European Commission

JRC TECHNICAL REPORTS

# EU GPP Criteria for Public Space Maintenance



*Technical report and criteria proposal (1st draft)*

October 2017

Oyeshola Kofoworola (JRC Seville)
Nieves Espinosa (JRC Seville)
Miguel Gama Caldas (JRC Seville)
Rocío Rodríguez Quintero (JRC Seville)
Oliver Wolf (JRC Seville)

Belinda Tato (Ecosistema Urbano)
Antonella Marlene Milano (Ecosistema Urbano)
Maria Gagliardi (Ecosistema Urbano)

Joint Research Centre

This publication is a Technical report by the Joint Research Centre (JRC), the European Commission's science and knowledge service. It aims to provide evidence-based scientific support to the European policymaking process. The scientific output expressed does not imply a policy position of the European Commission. Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use that might be made of this publication.

Contact information [optional element]

Name:

Address:

Email:

Tel.:

JRC Science Hub

https://ec.europa.eu/jrc

JRCxxxxx

EUR xxxxx xx

Print ISBN xxx-xx-xx-xxxxx-x ISSN xxxx-xxxx doi:xx.xxxxx/xxxxxx

PDF ISBN xxx-xx-xx-xxxxx-x ISSN xxxx-xxxx doi:xx.xxxxx/xxxxxx

# Contents

# 1 Introduction

Public authorities' expenditures in the purchase of goods, services and works (excluding utilities and defence) constitute approximately 14% of the overall Gross Domestic Product (GDP) in Europe, accounting for roughly EUR 1.8 trillion annually (Buying Green, 2016).

Thus, public procurement has the potential to provide significant leverage in seeking to influence the market and to achieve environmental improvements in the public sector. This effect can be particularly significant for goods, services and works (referred to collectively as products) that account for a high share of public purchasing combined with the substantial improvement potential for environmental performance. The European Commission has identified Public Space Maintenance as one such product group.

Green Public Procurement (GPP) is defined in the Commission's 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."

Therefore, by choosing to purchase products with lower environmental impacts, public authorities can make an important contribution to reducing the direct environmental impact resulting from their activities. Moreover, by promoting and using GPP, public authorities can provide industry with real incentives for developing green technologies and products. In some sectors, public purchasers command a large share of the market (e.g. public transport and construction, health services and education) and so their decisions have considerable impact. In fact, in the above mentioned Commission's communication the capability that public procurement has to shape production and consumption trends, increase demand for "greener" products and services and provide incentives for companies to develop environmental friendly technologies is clearly emphasised.

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

The development of EU GPP criteria aims to help public authorities ensure that the goods, services and works they require are procured and executed in a way that reduces their associated

environmental impacts. The criteria are thus formulated in such a way that they can be, if deemed appropriate by the individual authority, integrated into its tender documents with minimal editing.

GPP criteria are to be understood as being part of the procurement process and must conform to its standard format and rules as laid out by Public Procurement Directive 2014/24/EU (public works, supply and service contracts). Hence, EU GPP criteria must comply with the guiding principles of: Free movement of goods and services and freedom of establishment; Non-discrimination and equal treatment; Transparency; Proportionality and Mutual recognition. GPP criteria must be verifiable and it should be formulated either as Selection criteria, Technical specifications, Award criteria or Contract performance clauses, which can be understood as follows:

**Selection Criteria (SC):** Selection criteria refer to the tenderer, i.e., the company tendering for the contract, and not to the product being procured. It may relate to suitability to pursue the professional activity, economic and financial standing and technical and professional ability and may- for services and works contracts - ask specifically about their ability to apply environmental management measures when carrying out the contract.

**Technical Specifications (TS):** Technical specifications constitute minimum compliance requirements that must be met by all tenders. It must be linked to the contract's subject matter (the 'subject matter' of a contract is about what good, service or work is intended to be procured. It can consist in a description of the product, but can also take the form of a functional or performance based definition.) and must not concern general corporate practices but only characteristics specific to the product being procured. Link to the subject matter can concern any stage of the product's life-cycle, including its supply-chain, even if not obvious in the final product, i.e., not part of the material substance of the product. Offers not complying with the technical specifications must be rejected. Technical specifications are not scored for award purposes; they are strictly pass/fail requirements.

**Award Criteria (AC):** At the award stage, the contracting authority evaluates the quality of the tenders and compares costs. Contracts are awarded on the basis of most economically advantageous tender (MEAT). MEAT includes a cost element and a wide range of other factors that may influence the value of a tender from the point of view of the

contracting authority including environmental aspects (refer to the Buying Green guide for further details1). Everything that is evaluated and scored for award purposes is an award criterion. These may refer to characteristics of goods or to the way in which services or works will be performed (in this case they cannot be verified at the award stage since they refer to future events. Therefore, in this case, the criteria are to be understood as commitments to carry out services or works in a specific way and should be monitored/verified during the execution of the contract via a contract performance clause). As technical specifications, also award criteria must be linked to the contract's subject matter and must not concern general corporate practices but only characteristics specific to the product being procured. Link to the subject matter can concern any stage of the product's life-cycle, including its supply-chain, even if not obvious in the final product, i.e., not part of the material substance of the product. Award criteria can be used to stimulate additional environmental performance without being mandatory and, therefore, without foreclosing the market for products not reaching the proposed level of performance.

**Contract Performance Clauses (CPC):** Contract performance clauses are used to specify how a contract must be carried out. As technical specifications and award criteria, also contract performance clauses must be linked to the contract's subject matter and must not concern general corporate practices but only those specific to the product being procured. Link to the subject matter can concern any stage of the product's life-cycle, including its supply-chain, even if not obvious in the final product, i.e., not part of the material substance of the product. The economic operator may not be requested to prove compliance with the contract performance clauses during the procurement procedure. Contract performance clauses are not scored for award purposes. Compliance with contract performance clauses should be monitored during the execution of the contract, therefore after it has been awarded. It may be linked to penalties or bonuses under the contract in order to ensure compliance.

For each criterion there is a choice between two levels of environmental ambition, which the contracting authority can choose from according to its particular goals and/or constraints:

The **Core criteria** are designed to allow easy application of GPP, focussing on the key areas of environmental

performance of a product and aimed at keeping administrative costs for companies to a minimum.

The **Comprehensive criteria** take into account more aspects or higher levels of environmental performance, for use by authorities that want to go further in supporting environmental and innovation goals.

As said before, the development of EU GPP criteria aims to help public authorities ensure that the goods, services and works they require are procured and executed in a way that reduces their associated environmental impacts and is focused on the products' most significant improvement areas, resulting from the cross-check between the key environmental hot-spots and market analysis. This development also requires an understanding of commonly used procurement practices and processes and the taking on board of learnings from the actors involved in successfully fulfilling contracts.

For this reason, the European Commission has developed a process aimed at bringing together both technical and procurement experts to collate a broad body of evidence and to develop, in a consensus oriented manner, a proposal for precise and verifiable criteria that can be used to procure products with a reduced environmental impact.

This report presents the findings resulting from that process up to the 1st ad-hoc working group meeting that will be held in Seville on 15 November 2017. Consultation questions are integrated in the document and will serve for updating the document in a later stage of the project.

A detailed environmental and market analysis, as well as an assessment of potential improvement areas, was conducted within the framework of this project and was presented in the Preliminary Report on EU Green Public Procurement (GPP) criteria for Public Space Maintenance. This report can be publicly accessed at the JRC website for EU Green Public Procurement (GPP) criteria for Public Space Maintenance (http://susproc.jrc.ec.europa.eu/Public_space_maintenance/index.html). The main findings presented in the Preliminary Report are summarised in the next section.

# 2 Summary of the Preliminary Report

## 2.1 Product Group Definition and Scope

### 2.1.1 Scope

There are no existing European Union Green Public Procurement (EU GPP) criteria on Public Space Maintenance. Therefore a clearly defined scope is very important as it provides a robust basis for the whole study, and for future reviews and updates.

A first step in this direction was the development of a questionnaire aimed at defining the scope of this product group based on responses received from relevant stakeholders on the maintenance of public spaces.

As an outcome of research into existing legislation, as well as standards and criteria, statistical and technical categories, and the incorporation of stakeholder's responses to the first scope questionnaire, it has been possible to narrow down the precise scope and definition of EU GPP for Public Space Maintenance. Four groups of products are covered under the scope. For each product group, activities and or equipment's which may be required are also elucidated.

The four identified groups include:

1. Cleaning products and services
2. Gardening products and services
3. Vehicles for public space maintenance
4. Machinery for public space maintenance.

The specific activities covered under the scope are:

- Cleaning, including manual or mechanical sweeping and water jet cleaning, graffiti removal, façade cleaning, litter removal, etc.
- Snow removal
- Pruning, trimming, planting, lawn replacement, irrigation
- Fertilization, weed control and pesticides use

The specific equipment covered under the scope are:

- Vehicles (human controlled or autonomous) for the transport of workers and equipment, and materials
- Sweepers, spreaders and street cleaning vehicles for winter operation
- Machinery used for cleaning and gardening (lawn-mowers, chainsaws, trimmers; leaf collectors, leaf blowers, etc.)

Following stakeholder's recommendations, the following activities are excluded from the scope:

- Replacement of pavement and municipal furniture
- Repairing or replacement of irrigation systems, fountains, street signs, municipal furniture and mechanical equipment (e.g., gates)
- Maintenance of sewage
- Painting and repainting activities

### 2.1.2 Definitions

A comprehensive analysis of the various technical categories included within the European statistical system including the following was carried out (see preliminary report):

- ISIC - the United Nations International Standard Industrial Classification of all Economic Activities
- NACE - the statistical classification of economic activities in the European Communities
- CPC - the United Nations Central Product Classification
- CPA - the European Classification of Products by Activity
- HS - the Harmonized Commodity Description and Coding System, managed by the World Customs Organisation
- CN - the Combined Nomenclature, a European classification of goods used for foreign trade statistics
- SITC - the United Nations Standard International Trade Classification, an international classification of goods used for foreign trade statistics
- PRODCOM - the classification of goods used for statistics on industrial production in the EU

Following this review, it was concluded that the most appropriate system to analyse the features of the maintenance of public space sector is the Common Procurement Vocabulary (CPV) as it is essential for the public procurement of goods and services within the European context although it is not included as part of the European statistical system (ESS). In addition to the recommendation of the European Commission inviting the contracting entities and authorities to use it, this classification might help to measure more accurately the size and characteristics of the maintenance of public spaces sector than the remainder technical categories more focused on commercial transactions.

The CPV classification enables more accurate collation of the information registered on public procurement, by which public authorities, such as government departments or local authorities, purchase works, goods or services from companies.

It achieves this by establishing a single classification system for public procurement aimed at standardising by means of a single classification

system for public procurement, the terms used by contracting authorities and entities to describe the subject of contracts, by offering an appropriate tool to potential users (contracting entities/authorities, candidates or tenderers in contract award procedure). Thus, this classification tool consists of a main vocabulary for defining the subject of a contract, and a supplementary vocabulary for adding further qualitative information.

The main vocabulary is based on a tree structure comprising codes of up to 9 digits (an 8-digit code plus a check digit) associated with a wording that describes the type of supplies, works or services forming the subject of the contract.

- The first two digits identify the divisions (XX000000-Y);
- The first three digits identify the groups (XXX00000-Y);
- The first four digits identify the classes (XXXX0000-Y);
- The first five digits identify the categories (XXXXX000-Y);

Each of the last three digits gives a greater degree of precision within each category. The supplementary vocabulary may be used to expand the description of the subject of a contract. The correspondence between the CPV and the Statistical Classification of Products by Activity (CPA), the General Industrial Classification of Economic Activities within the European Communities (NACE Rev. 1) and the Combined Nomenclature (CN) could be found in the Official Journal of the European Communities (Common Position (EC) No 60/2002 adopted by the Council on 7 June 2002).

The use of the CPV is mandatory in the European Union since 2006. The CPV version 2008 is the current CPV version to:

- Fill the notices of calls for competition
- Search business opportunities in TED
- Find contract notices in the archive of TED

As the first step in the definition of the scope of the EU GPP for Public Space Maintenance the following four categories are proposed:

1. Cleaning Services and Cleaning Products

As preface to the cleaning services included in this category, it was essential to define which type of public spaces should be taken into consideration and defined as part of the scope of EU GPP for Public Space Maintenance. Analysis of the responses of stakeholders to the first questionnaire indicated that the places requiring cleaning services that should be considered as part of the scope are the following:

- Streets, roads, avenues and boulevards
- Sidewalks
- Bike lanes
- Parking lots
- Pedestrian areas, pathways and plazas

- Underways
- Stairways

Public furniture and façade/surface also have to be considered a target of cleaning services.

Following the suggestion of different stakeholders, it seems appropriate to exclude Playgrounds and Public sports facilities from the scope of this EU GPP.

