet lap); • Manage de-inking sludge in order to maximise beneficial applications and minimise waste; and • Select high quality fibre/paper sources that enable efficient processing into recycled pulp. Virgin fibres: • Ensure fibre sources are legal and adhere to legal and sustainable forestry practices (e.g. Forestry Stewardship Council (FSC) certified); and • Encourage suppliers to consider opportunities to reduce or prevent emissions of Polyaromatic hydrocarbons (PAH) and other toxic substances while increasing the use of biomass fuels. When using either fibre: • Improve energy efficiency during tissue manufacture; • Identify opportunities for changing to alternative, non-fossil based sources of energy for manufacturing operations; • Deliver product formats that maximise functionality and minimise consumption; and • Investigate opportunities for alternative disposal that deliver socio-economic benefits from waste products.

Source	Products	Related cleaning service area	Environmental hotspots
			Overall the results indicate that either fibre type can be considered environmentally preferable. Both virgin and recycled fibre offer environmental benefits and shortcomings. Intelligent and sustainable use of fibre sources requires understanding the challenges associated with each fibre type and effectively managing the life cycle to minimise impacts and maximise benefits.
European Commission (2009)	LCA conducted on five different vacuum cleaner types: • Canister domestic • Canister commercial • Upright domestic • Upright commercial • Battery cordless	Floor cleaning	The LCA results for the five vacuums studies are provide in Figure 18 and Figure 19, which shows the results for resources usage (MJ) (Figure 18) and GHG emissions (Figure 19) by life cycle stage (production, distribution, use and end of life). The use phase is a key environmental hotspot across most of the metrics (except waste generation), however, there are significant variations between metrics: • Energy use, process water, GHG, acidification: *use phase is the only hotspot* • Non-hazardous waste: *production and use phase are both relevant hotspots* • Hazardous waste: *end-of-life is the only hotspot* • Persistent organic pollutants (POPs) emissions, heavy metal : *production, use phase and end-of-life are all relevant hotspots* • Particulate matter: *distribution, use phase and end-of-life are all relevant hotspots*

Source	Products	Related cleaning service area	Environmental hotspots
			 **Figure 18 Lifecycle energy use of vacuum cleaners**

Source	Products	Related cleaning service area	Environmental hotspots
			 **Figure 19 Lifecycle GHG emissions of vacuum cleaners**

3.2.6 Findings from other studies

In this section, studies that did not comply with the screening criteria for the LCA studies are reviewed because they provided a useful methodology or data or additional aspects on environmental hotspots not provided in the LCA studies.

Procter & Gamble (2006). Comparative Life Cycle Assessment (LCA) of Ariel "Actif à froid" (2006), a laundry detergent that allows to wash at colder wash temperatures, with previous Ariel laundry detergents (1998, 2001)

This study provides an analysis of laundry detergents used in France in 1998, 2001 and 2006 using different washing temperatures and product formulations. Although the products are not considered to be within the scope of cleaning services EU Ecolabel, they have similar functions and environmental impact profiles to the cleaning products used within the cleaning services sector (see Figure 20).

The base-case results show that if the Ariel Actif a froid (2006) is used in a cold wash there are no significant environmental impacts for the 11 evaluated indicators, in fact, there are significant benefits versus Ariel (2001), in particular for primary energy consumption, total solid waste, climate change potential, photochemical oxidant formation potential, acidification and eutrophication potential. This is predominantly due to the reduced wash temperature, adjusted product formulation and dosage rates.

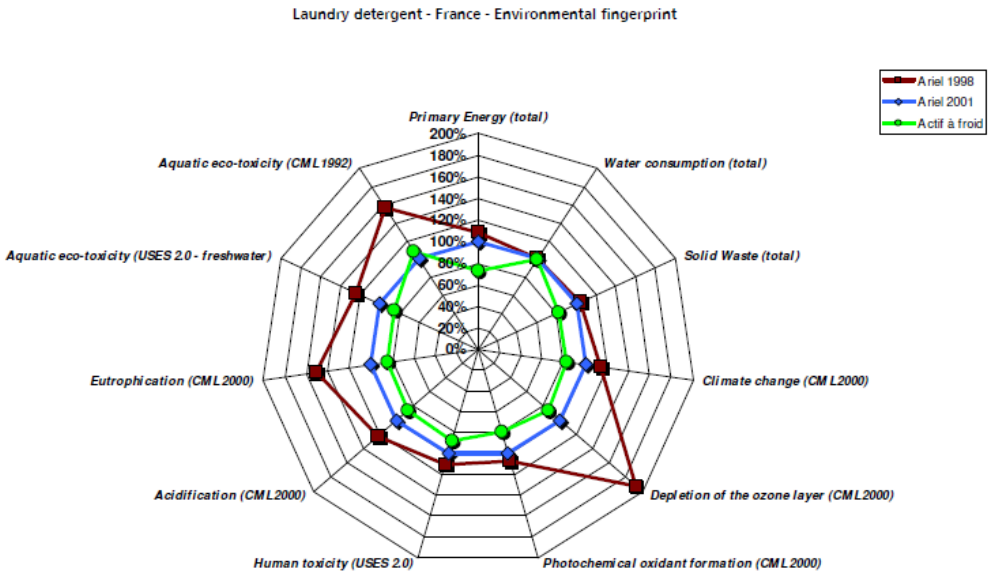


Figure 20 The environmental footprint of laundry detergent

Procter & Gamble (2004), Comparative life cycle assessment study 3 cleaning products for kitchen surfaces French study: an ISO-compliant life cycle assessment study of hard surface cleaning products used in the kitchen.

A cradle to grave life-cycle-assessment (LCA) study was performed on three kitchen cleaning products: kitchen cleaning wipes, kitchen cleaning spray and liquid household cleaner in a bottle Results shows a mixed pattern for the base scenario, where none of the product systems considered can be seen as environmentally superior on all indicators (see Table 60).

The sensitivity analyses have revealed that data uncertainty with respect to product consumption, cleaning habits, lotion evaporation from the wipe and cellulose production could significantly impact the result of the study. However, none of the sensitivity analyses resulted in a situation where one product would be the best with respect to all environmental indicators. The findings of this study highlight the impact of product manufacture and activity during the use phase when using surface and general cleaning products.

The study shows that the use of kitchen cleaning wipes generates significantly more waste than sprays and liquid cleaners due the 'solid' content of the product. Liquid house cleaners have the highest use of water. Energy consumption during the manufacture of the products is relatively similar.

Table 60 LCA of household kitchen wipes, spray and liquid cleaners for 1 year of kitchen cleaning in France

Life Cycle Impact categories	Units	Wipe	Spray	Liquid household cleaner
Climate Change	g eq. CO_2	7 399	6 462	6 912
Air Acidification	g eq. H^+	1.02	0.85	0.96
Ozone Depletion	g eq. CFC-11	0.000545	0.000565	0.000514
Photochemical Smog	g eq. Ethylene	122.33	122.98	8.00
Human Toxicity	kg bodyweight	42.73	37.73	39.83
Aquatic Eco-toxicity	m^3 polluted water	0.58	0.86	0.86
Eutrophication	g eq. PO_4^{3-}	1.23	4.59	8.31

3.2.7 Social impacts associated with cleaning services

The market structure of the cleaning services industry (see Market Report Chapter 2) and its social implications suggest that these are closely related to economic drivers. As labour costs make up the majority of cleaning service provider costs, the sector is particularly sensitive to wage regulations. Other key social and commercial impact considerations are cost-led contracting and staff training.

Wage regulations

The national minimum wage (NMW) is now implemented in three-quarters of EU member states. The remaining countries have minimum pay rates agreed through collective bargaining in their various employment sectors. For the cleaning service sector, it is common to have a sector specific minimum wage and this will usually be higher than the NMW (EFCI, 2014). Due to the high competition on cost for cleaning service contracts, these minimum wages are not always respected which can lead to unfair competition in the market place. It is therefore important that adherence to specific minimum wage regulations is taken into account when developing the cleaning services EU Ecolabel social criteria.

Cost-led contracting

In recent years, the value of contract cleaning services has been driven down by client demand for competitive valuing (Procurement Intelligence Unit, 2010). Many cleaning service providers have had to be proactive in negotiating contracts and providing services at an affordable cost to retain clients. Profit margins have been driven down significantly, which has also led to a drop in service quality. In some nations this has created tensions which have led to industrial action from employees that are unhappy about the focus that clients are placing on price at the expense of service quality..

Health risks associated with exposure to chemicals in cleaning products

Chemical ingredients used in cleaning products may also pose risks to human health e.g. carcinogenic and otherwise toxic ingredients at high concentrations. Fragrances and dyes are added to products to improve the user experience and these can increase sensitisation and allergic reactions during use of the chemicals (European Commission, 2009b). While 90% of the chemical substances used are the same, their concentration and conditions of use can lead to different exposure levels and environmental impacts.

Staff training

Staff training has been identified as a key social impact area. Adequate and sufficient staff training can significantly improve employee well-being and health, as well as more efficient use of products, equipment and supplies. Another important role of training is to improve service efficiency. It is suggested that by implementing good cleaning services practices, such as picking the right cleaning products with appropriate concentration for different cleaning tasks, the environmental performance of cleaning service can be significantly enhanced.

3.2.8 Conclusion: environmental and social impact hotspots of cleaning services

The literature identification, review and selection has allowed for a robust and comprehensive understanding of the environmental and social impacts of different types of cleaning services. This section provides a summary of these hotspots.

3.2.8.1 Summary of environmental impacts: literature review

A summary of the quality and availability of environmental impact assessment literature for cleaning services is provided below:

Literature availability – The number of studies on the environmental impact assessment for cleaning services is scarce. Most studies identified focused on cleaning products and did not consider cleaning services. Information and assumptions on the use phase of cleaning products is often lacking.

Impact category coverage – The studies have a good coverage of impact categories. All of the selected studies covered at least five impact categories specified by the European Commission Product Environmental Footprint (PEF) methodology. This allows a holistic, multi-metrics insight on the environmental impacts of different cleaning products and services to be developed.

Representative study for cleaning services – The ADEME (2010) study was the only study that focused on cleaning tasks and services. The scope of the study is in line with the scope of the cleaning services EU Ecolabel, covering floor, surface, sanitary and window cleaning. This study provides the best available data for understanding and modelling the environmental impacts of different types of cleaning services.

3.2.8.2 Environmental hostspots of cleaning services

The scope of the EU Ecolabel for cleaning services includes four types of cleaning services: floor cleaning, surface cleaning, sanitary cleaning and glass/window cleaning. Through literature review and stakeholder interviews, we have developed

Table 61 provides an overview of environmental hotspots of the four types of cleaning services based on the result of the literature review, stakeholder interviews (including a cleaning service provider, a cleaning product manufacturer and an industry body) and further complemented with analysis of criteria of labelling schemes for the cleaning services sector (as illustrated in Table 5, Chapter1).

Table 61 Environmental impact hotspots of different cleaning services

Service type	Aspects	Lifecycle stages	Hotspots	Significant impact categories	Indicative climate change impact of example product/ service $gCO_2e/m^2/yr$ kept clean**	Indicative freshwater eutrophication of example product /service $mgPO_4^{3-}$ eq./ m^2/yr kept clean**
Floor cleaning	**Cleaning products**	**Raw materials**	*Main source: European Commission (2014).* *Other supporting evidence: ADEME (2010); Ècosì (2012); Consorzio Soligena (2011); A.I.S.E (2014); Koehler & Wildbolz (2009).* The ingredients of cleaning products are important contributors of environmental impacts. Of all ingredients, the major part of the environmental impact is caused by the surfactant ethoxylated alcohol, which is commonly found in general purpose cleaners and sanitary cleaners (Kapur et al., 2012). Surfactants are of mixed origins, i.e. both oleo chemical origin (palm and coconut resources) and petrochemical, which has an effect on both natural land transformation and agricultural land occupation. For the impacts related to ozone depletion and metal depletion, the ingredient ethylene glycol diethylether caused the largest share of the environmental impact.	Highest for terrestrial ecotoxicity, agricultural land occupation and natural land transformation (≥90%), but also important for ozone depletion and metal depletion (>30%).	**Impact:** 2.41 **Product:** Conventional ready to use general purpose cleaning product **Source:** Kapur et al. (2012)	**Impact:** 0.12 **Product:** Conventional ready to use general purpose cleaning product **Source:** Kapur et al. (2012)
		Manufacturing	Not identified as an environmental impact hotspot by selected LCA studies and other supplementary information			

Service type	Aspects	Lifecycle stages	Hotspots	Significant impact categories	Indicative climate change impact of example product/ service $gCO_2e/m^2/yr$ kept clean**	Indicative freshwater eutrophication of example product /service $mgPO_4^{3-}$ eq./ m^2/yr kept clean**
		Packaging	*Source: AISE(2014), Kapur (2012)* The selected LCA studies have confirmed that primary product packaging is a key environmental impact hotspot for cleaning products. By reducing packaging material or even avoiding via the use of return or refill system, the environmental footprint of a product can be reduced. For conventional general purpose cleaners, primary packaging can be amounted for about 40% of the climate change impact. The environmental impact of packaging is most significant for ready-to-use products because they require higher volume of primary packaging.	Significant for climate change, energy consumption, fossil fuel depletion		
		Transport	*Source: Stakeholder interview, Nordic Swan (2014)* Transportation of cleaning products from cleaning service companies to cleaning sites has been identified as a significant source of environmental impacts. Transportation efficiency is particularly important for cleaning products due to the weight of liquid products.	Significant for climate change, energy consumption, fossil fuel depletion, particulate matter emissions		
		Use phase	**Water use** *Source: European Commission (2014)* Water is used for product dilution and rinsing. Together with energy used in water heating, the use phase of cleaning products, mainly associated with the product dilution, accounts for up to 88% (water depletion) of impact contribution. The most significant impact is on water depletion.	Highest for water depletion, but also important for freshwater eutrophication, human toxicity, freshwater ecotoxicity, marine ecotoxicity, ionising radiation and urban land occupation.		

Service type	Aspects	Lifecycle stages	Hotspots	Significant impact categories	Indicative climate change impact of example product/ service $gCO_2e/m^2/yr$ kept clean**	Indicative freshwater eutrophication of example product /service $mgPO_4^{3-}$ eq./ m^2/yr kept clean**
			Energy use *Source: ADEME (2010); European Commission (2014)* Hot water is typically used to dilute conventional concentrated cleaning products (Kapur et al., 2012; Koehler and Wildbolz, 2009). The energy used for heating water is regarded as an environmental hotspot by a number of sources. ADEME (2010) estimates that for manual floor cleaning the use of hot water contributes over 50% of impacts for 6 indicators.	Highest for abiotic resource depletion, acidification, human toxicity, ozone layer depletion, GHG and energy consumption.		
		End of life	**Waste water discharge** *Source: Stakeholder interview; Kapur et al. (2012)* Waste water generated from the use of cleaning products in cleaning services is identified by stakeholders as a significant contributor of environmental impacts. Kapur et al. (2012) shows that the end-of-life stage of cleaning products has significant impacts on freshwater and marine eutrophication.	Freshwater and marine eutrophication		
	Power equipment	**Raw materials**	Not identified as an environmental impact hotspot by selected LCA studies and other supplementary information		**Impact:** 27 **Product:** Upright (Commercial) Vacuum Cleaner **Source:**	**Impact:** 0.59 **Product:** Upright (Commercial) Vacuum Cleaner **Source:**
		Manufacturing	Not identified as an environmental impact hotspot by selected LCA studies and other supplementary information			
		Packaging	Not identified as an environmental impact hotspot by selected LCA studies and other supplementary information			

Service type	Aspects	Lifecycle stages	Hotspots	Significant impact categories	Indicative climate change impact of example product/ service $gCO_2e/m^2/yr$ kept clean**	Indicative freshwater eutrophication of example product /service $mgPO_4^{3-}$ eq./ m^2/yr kept clean**
		Transport	Not identified as an environmental impact hotspot by selected LCA studies and other supplementary information		European Commission (2009)	European Commission (2009)
		Use phase	**Energy use** *Main source: European Commission (2009)* Other supporting evidence: Arqum (2012); ADEME (2010); Consorzio Soligena (2011); For powered cleaning equipment, mainly floor cleaning machines (e.g. vacuum cleaners, rotary floor machines), the use phase clearly has the most impact, dominating the lifecycle impact of the product. Most of the impacts are associated with the consumption of energy. The use phase of cleaning equipment accounts for over 90% of energy and GHG emissions; and over 87% of acidification impact.	Highest for energy and water consumption. Also important for GHG emissions, acidification, VOC emissions, POP emissions and eutrophication.		
			Water use *Main source: European Commission (2009)* For water-using powered cleaning equipment, including carpet cleaners, wet pickup machines and pressure cleaners, the water use in use phase clearly is a dominant environmental impact hotspot. The use phase of these equipment accounts for over 90% of water consumption.			
		End of Life	Not identified as an environmental impact hotspot by selected LCA studies and other supplementary information			
	Supplies and accessories	**Raw materials**	Not identified as an environmental impact hotspot by selected LCA studies and other supplementary information		**Impact:** 384	**Impact:** 132

Service type	Aspects	Lifecycle stages	Hotspots	Significant impact categories	Indicative climate change impact of example product/ service $gCO_2e/m^2/yr$ kept clean**	Indicative freshwater eutrophication of example product /service $mgPO_4^{3-}$ eq./ m^2/yr kept clean**
		Manufacturing	**Manufacturing of disposable plastic mop head with gauze fibres** *Source: ADEME(2010)* The manufacturing process of the gauze fibres contributes about 75% of the total office floor cleaning impact for the depletion of abiotic resources impact category. This is by taking into account both cleaning equipment and activities.	Highest for acidification, photochemical oxidation and abiotic depletion. Also important for GHG emissions and ozone layer depletion.	**Product:** Cleaning service, e.g. vinyl gloves, bin bags **Source:** ADEME (2010)	**Product:** Cleaning service, e.g. vinyl gloves, bin bags **Source:** ADEME (2010)
			Raw materials and manufacturing of plastic bin bags *Source: ADEME(2010)* Raw materials and the manufacturing of trash bags contribute to more than 20% of the impact associated with three categories (depletion of natural resources, total energy consumption and water consumption). Plastic bin bags are disposable products that used in high volume in cleaning services.	Highest for depletion of abiotic resources, energy consumption and water consumption. Also important for GHG and creation of tropospheric ozone.		
			Manufacture of disposable vinyl gloves* *Source: ADEME(2010)* Evidence from one study show that the manufacture of disposable vinyl gloves has a significant impact across 5 indicators (identified in the next column). This is due to the resource and energy intensive production process.	Largest for depletion of abiotic resources, ozone layer depletion, GHG, energy consumption and water consumption.		
		Packaging	Not identified as an environmental impact hotspot by selected LCA studies and other supplementary information			
		Transport	Not identified as an environmental impact hotspot by selected LCA studies and other supplementary information			

Service type	Aspects	Lifecycle stages	Hotspots	Significant impact categories	Indicative climate change impact of example product/ service $gCO_2e/m^2/yr$ kept clean**	Indicative freshwater eutrophication of example product /service $mgPO_4^{3-}$ eq./ m^2/yr kept clean**
		Use phase	**Washing and drying of reusable mop heads** *Source: ADEME(2010)* The washing and drying of reusable mop heads has a significant impact in the use phase across 4 indicators (identified in the next column). This is due to the use of energy and water and the discharge of wastewater.	Largest for human toxicity, terrestrial ecotoxicity, creation of tropospheric ozone and total energy consumption. Also important for abiotic resource depletion, acidification, destruction of the ozone layer and GHG.		
		End of Life	**Solid waste generation** *Source: ERM (2007)* The use of disposable cleaning supplies generate significant amount of solid waste.	Eutrophication		
	TOTAL	**Minimum*** **	**Source**: ADEME (2010) **Scope**: Floor cleaning		**114**	**93**
		Maximum* **			**2 800**	**1 840**
Sanitary cleaning	**Cleaning products**	**Raw materials**	Same as floor cleaning	Same as floor cleaning	**Impact:** 3.32 **Product:** Conventional ready to use restroom cleaner **Source:**	**Impact:** 0.60 **Product:** Conventional ready to use restroom cleaner **Source:**
		Manufacturing	Not identified as an environmental impact hotspot by selected LCA studies and other supplementary information			
		Packaging	Same as floor cleaning	Same as floor cleaning		
		Transport	Same as floor cleaning	Same as floor cleaning		

Service type	Aspects	Lifecycle stages	Hotspots	Significant impact categories	Indicative climate change impact of example product/ service $gCO_2e/m^2/yr$ kept clean**	Indicative freshwater eutrophication of example product /service $mgPO_4^{3-}$ eq./ m^2/yr kept clean**
		Use phase	**Water consumption for toilet cleaning** *Source: ADEME(2010)* Toilet cleaning contributes over 70% of the water consumption impacts of sanitary cleaning, mainly due to the toilet flushing used whilst cleaning the toilet. This estimate includes other bathroom cleaning activities such as floor cleaning. However, the overall contribution to water consumption is likely to be larger than 70% if only the cleaning activities of sanitary facilities (i.e. toilet bowls and sinks) are considered.	Largest for water consumption and terrestrial ecotoxicity.	Kapur et al. (2012)	Kapur et al. (2012)
		End of Life	Same as floor cleaning	Same as floor cleaning		
	Supplies and accessories	**Raw materials**	Not identified as an environmental impact hotspot by selected LCA studies and other supplementary information		**Impact:** 381 **Product:** Cleaning service, e.g. vinyl gloves, bin bags **Source:** ADEME (2010)	**Impact:** 132 **Product:** Cleaning service, e.g. vinyl gloves, bin bags **Source:** ADEME (2010)
		Manufacturing	**Manufacture of paper towels** *Source: ADEME(2010)* The manufacture of paper towels for sink and toilet bowl cleaning is a significant impact for terrestrial ecotoxicity. Although not discussed in detail by the report, this relates to the resources used during the production process.	Largest for terrestrial ecotoxicity, abiotic resource depletion, acidification, eutrophication, human toxicity and creation of tropospheric ozone.		
			Raw materials and manufacturing of plastic bin bags *Source: ADEME(2010)* (same as floor cleaning)			
			Manufacture of disposable vinyl gloves** *Source: ADEME(2010)* (same as for floor cleaning)			

Service type	Aspects	Lifecycle stages	Hotspots	Significant impact categories	Indicative climate change impact of example product/ service $gCO_2e/m^2/yr$ kept clean**	Indicative freshwater eutrophication of example product /service $mgPO_4^{3-}$ eq./ m^2/yr kept clean**
		Packaging	Not identified as an environmental impact hotspot by selected LCA studies and other supplementary information			
		Transport	Not identified as an environmental impact hotspot by selected LCA studies and other supplementary information			
		Use phase	Not identified as an environmental impact hotspot by selected LCA studies and other supplementary information			
		End of Life	Not identified as an environmental impact hotspot by selected LCA studies and other supplementary information			
	TOTAL	**Minimum*** **	**Source:** ADEME (2010) **Scope:** Sanitary cleaning		**264**	**346**
		Maximum* **			**3 356**	**1 479**
Glass/window cleaning	**Cleaning products**	**Raw materials**	Same as for floor cleaning	Same as floor cleaning	**Impact:** 2.80 **Product:** Conventional ready to use glass cleaners **Source:** Kapur et al. (2012)	**Impact:** 0.10 **Product:** Conventional ready to use glass cleaners **Source:** Kapur et al. (2012)
		Manufacturing	Not identified as an environmental impact hotspot by selected LCA studies and other supplementary information			
		Packaging	Same as for floor cleaning	Same as floor cleaning		
		Transport	Same as for floor cleaning			
		Use phase	Not identified as an environmental impact hotspot by selected LCA studies and other supplementary information			

Service type	Aspects	Lifecycle stages	Hotspots	Significant impact categories	Indicative climate change impact of example product/ service $gCO_2e/m^2/yr$ kept clean**	Indicative freshwater eutrophication of example product /service $mgPO_4^{3-}$ eq./ m^2/yr kept clean**
		End of Life	Same as for floor cleaning	Same as floor cleaning		
	Supplies and accessories	**Raw materials**	Same as for floor cleaning	Same as floor cleaning	Impact: 350 **Product:** Cleaning service **Source:** ADEME (2010)	Impact: 120 **Product:** Cleaning service **Source:** ADEME (2010)
		Manufacturing	**Manufacture of disposable vinyl gloves**** *Source: ADEME(2010)* (same as floor cleaning)			
		Packaging	Not identified as an environmental impact hotspot by selected LCA studies and other supplementary information			
		Transport	Not identified as an environmental impact hotspot by selected LCA studies and other supplementary information			
		Use phase	Not identified as an environmental impact hotspot by selected LCA studies and other supplementary information			
		End of Life	Not identified as an environmental impact hotspot by selected LCA studies and other supplementary information			
	TOTAL	**Minimum*** **	Source: ADEME (2010) Scope: Window cleaning		**-120**	**2.67**
		Maximum* **			**23**	**457**
Surface cleaning	**Cleaning products**	**Raw materials**	Same as floor cleaning products	Same as floor cleaning products	**Impact::** 2.41 **Product:** Conventional	**Impact:** 0.12 **Product:** Conventional
		Manufacturing	Not identified as an environmental impact hotspot by selected LCA studies and other supplementary information			