Cleaning services include:

- Mechanical & manual sweeping of sidewalk, bike lane, road (asphalt, roadbed) and roadside (shoulders, curbs, green areas): corresponding to CPV code 90610000, street-cleaning and sweeping services
- Litter removal from the ground.
- Bins' litter collection and sorting: corresponding to CPV code 90918000, bin-cleaning services
- Mechanical & manual water jet cleaning: corresponding to CPV code 42924730, pressurised water cleaning apparatus and 42924740-8, high-pressure cleaning apparatus
- Façade/surface cleaning
- Graffiti removal: corresponding to CPV code 90690000, graffiti removal services
- Snow and ice removal from sidewalks, bike lanes and roads, corresponding to CPV code 90620000, snow-clearing services and 90630000, ice-clearing services
- Beach cleaning: corresponding to CPV code 90680000, beach cleaning services
- Cleaning of fountains, lakes and ponds

Some cleaning services remain outside of the scope of the EU GPP for Public Space Maintenance, due to their occasional nature. Following the suggestions of certain stakeholders it has been established that services such as “disaster assistance: debris removal” and “after event cleaning” should be excluded from the scope since they cannot be defined as routine maintenance services. It should be clarified that "after event cleaning" refers to events of a social nature like concerts, festivals, fairs, etc. Natural weather events (like storms or heavy rain/snow fall) also require cleaning in their aftermath and these activities will be under the scope.

Cleaning products:

- All-purpose cleaners
- Substances for snow and ice removal: (salt and sand-and-salt-mixture – called grit - used for removing and calcium chloride ($CaCl_2$) as a dust binder for spring cleaning)

Other supplies/accessories/ machinery parts:

- Brushes, rolls,

2. Gardening and Landscaping Services and Products

As preface to the gardening services included in this category, it results essential to define which type of green areas should be taken into consideration and defined as part of the scope of EU GPP for Public Space Maintenance. From the first stakeholder questionnaire, it emerged that the places requiring gardening and landscaping services that should be considered as part of the scope are the following green areas:

- Man-made gardens and parks
- Street vegetation

It is possible to define different configurations of green areas by considering different vegetation typologies. The following classification is derived from the Dutch Criteria for Sustainable Procurements of Green Spaces, and is considered appropriate also for the EU GPP criteria on the subject of Public Space Maintenance.

- Trees: trees that stand on their own, in rows or in small groups, not as part of a forest or small cluster of trees and bushes.
- Cluster of trees and bushes: contiguous area covered by planted bushes possibly with scattered trees.
- Hedges and shrubs: bushes, on their own, in small groups or in rows, usually closely maintained by trimming or closing off.
- Plant patches: patches of permanent and annual herbaceous plants (usually decorative) and bulbous plants.
- Lawns: short grass that is frequently mowed.
- Rough grass and herbage: grass and rough herbage that is mowed at most twice per year.
- Banks and water: open water and the areas that border dry land.

Two items originally included in the Dutch Criteria have been removed from the scope of EU GPP of Public Space Maintenance. These are:

- Forests, defined as "contiguous area covered by trees that may or may not have bushes (larger than 2 500 $m^2$)", excluded for not being man made green area; and
- Sports and playing fields (grass) defined as "grass fields primarily intended for sports and play activities", excluded for being associated with public sports facilities, previously excluded from the scope.

For general landscaping services the statistical categories used as reference correspond to 77313000, parks maintenance services, 45112710, landscaping works for green areas, 45112711, landscaping work for parks, 45112712, landscaping work for gardens; 45112713, landscaping work for roof gardens; 77311000, ornamental and pleasure gardens maintenance services

Gardening and Landscape Services include:

- Pruning: corresponding to CPV code 77341000, Tree pruning
- Trimming: corresponding to CPV code 77342000, Hedge trimming
- Planting and Plant and trees replacement: corresponding to CPV code 77330000, Floral display services; 03121100. Live plants, bulbs, roots, cuttings and slips; 03440000, Forestry products; 03441000. Ornamental plants, grasses, mosses or lichens; 03451000, Plants; 03451100, Bedding Plants; 03451200, Flower bulbs; 03451300, Shrubs; 03452000, Trees; 77314100, Grassing services; 77315000, Seeding services
- Fertilization
- Weed control and pesticides use: partially corresponding to CPV code 77312000, Weed-clearance services
- Lawn replacement
- Manual & automated irrigation

Gardening products include:

- Soil improvers
- Ornamental plants
- Irrigation systems
- Lubricant oils
- Herbicides and pesticides

3. Vehicles used for Public Space Maintenance
   - Human-controlled vehicles
   - Sweepers and street cleaning vehicles (e.g., mechanical brooms)
   - High pressure cleaner vehicle (water/sand)
   - Snow removal vehicles (with plough blades and salt spreader)
   - Maintenance utility vehicles for public green spaces
   - Maintenance utility vehicles for watering green spaces
   - Maintenance utility vehicles for transporting goods and branches
   - Remote controlled, autonomous or robotic vehicles

4. Machinery used for Public Space Maintenance
   - Lawn-mowers (including lawn tractors) and scarifiers
   - Chainsaws
   - Brush saws
   - Strimmers

- Hedge trimmers
- Pruners and similar hand-operated machines
- Leaf collectors and leaf blowers
- Auto-scythes
- Auto-hoes
- Rotary cultivators
- Compost shredders

## 2.2 Market Analysis

The Preliminary Report[1] presents the results of a market research on the situation of Maintenance of Public Spaces sector in the European context.

The market has been characterized according to market segmentation (geographical, technological, target group related), with an overview of the respective products and services, also identifying the key manufacturers/service providers and consumer groups/procurement entities.

Therefore, following the methodology of the market analysis, the public space maintenance sector has been described according to the volume of the public procurement purchases in EU 28 (product/service supply and demand) and its market structure.

One of the main findings of the market analysis is the fact that the volume and number of cleaning activities and services contracted by the public authorities in each country fluctuates in different years, since the rate of purchase is highly dependent on budget constraints.

Another essential finding is that there are a large number of local small and medium-sized enterprises and a smaller number of large international companies with a large share of the European market. The latter are specialized in a unique segment and are able to propose a wide and coordinated offer, which generates a high level of competition.

## 2.3 Key Environmental Hotspots and Improvement Areas

The latter part of the Preliminary Report is divided into four chapters representing the four groups of products/services included in the scope of Public Space Maintenance.

[1] Espinosa et al. 2017

The sections dedicated to environmental analysis provide a comparison of the different options of products/services through a literature review of relevant LCA studies. This method has enabled the identification and comparison of the performances of the different products/services highlighting the main environmental impacts across their life cycle.

The following sections provide a summary of the main hotspots that were found for the different groups of products/services.

### 2.3.1 Cleaning Activities

The analysis of cleaning products showed that for all categories, cleaning products are associated with many environmental impacts and are potentially harzardous to human health health. This is due to the use of substances derived from non-renewable sources (e.g. derived from petrochemical streams), and the release of toxic substances and waste from the manufacturing process[2].

Related to the manufacturing of cleaning products, there are also impacts from the production chain of packaging. For the estimation of these impacts, the complete chain of production of packaging should be considered as well as the different levels of packaging[3].

Finally, the manufacture of Calcium Magnesium Acetate (CMA) has been found to contribute to the stronger environmental impacts across the lifecycle of cleaning products due to the great amount of energy and water involved in the production process[4].

The analysis of the environmental hotspots showed strong environmental impacts related to the use phase and release of waste water (run-offs) containing chemicals into the environment as documented in the preliminary report.

Another key environmental hotspot related to the provision of cleaning services is related to water depletion from product dilution and cleaning operations.

Street cleaning operations were also identified as having significant environmental impacts in e.g. freshwater eutrophication, human toxicity,

[2] Nordic Ecolabelling 2016.

[3] Medyna, Neto, and Wolf 2016

[4] Ritthoff 2011

freshwater eco-toxicity, marine eco-toxicity, ionizing radiation - mostly resulting from the generation of sludge during the operation.

### 2.3.2 Gardening Activities

The production of soil improvers or ornamental plants which are used for gardening activities could have a strong environmental impact on climate change, eco-toxicity and human health due to the extraction of raw materials[5]. Particularly the extraction of peat has been shown to have a significant impact on climate change.

Peat has biological origin and is a very large carbon sink. Due to its slow regeneration rate, it is considered non-renewable material. In addition, due to the lower amount of nutrients entrained in it as compared to other materials such as compost, the use of peat should be minimized[6].

The production chain of ornamental plants has strong environmental impacts because of the use of fertilizer. It also causes substantial energy and fuel depletion when grown in greenhouse structures that need to be heated in winter.

The packaging of the plants represents another factor of pollution and environmental impact caused by the use of PVC pots or polystyrene plateau for the delivery of plants.

Finally, in the evaluation of environmental impacts, the delivery and transport of these products have to be considered for their contribution to greenhouse gas emissions and fuel depletion. Because of these impacts, the selection of an indigenous/native typology of plants is found to have a far less intense environmental impact[7].

The Preliminary Report identifies the use phase as the main hotspot of gardening activities. In particular, the use of chemicals as pesticides and fertilizers could cause important damages to the environment. Another impact related to gardening activities is the water depletion for irrigation. Often non-efficient irrigation systems provoke a great loss of water.

---

[5] EPAGMA 2012

[6] EU Commission 2011

[7] Fleisher 2009

### 2.3.3 Machinery

The production phase has been found to be one of the main hotspots across the life cycle of machinery due to multiple concerns.

First, several fossil based materials (i.e. plastics and rubber components) that require large amounts of energy during their production, are needed. Within the raw materials, copper and iron have the largest individual impact from a life cycle perspective. Battery production also has a high contribution to carcinogenicity and human toxicity, ozone depletion potential and ecotoxicity, due to the use of hazardous substances[8,9].

Fuel production results in resource depletion, and its combustion causes greenhouse effects due to carbon dioxide emissions, and it affects the tropospheric ozone and human health due to nitrogen oxide emissions. Additionally, fuel combustion in internal combustion engines in the use phase results in the production of particulate emissions, which are an environmental concern.

Machinery for Public Space Maintenance is often used in specific environments such as in forests and gardens. For that reason, the use of lubricants in open systems can be harmful to the environment as lost or spilled lubricants are directly emitted into the surroundings. Particularly harmful are traditional mineral based lubricants that have a low rate of biodegradability and can contain harmful substances (Nordic Ecolabelling 2013; Wightman et al. 1999).

Noise pollution from the operation of machinery is also another important issue that could cause injuries both for the workers and people. The use of electrically powered machines has considerable advantages in order to reduce noise and vibration (Nordic Ecolabelling 2013).

### 2.3.4 Vehicles

The analysis of the environmental hotspots showed that for fuel-powered vehicles the main environmental impacts are related to the use phase. The main impacts during the use phase are the GHG emissions, air pollutant emissions and noise.

The manufacturing phase is more relevant for electric vehicles where the battery manufacturing is the most impacting component.

---

[8] Nordic Ecolabelling 2013

[9] Samaras and Meisterling 2008

The reduction of the environmental impact of electric vehicles during the use phase, however, outweighs the negative environmental impacts of the additional emissions in the production phase (JRC, 2016a)). Closely related to the use phase are the environmental impacts related to the production of energy carriers (liquid or gaseous fuels or electricity). The main environmental issues of the supply chain of energy carriers are GHG emissions and air pollutant emissions (JRC, 2016a).

From the literature review carried out in the Preliminary Report, it seems that hybrids provide a significant reduction in overall environmental impacts for the different categories of vehicles (LDV, HDV) used in urban duty cycles (JRC 2016a; Zhao, Burke, and Miller 2013; Inzunza Soriano and Petter Laudon 2012).

Finally, concerning the control of PM10 in urban environments, through the literature review carried out in the Preliminary Report, background information has been provided on different kinds of specialised vehicles, such as mechanical sweepers, vacuum sweepers and regenerative air sweepers. The latter technology has been found as the most effective in PM10 suppression.

# 3 Draft Proposed EU GPP criteria for Outdoor Cleaning Activities

## 3.1 Criteria proposal for cleaning products

### Scope

This category covers the purchase of products used for the cleaning of public spaces or outdoor use. It includes as well the purchase of supplies and accessories needed to perform the task.

Products related to cleaning services are distinguished in three categories as identified in the Preliminary Report:

- All-purpose cleaners or industrial cleaning products for outdoor services
- Substances for snow and ice removal
- Binding agents for dust control

Supplies and accessories are e.g. brushes, rolls, soft rags and microfiber cloths, brooms, and accessories alike.

Machinery as non-road mobile machinery used is dealt with in the categories machinery or vehicles - see Chapters 5 and 6.

### 3.1.1 Cleaning products

#### Rationale

Cleaners used professionally outdoors are mainly classified in three categories: 1) acid based products, to remove hard deposits from water systems cleaning floors, walls, oxidation, rust and algae (HCl), 2) alkali based products, to remove grease, dirt or oil from concrete floors and 3) solvent/petroleum based degreasers, which are able to remove grease while not corroding metal.

One of the strong environmental impacts related to the use of cleaning products, is related to water depletion from product dilution and cleaning operations. In addition, the use phase in cleaning services contributes significantly to freshwater eutrophication, human toxicity, freshwater ecotoxicity, marine ecotoxicity or ionizing radiation. These impacts are mostly related with sludge production during street cleaning operations.

The amount of wastewater produced after street cleaning could be immense. This wastewater does not always end up in the public grid of water treatment. Mitigating the resulting environmental impact is strongly dependent on good operational practices that ensures less use of products and decreased production of sludge.

Dust binders as calcium chloride can have significant short-term effects to reduce street dust. The present criteria proposal does not target dust binders as alternative products have not been identified yet. Their use for dust suppression shows that results vary with regard to the method of application, the time of the year and the climate conditions. A separate criterion is dealing with these issues named Operational procedures and best practices.

#### Criterion Proposal

| **Core criteria** | **Comprehensive criteria** |
|---|---|
| **Technical Specification** | |
| **TS1. Use of cleaning products with low environmental impacts**<br>1) At least X% [1)] by volume at purchase of all cleaning products per year, shall have been awarded with the EU Ecolabel for Hard Surface Cleaning Products according to Commission Decision (EU) 2017/1217 of 23 June 2017 or with another ISO Type I ecolabel.<br>2) All products that have not been awarded with the EU Ecolabel for Hard Surface Cleaning Products or with another ISO Type I ecolabel shall not be classified and labelled as being acutely toxic, a specific | **TS1. Use of cleaning products with low environmental impacts**<br>1) At least Y% [1)] by volume at purchase of all cleaning products per year, shall have been awarded with the EU Ecolabel for Hard Surface Cleaning Products according to Commission Decision (EU) 2017/1217 of 23 June 2017 or with another ISO Type I ecolabel.<br>2) All products that have not been awarded with the EU Ecolabel for Hard Surface Cleaning Products or with another ISO Type I ecolabel shall not be classified and labelled as being acutely toxic, a specific |

| | |
|---|---|
| target organ toxicant, a respiratory or skin sensitiser, carcinogenic, mutagenic or toxic for reproduction, or hazardous to the environment, in accordance with Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures (the 'CLP Regulation').<br><br>**Verification**:<br>1) The tenderer shall provide annual data (commercial name and volume of products) and documentation (including relevant invoices or site inventories) indicating the cleaning products used in the EU Ecolabel cleaning service contracts. Where EU Ecolabel products are used, the applicant shall provide a copy of the EU Ecolabel certificate and/or packaging label showing that it was awarded in accordance with Commission Decision (EU) 2017/1217 of 23 June 2017 n establishing the ecological criteria for the award of the EU Ecolabel to all-purpose cleaners and sanitary cleaners[2)]. Where other ISO type I ecolabel products are used, the applicant shall provide a copy of the type I label certificate and/or packaging label.<br><br>2) The tenderer shall provide a declaration of compliance with this criterion supported by the safety data sheets for all products that that have not been awarded with the EU Ecolabel for Hard Surface Cleaning Products or with another ISO Type I ecolabel. | target organ toxicant, a respiratory or skin sensitiser, carcinogenic, mutagenic or toxic for reproduction, or hazardous to the environment, in accordance with Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures (the 'CLP Regulation').<br><br>**Verification**:<br>1) The tenderer shall provide annual data (commercial name and volume of products) and documentation (including relevant invoices or site inventories) indicating the cleaning products used in the EU Ecolabel cleaning service contracts. Where EU Ecolabel products are used, the applicant shall provide a copy of the EU Ecolabel certificate and/or packaging label showing that it was awarded in accordance with according to Commission Decision (EU) 2017/1217 of 23 June 2017 establishing the ecological criteria for the award of the EU Ecolabel to all-purpose cleaners and sanitary cleaners[2)]. Where other ISO type I ecolabel products are used, the applicant shall provide a copy of the type I label certificate and/or packaging label.<br><br>2) The tenderer shall provide a declaration of compliance with this criterion supported by the safety data sheets for all products that that have not been awarded with the EU Ecolabel for Hard Surface Cleaning Products or with another ISO Type I ecolabel. |
| **Core criteria** | **Comprehensive criteria** |
| **Explanatory Notes**<br>1) Recommended values for a minimum volume of Ecolabel products purchased X=30%, Y=50%.<br>2) http://data.europa.eu/eli/dec/2017/1217/oj<br>3) Recommended values for a minimum volume of diluted products used X=30%, Y=50%. | |

| **Consultation questions** |
|---|
| ○ Which is the standard industry magnitude for cleaning products? Is it volume, weight or value? |

### 3.1.2 De-icing and snow removal products

#### Rationale

De-icers are essential to wintertime road maintenance and are applied to prevent the freezing of surfaces such as roads or footpaths. They are considered necessary for road safety and accessibility. There has been a growing concern (e.g. in Northern Europe) about the environmental effects of de-icing resulting from the use of road salts such as NaCl, $CaCl_2$ and $MgCl_2$ (Joutti et al. 2003). Large amounts of salt are used every winter season in Nordic countries. In the four Nordic countries of Sweden, Norway, Finland and Denmark more than 500,000 tonnes of salt is used each year (NVF, 2014). Salt is also seen as an environmental pollutant, having a negative effect on vegetation, surface and ground water aquifers increasing the salinity of freshwater ecosystems in proximity to salted roads (Kaushal et al. 2005; Ramakrishna & Viraraghavan 2005; Corsi et al. 2010; Cañedo-Argüelles et al. 2016; Kefford et al. 2016). Efforts have therefore to be made to reduce the use of salt by more efficient application. Most efforts to date to study salt processes involves the drainage or spray of salt from the road surface.

One of the main environmental impacts from the use of anti-icing agents is water pollution from product dilution and cleaning operations. In addition, the use of de-icers mean substantial impacts for freshwater eutrophication, human toxicity, freshwater ecotoxicity, marine ecotoxicity or ionizing radiation. Alternative organic based de-icers are in the market, including carbohydrate-based solutions (corn or beet by-products), calcium magnesium acetate (CMA), and potassium acetate. The overall environmental improvement resulting from the use of some of them is still debated.

The following criterion proposes their use when the application of salt is ineffective or is not appropriate (e.g. when particular care has to be given to the water runoff scenario due to the proximity of water ecosystems, the possibility of water precipitation, and/or the absence of sewage systems).

As road salts and their additives can have an effect on aquatic ecosystems, they should be used with caution near lakes and ponds. Further research on the effects of road salts in aquatic ecosystems at higher concentrations would be useful. More information is needed on the interaction between microbes and organic additives, and the effect on algae.

#### Criterion Proposal

| Core criteria | Comprehensive criteria |
|---|---|

| Technical Specification |
|---|
| **TS2. De-icing and snow removal products**<br>*(Same formulation for Core and Comprehensive)*<br><br>De-icing and snow removal products shall not be classified and labelled as being acutely toxic, a specific target organ toxicant, a respiratory or skin sensitiser, carcinogenic, mutagenic or toxic for reproduction, or hazardous to the environment, in accordance with Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures ('CLP Regulation').<br><br>**Verification**:<br>The tenderer shall provide data (material safety data sheet and amount) of the products to be supplied in the execution of the contract. Products that have been awarded with a relevant ISO Type I ecolabel will be deemed to comply with the requirements. |

| Consultation questions |
|---|
| ○ Are there other de-icer products recommended for their low environmental impact? Are there evidences that prove it?<br>○ Are geographical conditions determining the best environmental practices? Are there protocols in place to apply these snow removal/de-icer products causing the least environmental damage?<br>○ Is a potential reduction in quantity required a viable option? |

## 3.1.3 Consumable goods

### Rationale

This criterion rewards the use of biodegradable bin bags as this will make the composting or organic degradation of biowaste easier to carry out, if the biowaste is collected separately and processed by composting plants that admit compostable bags.

The proposed verification for the supplies relies on test according to the norm EN 14995:2007

### Criterion Proposal

| Core criteria | Comprehensive criteria |
|---|---|
| **Award Criteria** | |
| | **AC1. Compostable bin bags for biowaste**<br><br>*Note: this criterion applies if biowaste is* |

| | |
|---|---|
| | *collected separately and processed by composting plants that admit compostable bags*<br><br>Points will be awarded to bin bags used to collect biowaste that are compostable according to standard EN 14995:2007 or equivalent.<br><br>**Verification**:<br>Tenderers shall present proof of third party certification in accordance with EN 14995:2007 for the bin bags used to collect biowaste. Bin bags that have been awarded with an appropriate ISO Type I ecolabel will be deemed to comply. |

## 3.2 Criteria proposal for cleaning services

### Scope

This category covers the purchase of the following services as identified in the Preliminary Report:

- Mechanical and manual sweeping of sidewalk, bike lane, road (asphalt, roadbed) and roadside (shoulders, curbs, green areas)
- Litter removal from the ground
- Bins' litter collection and sorting
- Mechanical and manual water jet cleaning
- Façade/surface cleaning
- Graffiti removal
- Snow and ice removal from sidewalks, bike lanes and roads, snow-clearing services, ice-clearing services
- Beach cleaning
- Cleaning of fountains, lakes and ponds

All machinery and vehicles employed in the provision of cleaning services shall respect the GPP criteria for machinery and vehicles in Chapters 5 and 6 as well as the common criteria for service categories in Chapter 7.

### 3.2.1 Purchase of cleaning products

The purchase of cleaning products included in a service offer must fulfil criteria specified in the above section 3.1.

### 3.2.2 Operational procedures and best practices

#### Rationale

Spraying chemical herbicides is the cheapest weed control method. Unfortunately this causes unwanted side-effects in case of negligent use under unfavourable conditions. The most important side-effect is the runoff of herbicides to surface water. This is has adverse effects on plant and animal life but also on the production of drinking water (PIANOo 2015b). Work on the development of a sustainable weed management system for pavements has been conducted since 2002. Extensive field tests have shown that weed control under SWEEP guidelines is effective and that when herbicides are used runoff to surface water is reduced (SWEEP).

Street dust mainly referred as to the "respirable" portion of street dust: PM10 – are particles with aerodynamic diameter smaller than 10 micrometers.

To reduce the levels of respirable PM10 street dust in urban areas, the street dust in street environments is important to apply best maintenance practices in the fields of traction control, dust suppressing and street cleaning.

Studded winter tyres have been observed to quickly increase street dust emissions when the winter tyre season starts, even before any traction sanding material has been used. This effect has been observed repeatedly at the air quality monitoring stations of busy traffic environments. Measurements performed during several studies (REDUST 2014) support the hypothesis that reducing the share of studded tyres would decrease street dust originating from pavement wear.

Traction sanding is used in northern countries during winters depending on weather and local practices. Most commonly traction sanding is used on walkways, stairs, cycle paths, intersections and bus stops. A portion of the traction sanding material always ends up on the driveways, causing a share of street dust emissions. Generally, traction sanding has been observed to increase dust emissions, especially if the quality of the rock material used for traction sanding was sub-optimal. Wet sieved material was found to cause less short term emissions than dry sieved material.

Wet sieved and wear resistant rock material, from which smallest size fractions (<1-2 mm) have been removed, should be used when traction sanding is applied. Quality control of the procurement and maintenance organizations should be developed so that inferior quality shipments of traction sanding materials will be quickly discovered and the mistake corrected. Non sieved and fine grained traction sanding material should be avoided, because they contain a large portion of PM10 dust forming material.

Dust binding may be used as an acute measure against rising PM10 levels in priority locations when the spring dust season is ongoing. In the Helsinki metropolitan area, dust binding with calcium chloride has in recent years showed success in mitigating street dust. If dust binding is applied consistently through the spring dust period, a significant reduction in street dust emissions may be achieved in locations where traffic volume and dust levels are high. Dust binding with $CaCl_2$ (10 mass-% solution) can be recommended to mitigate spring time PM10 street dust emissions. Dust binding was also found to be the most cost-efficient method to decrease PM10 emissions. Targeted spreading of dust binding solution is recommended as the main technique to decrease possibility of harmful side effects such as corrosion, environmental effects or reduced traction on streets. Typically a good time to perform dust binding with $CaCl_2$ would be when air humidity is still high, for example very early in the morning before rush-hour.

The conducted studies on the use of salts and acetates for dust suppression show discordant results. Dust suppressants are effective where the road dust load is high, such as in region where the use of studded tires and de-icing agents lead to high PM10 concentrations when the snow melts in the spring. The effectiveness of dust suppressant has been noticed in regions with relatively wet climates (Scandinavia, Netherlands, UK, Germany, Austria and North Italy).

For Southern Europe, where solar radiation is higher, street washing has been shown as a more effective method for dust suppression compared with binding agent spreading (AIRUSE project).

Modern street scrubber with captive hydrology was found to be the most effective street cleaning technique. It is especially efficient when used on very dirty streets, which have high load of fine street dust material. Emissions can be reduced up to 40% during first day after treatment and 20% by average during the first week after treatment (REDUST 2014). Traditional vacuum sweeper alone hasn’t been proof as efficient in reducing PM10 street dust levels, possibly because the method does not remove the finest dust from the pores of street surfaces. When traditional vacuum sweeper was used in conjunction with a separate washing lorry, which flushed the street with high pressure water sprays (combination cleaning), reductions in PM10 street dust emissions were achieved. The key feature to achieve reduction in PM10 street dust is believed to be the high pressure water washing in both modern street scrubber and combination cleaning techniques.