Service type	Aspects	Lifecycle stages	Hotspots	Significant impact categories	Indicative climate change impact of example product/ service $gCO_2e/m^2/yr$ kept clean**	Indicative freshwater eutrophication of example product /service $mgPO_4^{3-}$ eq./ m^2/yr kept clean**
		Packaging	Same as floor cleaning products	Same as floor cleaning products	ready to use general purpose cleaning product **Source:** Kapur et al. (2012)	ready to use general purpose cleaning product **Source:** Kapur et al. (2012)
		Transport	Same as floor cleaning products	Same as floor cleaning products		
		Use phase	Same as floor cleaning products	Same as floor cleaning products		
		End of Life	Same as floor cleaning products	Same as floor cleaning products		
	Supplies and accessories	**Raw materials**	Not identified as an environmental impact hotspot by selected LCA studies and other supplementary information		**Impact:** 372 **Product:** Cleaning service, e.g. vinyl gloves, bin bags **Source:** ADEME (2010)	**Impact:** 127 **Product:** Cleaning service, e.g. vinyl gloves, bin bags **Source:** ADEME (2010)
		Manufacturing	**Manufacturing of cotton cloths** *Source: ADEME(2010)* The manufacture of cotton cloths is a significant impact across 4 indicators (identified in the next column). The largest impact for this activity relates to the water consumption.	Largest for water consumption, acidification, creation of tropospheric ozone and destruction of the ozone layer.		
		Packaging	Not identified as an environmental impact hotspot by selected LCA studies and other supplementary information			
		Transport	Not identified as an environmental impact hotspot by selected LCA studies and other supplementary information			
		Use phase	Not identified as an environmental impact hotspot by selected LCA studies and other supplementary information			
		End of Life	Not identified as an environmental impact hotspot by selected LCA studies and other supplementary information			

Service type	Aspects	Lifecycle stages	Hotspots	Significant impact categories	Indicative climate change impact of example product/ service $gCO_2e/m^2/yr$ kept clean**	Indicative freshwater eutrophication of example product /service $mgPO_4^{3-}$ eq./ m^2/yr kept clean**
	TOTAL	**Minimum*** **	**Source:** ADEME (2010) **Scope:** Furniture cleaning		**11**	**10**
		Maximum* **			**727**	**152**

* ADEME (2010) collects data for 5 sites for office, corridor and bathroom cleaning services in France. One of the sites uses disposable vinyl gloves and this one occurrence is identified as an environmental hotspot. This indicates that the environmental impact of cleaning services the use of disposable gloves, which is not likely to have a substantial environmental impact itself, can be identified as an environmental hostpot for cleaning services..

**The functional units of the sources used are all aligned to $1m^2$ kept clean for a year. However, the results given in this table are indicative and are not directly comparable due to differences in study scope, boundaries and assumptions between each source. The scopes and assumptions of each selected study are detailed in Table 49 (2.4.1.8.)

*** The ADEME study has performed LCA studies of cleaning services on 5 sites. The maximum and minimum values in the table illustrate the result ranges for different cleaning services.

3.2.8.3 Overview of the main environmental hotspots of cleaning services

The biggest obstacle for understanding the environmental impact of cleaning services is the scarcity of information at the service level. There are good LCA studies on individual cleaning products, equipment, supplies and accessories. These studies provide good insight on lifecycle environmental impacts of individual products. However, the holistic environmental impact of cleaning service, which is a combination of different cleaning tasks using different cleaning products and equipment, is not being investigated in great detail. ADEME (2010) is only available study that investigates the environmental impact of cleaning services in a holistic sense.

The different environmental hotspots for the core components of cleaning services, i.e. cleaning products, cleaning supplies and accessories cleaning power equipment were identified. To this other environmental hotspots related to road transport and operational management were added based on a review of evidence from other labelling schemes and informed by stakeholders consultation. In order to develop a more comprehensive understanding of the environmental impact of cleaning services, information provided by stakeholders has also been used to fill the information gaps. Three stakeholders from different section of the cleaning service industry (a cleaning service provider, a cleaning product manufacturer and an industry body) were consulted. Stakeholders have provided useful insight on areas that are not covered by the literature in great detail, such as transport (i.e. logistics for both products and cleaning staff) and cleaning operations. In particular, cleaning operations (i.e. how cleaning services are being conducted), has been identified by stakeholders as a key determining factor of the efficiency and environmental impacts of cleaning services. The information gathered was further complemented with the analysis of the criteria in similar available labelling schemes for cleaning services. Table 5 (Chapter 1) summarises the criteria in existing schemes and standards relevant for Cleaning services.

The main environmental hotspots are briefly summarised in Table 62**Error! Reference source not found.**.

Table 62 Main environmental hotspots of cleaning services

Cleaning service components	Environmental hotspots
Cleaning products, supplies and accessories	Cleaning product formulation (raw materials) Packaging of cleaning products Raw material use, manufacturing and end-of-life of disposable cleaning supplies
Cleaning operations / power equipment / power equipment	Energy and water consumption in the use phase of cleaning products and power equipment
Road transport	Energy consumption and air emissions of road transport
Operational management	Wastewater discharge related to the used of cleaning products Waste treatmeant (solid and liquid waste sorting and collection)

In the following a brief critical analysis related to some of assumptions used in the LCA study reviewed for cleaning services (ADEME, 2010).

The LCA study reviewed (ADEME, 2010) considers the energy mix of France. Changing the energy mix may change the magnitude of the environmental impacts categories associated with the consumption of energy. The energy used during cleaning services operations has been identified as one of the environmental hotspot and feasible criterion options can be defined for this environmental aspect. This can be considered generally valid independently from the analysed geographical context.

The LCA study reviewed (ADEME, 2010) considers for the end of life scenario for solid waste: 53% incineration and 47% landfill (as illustrated in Table 49). According to the study this could be considered representative for the end of life disposal of plastics and paper (cardboard) in France. The magnitude of the environmental impact categories may vary depending on the treatment options considered and they could also represent an hotspot to some impact categories. Nevertheless, the end of life has been identified as an area where environmental benefits could be pursued by improving collection and sorting of waste at the point where the service is provided.

3.2.8.4 Summary of social impacts of cleaning services

Four key social impact considerations associated with cleaning services have been mainly identified:

- **Wage regulation** – As a labour cost intensive industry, wage regulations and policies have a direct impact of the work and living quality of cleaning service employees.
- **Cost-led contracting** – High pressures on cost are imposed to the cleaning service provider from clients, driving down profit margins and affecting service quality.

- **Health risks** – Exposure to cleaning chemicals may increase substantially health risks for workers..
- **Staff training** – Adequate staff training can significantly improve the efficiency and environmental performance of cleaning services.

4 Improvement potential areas

4.1 Objective

The aim of this chapter is to evaluate and prioritise improvement options which could assist the development of EU Ecolabel criteria for cleaning services by using findings from the market and technical analysis (Chapter 2 and 3) reports. To inform improvement options, the chapter identifies best practices and techniques for cleaning services.

Innovations and best practices for tackling key environmental and social impact hotspots have been identified through desk-based research and stakeholder interviews. Cleaning service providers can achieve significant environmental improvements by adopting best practice for product procurement, cleaning activities and operations management. Social improvements can be achieved through the development and implementation of good employee training and policies.

The following section discusses the innovations, best practices and best available techniques available in the market to improve the environmental and social performance of cleaning services.

Further detailed feedback is expected from the two Ad-Hoc Working Groups (AHWG's) that will take place during the criteria development process for EU Ecolabel and for revision of EU GPP criteria.

4.2 Environmental improvement areas

4.2.1 Cleaning products, supplies and accessories

4.2.1.1 Use of cleaning products with lower environmental impact

Cleaning services that use products with low environmental impact have lower overall impact. Ecolabels provide a reliable and easy way for cleaning service providers to identify cleaning products with improved sustainability performance. For example, products carrying the EU Ecolabel for all-purpose cleaners and sanitary cleaners (European Commission, 2014) are guaranteed to have the following merits:

- a reduced total quantity of chemicals,
- limited substances harmful to the aquatic environment,
- increased biodegradability,
- less packaging,
- an efficient wash, and
- carry reliable consumer information.

Some ecolabels for cleaning services require the use of ecolabelled cleaning products (European Commission, 2014). Cleaning service providers who aim to improve the sustainability of their operations should make conscious effort to use ecolabelled cleaning products. The European Commission estimates that the market penetration of ecolabelled I&I cleaning products is about 10-20%. With the introduction of the EU Ecolabel for cleaning services, the adoption of ecolabelled cleaning products in the professional cleaning service industry has significant potential to increase.

4.2.1.2 Cleaning product concentration at purchase

Transporting concentrated cleaning products is preferable in environmental terms as it avoids the need to transport the water used for product dilution. Concentrated products also reduce the amount of packaging per dose, further reducing environmental impact by saving materials and weight. Key types of transport-related environmental impact reduction include reduced fuel consumption, greenhouse gases emissions and particulate matter emissions.

For cleaning service providers, the best practices for cleaning product procurement and logistics include:

- Purchase concentrated cleaning products to transport them in concentrated form and delivery in bulk
- Posterior dilution at client sites

4.2.1.3 Recycled content in cleaning supplies

The use of recycled materials reduces the embodied environmental impacts of products by reducing the need to extract and process virgin materials. Cleaning equipment, such as rubbish bins, trolleys and bin bags, can use materials with recycled content to reduce environmental impacts.

No data was made available for the level of market penetration for cleaning supplies with recycling content. However, stakeholder consultation has indicated that this is a significant area of consideration for identifying environmental impact reduction opportunities.

4.2.1.4 Packaging

Packaging is used in large quantities for transporting and storing cleaning products. The environmental analysis has identified packaging as an environmental hotspot for cleaning products and consequently it has significant environmental implications for cleaning services. Cleaning service providers should look for cleaning products that use packaging materials with a lower environmental impact. The following list includes examples of how the sustainability of packaging can be improved by altering raw materials (UNEP, 2008).

- Avoid chlorinated plastics such as PVC

- Use recycled content and recyclable materials
- Use mono-material (single material) parts that can be separated and easily collected for recycling
- Reduce packaging sizes

4.2.1.5 Cleaning product dosing

Cleaning products at recommended concentrations are sufficient to achieve the required level of cleanliness. It is a common misconception that using more cleaning products will deliver better cleaning results. Moreover, stakeholder feedback suggests that overdosing of cleaning product is common in professional cleaning service industry. The use of cleaning chemicals at higher-than-recommended concentrations can also damage the surfaces being cleaned. Moreover, the excess use of cleaning products increases the environmental impact of cleaning services and health risks of cleaning workers associated to the use of cleaning products. The potential for improvement is due when adequate training to employees on optimal cleaning product dilution for different cleaning situations is provided. Dosing systems and clear, visual-led guidance for cleaning dilution can help cleaning staff achieves the right mix.

4.2.1.6 Cleaning cloths, mops and rags

For conventional cleaning supplies and accessories, such as cotton cloths and Kentucky mops, recycled materials can be a means to reduce environmental impacts by resource savings. Cleaning service providers should prioritise the opportunities to upgrade their cleaning supplies to achieve environmental improvements.

Innovative cleaning supply and accessory materials can improve cleaning efficiency and create considerable environmental benefits.Some cloths (e.g. microfibre cloths and ultra microfibers)are made with synthetic fabric with multi-stranded fibres. This fabric is highly absorbent, so in regular and light-weight cleaning scenarios, microfibre can deliver the desired cleaning result without cleaning chemicals. The latter example can remove grease and fingerprints on glass, mirrors, digital displays and metal surfaces without cleaning chemicals. Other rags (e.g. microfibre rags) are used for floor cleaning. Unlike traditional mops, they can pick up and retain large quantities of dirt and do not require frequent rinsing, reducing the need for water.