Modern street scrubber machinery is recommended to achieve the best street cleaning result for PM10 emission reductions. Also combination cleaning technique may be recommended to reduce PM10 emissions. Traditional vacuum sweeper alone cannot be recommended as an effective measure to reduce PM10 street dust, but it may still be efficient to reduce larger size fractions of street dust. Street cleaning should be done as early as practically possible. First priority for street cleaning should be the busy

and very dusty streets, where many inhabitants or pedestrians are exposed to air pollutants. Cost efficiency and PM10 dust reduction efficiency of street cleaning actions are at their best when cleaning operations are started early in the spring and focused on very dusty, high priority streets

A set of criteria that gathers the best practices in order to reduce the environmental impact of the cleaning activities is presented below. Public authorities are advised to select the most appropriate practices best suited to the requested cleaning service from these.

## Criterion Proposal

| **Core criteria** | **Comprehensive criteria** |
|---|---|
| **Technical Specifications** | |
| **TS3. Cleaning, de-icing and snow removal products used for the provision of cleaning services**<br><br>• The cleaning products used for the provision of the cleaning services must be compliant with the requirements of the relevant technical specifications (TS1) at Core level.<br>• The de-icing and snow removal products used for the provision of the cleaning services must be compliant with the requirements of the relevant technical specifications (TS2) at Core level.<br><br>**Verification:**<br>See the verification of the relevant technical specifications. | **TS3. Cleaning, de-icing and snow removal products used for the provision of cleaning services**<br><br>• The cleaning products used for the provision of the cleaning services must be compliant with the requirements of the relevant technical specifications (TS1) at Comprehensive level.<br>• The de-icing and snow removal products used for the provision of the cleaning services must be compliant with the requirements of the relevant technical specifications (TS2) at Comprehensive level.<br><br>**Verification:**<br>See the verification of the relevant technical specifications. |
| **Core criteria** | **Comprehensive criteria** |
| **Contract performance Clauses** | |
| **CPC1. De-icing and snow removal operations**<br>*(Same formulation for Core and Comprehensive level)*<br><br>When operationally possible, lower environmental impact de-icers than salts, e.g. carbohydrate-based solutions (corn or beet by products), calcium magnesium acetate (CMA) and potassium acetate, should be used.<br>Records of de-icing operations, including operational conditions and products used shall be kept and made available to the contracting authority for verification purposes. The contracting authority may set rules for penalties for non-compliance. | |
| **CPC2. Reduction of PM10 street dust** | |

*(Same formulation for Core and Comprehensive level)*

PM10 street dust reduction measures must be implemented by means of the following best practices:
- Traction control practices (winter tyres, traction sanding);
- Implement dust binding practices (dust binding solutions, dispersion techniques);
-Street cleaning practices (mechanical & vacuum sweepers, street scrubbers, combinations).

Records of PM10 street dust reduction operations, including operational conditions and products used shall be kept and made available to the contracting authority for verification purposes. The contracting authority may set rules for penalties for non-compliance.

**CPC3. Use of weed killers**

*(Same formulation for Core and Comprehensive level)*

*Note: Contracting authorities need to indicate the local regulations for the application of weed killers and the street sweeping schedules in order to allow the contractor to comply with this contract performance clause.).*

In addition to the requirements set-up by local regulations concerning the application of weed killers, these products should not be applied:

1) 4 days before or after the area is swept; and
2) in the event (or high probability of occurrence) of precipitation or dew, to prevent weed killers from being washed off the plants.

Also, weed killers must be used in line with the most recent valid version of the sustainable weed control on pavements method (DOB method[1]).

Records of weed killer application operations, including weed killers used and weed management methods, shall be kept and made available to the contracting authority for verification purposes. The contracting authority may set rules for penalties for non-compliance.

1) http://www.wur.nl/en/Research-Results/Projects-and-programmes/SWEEP/Results.htm

**Consultation questions**

- Are you aware of any further operational procedure able to reduce the environmental impact of outdoor cleaning activities?
- Which dust binders do you know apart from calcium chloride? Are you aware of their environmental impact?

# 4 Draft Proposed EU GPP criteria for Gardening Activities

## 4.1 Ornamental plants

### Environmental hotspots

The production chain of ornamental plants has strong environment impacts from the use of fertilizer and water depletion in the plant nurseries. It also results in fuel depletion due to the heating of greenhouse structures during winter.

The packaging of the plants represents another factor of environmental impact caused by the use of disposable pots (which can be difficult to recycle) for the delivery of plants.

### Rationale

The inclusion of a criterion on organic produce is proposed based on studies that demonstrate that the possibility of achieving some environmental benefits can be brought under certain conditions, for example benefits regarding biodiversity or the quality of soil.

The verification of the proposed criterion is based on the Regulation (EC) No 834/2007 on organic production and labelling of organic products and an accounting document of the expected annual purchases. In accordance with Regulation (EC) No 834/2007, organic products can be certified and labelled as such being easily recognised and making feasible the verification of this criterion.

Procurers can also verify the purchases of organic products throughout detailed invoices. Invoices of the products purchased should be detailed enough and include the name of the product, the quantity and the costs

It is proposed to move the technical specification on plant characteristics present in the previous version of EU GPP for Gardening Products and Services to a contract performance clause in the gardening services section. The wording of the said technical specification in the previous version was:

> *At least [X]% of ornamental plants must be plant species suitable for the local growing conditions (e.g., soil acidity, average rainfall, range of temperature over the year, etc).*

Although the use of indigenous species can have a strong impact namely in what concerns water consumption for irrigation, this technical specification is quite difficult/contentious to verify. Moreover, the contracting authority should be able to specify exactly the species of plants it wants to purchase and not leave that decision to the contractor.

The concept of resorting to indigenous plant species is better implemented directly by the contracting authority at the planning stage or as a contract performance clause in the gardening services section. This was been proposed as CPC4 ahead.

## Criteria proposal

| Core criteria | Comprehensive criteria |
|---|---|
| **Technical Specifications** | |
| **TS1. Organically grown ornamental plants**<br>*Note: In order to reduce water and fertilizer consumption, purchased ornamental plants should be plant species suitable for the local growing conditions (e.g., soil acidity, average rainfall, range of temperature over the year, etc).*<br><br>At least X%[1)] of purchased ornamental plants must be organically produced according to Regulation (EC) No 834/2007.<br><br>**Verification:**<br>The tenderer shall provide information (name and amount) of ornamental plants to be supplied in the execution of the contract indicating specifically the products that comply with organic requirements.<br>Organic products that have been third party certified in accordance with Regulation (EC) No 834/2007 on organic production and labelling of organic products will be deemed to comply. | **TS1. Environmental sustainable ornamental plants**<br>*Note: In order to reduce water and fertilizer consumption, purchased ornamental plants should be plant species suitable for the local growing conditions (e.g., soil acidity, average rainfall, range of temperature over the year, etc).*<br><br>All purchased ornamental plants must be organically produced according to Regulation (EC) No 834/2007.<br><br>**Verification:**<br>The tenderer shall provide information (name and amount) of ornamental plants to be supplied in the execution of the contract indicating specifically the products that comply with organic requirements.<br>Organic products that have been third party certified in accordance with Regulation (EC) No 834/2007 on organic production and labelling of organic products will be deemed to comply. |
| | **TS2. Plants containers and packaging**<br>Plants must be delivered in reusable or biodegradable containers (or crates or boxes in the case of small plants).<br>- If plant containers are reusable, the company must take them back after the planting of the plants/trees.<br>- If plant containers are biodegradable, they must be made of 100% biodegradable (compostable) substances, such as straw, cork, wood flour or maize starch. |

| | |
|---|---|
| | **Verification:**<br>If containers are reusable, bidders must present a signed declaration stating that they will take back the plant containers selectively collected by gardening staff. If containers are biodegradable, bidders must provide a list of the product ingredients and their respective shares together with a declaration that the specifications are met. Plant containers carrying a type I ecolabel meeting the above requirements will be deemed to comply as well as products classified as biodegradable and compostable according to the EN ISO 17556:2012 standard or equivalent. |
| **Award Criteria** | |
| **AC1. Additional organically grown ornamental plants**<br>Points shall be proportionally awarded to tenders in which more than the required X%[1)] of the total purchases of ornamental plants have been produced in accordance with Regulation (EC) No 834/2007.<br><br>**Verification:**<br>See above TS1. | |
| **Explanatory notes** | |
| **Organically grown ornamental plants**<br>*The contracting authority will have to specify how the percentage of purchase will be calculated, either in number or value. It could also require that for specific plants all of them should be organic to facilitate verification.*<br><br>*<u>Recommended values for core criteria:</u>*<br>*Range% in number of the total purchases of ornamental plants.*<br>*Range% in value of the total purchases of ornamental plants.* | |
| [1)] X is the threshold to be defined by the procurer for the core level (TS and AC). Recommendations for its value are given in explanatory notes above. | |

| **Consultation questions** |
|---|
| ○ What could be the potential thresholds on organically grown ornamental plants based on your expertise? |

## 4.2 Soil improvers

### Environmental hotspots

Soil improvers are materials added to a soil to improve its physical properties, such as water retention, permeability, water infiltration, drainage, aeration and structure. The goal is to provide a better environment for roots.
A mulch is a layer of material (usually of organic nature) applied to the surface of soil. Although they are not, strictly speaking, considered soil improvers (soil improvers must be thoroughly mixed into the soil, while mulch is left on the soil surface), organic mulches reduce evaporation and runoff, inhibit weed growth, and create an attractive appearance. Organic mulches may be incorporated into the soil as amendments after they have decomposed to the point that they no longer serve their purpose.
There are two broad categories of soil improvers: organic and inorganic. Organic improvers include peat, wood chips, grass clippings, straw, compost, manure, biosolids, sawdust and wood ash. Inorganic improvers include vermiculite, perlite, and tyre chunks.
Compost is a mixture of organic and inorganic materials and there are three broad categories: peat based, loam based, peat free.
The word compost also defines another kind of organic material, which is the result of the 'composting' of organic waste. Nowadays many municipalities have facilities to process the compost and provide it for horticulture.
Peat is an accumulation of decayed vegetation or organic matter. It forms when plant materials are inhibited from decaying fully by acidic conditions. Even though peat has a biological origin, due to the slow regeneration rate it is considered non-renewable material. Because of that, and also due to the lower amount of nutrients as compared to other compost, the use of peat should be minimized.
Nevertheless, the control of the quality of compost is important to minimize emissions from hazardous substances or from the presence of heavy metals in the mixture.
Compost can come from household waste, horticultural/forest waste, or sewage sludge. Considering those factors compost must be processed separately from waste and submitted to quality control.
The supply chain of soil improvers could have a strong environmental impact on climate change eco-toxicity and human health due to the

extraction of raw materials. Particularly peat and other minerals are shown to have the strongest impacts for climate change.
Further information and technical indications about soil improvement and mulch can be consulted in Commission decision (EU) 2015/2099 of 18 November 2015 establishing the ecological criteria for the award of the EU Eco-label for growing media, soil improvers and mulch[10]. These criteria aim at promoting the recycling of materials and the use of renewable and recycled materials, thus reducing environmental degradation and decreasing soil and water pollution by means of establishing strict limits on pollutant concentrations in the final product.

## Rationale

The GPP strategy should ensure the supply of environmentally friendly soil improvers, in particular selecting low-impact fertilizer and soil improvers, preferring single nutrient fertilizer or calcium ammonium nitrate-based fertilizer and to avoid the use of peat-based fertilizers.
The criteria were changed in order to harmonize it with the EU Ecolabel for growing media, soil improvers and mulch, but apart from that no significant change was proposed.