4.2.2 Cleaning operations / power equipment

4.2.2.1 Water use in cleaning services

Water use in cleaning services has been identified as an environmental hotspot in the environmental analysis. Water is used in significant amounts in cleaning services, for dilution, washing and rinsing. Water use is particularly high for sanitary and floor cleaning. The professional cleaning service industry has demonstrated that the use of innovative cleaning

equipment and supplies, such as microfibre cloths and cutting pads, provide alternative cleaning solutions that require the uses of low amount of water. Staff training on efficient cleaning practices can also reduce water use in washing and rinsing.

4.2.2.2 Energy use

- *WATER HEATING*

Hot water is often used for diluting concentrated cleaning products as cleaning staff believe higher temperatures will enhance cleaning efficiency. A consulted cleaning product supplier suggested that this is a common misconception and hot water is not generally required. Energy use for water heating can be easily reduced or eliminated by using unheated water for product dilution.

- *POWER EQUIPMENT*

The use phase is a very significant environmental hotspot for power cleaning equipment. Evidence on that is provided by the LCA studies reviewed and supported by stakeholders' views. Cleaning service providers can make use of this cleaning equipment that presents a good efficiency performance for energy consumption.

Cleaning service providers should prioritise the opportunities to upgrade their power cleaning equipment. This upgrade is supported by the new EC ecodesign legislation requires all vacuum cleaners produced after 1st September 2014 to include an energy efficiency rating label. Other restrictions will also be coming into force including power limits and performance requirements.

4.2.2.3 Staff Uniforms

Uniforms are used by the majority of cleaning service providers of all scales. Stakeholders have identified uniforms as a significant environmental hotspot because of laundering of uniforms contracted by the cleaning service providers. Washing of uniforms is the most significant contributor to the lifecycle environmental impacts of garments due to the water and energy consumptions. Laundry service specifications can mitigate these impacts by requiring specificities for the contracted services for uniform washing.

4.2.3 Road transport

Road transport in the cleaning services sector is dominated by passenger cars and vans used to move people, equipment and products between client sites. These journeys generate significant environmental impacts through energy use and emissions to air. To minimise these impacts, cleaning service providers should use vehicles with good fuel economy and environmental performance. European emission standards define the acceptable limits for

exhaust emissions of new vehicles sold in EU member states and therefore, provide good guidance for selection of vehicles with low air emissions. These emission standards are defined in a series of European Union directives.

The environmental impacts of cleaning product transportation from product manufacturers to cleaning service providers' warehouses or client sites can be also significant. The focus on the cleaning products is more evident due to the comparative larger weight and shorter lifetimes. An indicative example aiming to illustrate the scale of impact (not intended to represent a "current case") shows that greenhouse gas emissions could increase 26 times if a UK cleaning service provider sourced its products from China instead of the UK.

4.2.4 Operational management

4.2.4.1 Staff training

Cleaning services is a labour intensive industry. Despite the quality of cleaning products and equipment, efficient delivery of cleaning services depends on the skills of cleaning workers. Cleaning service providers should invest in staff training to ensure that their workforce has adequate cleaning skills. Training should cover the following areas:

- Handling of chemicals
- Use and maintenance of cleaning equipment and supplies
- Cleaning procedures
- Training on product, equipment and supply use
- Handling of waste
- Health, safety and environmental issues

Training standards and materials, some developed by industry bodies, are widely available and can help ensure the quality and credibility of training. Some service providers have developed their own training curriculum with additional focus on environmental and social sustainability (see for example Greenzone, 2014).

Using the right product for the right cleaning task can improve not only the effectiveness of cleaning activities, but also reduce the health risks associated with the misuse of cleaning products. Misuse of cleaning products can also lead to direct and immediate health risks. Although there is no available statistic to illustrate the scale of cleaning product misuse in the cleaning services sector, industry consultation suggests that this is an issue with considerable environmental and social impacts. For example, there have been incidents where ammonia has been accidentally mixed with bleach, releasing a toxic chloramine vapour that can damage the human respiratory system.

The promotion of the use appropriate chemicals is also very much related to the staff training. This is to say that cleaning service providers should ensure that their staffs have sufficient knowledge on the selection and use of cleaning products for different cleaning situations. Moreover, the use of a simplified cleaning product inventory also prevents the chemical misuse.

Industry stakeholders often point out that it is common for cleaning service providers to have a complex cleaning product inventory that consist of a range of specialised cleaning products for different cleaning purposes. Such complexity can easily lead to misuse and overuse of cleaning products, increasing the environmental impact of cleaning services and the health and safety risks associated with cleaning chemical exposure. A simplified product inventory could reduce these impacts and may have other advantages. For example, it eases the training to employees on efficient use of cleaning products and delivery of cleaning operations when there are fewer products involved. There is no data on the number of companies that are currently using a simplified inventory. However, some stakeholders have indicated that this can be considered for reduction of the environmental impacts.

4.2.4.2 Solid waste collection, disposal and recycling

The solid waste collection and disposal infrastructure and mechanism may be provided and managed by cleaning service providers. Cleaning services should provide easy ways to encourage recycling at client sites, such as colour-coded recycling bins. Prior to disposal, it is cleaning service providers' responsibility to ensure recyclable materials are separated from other waste to maximise recycling efficiency. The disposal and further treatment of solid waste can be delivered by independent waste treatment and disposal companies. However, cleaning service provider should ensure a streamlined waste collection and categorisation process prior to the collection for disposal and recycling. This can be done by providing the physical means (e.g. recycling bins) to streamlined waste collection at the company's facilities and also to promote streamlined wastes collection in staff training.

4.2.4.3 Wastewater discharge

Wastewater discharge inappropriately performed can be a large contributor to the environmental impact of the end-of-life phase of cleaning services. Inappropriate discharge of wastewater resulting from the cleaning operations can lead to severe environmental consequences such as eutrophication. This impact can be partly mitigated by using more sustainable cleaning products that contain less or no toxic ingredients and by training staff in best disposal practices. The best practice is to discharge waste water through channels that are connected to waste water treatment system, such as sinks or toilets. Cleaning service provider should work with their clients, ideally via the property management team, to identify best arrangement for waste water discharge.

4.2.4.4 Working environment and practices

Operational management has important implications on the efficiency of cleaning services. Best management practices that reducing the environmental impacts of cleaning products, equipment and supplies may include:

- **Colour coding** is very effective in helping cleaners to identify the right cleaning products and equipment to use in different situation. The colour code system is consistently applied to most cleaning equipment, including mops, buckets, clothes, microfibre dusters and gloves.
- Putting up **Image-led instruction posters** at noticeable locations of cleaning sites allows cleaning workers to find environmental and health and safety information easily.
- **Cleaning product and equipment storage** is important for cleaning service workers from a health and safety point of view. Cleaning workers have frequent and physical interaction with cleaning products and equipment, and storing them in a safe and easily-accessible way can improve efficiency and reduce health and safety risks.
- Cleaning service providers should comply with environmental management schemes such as the European Commission eco-management and audit scheme (EMAS), ISO 14001 standard, OHSAS 18001 standards or equivalent.

4.3 Social improvement areas

4.3.1 Wage policy

Responsible cleaning service providers should comply with minimum wage regulations. Cleaning service providers often commit to pay above minimum wage.

4.3.2 Cost-led contracting

The cleaning service industry is strongly driven by cost. The cleaning services EU Ecolabel might not be able to address cost-led contracting directly as it is a market issue rather than an operational one. However, the introduction of the EU Ecolabel may raise awareness of the benefits of sustainable cleaning services amongst clients. Offering genuinely sustainable cleaning services is valued by client organisations and has been proven to create competitive advantage for service providers. The EU Ecolabel aims to provide a commercial incentive for cleaning service providers to be more sustainable by acknowledging their good cleaning practices; and a means to connect them with the procurement needs of sustainable cleaning services.

4.3.3 Labour standards

Cleaning services is a highly cost-driven industry, and as a result the working environment and remuneration of cleaning service staff are of significant concern. Cleaning service providers should always comply with international labour standards to safeguard the wellbeing of their employees. The following is a list of international working standards (ILO

Core Conventions) provided by UNEP's Sustainable Procurement Guidelines for cleaning services (UNEP, 2008b):

- Freedom of Association and Protection of the Right to Organise (No. 87)
- Right to Organise and Collective Bargaining (No. 98)
- Forced Labour (No. 29)
- Abolition of Forced Labour (No. 105)
- Discrimination (Employment and Occupation) (No. 111)
- Equal Remuneration (No. 100)
- Minimum Age (No. 138)
- Worst Forms of Child Labour (No. 182)

4.4 CONCLUDING REMARKS

In conclusion, substantial potential improvement areas to reduce the environmental and social impacts of cleaning services have been identified.

Environmental improvement areas were identified for different aspects (i.e. criteria areas) of cleaning services. Cleaning products have been identified as a significant contributor to the environmental impact of cleaning services. The environmental impacts associated with cleaning products can be mitigated by using products with lower embodied environmental impacts. The use of ecolabelled products is a good way to ensure that the cleaning products used are more environmentally friendly. Cleaning service providers can also implement good practices on cleaning product procurement, including local sourcing and purchase of concentrated products to reduce the environmental impact of product transport. On the operational side, cleaning service providers should always look to increase the efficiency of their cleaning product use. This can be achieved by simplifying their cleaning product inventory. Cleaning service providers should look for recycled content in cleaning supplies and cleaning product packaging.

Optimising the operations of cleaning services can deliver substantial environmental impact reduction for cleaning services. Energy consumption from water heating and the use of power equipment are environmental hotspot of cleaning services. This can be addressed by using cold water for product dilution and using power equipment with high energy efficiency. Good practices on cleaning operations can also address environmental impacts associated with product dosing and water consumption. Innovations of cleaning accessories and supplies can improve the resource efficiency of cleaning operations significantly. Other areas of cleaning service operations, including road transport of staff and equipment and waste collection and disposal, were identified as key components of cleaning services and best practices to reduce environmental impact have been identified.

Effective general management of cleaning workforce and work place ensures that genuine environmental impact reduction for cleaning services can be realised. The provision of

comprehensive staff training and organised working environment is key to the delivery of efficiency cleaning services.

On the other hand, the social side of cleaning services should not be overlooked. Social hotspots, including wage policy, cost-led contracting and labour standards, can be improved by enforcing fair employment policies and complying with recognised labour standards.

These findings will be used as first supporting evidence for the development of criteria of the EU Ecolabel for cleaning services and revising the current EU GPP criteria for Cleaning Services.

5 Proposal for scope and definition for cleaning services

A review of the available ecolabelling schemes, standards, statistics and regulations shows that in general inside the scope of cleaning services are all indoor activities typically refer to clean commercial, public, and industrial buildings – performed on a regular basis (See section 1.3.1 for detail). Consolidating the result of the review, the majority of schemes identified focus on **Indoor activities performed regularly or periodically including the cleaning of commercial (e.g. offices, schools, shopping centres, hotels) or public/ institutional buildings (e.g. libraries, schools, museums, churches).** The proposed approach considers domestic/residential cleaning out of scope. This is mainly because commercial and institutional cleaning constitutes the largest market share of cleaning services provisions to market. This is also because some schemes (e.g. GS-49 Residential Cleaning Services (Green Seal)), consider domestic cleaning separately from commercial/institutional. However, this first approach maybe later revised in line with stakeholder opinions and further investigation on the eventual differences between domestic/residential and commercial cleaning practices.

Stakeholders feedback was required (by using a consultation questionnaire) on the following definition for Cleaning Services: *Professional cleaning operations, performed regularly or periodically in order to keep an indoor space clean, and that can be performed manually or making use of machinery.*

According to the preliminary research and stakeholder consultation questionnaire, the PG definition proposed to take further is presented below. A total of 21 organisations agreed with the proposed definition of the product group addressed in the survey. This constitutes an overall 78% of the total respondents. The extension to sanitization operations (e.g. cleaning of washrooms, bathrooms and toilets) aim to cover also the activities provided in the sanitary services taking place within indoor cleaning currently carried out by the cleaning services sector. The relevance of the **proposed definition** as defined below has been confirmed by stakeholders during the stakeholder consultation feedback.

Professional cleaning operations, performed regularly or periodically in order to keep an indoor space clean and sanitized, and that can be performed manually or making use of machinery

In terms of the **scope** a breakdown of market segment data for cleaning services show that indoor cleaning has the bulk of the market share. Data from 2010 shows that offices constitute 50% of the cleaning industry market (EFCI, 2012). The review made shows that several cleaning tasks take place routinely in order to keep an indoor space (building) clean and sanitized. Floor cleaning and the sanitary cleaning are among the most frequent cleaning operations. The stakeholder feedback suggested inclusion of glass/window cleaning and surface cleaning as part of the tasks routinely carried out in indoor cleaning of buildings. The scope of this project is then defined by the tasks performed in **routine cleaning (daily or weekly operations) taking place in indoor cleaning of buildings.** The activities in focus are the floor, surface, sanitary and glass/windows cleaning.

Table 63 provides insight, in terms of activities and operations for the cleaning service activities (i.e. floor cleaning, sanitary cleaning, glass/windows cleaning and surface cleaning) falling under the scope of Cleaning Services by considering the cleaning products, the power equipment use and the accessories and supplies assisting the cleaning operations tasks. These are also based upon the review made on similar labelling schemes for the cleaning services sector. There are evident relations among cleaning services and the cleaning products used under cleaning services. The criteria for cleaning products, used under the scope of Cleaning Services (all-purpose and sanitary cleaners), are being revised in parallel with the ongoing criteria revision for the EU Ecolabel for Cleaning Services.

Table 63 Cleaning activities, components and operations falling in the scope for cleaning services

Cleaning services activities		Operations
Floor cleaning	**Key cleaning activities:**	**Hard floor - vacuuming and washing; carpets - vacuuming**
	Cleaning product	General purpose cleaners; floor cleaners**
	Cleaning power equipment	Commercial upright vacuum cleaners, carpet extractors, rotary floor machines, wet pick-up machines
	Cleaning accessories and supplies	Floor pads, wet mops, bucket, trolleys, brooms, brush, plastic shovel, plastic brush, vacuum bag
Sanitary cleaning	**Key cleaning activities:**	**Cleaning sinks, toilet bowls and urinals, washing floor, emptying rubbish and sanitary bins, cleaning vertical surfaces**
	Cleaning product	Sanitary cleaners including toilet cleaners (various forms) and cleaners with limescale removal function
	Cleaning power equipment	Restroom cleaning machines; pressure washers
	Cleaning accessories and supplies	Waste handling equipment (carts/receptacles), towels, facial tissue, toilet tissue, sponges, scouring pads
Glass/windows cleaning	**Key cleaning activities:**	**Cleaning of internal windows, glass and mirrors**
	Cleaning product	General purpose cleaners; glass/window cleaners; window washing concentrate
	Cleaning power equipment	N/A (manual cleaning only)
	Cleaning accessories and supplies	Reusable gloves; disposable gloves; water buckets; cloths rags and paper towels; sprayer bottle

Cleaning services activities		Operations
Surface cleaning	**Key cleaning activities:**	**Dusting and washing surfaces and furniture; maintenance of office and communication equipment; cleaning of contact points: handles, switches and phones; washing waste bins, wiping windowsills, dusting table legs and chairs**
	Cleaning product	General purpose cleaners
	Cleaning power equipment	N/A (manual cleaning only)
	Cleaning accessories and supplies	Dusters; mops; disposable wipes

N/A – not applicable

In respect to what is normally considered **out of scope** the same schemes reviewed include: **Industrial cleaning** (e.g. environmental remediation, manufacturing process cleaning); **special cleaning services** (e.g. carpet shampooing, upholstery cleaning, or mould remediation services) and **sanitation services** (e.g. sewer sanitation, cleaning after accidents/disasters, and removal of graffiti). In addition, the overview allow concluding that laundry, handwashing and dishwashing are services that do not fall under the definition and/or existing scope for cleaning services for a large number of current labelling schemes. Out of scope are the non-routine cleaning operations (as e.g. specialised cleaning and specialised industrial cleaning activities).

This initial proposed scope also considers that domestic/residential cleaning may be out of scope. This is mainly because the breakdowns of the cleaning services market do not clearly evidence a market share specifically for residential / domestic cleaning (cfr. Figure 10, Chapter 1). However, considering that some ecolabels such as the Australian Ecolabel Program - Good Environmental Choice Australia Standard – Cleaning and the Nordic Swan consider domestic/residential cleaning included in the scope and that stakeholders expressed residential building to be an area for cleaning activities (cfr. Table 4, Chapter 1), this first approach might be later revised in line with stakeholder opinions and further investigation on the eventual differences (in terms of tasks performed and the use, or not, of specialised products used) in domestic/residential cleaning practices.

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ANNEX

ANNEX A: First Stakeholder Questionnaire: Product scope and criteria

The stakeholder questionnaire on product scope and criteria is enclosed below:

This questionnaire is intended to inform the 'Development of an EU Ecolabel and Revision of Green Public Procurement (GPP) criteria for Cleaning Services'

Your Company or Organisation details

Please provide your contact details in the table below.

Detail	Please provide your details below	
Title		
* Name		
* Company/Organisation		
* Organisation type	Cleaning products manufacturer:	
	- Dishwashing detergents	
	- Laundry detergents	
	- General cleaning products (please specify):	
	Certified EPD cleaning services	
	Cleaning services buyer	
	Cleaning services provider	
	Cleaning services providers (umbrella organisation)	
	Cleanings services (facilities management)	
	Ecolabeling schemes organisations	
	Organisations awarded with Ecolabeling schemes	
	Government /Public administration	
	Industry (umbrella organisations)	
	Industry body	
	Public procurers (*please specify your involvement with public procurement*)	
	Other (please specify):	
Job Title/Position		
Address		
Postal Code		
* Country		
Telephone Number		
* Email		
Web		

** Please provide these details at a minimum*

Please email completed questionnaires to

JRC-IPTS-CLEANINGSERVICES@ec.europa.eu and bethany.field@bestfootforward.com no later than the **24th February 2014**

All information will be treated confidentially and will only be used as background information in order to propose a coherent and realistic product scope. Please, feel free to forward this questionnaire to any person or organisation which may potentially be interested in the EU Ecolabel development and revision of GPP criteria.

1. Introduction

The objective of this questionnaire is to:

1. Obtain your views on what should be considered within the scope of the new EU Ecolabel for Cleaning Services;
2. Understand your experience with the current EU Green Product Procurement (GPP) criteria for Cleaning Services; and
3. Evaluate what you consider as priorities for the revision of the EU GPP criteria.

Stakeholder involvement in this project is very important. This questionnaire is the first opportunity for stakeholders to input into the development and revision process. Stakeholders are invited to share with us their experience and knowledge in relation to the GPP criteria for Cleaning Services and to contribute to the development of new Ecolabel in terms of definitions, scope and criteria of assessment.

Following this questionnaire, a formal proposal on the scope for the Ecolabel and Green Public Procurement on Cleaning Services will be developed. We will then complete a market and a technical analysis. The technical analysis will take a life cycle approach to assessing cleaning services on economic, social and environmental criteria. This will further inform and validate criteria development.

Later in the process, drafts of the proposed EU Ecolabel and EU GPP criteria and supporting technical reports (including Market and Technical Analysis) will be circulated. These drafts will be discussed at two working group meetings planned to take place during 2014 and 2015. Meetings will be open to all registered stakeholders.

This questionnaire is divided into different sections addressing EU Ecolabel and GPP stakeholders. Section 3 is devoted to Development of criteria for the EU Ecolabel for Cleaning Services and Section 4 on the Revision of criteria for EU GPP for Cleaning Services.

In order to be kept up-to-date, stakeholders are invited to use the official project website: **http://susproc.jrc.ec.europa.eu/cleaning services/**

Key documents produced during the project will be posted here for public access and comment. The current GPP criteria for the product group can also be downloaded from the above website.

Questionnaire structure

- **Section 2** will introduce preliminary analysis relating to product scope, definition and sector focussed market information.

- **Section 3** will ask for feedback on the development of criteria for the EU Ecolabel for Cleaning Services

- **Section 4** will ask for feedback on the revision of criteria for EU GPP for Cleaning Services

2. Product Group definition and scope on Cleaning Services

A preliminary analysis of the existing definitions and scope for the product group is summarised here in order to help identify the type of approaches being taken for Cleaning Services. **Section 3** and **4** will then ask for your specific views on the proposed scope and definition, and will capture your initial views for Cleaning Services.

Product Group Definitions

The product group "cleaning services" is yet to be defined. No clear product definition is available. Examples of definitions and scope taken from other existing initiatives for Cleaning Services are listed below and have been taken into consideration.

Example 1 (taken from Nordic Swan):

Standard* cleaning: regarding regular or periodic tasks performed to keep an indoor space clean reported to an area (m^2) of clean space per year.

**Standard cleaning: is performed regularly and frequently – on a day to day basis and up to once per month.*

Example 2 (taken from the current Product Category Rules for professional Cleaning Services for Buildings):

Professional cleaning services for public and private building (as offices, hospitals and schools) making use of machinery or equipment as (e.g. washing machines, trolleys) This covers all type of floor cleaning services including vertical surfaces as windows if the area cleaned (m^2) is < 20% of the total.

Measurement: 1m^2 of average representative cleaning area (1 year). The cleaning may be due in a daily basis, one or two times per week, but is fixed within a year.

Summary on scope definitions:

A review of the available criteria for cleaning services, used in other initiatives, shows that in general the following services are **inside the scope** of 'cleaning services':

All indoor activities typically required to clean commercial, public, and industrial buildings – performed on a regular basis.

Services that are normally considered **out of scope** in other initiatives include:

- Specialised/industrial cleaning (such as window cleaning, sewer sanitation, carpet cleaning, cleaning after accidents, cleaning of manufacturing rooms, refurbishment/asbestos removal)
- Domestic/residential cleaning is not normally in scope

The scope revision does not allow for a clear identification on the inclusion of certain aspects such as laundry, hand washing and dishwashing.

Relevant existing criteria for Cleaning Products and its use within Cleaning Services

Cleaning Services refers both to products and services. In that context it is important to point out that a range of cleaning products is covered by EU Ecolabel criteria. These are dishwashers' detergents (domestic and industrial & institutional) and laundry detergents (domestic and industrial & institutional), all-purpose cleaners and hand dishwashing detergents.

The product groups dishwashers' detergents (domestic and industrial & institutional) and laundry (domestic and industrial & institutional) criteria are being revised currently. The product groups all-purpose cleaners and hand dishwashing detergents will be launched earlier this year. Common criteria for these products are:

- *Toxicity to aquatic environment*
- *Biodegradability*
- *Substances*
- *Fragrances*
- *Packaging*
- *Fitness for use*
- *User instructions*
- *Information on Ecolabel*

A link to the existing criteria for the full range of cleaning product groups can be found below.

EU Ecolabel to all-purpose cleaners and sanitary cleaners *(Commission Decision (2011) 4442)*	http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:169:0052:0064:EN:PDF
Ecolabel to hand dishwashing detergents *(Commission Decision (2011) 4448)*	http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:169:0040:0051:EN:PDF
EU Ecolabel for laundry detergents *(Commission Decision (2011) 2815)*	http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:111:0034:0047:EN:PDF
EU Ecolabel to detergents for dishwashers *(Commission Decision (2011) 2806)*	http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:111:0022:0033:EN:PDF

Criteria for sourcing the cleaning products associated with a cleaning service could be based on the EU Ecolabel. Therefore a cleaning service company has to use cleaning products certified to the EU Ecolabel or equivalent to be able to obtain the EU Ecolabel for Cleaning Services. However, in addition to criteria specific to the cleaning products purchased; there will be criteria concerning other items used by a cleaning services company. For example, the machinery used, if and whether this is mechanical or manual; and approaches to reducing water use and waste production.

We would like your feedback on the relevance of these criteria for the development of EU Ecolabel and GPP criteria on Cleaning Services.

A set of criteria will be developed for the Cleaning Services Ecolabel drawing on existing definitions and category scope. The questionnaire below aims to capture your feedback on the definition and which services should be included or excluded from the category scope. It is also requested a preliminary view on the boundaries for this broad product group: Cleaning Services.

Preliminary market data in the industrial cleaning sector[1]

[1] Source: http://www.feni.be/index.php?id=18

Sector in Europe	2010 data from the European Federation of Cleaning Industries
Turnover	61.5 billion €
Market penetration	64.7%
Cleaning contractors	over 139,000
Employees	over 3.32 million
Part-time work	67%
Proportion of women	74%

Market trends characterised by a diversification of services

The perception of services provided by cleaning companies is very often limited to "office" cleaning, and in 2002 the EFCI reports a share of 57% of the market[2]. However, although that type of activity still represents the bulk of the market in Europe, the diversification of activities towards **integrated services and facilities management** is now a reality in all EU member states: industrial cleaning (including the hygiene of food chains), specialised cleaning services (e.g. hospital cleaning), façade and window-cleaning, cleaning of public transport, cleaning of schools and others. Taken together, these services represent almost half the sector's turnover. They all involve the use of equipment as well as specific training for employees[3].