## Criteria proposal

| Core criteria | Comprehensive criteria |
|---|---|
| **Technical Specifications** | |
| **TS3. Organic constituents of soil improvers**<br><br>The following materials are not allowed as organic constituents of a final product:<br>• Peat;<br>• Materials totally or partially derived from the organic fraction of mixed municipal household waste separated through mechanical, physicochemical, biological and/or manual treatment;<br>• Materials totally or partially derived from sludges derived from municipal sewage water treatment and from | **TS3. Organic constituents of soil improvers**<br><br>1) The following materials are allowed as organic constituents of a final product:<br>• Materials derived from the recycling of bio-waste from separate collection, as defined in Article 3 of Directive 2008/98/EC of the European Parliament and of the Council[11];<br>• Materials derived from category 2 and 3 animal by-products as laid down in Article 32 of Regulation (EC) No |

[10] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015D2099&from=EN

[11] Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (OJ L 312, 22.11.2008, p. 3).

| | |
|---|---|
| sludge derived from the paper industry;<br>• Materials totally or partially derived from category 1 animal by-products according to Regulation (EC) No 1069/2009.<br><br>**Verification:**<br><br>Tenderers must provide the detailed composition of the product, the origin of organic matter and a declaration of compliance with the above requirements.<br><br>Products holding the EU Ecolabel for growing media, soil improvers and mulch in accordance with the Commission Decision 2015/2099/EC or another relevant type I ecolabel fulfilling the listed criteria, will be deemed to comply. Other appropriate means of proof, such as a technical dossier of the manufacturer or a test report of an independent body, will also be accepted. | 1069/2009 of the European Parliament and of the Council[12] and technical standards which are laid down by implementing Regulation (EU) 142/2011;<br>• Materials derived from fecal matter, straw and other natural non-hazardous agricultural or forestry material as defined in Article 2.1(f) of Directive 2008/98/EC;<br>• Materials derived from any other biomass by-products, as defined in article 5 of Directive 2008/98/EC, that are not mentioned above, subject to the provisions of 2) and 3);<br>• Materials derived from recycling or recovery of any other biomass waste not mentioned above, subject to the provisions of 2) and 3).<br><br>2) The following materials are not allowed as organic constituents of a final product:<br>• Peat;<br>• Materials totally or partially derived from the organic fraction of mixed municipal household waste separated through mechanical, physicochemical, biological and/or manual treatment;<br>• Materials totally or partially derived from sludge derived from municipal sewage water treatment and from sludge derived from the paper industry;<br>• Materials totally or partially derived from category 1 animal by-products according to Regulation (EC) No 1069/2009;<br>• Materials totally or partially derived from sludge other than those allowed in 3) below.<br><br>3) Materials derived from recycling or recovery of sludge are only allowed if the sludge comply with the following requirements:<br>a) They are identified as one of the |

[12]Regulation (EC) No 1069/2009 of the European Parliament and of the Council of 21 October 2009 laying down health rules as regards animal by-products and derived products not intended for human consumption and repealing Regulation (EC) No 1774/2002 (OJ L 300, 14.11.2009, p. 1).

| | |
|---|---|
| | following types of waste according to the European List of Wastes, as defined by Decision 2000/532/EC13:<br>• 020305 sludge from on-site effluent treatment in the preparation and processing of fruit, vegetables, cereals, edible oils, cocoa, coffee, tea and tobacco; conserve production; yeast and yeast extract production, molasses preparation and fermentation.<br>• 020403 sludge from on-site effluent treatment in sugar processing.<br>• 020502 sludge from on-site effluent treatment in dairy products industry.<br>• 020603 sludge from on-site effluent treatment in baking and confectionery industry.<br>• 020705 sludge from on-site effluent treatment in the production of alcoholic and non-alcoholic beverages (except coffee, tea and cocoa).<br>b) They are single-source separated, meaning that there has been no mixing with effluents or sludge outside a specific production process.<br><br>**Verification:**<br>Tenderers must provide the detailed composition of the product, the origin of organic matter and a declaration of compliance with the above requirements.<br>Products holding the EU Ecolabel for growing media, soil improvers and mulch in accordance with the Commission Decision 2015/2099/EC or another relevant type I ecolabel fulfilling the listed criteria, will be deemed to comply. Other appropriate means of proof, such as a technical dossier of the manufacturer or a test report of an independent body, will |

[13]Commission Decision 2000/532/EC of 3 May 2000 replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste and Council Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous waste (OJ L 226, 6. 9.2000, p. 3).

<table>
<tr><td></td><td>also be accepted.</td></tr>
<tr><td>TS4. Hazardous substances (heavy metals) in soil improvers<br><br>The content of the following elements in the final product or constituent shall not exceed the values shown below, measured in terms of dry weight (DW) of the product.<br><br><table><tr><th>Element</th><th>mg/kg (dw)</th></tr><tr><td>Cadmium (Cd)</td><td>1</td></tr><tr><td>Chromium total (Cr)</td><td>100</td></tr><tr><td>Copper (Cu)</td><td>100</td></tr><tr><td>Mercury (Hg)</td><td>1</td></tr><tr><td>Nickel (Ni)</td><td>50</td></tr><tr><td>Lead (Pb)</td><td>100</td></tr><tr><td>Zinc (Zn)</td><td>300</td></tr></table><br>Verification:<br><br>Tenderers must provide the relevant test reports (EN 13650 or equivalent; EN 16175 or equivalent for Hg) demonstrating that the above criterion is met.<br><br>Products holding the EU Ecolabel for growing media, soil improvers and mulch in accordance with the Commission Decision 2015/2099/EC or another relevant type I ecolabel fulfilling the listed criteria, will be deemed to comply. Other appropriate means of proof, such as a technical dossier of the manufacturer or a test report of an independent body, will also be accepted.</td><td>TS4. Hazardous substances (heavy metals) in soil improvers<br><br>The content of the following elements in the final product or constituent shall not exceed the values shown below, measured in terms of dry weight (DW) of the product.<br><br><table><tr><th>Element</th><th>mg/kg (dw)</th></tr><tr><td>Cadmium (Cd)</td><td>1</td></tr><tr><td>Chromium total (Cr)</td><td>100</td></tr><tr><td>Copper (Cu)</td><td>100</td></tr><tr><td>Mercury (Hg)</td><td>1</td></tr><tr><td>Nickel (Ni)</td><td>50</td></tr><tr><td>Lead (Pb)</td><td>100</td></tr><tr><td>Zinc (Zn)</td><td>300</td></tr></table><br>Verification:<br><br>Tenderers must provide the relevant test reports (EN 13650 or equivalent; EN 16175 or equivalent for Hg) demonstrating that the above criterion is met.<br><br>Products holding the EU Ecolabel for growing media, soil improvers and mulch in accordance with the Commission Decision 2015/2099/EC or another relevant type I ecolabel fulfilling the listed criteria, will be deemed to comply. Other appropriate means of proof, such as a technical dossier of the manufacturer or a test report of an independent body, will also be accepted.</td></tr>
<tr><td></td><td>TS5. Physical contaminants in soil improvers<br><br>The content of glass, metal and plastic with mesh size of > 2 mm (the sum of each contribution) in the final product shall not exceed 0.5 %, measured in terms of dry weight.<br><br>Verification:<br><br>Tenderers must provide the relevant test reports (CEN/TS 16202 or equivalent) demonstrating that the above criterion is met.<br><br>Products holding the EU Ecolabel for growing media, soil improvers and mulch in accordance with the Commission Decision 2015/2099/EC or another relevant type I ecolabel fulfilling the listed</td></tr>
</table>

| | |
|---|---|
| | criteria, will be deemed to comply. Other appropriate means of proof, such as a technical dossier of the manufacturer or a test report of an independent body, will also be accepted. |
| | **TS6. Product performance of soil improvers**<br>a) Products shall not adversely affect plant emergence and subsequent growth;<br>b) The organic matter as loss on ignition of the final product shall be at least 15% dry weight (% DW);<br>c) The dry matter content of the final product shall be at least 25% of the fresh weight (% FW).<br><br>**Verification:**<br>Tenderers must provide the relevant test reports (a: EN 16086-1 or equivalent; b: EN 13039 or equivalent; c: EN 13040 or equivalent) demonstrating that the above criterion is met.<br>Products holding the EU Ecolabel for growing media, soil improvers and mulch in accordance with the Commission Decision 2015/2099/EC or another relevant type I ecolabel fulfilling the listed criteria, will be deemed to comply. Other appropriate means of proof, such as a technical dossier of the manufacturer or a test report of an independent body, will also be accepted. |
| | **TS7. Primary pathogens in soil improvers**<br>The content of primary pathogens in the final product shall not exceed the following levels:<br>a) Salmonella spp: absent in 25g fresh weight<br>b) E.coli: <1000 CFU/g fresh weight (CFU: colony-forming units)<br><br>**Verification:**<br>Tenderers must provide the relevant test reports (a: ISO 6579 or equivalent; b: CEN/TR 16193) demonstrating that the above criterion is met.<br>Products holding the EU Ecolabel for growing media, soil improvers and mulch in accordance with the Commission Decision 2015/2099/EC or another |

| | |
|---|---|
| | relevant type I ecolabel fulfilling the listed criteria, will be deemed to comply. Other appropriate means of proof, such as a technical dossier of the manufacturer or a test report of an independent body, will also be accepted. |

| **Consultation questions** |
|---|
| ○ Do you agree with the alignment of the soil improvers' chapter of EU GPP criteria for Gardening Products and Services with the revised criteria for the EU Ecolabel for growing media, soil improvers and mulch?<br>○ Do you agree with the introduction of a technical specification at Core level (identical to the one at Comprehensive level) limiting heavy metals contents? |

## 4.3 Automatic irrigation systems

### Environmental hotspots

Water is an essential good that has to be preserved. Often non-efficient irrigation systems provoke great loss of water. Moreover, not all irrigation systems in urban areas are connected with phreatic sources, meaning that high-quality water is used for irrigation.
The purification of water to make it safe to drink (also known as Potabilization) is a productive chain that has environmental impacts and costs itself, which is why potable water should not be used for irrigation activities.
Due to climate specificity, especially in the South of Europe, water depletion constitutes a strong environmental impact of gardening activities.
Improvements areas for these activities were proposed in the GPP for Gardening activities:

- *Use non-potable water for watering*
- *Calculate accurately the water needs of each green area*
- *Install and programme correctly efficient irrigation systems*
- *Apply mulching as a prevention and water saving techniques*
- *Arrange plants according to their hydric requirements*
- *Select regional plants adapted to the weather conditions*

### Rationale

The main purpose of the proposed criteria is to contribute to the reduction of water consumption for irrigation for the reasons stated before.

It is proposed that the use of locally recovered water sources that was previously an award criterion becomes now a technical specification conditional to the contracting authority judging it appropriate.

## Criteria proposal

| Core criteria | Comprehensive criteria |
|---|---|
| **Technical Specifications** | |
| **TS8. Automatic irrigation**<br>*(Same formulation for Core and Comprehensive levels)*<br><br>*Note: Where irrigation water can be sourced from locally recovered sources, as a combination of rain water, ground water and filtered grey water, the public authority could require the use of these sources.*<br><br>The automatic irrigation systems shall allow for detailed parametrization, namely in what concerns:<br>• Allowing the set-up of different irrigation zones;<br>• Possibility to adjust the volume of dispensed water by zones;<br>• Possibility to program watering time periods by zones;<br>• Possibility to measure soil humidity level and to automatically block the irrigation when it is high enough (as defined by the contracting authority), for example after rain, by zones.<br><br>**Verification:**<br>Tenderers must provide appropriate documentation demonstrating that these criteria are met. The contracting authority will provide the guidelines based on the water resources availability characteristics specific to the climate and location of the irrigation system. | |

| Consultation questions |
|---|
| ○ Do you agree that the use of locally recovered water sources (previously an award criterion) becomes now a technical specification conditional to the contracting authority judging it appropriate? |

## 4.4 Gardening Services

### Environmental hotspots

The environmental hotspots associated with ornamental plants, soil improvers, water consumption, machinery and vehicles used for the provision of the services have been described in other sections of the document. Regarding other environmental impacts associated with the provision of gardening services, the most relevant ones are the following:

**Pest control:**
The products aimed at the protection of plants could be biological, physical or chemical. Those products do not just refer to insecticides but also herbicides, fungicides, bactericides and other substances.
Plant protection is used in gardening services to control disease, competitors and to ensure growing and healthy plants. Usually pest control is addressed to the control of a special group of organisms; this means that this typology of products has a selective effect against specific pests. Nevertheless, products for pest control can have disease effects, e.g. they could adversely affect the pest's natural predators.
The main impact of pest control depends on the alteration of biodiversity; it can cause the loss of some species but can also cause the mutation of some organisms inducing the appearance of resistant lineages of weeds, pests or diseases in general.
Other impacts relate to the eco-toxicity in soil, water and air.
Those substances can also generate an impact on eutrophication and biomagnification caused by the increasing of substances affecting the food chain.
The use of plant protection in the EU is highly regulated. All products available on the market have to be submitted to a control and a risk evaluation to human health and the environment[14].

**Invasive species:**
Invasive alien species are plants or animals that are non-native to an ecosystem, which may cause economic or environmental impact affecting human or animal health. Particularly their impact affects biodiversity, inducing the decline or elimination of native species.
While all species compete to survive, invasive species are characterized by traits that allow them to out-compete native species. The invasive species are found to have an efficient rate of growth and reproduction, as well as a higher rate in using the resources from the ecosystem.

[14] Information available at: https://ec.europa.eu/food/plant/pesticides_en

It is estimated that the invasion of alien species affecting human health, damaging infrastructures and causing agricultural losses is one of the biggest issues in Europe as they constitute economic and ecological problems (damage to ecosystems and extinction of species), causing as result EUR 12 billion damages per year[15].

A European-wide strategy[16] has been developed to contain this problem and control environmental and economic consequences. The Regulation on invasive alien species[17] provides a set of measures that include prevention, detection and eradication, and management. Moreover, the European Commission provides a list of alien species of Union concern[18].