3. Questionnaire: Development of criteria for the EU Ecolabel for Cleaning Services

This questionnaire will ask for your feedback relating to a) the cleaning service **definition**, b) the physical **scope** of cleaning services, c) the **boundaries** for cleaning services and d) the **legislation, industry guidance, and standards** used for cleaning products and services

CLEANING SERVICES DEFINITION	YES	NO	COMMENTS (please also specify the reasoning for disagreement)
3.1 Do you agree with the definition for this Product Group?			

[2] Source: EFCI survey, EFCI, July 2003, p.9 The cleaning industry in Europe: An EFCI survey, EFCI

[3]Source: http://www.feni.be/index.php?id=18

Professional cleaning operations, performed regularly or periodically in order to keep an indoor space clean, and that can be performed manually or making use of machinery.			
CLEANING SERVICES SCOPE (PHYSICAL)	**YES**	**NO**	**COMMENTS (please also specify the reasoning for disagreement)**
3.2 Do you agree that the services listed should be part of the scope?			
Commercial buildings (as e.g. offices)			
Institutional buildings (as e.g. schools, hospitals, prisons)			
Residences			
Other			
3.3 Would you consider these types of cleaning operations to be in scope?			
Floor cleaning			
Windows cleaning			
Sanitary cleaning			
Carpets & upholstery cleaning			
Any other type? Why?			

Introduction:

Currently, environmental criteria areas are addressing mainly agents used in cleaning. In addition to that there are a number of other issues to address that include the type of equipment used, energy consumption, water use, transportation, waste and staff training and cleaning procedures. Please give a feedback regarding their potential inclusion.

CLEANING SERVICES (BOUNDARIES)	**YES**	**NO**	**COMMENTS (please also specify the reasoning for disagreement)**
3.4 Should chemical use be considered for inclusion within the boundaries?			
3.5 Should energy consumption be considered if the cleaning operations are mechanised?			
3.6 Should machinery used be included where used?			
3.7 Should requirements on transportation be considered (e.g. fuel use and efficiency)?			
3.8 Should water consumption be considered?			
3.9 Should waste (and wastewater) be considered?			
3.10 Should the purchase cleaning products and materials be considered?			
3.11 Should requirements on employment practices (e.g. training) be considered?			
3.12 Do you identify any other area important to consider? Please specify the reasoning			

The following section aims to obtain feedback from **providers of cleaning services** and also **providers of cleaning products**. Please provide information accordingly to your activity.

FEEDBACK ON LEGISLATION, INDUSTRY GUIDANCE, AND STANDARDS USED FOR CLEANING PRODUCTS AND SERVICES	YES	NO	COMMENTS (please also specify the reasoning for disagreement)
3.13 Are there any important voluntary or mandatory standards and regulations which you follow?			
3.13.1. For Cleaning Products?			
3.13.2. For Cleaning Services?			
3.14 Is your organisation awarded with any existing Ecolabel scheme for cleaning services (e.g. Nordic Swan)?			
3.15 Do you carry out any risk assessments of your cleaning products to assess its chemical impacts?			
3.16 Does the REACH regulation affect your business? *If yes, please indicate how?*			
3.17 Does the CLP Directive affect your business? *If yes, please indicate how?*			
3.18 Does the Detergents Regulation affect your business? *If yes, please indicate how?*			

4. Questionnaire: Revision of criteria for EU GPP for Cleaning Services

This section is to be filled out by organisations that procure cleaning services. This questionnaire will ask for your feedback relating to a) **product group definition** for Cleaning Services, b) on your **activities** in relation to Cleaning Services and finally c) on the **existing** GPP criteria.

Cleaning services buyers and providers are requested to complete section 4.1.

- If you **buy** cleaning services please also complete section 4.2 and 4.4
- If you **provide** cleaning services please also complete section 4.3

4.1. Product Group (Cleaning Services) definition

No definition for the product group scope is available for Cleaning Services. We would like to obtain your feedback on the approach to the definition that may be taken.

Question for buyers and providers of cleaning services	YES	NO	COMMENTS (please also specify the reasoning for disagreement)
4.1.1 From the perspective of GPP, do you agree to the same definition for Cleaning Services as identified for Ecolabel (*below a copy of the definition taken from question 3.1 .is provided*) *Professional cleaning operations, performed regularly or periodically in order to keep an indoor space clean, and that can be performed manually or make use of machinery.*			

4.2. Specific details about Cleaning Services purchasing within your organisation

The provision of this information is important for the development of the criteria to understand the scope of services that are currently procured; as this will feed into the scope and definition for Cleaning Services product category.

Questions for buyers of Cleaning Services	COMMENTS (please also specify when applicable)		
4.2.1 How relevant are the following categories of **products** within the Cleaning Services purchasing contracts? *Please see also (a) (b) or (c) as indicated in this table footnote for details*	**Very important**	**Important**	**Not important /n.a. (if not purchased)**
All-purpose cleaners (a)			

Questions for buyers of Cleaning Services	COMMENTS (please also specify when applicable)		
Sanitary cleaners (b)			
Windows cleaners (c)			
Hand dishwashing detergents			
Laundry detergents and stain removers			
Dishwasher detergents and rinse aids			
Please also refer to other if applicable.			

4.2.2 If you purchase Cleaning Services, *please indicate:*		
Do you purchase a whole package of services? If yes please indicate which?	Indoor cleaning	
	Floor cleaning	
	Windows cleaning	
	Sanitary cleaning	
	Laundry	
	Dishwasher detergents and rinse aids	
	Please also refer to other if applicable	

4.2.3 Do you purchase individual products? If yes, please *indicate which ones and how often?*	All-purpose cleaners	
	Sanitary cleaners	
	Windows cleaners	
	Hand dishwashing detergents	
	Laundry detergents and stain removers	
	Dishwasher detergents and rinse aids	
	Please also refer to other if applicable	

(a) All-purpose cleaners comprising detergent products intended for the routine cleaning of floors, walls, ceilings, windows and other fixed surfaces, and which are either diluted in water prior to use or used without dilution. All-purpose cleaners mean products intended for indoor use in buildings which include domestic, commercial and industrial facilities.

(b) Sanitary cleaners comprising detergent products intended for the routine removal, including by scouring, of dirt and/or deposits in sanitary facilities, such as laundry rooms, toilets, bathrooms, showers, and kitchens. This subgroup thus contains bathroom cleaners and kitchen cleaners.

(c) Window cleaners comprising specific cleaners intended for the routine cleaning of windows, and which are used without dilution.

4.3. Specific details about Cleaning Services provisions by your organisation

This information is important for the development of the criteria to understand the scope of services that are currently procured; as this will feed into the scope and definition for Cleaning Services.

Questions for providers of Cleaning Services	COMMENTS (please also specify when applicable)		
4.3.1. What types of Cleaning Services are usually provided by your organisation? *(e.g. indoor cleaning (performed in offices, hospitals, schools) and including floor cleaning;* *windows cleaning;* *sanitary cleaning;* *carpets and upholstery;* *other professional cleaning (e.g. laundry services, sanitary washing (i.e. use of hand washing detergents),* *dishwashing)*			
4.3.2 How important (in product units) are the following categories of products within public procurement for Cleaning Services? *Please see also (a) (b) or (c) as indicated in this table footnote for details*	**Very important**	**Important**	**Not important /N.A (if not provided)**
All-purpose cleaners (a)			
Sanitary cleaners (b)			
Windows cleaners (c)			
Hand dishwashing detergents			
Laundry detergents and stain removers			
Dishwasher detergents and rinse aids			
Please also refer to other if applicable.			

Questions for providers of Cleaning Services	COMMENTS (please also specify when applicable)	
4.3.3 Please indicate below how Cleaning Services are purchased within public procurement (e.g. in bulk package or as single products)		
4.3.3.1 Do you provide a whole package of services? If yes, please indicate which ones.	Indoor cleaning	
	Floor cleaning	
	Windows cleaning	
	Sanitary cleaning	
	Laundry	
	Dishwasher detergents and rinse aids	
	Please also refer to other if applicable	
4.3.3.2 Do you provide individual products? If yes, please indicate which ones.	All-purpose cleaners (a)	
	Sanitary cleaners (b)	
	Windows cleaners (c)	
	Hand dishwashing detergents	
	Laundry detergents and stain removers	
	Dishwasher detergents and rinse aids	
	Please also refer to other if applicable	
4.3.3 Please identify elements considered as best environmental practices within the cleaning services you provide?		

(a) All-purpose cleaners comprising detergent products intended for the routine cleaning of floors, walls, ceilings, windows and other fixed surfaces, and which are either diluted in water prior to use or used without dilution. All-purpose cleaners mean products intended for indoor use in buildings which include domestic, commercial and industrial facilities.

(b) Sanitary cleaners comprising detergent products intended for the routine removal, including by scouring, of dirt and/or deposits in sanitary facilities, such as laundry rooms, toilets, bathrooms, showers, and kitchens. This subgroup thus contains bathroom cleaners and kitchen cleaners.

(c) Window cleaners comprising specific cleaners intended for the routine cleaning of windows, and which are used without dilution.

4.4. Feedback on GPP criteria for Cleaning Services

Green Public Procurement criteria are structured in core criteria, which represent a minimum requirement and a set of comprehensive criteria, which reflects higher environmental ambitions. The existing Cleaning Services criteria are structured as follows (also available in http://ec.europa.eu/environment/gpp/pdf/criteria/cleaning.pdf.

Criteria
Criterion #1: Products used must **meet the relevant comprehensive criteria for cleaning products** (see below *)
Criterion #2: After the first six months of the contract, and thereafter at the end of every year of the contract, **a balance must be submitted by the contractor indicating the name and quantity of the cleaning products used**.
Criterion #3: All **cleaning staff** employed in carrying out the service must be **regularly trained** for their various tasks. This training should cover cleaning agents, methods, equipment and machines used; waste management and aspects of health, safety and the environment.
Criterion #4: The tenderer must demonstrate its capacity to carry out the service in an environmentally sound manner. This must include **evidence of the regular training of staff on health, safety and environmental aspects** of cleaning activities and **evidence of compliance with environmental and health and safety obligations**.
Criterion #5: In agreement with the contracting authority, **precise work instructions** on environmental protection and on health and safety standards in carrying out the service **shall be produced and displayed in the buildings** in a way that they can be consulted by cleaning staff at any time.

Criterion #6: A **facility manager**, foreman/forewoman or co-ordinator **should be nominated to organise and supervise the cleaning**. The appointed person should stay in contact with the contracting authority and be reachable during working hours. The facility manager, foreman/forewoman or coordinator **has to be sufficiently trained in the fields of occupational health and safety standards, application techniques and environmental issues.**
Criterion #7: The contractor should **use reusable microfiber cloths where appropriate**

** Cleaning agents must meet a range of minimum requirements relating to the exclusion of certain hazardous ingredients, the bioaccumulation of biocides, the content of phosphorus and dosage recommendations.*

For detailed information see criteria for the all set of cleaning agents in http://ec.europa.eu/environment/gpp/pdf/criteria/cleaning.pdf.

The following table allows us to obtain an overview of the use of GPP criteria within the procurement process.

	YES	NO	COMMENTS
4.4.1 Have you or authorities you work with, used any environmental criteria (*other than EU GPP*) in your tenders for purchasing Cleaning Services?			
If yes, please briefly identify the criteria in use and how they have been applied (If possible refer to: *selection criterion, technical specifications, award criteria or contract specifications*)	*NOTE: in alternative please list the criteria used or a current relevant standard).*		
4.4.2. Do you have experience in using EU GPP criteria?			
If yes, which of the EU GPP criteria listed previously (in previous page) have been used in your tenders for purchasing Cleaning Services? (Please refer to the table above for criterion #1 to #7)			
4.4.3. Do you have experience in using <u>adapted</u> EU GPP criteria?			*NOTE: If yes, please specify the set of criteria in use*
4.4.4 Based on your experience with the current EU GPP criteria what would your priority criteria areas or approaches be in seeking to revise the current EU GPP criteria?	NOTE: What improvements could be made to the EU GPP criteria (#1 to #7)		
4.4.5 Are you aware of any relevant procurement network, forum or ready available documents that inform about the use of GPP for Cleaning Services?	NOTE: Please provide us with information you may think relevant for EU GPP criteria revision		

Thank you for taking the time to complete this questionnaire. We look forward to hearing from you. If you have any further questions please do not hesitate to contact us.