**Waste generation**

The waste generated from gardening activities could have a positive environmental impact thanks to its recyclability.
Gardening services should ensure that all the organic waste is collected separately and composted or sent to a public composting plant.
The gardening service should provide machines to shred the resulted wood from forest activities and re-use it as mulch in situ.

Plant delivery could generate a large amount of waste because plants are normally delivered in PVC pots or in polystyrene plateau which are not always reusable or reused. The nurseries usually do not provide the option of taking back the pots for reuse. For that reason, most of the time this material is disposed of in a landfill. The tender of gardening services should ensure the correct management of this waste flow and separate as much as possible recyclable or reusable material.

**Rationale**

The proposed criteria in areas other than the ones that are tackled elsewhere in this report (ornamental plants, soil improvers, irrigation water consumption, machinery and vehicles) focus mainly on raising the

[15]Information available at: http://europa.eu/rapid/press-release_IP-13-818_en.htm

[16]Information available at: http://ec.europa.eu/environment/nature/invasivealien/index_en.htm

[17]Information available at: http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014R1143&from=EN

[18]Information available at: http://ec.europa.eu/environment/nature/invasivealien/list/index_en.htm

awareness levels of the service provider regarding environmentally sensitive aspects, such as pest management, invasive species and waste management, and promote the search for effective solutions that can be found in dialogue with the contracting authority.

All machinery and vehicles employed in the provision of gardening services shall respect the GPP criteria for machinery and vehicles in Chapters 5 and 6, as well as the common criteria for service categories in Chapter 7.

## Criteria proposal

| **Core criteria** | **Comprehensive criteria** |
|---|---|
| **Technical Specifications** | |
| **TS9. Ornamental plants and soil improvers used for the provision of gardening services**<br><br>• The ornamental plants supplied during the provision of the gardening services must be compliant with the requirements of the relevant technical specifications (TS1) at Core level.<br>• The soil improvers used for the provision of the gardening services must be compliant with the requirements of the relevant technical specifications (TS3 and TS4) at Core level.<br><br>**Verification:**<br>See the verification of the relevant technical specifications. | **TS9. Ornamental plants and soil improvers used for the provision of gardening services**<br><br>• The ornamental plants supplied during the provision of the gardening services must be compliant with the requirements of the relevant technical specifications (TS1 and TS2) at Comprehensive level.<br>• The soil improvers used for the provision of the gardening services must be compliant with the requirements of the relevant technical specifications (TS3 to TS8) at Comprehensive level.<br><br>**Verification:**<br>See the verification of the relevant technical specifications. |
| **Core criteria** | **Comprehensive criteria** |
| **Contract Performance Clauses** | |
| **CPC1. Watering practices**<br>*(Same formulation for Core and Comprehensive)*<br><br>Watering practices must:<br>• Maximise the use of non-potable water (from rain, phreatic water or reused water).<br>• Apply mulching to avoid evaporation in the areas specified by the contracting authority.<br>• Use automatic irrigation systems as provided by the contracting authority and fit the volume of dispensed water according with plant needs. In this case the contractor will be in charge of the maintenance of the said irrigation system.<br><br>In case of manual irrigation, where no automatic irrigation system is available, or when | |

an over-irrigation is necessary, the contractor will provide the solution for the manual irrigation.
The contractor shall provide a water requirement study, within one month of the start of the contract, to define the amount of water that is needed for each green area. The contracting authority will provide the guidelines based on the water resources availability characteristics specific to the climate and location of the irrigation system.

Records of watering practices shall be kept and made available to the contracting authority for verification purposes. The contracting authority may set rules for penalties for non-compliance.

**CPC2. Waste management**

*(Same formulation for Core and Comprehensive)*

Waste produced during the carrying out of gardening services must be collected separately and managed as follows (*the contracting authority can/should limit the management options according to the local circumstances)*:

- All organic waste (dry leaves, pruning, grass) must be composted "in-situ", in the company facilities or by contracting out this practice to a waste treatment enterprise.
- Woody organic waste from branches, etc. must be shredded "in situ" or in the company facilities and used as mulching in the agreed areas.
- Packaging waste must be separated into the existing urban waste fractions and placed into the corresponding street containers (*paper, plastic and other - available waste streams to be inserted*.). However, packaging waste of dangerous substances, such as plant protection products, must be disposed of safely in approved collection points or through an authorized waste manager for further treatment.

Records of the management of waste produced during gardening operations shall be kept and made available to the contracting authority for verification purposes. The contracting authority may set rules for penalties for non-compliance.

**CPC3. Pest control and invasive species management**

*(Same formulation for Core and Comprehensive)*

The use of chemical plant protection products must be reduced by applying alternative techniques (such as thermal, mechanical or biological treatments) for the main plant diseases. Integrated pest management should be implemented after discussed and agreed with the contracting authority.
The presence of any plants or animals suspected to be invasive shall be immediately reported to the contracting authority and adequate control measures shall be defined in joint agreement.

Records of plant protection operations for pest control and invasive species management actions, including specific techniques and products used, shall be kept and made available to the contracting authority for verification purposes. The contracting authority may set rules for penalties for non-compliance.

**CPC4. Indigenous plant species**

*(Same formulation for Core and Comprehensive)*

Unless otherwise specified by the contracting authority, all ornamental plants supplied in the execution of the contract must be plant species suitable for the local growing conditions (e.g., soil acidity, average rainfall, range of temperature over the year, etc).

Records of supplied plants shall be kept and made available to the contracting authority for verification purposes. The contracting authority may set rules for penalties for non-compliance.

| **Consultation questions** |
| --- |
| Do you think the criteria on pest management and invasive species should be either more specific or more stringent?<br>Are you aware of any practical way to verify whether a given plant species is suitable for the local growing conditions according to CPC4 (like, e.g., indigenous plant species lists by geographical zones)? |

## 4.5 Cost considerations

The practices for gardening activities proposed in this study can result in cost savings for administrations. As shown in the experience carried out at Harvard University with an organic landscaping maintenance program[19] the sustainable management of green areas can result in overall advantages, both economic and environmental. In the first year of implementation (2008) this program was able to save 30% of water and reduce the use of products including fertilizer and products for disease control.

With this in mind, we can consider that performing gardening activities in accordance with environmental criteria may enhance savings for public administrations. Nevertheless, we have to consider that additional costs can occur because often organic and environmentally friendly products have a higher price on the market (e.g. ornamental plants, eco-labelled certified products, reusable packaging etc). Even still, experience shows that boosting biodiversity and sustainable maintenance of green areas can result in a reduction of irrigation needs and plant protection.

[19] Information available at: https://green.harvard.edu/topics/nature-ecosystems

# 5 Draft Proposed EU GPP criteria for Machinery

## 5.1 Machinery for Cleaning and Gardening Activities

### Scope

This category covers the procurement of the following products as identified in the Preliminary Report:

- Lawn-mowers (including lawn tractors) and scarifiers
- Chainsaws
- Brush saws
- Strimmers
- Hedge trimmers
- Pruners and similar hand-operated machines
- Leaf collectors and leaf blowers
- Auto-scythes
- Auto-hoes
- Rotary cultivators
- Compost shredders

### 5.1.1 Machinery Engine Exhaust Emission

#### Rationale

Traditionally, the majority of organizations (public/municipal authorities, contractors) involved in the maintenance of public spaces employ reciprocating engines, fuelled with liquid hydrocarbon-based fuels. These engines could be diesel- (compression ignition), petrol- and or LPG- (spark ignition) engines.

One of the main environmental impacts related to the use of machinery, are emission of greenhouse gases from the combustion of "traditional" fuels (e.g. gasoline, diesel) in engines, and other atmospheric emissions such as nitrogen oxide emissions with human health and environmental implications as detailed in the Preliminary Report.

Powering machinery used for public space maintenance by using cleaner burning fuels (e.g. compressed natural gas, propane) can help reduce the exhaust air emissions resulting from the use of machinery. However the use of electricity (corded or cordless) can eliminate the generation of exhaust air emissions. A number of machinery capable of running on these various fuel types/ energy forms (especially for lawnmowers) are currently available and could be integrated into the fleet of PSM machinery.

In Europe the technical specifications on health and environmental grounds for fuels to be used for vehicles equipped with positive-ignition and compression-ignition engines are laid out in Directive 98/70/EC of 13

October 1998, otherwise known as the "fuel quality directive". The directive requires member states to ensure that gas oils intended for use by NRMM do not exceed a sulphur content of 10mg/kg (at placing on the market) respectively 20 mg/kg (at point of final distribution).

Regulation (EU) 2016/1628 otherwise known as the Non-Road Mobile Machinery (NRMM) Regulation which amends and repeals the existing Directive 97/68/EC with effect from 1 January 2017 specifies fuel quality for use during type-approval testing.

The NRMM covers a very wide variety of internal combustion engines used in all types of machinery including those used for public space maintenance. The regulation defines emission limits for engines of NRMM equipment and vehicles covering a large variety of machines, including small handheld tools (such as chainsaws, trimmers and lawn mowers), construction machinery and other non-road machinery (e.g. generating sets, railcars, locomotives). Engine types referred to in the NRMM differ in engine size and are either as compression-ignition (CI), or spark -ignition (SI).

Five types of spark-ignition (SI) engines, mainly fuelled with gasoline, are more typically found in lawn and garden equipment:

- Two-stroke with carburetor (2c)
- Two-stroke with pre-chamber fuel injection (2i)
- Two-stroke with direct fuel injection (2di)
- Four-stroke with carburetor (4c)
- Four-stroke with fuel injection (4i) (includes direct injection)

Two stroke engines with carburettor or pre-chamber fuel injection are overall more polluting (emitting more VOCs and CO but lower NOx) due to their inability to completely separate the inlet gases from the exhaust gases. Consequently, up to 30% of the fuel is unburnt, with the additional need to introduce lubricating oil into the fuel chamber unlike in the four stroke engines which possess separate reservoirs for fuel and oil.

Almost all the uses of two-stroke engines are in off-road applications due to their light weight and handling ability (particularly in over-head applications) in contrast to four-strokes. As a result of this, they are mostly used in non-lawnmower garden equipment (chain saws, leaf blowers, trimmers, etc).

In contrast lawn mowers are usually equipped with either two stroke or four stroke engines – with newer models using four stroke engines. Lawn mowers are either used for domestic or professional applications.

Domestic lawn mowers can be either:

- two-stroke or four-stroke petrol-engine powered with a power output of between 0.5 and 5 kW or,
- ride -on mowers with either one- or two-cylinder diesel engines or four-stroke petrol engines

Conversely professional lawn mowers normally could be ride-on mowers and are typically diesel or four-stroke petrol-engine powered.

Four stroke carburettor engines are generally quieter, more fuel efficient and are less polluting than conventional two stroke engines.

Machinery used for PSM could also be electrically powered by machines which may be corded or battery operated. Self-propelled lawnmowers (also referred to as robots) fall into the latter category as they could be driven either by a battery or solar cells.

Data available indicates that in 2015, of all the 17 million PSM machinery and equipment sold in Europe, 9.9 million were petrol units, 4.7 million corded units, and 2.4 million cordless units.

Although the market dynamic differs, information available from the US indicates that lawn mowers (both ride-on and walk behind) appear to have the largest growth segment followed by the handheld segment, of which the largest categories are chainsaws and trimmers. The market share of electric/battery-powered equipment is increasing as new innovations and technology are being introduced into the market. The growth in electric products is being driven by battery-powered products such as robotic lawn mowers and handheld products such as trimmers, hedge cutters and chainsaws[20]. The demand for robotic mowers is also projected to increase as the costs of these equipment drops and their performance improves.

As they do not require hydrocarbon fuels for their operation, electric powered and battery powered products generally more environmentally positively ranked across most impact categories (e.g. the absence of direct air pollutant emissions).

Fuel quality can also impact air emissions. For liquid fuel driven PSM machines, alkylate fuel also called alkylate gasoline has been recommended as being cleaner than conventional gasoline. This is because it is free from sulphur, benzene and aromatics. Other advantages of the application of the fuel include[21]:

- Improvement in machine performance and a longer service life ( it can be stored for a long time without any deterioration in quality)

[20] http://www.husqvarnagroup.com/en/about/market

[21] http://www.aspen.se/Guider/Guide_Engelsk/What_is_alkylate_petrol_/Aspen_miljobensin

- Reduced emission of pollutants (e.g. Polycyclic Aromatic Hydrocarbons (PAH) in the emissions are reduced by up to 90%[22])

Alkylate gasoline is available in 2- and 4-stroke variants. However, it is about 3 to 4 times more expensive than standard gasoline.

The NRMM in addition to regulating exhaust gas emissions specifies fuel types that are allowed for use during type-approval testing and relevant for test methods. This regulation amends and repeals the existing Directive 97/68/EC with effect from with effect from 1 January 2017. In addition, the ISO 8178-4 enables the measurement of exhaust emission of non-road machinery under steady-state test cycles for different engine applications.

European emission standards for engines used in new non-road mobile machinery (NRMM) have been structured in phased stringent tiers known as Stage I...V standards[23].

Stage I/II – these regulated emissions from non-road diesels (off-road depending on the engine power output but did not explicitly cover the range of equipment and machinery applied for PSM. This deficit was corrected through Directive 2002/88/EC which amended the non-road Directive 97/68/EC by adding emission standards for small spark-ignited engines below 19 kW. The utility engine emission standards were mostly aligned with the US emission standards for small utility engines.

Stage III/IV – these emission standards for non-road engines were adopted on April 21, 2004 for agricultural and forestry tractors on February 21, 2005, and are harmonized with the US Tier 3/4 standards. Stage III/IV legislation is applicable only to engines in new vehicles and equipment; replacement engines to be used in machinery already in use (except for railcar, locomotive and inland waterway vessel propulsion engines) would have to comply with the limit values that the engine to be replaced had to meet when originally placed on the market.

The regulated EU Stage V and US (EPA) Tier 4 Final emission limits are almost identical when considering the limits for diesel engines, based on the power range in which the engine operates. However, the NRMM Stage V has a stricter limit of 0.015 for particulate matter (PM), and it also includes a particle number (PN) limit for the engine power range of 19 kW to < 560 kW. The main difference between both regulations is that EU

[22] http://www.holmberg.eu/info/produkter/special-fuels/alkylate-gasoline/about-alkylate-gasoline.aspx

[23] http://www.transportpolicy.net/standard/eu-nonroad-emissions/

Stage V applies to all combustion engines (diesel, petrol, gas) and that Tier 4 in the USA only applies to diesel engines[24].

The EU Stage V Particulate Number (PN) limits set out in the new Regulation (EU) 2016/1628 result in the use of diesel particulate filters (DPF) on all affected engines (as the Regulation is technology-neutral, DPFs are not explicitly required), while the US Tier 4 standards can be met without filters[25]. This to a large extent stops the harmonization of emissions limits between the two authorities as the Stage I/II limits were in part harmonized with US regulations. Stage III/IV requirements were harmonized to a large degree with the US Tier 3/4 standards. Moreso, as the difference between the new EU and US legislation due to PN limits starts only >19kW, which is not the power range considered for machinery within the GPP Criteria for PSM, this is not dwelt upon.

To encourage the purchase of machinery deployed for PSM with lower engine exhaust emissions, the best available performing technologies in the market could be used as starting points for drafting GPP criteria.

Apart from the Nordic Ecolabelling criteria relating to fuel consumption and exhaust gas emissions of machines for parks and gardens, no other ecolabel criteria on this parameter for this product group was found. Therefore, it is proposed for the core criteria to set the technical specifications to promote machinery operating with engines that comply with Euro V limits. At the comprehensive level, the technical specification is designed to encourage the deployment of that machinery capable of being operated without emitting any direct air pollutant. These would include corded and non-corded machinery technologies.

## Criterion Proposal

| **Core criteria** | **Comprehensive criteria** |
|---|---|
| **Technical Specification** | |
| **TS 1. Engine Exhaust Emissions**<br>The engine exhaust emissions shall be below the levels outlined in the tables below: | **TS 1. Engine Exhaust Emissions**<br>The machinery shall operate with zero exhaust emissions. |

[24] https://www.hydac.com/fileadmin/pdb/pdf/PRO0000000000000000000013200020011.pdf.

[25] https://www.dieselnet.com/standards/eu/nonroad.php

SI Engines

| | | emissions (g/kWh) | | |
|---|---|---|---|---|
| | Class | CO | NOx | HC |
| 0- 19 kW handheld | <50 cc | 805 | 50 | |
| | >50 cc | 603 | 72 | |
| 0- 19 kW Non-handheld | 80-225 cc | 610 | 10 | |
| | >225 cc | 610 | 8 | |

CI Engines

| | | emissions (g/kWh) | | | |
|---|---|---|---|---|---|
| | Class | CO | NOx | HC | PM |
| 0-8 kW | Variable and constant | 8 | 7.5 | 7.5 | 0.4/0.6 |
| 8-19 kW | Variable and constant | 6.6 | 7.5 | 7.5 | 0.4 |

**Verification**:

The tenderer shall provide an engine test report or type approval certificate demonstrating that the engine emission performance limits are in conformity with the criterion. The test report shall be from an independent body that meets the requirements of EN-ISO/IEC 17025. The type approval certificate shall indicate the type approval number of the engine.

**Verification**:

The tenderer shall provide a copy of the type-approval certificate of the power unit of the Machinery.

**Award Criteria**

**AC1. Exhaust Emissions**

Points will be awarded to machines with lower exhaust emissions than the maximum included in the technical specifications, proportionally to their air pollutant emissions performance.

**Verification**:

The tenderer shall provide test report or type approval certificate demonstrating

| | |
|---|---|
| that the exhaust emission performance limits are lower than those specified in the criterion. The test report shall be from an independent body that meets the requirements of EN-ISO/IEC 17025. The type approval certificate shall indicate the type approval number of the engine. | |

**Consequences**

PSM engine exhaust emission levels will meet as a minimum the upper limit of the exhaust emissions included in the specifications. As their engine configurations develop further, even better emission performance is expected.

| **Consultation questions** |
|---|
| ○ Would it be feasible to include engine useful life measured by the Emission Durability Period as a technical criterion supporting the engine exhaust emissions criterion?<br>○ Do you agree that tenders for machinery requiring lower engine exhaust emissions than those in the core specification can be met by tenderers?<br>○ |

### 5.1.2 Battery Quality

#### Rationale

Given the increasing market shares for both electric, battery-operated, robotic products - robotic mowers gained rapidly in popularity as their total market for Europe was 170 million dollars in 2012, with a 30 % growth rate per year[26] - the potential impacts which could arise from the deployment of batteries as well as their operational lifetime will need to be addressed. Generally, the results of environmental analysis of different battery types for stationary applications indicates that battery technologies using lead-acid, nickel-cadmium and nickel-metal have a higher environmental impact than the lithium-ion and the sodium nickel chloride batteries[27,28].

The EU Batteries Directive 2013/56/EU of November 23, 2013 which amended the Directive 2006/66/EC performs this role by removing restricting the use of cadmium in cordless power tools until 31 December 2016 after which the use of this heavy metal will be prohibited. A restriction was also applied to mercury use in all batteries.

Additionally, as suitable cadmium-free substitutes for use in cordless power tools applications are available on the market, namely nickel-metal hydride and lithium-ion battery technologies[29,30], a criterion on battery is also introduced.

#### Criterion Proposal

---

[26] https://encrypted.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=21&cad=rja&uact=8&ved=0ahUKEwiVl6q306TWAhXLbRQKHbL1DNo4FBAWCCQwAA&url=https%3A%2F%2Fwww.vdma.org%2Fdocuments%2F266687%2F344832%2FEcodesign%2BWP3_Draft_Task_3_report_20140616_1500.pdf%2Fd7f57d0c-3158-4194-aa89-d376894d7307&usg=AFQjCNFT271gNxEfYeTeukKJKbP0OHQRtw

[27] Hiremath, M., et al. 2015. Comparative Life Cycle Assessment of Battery Storage Systems for Stationary Applications, Environmental Science & Technology 2015 49 (8), 4825-4833. DOI: 10.1021/es504572q

[28] https://www.mech.kuleuven.be/lce2006/010.pdf.

[29] http://eur-lex.europa.eu/eli/dir/2013/56/oj/eng

[30] https://www.lowesforpros.com/articles/cordless-tools-comparing-lithium-ion-and-nicd-battery-benefits_a1475.html

| Core criteria | Comprehensive criteria |
|---|---|
| **Technical Specification** | |
| **TS 2. Battery rechargeability and quality**<br>*(Same formulation for Core and Comprehensive)*<br><br>The battery shall meet the performance requirements of the EN 61960.<br>**Verification:**<br>Tenderers shall provide a test report verifying battery quality and performance to ISO 61951-2 for NiMH or to ISO 61960 for lithium ion batteries. The test report shall be from an independent testing laboratory that fulfils the requirements for the competence of testing and calibration laboratories according to EN ISO/IEC 17025. | |
| **Award Criteria** | |
| **AC 2. Battery heavy metal content**<br>*(Same formulation for Core and Comprehensive)*<br><br>Points will be awarded for the provision of battery-powered machinery employing rechargeable batteries with lower heavy metal concentration than those specified below:<br>Mercury < 0.1 ppm<br>Cadmium < 1.0 ppm<br>Lead < 5 ppm<br><br>**Verification**:<br>Tenderers shall provide a test report verifying battery quality and performance to ISO 61951-2 for NiMH or to ISO 61960 for lithium ion batteries. The test report shall be from an independent testing laboratory that fulfils the requirements for the competence of testing and calibration laboratories according to EN ISO/IEC 17025. | |

### Consequences

This criterion proposal will encourage the use of PSM equipment with reduced environmental impacts.

| Consultation questions |
|---|
| ○ What is /are the potential implication (s) of the introduction of this criterion from the tenderer standpoint?<br>○ Are there enough accredited testing laboratories competent for conducting these tests? |

## 5.1.3 Noise Emission

### Rationale

Noise pollution has been identified in the preliminary report as one of the significant environmental impacts arising from the use of machinery for PSM. In Europe, machinery noise is regulated via:

The outdoor equipment directive 2000/14/EU which sets out noise requirements for equipment used outdoor indicated through the sound power level which must be declared.

The machinery directive regulates the noise level for the operator. This mandates a determination and declaration of the emission sound pressure level. However, this declaration is only required if the emission sound pressure level exceeds 80 dB(A).

All types of machinery covered by the outdoor equipment directive must be labelled with the guaranteed sound power level before they can be sold in Europe.

Technology developments have shown that it is possible to have outdoor machinery with lower noise as hybrid drives are now used increasingly in outdoor equipment with the advantage of fuel efficiency, lower exhaust emissions and noise reduction. However the market share of this equipment is not known.

Electric powered equipment is also increasingly available because of its improving performance and the lower price of battery-powered units. This also represents a potential market sector where growth can be expected in the future. If this trend continues, they could replace some of the combustion engine powered equipment which is mainly handheld equipment. In spite of all these developments, for most professional and large equipment types, combustion engines are still in majority. In contrast handheld machinery such as chainsaws, brush cutters and leaf blowers possess lighter but noisier two stroke engines. Data available indicates that in 2015, of all the 17 million PSM machinery and equipment sold in Europe, 9.9 million were petrol units, 4.7 million corded units, and 2.4 million cordless units.

Although the market dynamic differs, information available from the US indicates that the introduction of battery has positively impacted the power lawn and garden equipment market. Lawn mowers (both ride-on and walk behind) lawn mowers appear to have the largest growth segment followed by the handheld segment, of which the largest categories are chainsaws and trimmers. The electric category, which covers corded and battery-powered products, is a relatively small segment but it is currently showing the strongest growth rate as new innovations and technology are being introduced into the market. The growth in electric products is being

driven by battery-powered products such as robotic lawn mowers and handheld products such as trimmers, hedge cutters and chainsaws[31]. Although the costs of these products are high, as the costs of these equipment drops and their performance improves, demand for them is also projected to increase.

As they are electrically powered, these products do not have any direct $CO_2$ emissions and are quieter than the conventional machines running with ICEs. Electric lawn mowers generate roughly a tenth of the noise level of gasoline powered mowers, at 84-88 db(A), and robotic mowers produce even less noise emission[32] (See Table 1).

Table 1. Comparison of Lawnmowers[33]

| Type | Battery types | Charging time (mins) | Noise level (dB) | Cost (EUR) |
|---|---|---|---|---|
| Robotic | Li –Ion, LiFePO4 | 60-110 | 51-94 | 999 - 4200 |
| Battery powered | Li –Ion | 55 – 150 | 78 – 94 | 449 - 965 |
| Electric cable (corded) | | | 77 - 96 | 450 - 999 |

A recent study (ODELIA) commissioned by the European Union concluded that there exists additional potential for increased noise reduction from machinery typically used in PSM, and proposed new noise emission limits which could become mandatory regulatory requirements when accepted. However, as this proposal is still being discussed and the aim of the criteria is to push the market to adopt the best environmentally friendly technologies, this criterion is based on the review of noise limits available for ecolabel products and the increasingly positive developments envisaged in the electric powered machinery product sector.