ANNEX B: Market Analysis Calculation Methods and Assumptions

Calculation method for the market size estimation of the EU cleaning services industry

The EFCI dataset provides cleaning services turnover for 19 out of 30 countries of the EU28, Norway and Switzerland. In order to estimate the total cleaning service industry turnover of all EU28, Norway and Switzerland countries, the cleaning service industry turnover figures of the 19 available countries were compared against their corresponding GDP figures (World Bank, 2012) to calculate an average turnover-to-GDP ratio using the following formula:

Average percentage of total cleaning service industry turnover to total GDP = Total cleaning services turnover of the 19 countries available on the EFCI dataset for 2010 / Total GDP of the corresponding countries = €62bn / €11 642bn = 0.5%.

This percentage figure is then applied to the GDP (World Bank, 2012) of the EU28 countries that EFCI cleaning service industry turnover figures were unavailable = 0.5% * €705bn = €3bn

By adding the EFCI and the calculated figures, total estimated turnover of the cleaning service industry in the EU28 can be calculated: €62bn + €3bn = €65bn.

Table B1 GDP and turnover figures used for calculation

Country	EU28	GDP (million €) (World Bank, 2012)	Industry turnover (Millions €)	% Cleaning service turnover: GDP	Market turnover data source
Germany	Yes	2 535 207	11 447	0.45%	EFCI, 2012
France	Yes	1 932 304	11 036	0.57%	
Italy	Yes	1 489 910	8 538	0.57%	
United Kingdom	Yes	1 828 984	8 431	0.46%	
Spain	Yes	978 373	7 113	0.73%	
Netherlands	Yes	592 396	3 147	0.53%	
Sweden	Yes	387 615	2 669	0.69%	
Finland	Yes	183 068	1 700	0.93%	
Denmark	Yes	233 018	1 600	0.69%	
Belgium	Yes	357 717	1 320	0.37%	
Norway	No	369 754	1 165	0.32%	
Austria	Yes	291 899	1 000	0.34%	
Czech Republic	Yes	145 370	645	0.44%	

Country	EU28	GDP (million €) (World Bank, 2012)	Industry turnover (Millions €)	% Cleaning service turnover: GDP	Market turnover data source
Hungary	Yes	92 204	500	0.54%	
Switzerland	No	467 075	427	0.09%	
Portugal	Yes	156 983	400	0.25%	
Poland	Yes	362 490	168	0.05%	
Slovenia	Yes	33 581	141	0.42%	
Luxembourg	Yes	40 806	100	0.25%	
Bulgaria	Yes	37 719	194	Assumed 0.5% based on calculation of other EU28 countries	Calculated
Estonia	Yes	16 558	85		
Ireland	Yes	155 872	803		
Greece	Yes	184 216	949		
Cyprus	Yes	16 848	87		
Latvia	Yes	21 000	108		
Lithuania	Yes	31 331	161		
Malta	Yes	6 494	33		
Romania	Yes	125 353	646		
Slovakia	Yes	67 598	348		
Croatia	Yes	41 771	215		
Total cleaning service industry turnover			**65 023**		

The main assumption used in the calculation is that it assumes that the turnover: GDP ratio of cleaning service industry in the countries that are not available on the EFCI data is similar to the countries on the dataset. This is a reasonable assumption because:

1. The range of the turnover: GDP percentage ratio for the 17 countries is relatively narrow, ranging from 0.05% to 0.93%
2. The countries that are unavailable on the EFCI datasets have relatively minor contribution to the EU economically. The total GDP of these countries only accounts for 6% of the total EU28 GDP, implying that they are not likely to affect the estimation significantly.

ANNEX C: Categorisation of Cleaning Products, Equipment, Supplies & Accessories and Paper and Plastics

Table C1 Product classification extracted from Report on 2012 Sanitary Supply Distributor Sales Results (Sanitary Maintenance Magazine & ISSA, 2013)

Products	Category/scope
Resilient & Hard Floor Chemicals (stripper/neutralizers/seals/finishers/restorers/spray buffs/etc.)	Floor cleaning
Carpet Care Chemicals (shampoos/pretreats/spotters/etc.)	Floor cleaning
Disinfectants & Sanitizers (bowl/porcelain cleaners/etc.)	Sanitary cleaning
Cleaners & Degreasers (glass/wall)	Windows cleaning
Power equipment	**Category/scope**
Replacement Parts	All
Automatic Scrubbers	Floor cleaning
Vacuums (upright/wide area)	Floor cleaning
Electric (Corded) Powered Floor Machines (polishers/burnishers)	Floor cleaning
Carpet Extractors	Floor cleaning
Battery Powered Floor Machines (polishers/burnishers)	Floor cleaning
Vacuums (tank and wet/dry)	Floor cleaning
Vacuums (backpack)	Floor cleaning
Propane Powered Floor Machines	Floor cleaning
Restroom Cleaning Machines (not including pressure washers)	Floor cleaning/Sanitary
Supplies and accessories	**Category/scope**
Gloves (light weight/disposable & safety)	All
Microfibre Products (mops, clothes, etc.)	All
Waste Handling Equipment (carts/receptacles, NOT liners)	All
Cloth rags (not microfibre)	All
Other Supplies/Accessories not listed above	All

Safety Products (other than gloves)	All
Protective Clothing/Equipment	All
Absorbents/Spill Containment	All
Floor Pads	Floor cleaning
Wet Mops (all types, except microfibre)	Floor cleaning
Mopping Equipment	Floor cleaning
Brooms & Brushes	Floor cleaning
Dusters & Dust Mops, & Applicator Pads	Floor cleaning
Floor Machine Brushes	Floor cleaning
Window Washing Accessories (buckets/holsters/etc., NOT squeegees)	Window washing
Mats & Matting	Floor cleaning
Paper and plastics	Category/scope
Liners & Bags (paper or synthetic/plastic)	All
Packaging Products	All
Towels/Facial Tissue/Toilet Tissue	Sanitary cleaning
Industrial Wipers	Windows cleaning

ANNEX D: Calculation Method for an Alternative Market Value and Consumption Estimate of Professional Cleaning Products in EU

The EU28, Norway and Switzerland professional cleaning product market value and consumption data is provided by EFCI (i.e. 590 000 tonnes). The total product consumption figure is a top-down estimation calculated using the market value. An additional estimate calculation has been performed to sense-check the EFCI figure by using a bottom-up calculation approach based on the Italian professional cleaning product production dataset provided by Afidamp, an Italian association of manufacturers.

The calculation is to put the Italian data in the context of the EU cleaning services industry by first estimating the percentage contribution of the Italian cleaning service industry to the entire EU cleaning service industry. This is done by using cleaning service industry market size data calculated in the previous section:

Italian percentage contribution = Turnover of Italian cleaning service industry / Total turnover of EU28, Norway and Switzerland cleaning service industry

= €9bn / €65bn = 13%

The next step is to scale up the Italian data to the EU level:

Total EU28, Norway and Switzerland professional cleaning product production = Italian professional cleaning product production / Italian percentage contribution

= 109 303 tonnes / 13% = 832 000 tonnes (Market volume)

= €179 m / 13% = €1 361m (Market value)

This calculation gives us a product consumption to market value ratio of 1.6 €/kg, which is close the 1.5 €/kg ratio used by A.I.S.E to convert the market value figure into consumption. This sense-checking exercise suggests that the reliability of market value and consumption estimate provided by A.I.S.E is likely to be high.

ANNEX E: Professional Cleaning Product Production in EU

This section provides an explanation on how the export adjustment factor used in section 2.3.3.1 to estimate professional cleaning product production in EU is calculated.

The export adjustment factor is calculated by comparing the total EU27 production figure of cleaning products (include both domestic and commercial cleaning products) that are associated to professional cleaning activities with the corresponding apparent consumption figure. A selection of 22 PRODCOM product groups is used for the calculation of this factor. It is assumed that the selected PRODCOM product groups are representative of products used for professional cleaning services.

Table E1 List of PRODCOM product groups used in this analysis

Code	PRODCOM List Description	Apparent consumption (tonnes)	Production (tonnes)
13922953	Floor-cloths, dish-cloths, dusters and similar cleaning cloths, of nonwoven textiles	27 864	25 515
13922957	Floor-cloths, dish-cloths, dusters and similar cleaning cloths (excluding knitted or crocheted, articles of nonwoven textiles)	52 621	37 110
20412020	Anionic surface-active agents (excluding soap)	1 228 238	1 460 952
20412030	Cationic surface-active agents (excluding soap)	669 997	693 818
20412050	Non-ionic surface-active agents (excluding soap)	1 058 980	1 235 774
20412090	Organic surface-active agents (excluding soap, anionic, cationic, non-ionic)	293 445	341 086
20411000	Glycerol (glycerine), crude; glycerol waters and glycerol lyes	474 101	432 475
20413120	Soap and organic surface-active products in bars, etc., n.e.c.	142 617	147 968
20413150	Soap in the form of flakes, wafers, granules or powders	192 904	166 450

Code	PRODCOM List Description	Apparent consumption (tonnes)	Production (tonnes)
20413180	Soap in forms excluding bars, cakes or moulded shapes, paper, wadding, felt and non-wovens impregnated or coated with soap/detergent, flakes, granules or powders	596 922	603 146
20413240	Surface-active preparations, whether or not containing soap, p.r.s. (excluding those for use as soap)	1 061 711	1 108 191
20413250	Washing preparations and cleaning preparations, with or without soap, p.r.s. including auxiliary washing preparations excluding those for use as soap, surface-active preparations	7 130 912	7 756 702
20413260	Surface-active preparations, whether or not containing soap, n.p.r.s. (excluding those for use as soap)	408 867	580 049
20413270	Washing preparations and cleaning preparations, with or without soap, n.p.r.s. including auxiliary washing preparations excluding those for use as soap, surface-active preparations	1 601 111	1 765 769
20414270	Artificial and prepared waxes of polyethylene glycol	69 040	80 000
20414280	Artificial and prepared waxes (including sealing waxes) (excluding of polyethylene glycol)	289 366	366 828
20414330	Polishes, creams and similar preparations, for footwear or leather (excluding artificial and prepared waxes)	15 317	21 958
20414350	Polishes, creams and similar preparations, for the maintenance of wooden furniture, floors or other woodwork (excluding artificial and prepared waxes)	41 797	47 590
20414370	Polishes and similar preparations, for coachwork (excluding artificial and prepared waxes, metal polishes)	53 913	62 495
20414383	Metal polishes	23 704	32 351

Code	PRODCOM List Description	Apparent consumption (tonnes)	Production (tonnes)
20414389	Other polishes, creams and similar preparations, n.e.c.	54 703	54 767
20414400	Scouring pastes and powders and other scouring preparations	69 040	80 000
	Total (entire table)	**15 557 170**	**17 100 994**

The Apparent consumption in volume of professional cleaning products in EU27 is 16 million tonnes; the Apparent consumption in value of professional cleaning products in EU27 is 17 million tonnes.

The export adjustment factor can therefore be calculated as follow:

Export adjustment factor = production / apparent consumption

= 17m tonnes / 16m tonnes = 1.1

The production of professional cleaning products in EU can then be estimated by applying the adjustment factor to the consumption volume and value figures calculated in the previous step:

Production in volume of professional cleaning products in EU28, Norway and Switzerland = 590 000 tonnes * 1.1 = 649 000 tonnes

Production in value of professional cleaning products in EU28, Norway and Switzerland = €886m * 1.1 = €974m

The production volume of professional cleaning products in EU28, Norway and Switzerland is estimated to be 649 000 tonnes and the product value is €974m. Note that PRODCOM data is for EU27, which excludes Croatia, Norway and Switzerland. Although this is inconsistent with the scope of the A.I.S.E data, the market value of cleaning service industry of EU27 presents over 90% of the EU28, Norway and Switzerland total market value. Therefore the minor inconsistency in data scope would not have a significant impact on the result of the calculation.

ANNEX F: Professional Cleaning Equipment Use in the EU

The total value of cleaning equipment production in the EU28, Norway and Switzerland is estimated using the same method as the cleaning product production estimate calculation:

Total EU28, Norway and Switzerland cleaning equipment production = Italian cleaning equipment production / Italian percentage contribution

Cleaning accessories and supplies = €72 m / 13% = €572m

Power cleaning equipment = €374 m / 13% = €2 972m

The breakdown of the total production value by service type and product type were calculated based on the Italian service and product proportion splits. It is acknowledged that there are significant variations on product/service proportions between countries.

Another aspect that needs to be caveated is that for Italy a majority of the cleaning equipment produced are designated for export. Again, it is recognised that the export proportion for different countries are significantly different. However due to the limitation of data availability, it is difficult to improve the accuracy and granularity of the estimates.

ANNEX G: EU Ecolabelled Products per Category and Country

The EU Ecolabel currently covers a huge range of products and services. Tissue paper and all-purpose cleaners each equate to around 15% of EU Ecolabel products, while indoor paints and varnishes make up nearly 12%. The largest product group is hard coverings, which total more than 39% of EU Ecolabel products.

Please note that these statistics represent the current number of total valid licences. Licences under application or renewal process are not taken into account. These figures are based on Competent Bodies' internal data.

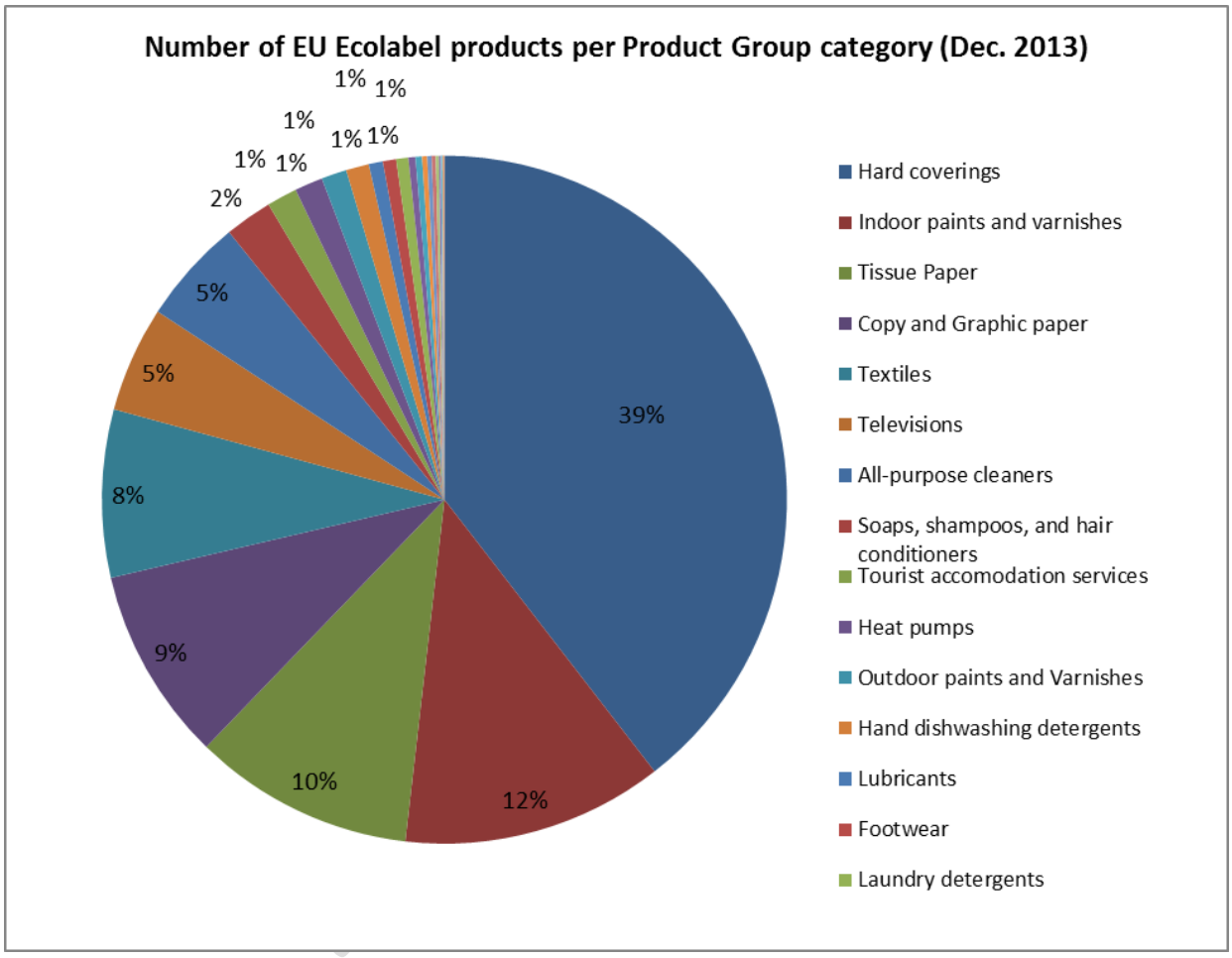

Figure G1 Number of EU Ecolabelled Products per Product Group Category (December 2013). The data used may not be represent the real situation as the guidance on how to report EU Ecolabel licences and products was not ready available when each country information was made available.

The EU Ecolabel has been awarded to the largest number of products in Italy, France and the UK. Italy has issued more than 50% of the total number of Ecolabel awards, while France and UK total 22% and 9% respectively. These are followed by the Netherlands and Spain. While these statistics refer to the awarding countries, EU Ecolabel products can be sold across the continent.

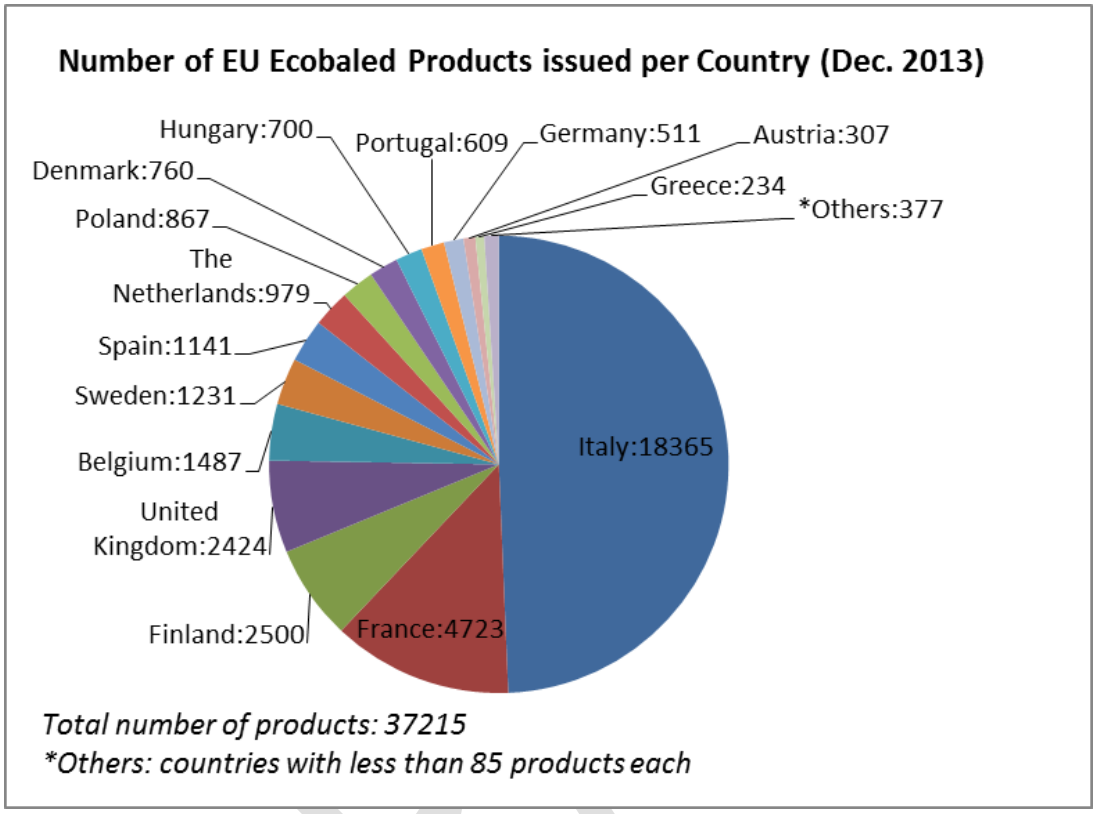

Figure G2 Number of EU Ecolabel Awards per Country (December 2013). The data used may not be represent the real situation as the guidance on how to report EU Ecolabel licences and products was not ready available when each country information was made available.

ANNEX H: Market Leaders in 2010 per Country

Table 64 Market leaders in 2010 per country (EFCI, 2012)

FRANCE	GERMANY	ITALY	SPAIN	UNITED KINGDOM
ONET GROUP	DUSSMANN	CNS	ISS	ISS
SAMSIC	KLÜH SERVICE MGMNT	COLSER	CLECE	INITIAL
ATALIAN	WISAG SERVICE	CONSORZIO EVOLVE	EULEN	MITIE
ISS FRANCE GROUP	GEGENBAUER	COOPSERVICE	EUROLIMP	OCS
GSF GROUP	PIEPENBROCK	COPMA	FCC	COMPASS
ELIOR SERVICES	ISS FACILITY SERVICES	DUSSMAN	PLISA	INTERSERVE
DERICHEBOURG PROPRETE	KOTTER SERVICES	ISCOT	ACCIONA	RESOURCE GROUP
ISOR – COFIGOR	HECTAS	L'OPEROSA	VALORIZA	SODEXO
VEBEGO SERVICES	DORFNER GROUP	MANITAL	LIMPISA	CARILLION
CHALLANCIN	DR. SASSE AG	MANUTENCOOP	SAMSIC	EMPRISE
		MARKAS		
		SOTRAF		

ANNEX I: AISE charter members supplying to I&I sector

Table 65 AISE charter members supplying to I&I sector (AISE, 2014)

Company	Type	Sector	Countries
Agraplan Farmaca BV	Distributor	I&I	NL
ALCO Chemicals BV	Distributor	I&I	NL
Alpheios	Distributor	I&I	BE, NL, FR
Asito	Distributor	I&I	NL
ASP Cleaning Products B.V.	Distributor	I&I	BE, NL
Avodesch B.V.	Distributor	I&I	NL
Bertels B.V.	Distributor	I&I	NL
Boesch Reinigungssysteme GmbH	Distributor	I&I	AT, CZ, SI
Dasselaar Grootverbruik B.V.	Distributor	I&I	BE, NL
Dr. Weigert Nederland BV	Distributor	I&I	NL
Ewepo B.V.	Distributor	I&I	BE, NL
FACILICOM PROFESSIONAL PRODUCTS	Distributor	I&I	BE, NL, FR
Hilco Chemie B.V.	Distributor	I&I	AT, LV, BE, LI, BG, LT, CY, LU, CZ, MT, DK, NL, EE, PL, FI, PT, FR, NO, DE, RO, GR, SK, HU, SI, IS, ES, IE, SE, IT, CH, GB

Company	Type	Sector	Countries
MTS Euro Products B.V.	Distributor	I&I	NL
New York N.V. - Pama Industries	Distributor	I&I	BE
Rhima Nederland B.V.	Distributor	I&I	BE, NL
Tristar Industries Group	Distributor	I&I	BE, LU, DK, NL, FR, NO, DE, GB
VAT Onderhouds- en Reinigingsproducten B.V.	Distributor	I&I	BE, NL, DE
DIVERSEY	Manufacturer	I&I	NL, AT, LV, BE, LT, CY, LU, CZ, MT, DK, EE, PL, FI, PT, FR, NO, DE, SK, GR, SI, HU, ES, SE, IE, CH, IT, GB, RO, IS, BG
Ecolab GmbH & Co. OHG	Manufacturer	I&I	AT, LV, BE, LT, CY, LU, CZ, MT, DK, NL, EE, PL, FI, PT, FR, NO, DE, SK, GR, SI, HU, ES, IS, SE, IE, CH, IT, GB, BG, RO
FILER SL	Manufacturer	I&I	ES
Kiter S.r.l.	Manufacturer	I&I	IT
SUMINISTROS CIENTIFICOS TECNICOS, S.A.	Manufacturer	I&I	AT, LV, BE, LT, CY, LU, CZ, MT, DK, NL, EE, PL, FI, PT, FR, NO, DE, SK, GR, SI, HU, ES, IS, SE, IE, CH, IT, GB, BG, RO

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ISBN 978-92-79-22551-2

Publications Office