[31]http://www.husqvarnagroup.com/en/about/market

[32]https://encrypted.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=26&cad=rja&uact=8&ved=0ahUKEwjwzNz41aTWAhUGbxQKHVVtDzY4FBAWCD8wBQ&url=http%3A%2F%2Fwww.eurovaprint.eu%2Ffileadmin%2Feurovaprint_files%2Fpdfs%2FEcodesign_WP3_Task_3_Draft_Final_Report_17092014.pdf&usg=AFQjCNGQnLWJeB-foptm03ZWnrFzQlw1BA

[33]Compiled from: http://www.topten.ch/private/products/lawn_mowers

## Criterion Proposal

<table>
<tr><th>Core criteria</th><th>Comprehensive criteria</th></tr>
<tr><td colspan="2">Technical Specification</td></tr>
<tr><td></td><td>
TS 3. Low Noise Polluting/ Emitting Machinery<br><br>
The noise emission level of the machine shall be below the noise levels outlined in the table below:
<table>
<tr><th>Machine</th><th>Specific test method</th><th>Sound power level LWA (dB)</th></tr>
<tr><td>Chainsaws</td><td>EN 62841-4-1</td><td>99</td></tr>
<tr><td>Hedge trimmers</td><td>EN 62841-4-2</td><td>93</td></tr>
<tr><td>Lawn-mowers cutting width ≤ 40 cm</td><td rowspan="2">EN 60335-2-77</td><td>88</td></tr>
<tr><td>Lawn-mowers cutting width > 40 cm</td><td>91</td></tr>
<tr><td>Electrical trimmers and scythes</td><td>EN 50636-2-91</td><td>91</td></tr>
<tr><td>Scarifiers</td><td>EN 50636-2-92</td><td>92</td></tr>
<tr><td>Shredders</td><td>EN 50434</td><td>92</td></tr>
<tr><td>Pole pruners</td><td>EN 62841-4-1</td><td>95</td></tr>
<tr><td>Leaf blowers (for professional use)</td><td>ISO 3744</td><td>104</td></tr>
<tr><td>Garden Shredders</td><td>ISO 3744</td><td>92</td></tr>
<tr><td>Cultivators</td><td>ISO 3744</td><td>93</td></tr>
<tr><td>Riding lawnmowers*</td><td></td><td></td></tr>
<tr><td>Snow blowers</td><td>ISO 3744</td><td>reported</td></tr>
</table>
* covered by the limit values of the Noise Directive (2000/14/EC). Riding lawn tractors are covered to the extent that they fall under the directive's lawnmower definition. The limit value stated is the guaranteed limit value<br><br>
Verification:<br><br>
The tenderer shall provide a test report demonstrating that the machinery's noise emission performance limits are in accordance with the relevant ISO Norm for the weighted sound power level tool-specific testing as stated in the EU Noise Directive 2000/14/EU.<br><br>
• Machinery holding a relevant Type I ecolabel fulfilling the listed criteria will be deemed to comply.
</td></tr>
</table>

| Award Criteria | |
|---|---|
| | **AC 3. Noise Emissions**<br>Points shall be awarded to machines with lower noise emissions than the maximum included in the comprehensive technical specifications (TS 3).<br><br>**Verification**:<br>see above |

### Consequences

This criteria proposal could enable the uptake of quieter (reduced noise emission) machinery employed for PSM.

| Consultation questions |
|---|
| ○ Are the proposed thresholds feasible for all service providers?<br>○ What segment of the product in the market is able to fulfil these criteria?<br>○ Would the criteria proposed entail a significant increase of the costs? |

## 5.1.4 Machinery Lubricant

### Rationale

Industrial lubricants are mainly used for equipment and machinery and as detailed in the Preliminary Report can be categorized into:

- general industrial oils: regularly used for machinery maintenance in order to prevent rust, wear & tear and other chemical corrosion problems
- industrial engine oils: used to reduce friction in engines for powered equipment. The majority of machinery engines run on diesel and request a specific viscosity index for lubricants.
- greases: semisolid lubricants usually consisting of soap emulsified with oil (mineral or vegetable oil based)

Lubricants used in open applications are called loss lubricants (e.g. two-stroke oils, chain saw oils, etc.), and they are often if not always used in outdoor machinery and are by definition directly emitted into the surroundings, making them more dangerous for the environment than other lubricants (such as engine oils) used in closed systems.

Generally, lubricants mainly fall into two categories: petroleum derived or synthetic. Due to the technical shortcomings of petroleum based lubricants (e.g., inability to meet lubricity requirements), synthetic lubricant were developed. However as both forms of lubricants are mineral based, they can be harmful for the environment as conventional petroleum based

lubricants have the potential to bio accumulate, have low biodegradability and could also be highly toxic to the aquatic environment.

Bio based (from vegetable oils and animal fats) lubricants are highly biodegradable in the environment, and are well suited for use in variety of applications where partial, incidental or total loss of lubricants can occur.

The Total Loss of a Lubricant (TLL) occurs when a lubricant product that is fully released to the environment during use. Similarly, Partial Loss of a Lubricant (PLL) occurs when the lubricant product is partially released to the environment during use, and Accidental Loss of a Lubricant (ALL) implies a lubricant product that can be released to the environment only incidentally from a closed system.

Almost all the uses of two-stroke engines are in off-road applications due to their light weight and handling ability in contrast to four-strokes. As a result of this, they are mostly used in non-lawnmower garden equipment (chain saws, leaf blowers, trimmers, etc.). In contrast lawn mowers are usually equipped with either two stroke or four stroke engines – with newer models using four stroke engines.

Machinery equipped with 2 stroke engines run on a mixture of gasoline and two stroke oil. Two stroke oil is a particular type of motor oil intended for use in crankcase compression two-stroke engines. The oil is mixed with gasoline (resulting in petroil), and is distributed throughout the engine for lubrication.

Lubrication is also required for cutting parts of machinery that are not enclosed such as the bar and chain of chain saws, brush cutters, hedge trimmers, etc, and there is essentially no difference in the type of lubrication used regardless of the power source of the machine (i.e. electric or gasoline –powered).

This criterion applies to the following lubricant products as classified in the EU Ecolabel for Lubricants:

- Two stroke engine machinery oils which are typically applied in public space maintenance and are classified as PLL
- Chainsaw oils which are classed as TLL

Additionally, the criterion and the verification requirements are based on information available in the EU Ecolabel for lubricants (EEL) which is currently being revised. It is anticipated that this criterion will need to be modified following developments relating to the revision of the EEL.

## Criterion Proposal

| **Core criteria** | **Comprehensive criteria** |
|---|---|
| **Technical Specification** | |

| | |
|---|---|
| **TS 4. Machinery Lubricant**<br><br>*This criterion is only applicable if the machinery lubricant is included at the time of purchase.*<br><br>The machinery shall contain a lubricant product with a minimum content of:<br>a)carbon derived from renewable raw materials; or<br>b)synthetic esters, poly-alphaolefins (PAOs) or poly-alkylene glycols (PAGs); or<br>c) a combination of a) and b), at percentage<br>≥65% (m/m) for lubricants under PLL group,<br>≥70% (m/m) for lubricants under TLL group.<br><br>**Verification**:<br>The tenderer shall indicate on the tender the type (s), source(s) and origin of the material(s) of the main components. The tenderer shall provide the test results according to ASTM D6866 test method or equivalent (e.g. ISO 16620-2) in case of renewable origin raw materials and data sheets of the product, from the supplier or applicant, as appropriate.<br>2T engine oils possessing the EU Ecolabel for Lubricants or equivalent Type I ecolabel fulfilling the listed criteria will be deemed to comply. Other appropriate means of proof will also be accepted. | **TS 4. Machinery Lubricant**<br><br>*This criterion is only applicable if the machinery lubricant is included at the time of purchase.*<br><br>The machinery shall contain a lubricant product with a minimum content of:<br>a)carbon derived from renewable raw materials; or<br>b)synthetic esters, poly-alphaolefins (PAOs) or poly-alkylene glycols (PAGs); or<br>c) a combination of a) and b), at percentage<br>≥65% (m/m) for lubricants under PLL group,<br>≥70% (m/m) for lubricants under TLL group.<br><br>**Verification**:<br>The tenderer shall indicate on the tender the type (s), source(s) and origin of the material(s) of the main components. The tenderer shall provide the test results according to ASTM D6866 test method or equivalent (e.g. ISO 16620-2) in case of renewable origin raw materials and data sheets of the product, from the supplier or applicant, as appropriate.<br>2T engine oils possessing the EU Ecolabel for Lubricants or equivalent Type I ecolabel fulfilling the listed criteria will be deemed to comply. Other appropriate means of proof will also be accepted. |
| **Award Criteria** | |
| | **AC 4. Purchase of non-classified machinery lubricants**<br><br>*This criterion is only applicable if the machinery lubricant is included at the time of purchase.*<br>Points will be awarded to those tenders who offer the machinery containing a lubricant which is not classified as being acutely toxic, a specific target organ toxicant, carcinogenic, mutagenic or toxic for reproduction, hazardous to the |

environment, in accordance with Regulation (EC) No 1272/2008 (CLP Regulation), as indicated in Table 1 below.

Table 1 Final machinery lubricant classification

| | |
|---|---|
| Acute toxicity | Acute Tox. 1<br>Acute Tox. 2<br>Acute Tox. 3 |
| Specific target organ toxicity – repeated exposure<br>Specific target organ toxicity – single exposure | STOT RE 1 or 2<br>STOT SE 1, 2 or 3 |
| Carcinogenicity | Carc. 1A<br>Carc. 1B<br>Carc. 2 |
| Germ cell mutagenicity | Muta. 1A<br>Muta. 1B<br>Muta. 2 |
| Reproductive toxicity | Repr. 1A<br>Repr. 1B<br>Repr. 2 |
| Hazardous to the aquatic environment | Aquatic Acute 1 |
| | Aquatic Chronic 1 or 2 |
| Skin corrosion/irritation | Cat 1, 2 |

**Verification:**

The tenderer shall provide appropriate documentation confirming that the machinery lubricant is not classified with the listed hazards.

The documentation of the mixture classification shall be provided in accordance with the rules provided in Regulation (EC) No 1272/2008 (CLP Regulation) and/or Safety Data Sheets.

Products which have been awarded the EU Ecolabel for lubricants, as established in

| | |
|---|---|
| | Commission Decision (EU) xxx/xx/EU (currently under revision), or other ecolabel fulfilling the listed requirements, should be deemed to comply. |

**Consequences**

This criteria proposal will enable the use of high performing, environmentally friendly lubricants.

| **Consultation questions** |
|---|
| ○ Do you agree with the award criterion?<br>○ Does this result in additional difficulties in sourcing environmentally friendly, non-toxic and biodegradable lubricants? |

## 5.1.5 Machinery Materials

**Rationale**

The manufacture of PSM machinery requires the utilization of different materials such as petrol based material (plastics and rubbers), or metallic materials, which require a large amount of energy during their production as detailed in the Preliminary report. Thus the production of these raw materials contributes significantly to the life cycle environmental impacts of the machinery examined.

Plastics are the second most dominant materials used after metals in making machinery which are employed for PSM, and most of them have been chemically modified to enable the material withstand outdoor working conditions through the addition of various chemicals such as Phthalates (e.g. DEHP (di(ethylhexyl) phthalate), dibutyl phthalate (DBP) and butyl benzyl phthalate (BBP)). The phthalates are not chemically bonded to the material. Therefore, they can leak from materials and be absorbed by the body.

These substances are classed as toxic to human life and the environment and as highly toxic to aquatic organisms. The EU has introduced restrictions for a few of these phthalates. In the European Union the use of DEHP, BBP, and DBP are restricted for all toys; DINP, DIDP, and DNOP are restricted only in toys that can be taken into the mouth. The restriction is hinged to the condition that the amount of these phthalates may not be greater than 0.1% mass percent of the plasticized part of the toy.

The high molecular weight phthalates DINP, DIDP and DPHP are not classified for any health or environmental effects and have been registered under REACH. However, the lower molecular weight products BBP, DEHP, DIBP, and DBP have been included in the Candidate list of Substances for

Authorization under REACH in February 2011. Therefore from February 2015 they are not allowed to be produced in the EU unless authorization has been granted for a specific use, however they may still be imported in consumer products.

There is evidence that biobased plasticizer based on vegetable oils can be manufactured at the same price with similar performance compared to the one of the most commonly used, phthalate, dioctyl pthalate. This phthalate-free plasticizer has applications in medical devices, child products, and food packaging but it is unclear if it can be applied for use for plastics used for PSM related machinery used. Additionally countries such as Denmark are exploring the possibilities to reduce and phase out phthalates in the public demand for products and services on a voluntary basis. Therefore it is necessary to look at the whole group of phthalates which is one of the objectives of this criterion.

According to the preliminary report, machines for parks and gardens also generate air emissions that are created when fuel evaporates when the engine is turned off, so called evaporative emissions. Organic gas molecules penetrate the walls of the material used in the fuel system and components and evaporate from surfaces such as the fuel tank, fuel hoses, gaskets and seals. Consequently it is vital to specify machinery that is designed to avoid spillage or leakage of fuel.

## Criterion Proposal

| **Core criteria** | **Comprehensive criteria** |
|---|---|
| **Technical Specification** | |
| | **TS 5. Machine materials and components**<br><br>1. Machine plastic components weighing more than 25 g shall not contain any of the listed phthalates:<br>– Diethylhexyl phthalate (DEHP)<br>– Dibutyl phthalate (DBP/ DnBP)<br>– Benzyl butyl phthalate (BBP)<br>– Dicyclohexyl phthalate (DCHP)<br>– Diisobutyl phthalate (DIBP)<br>– Diisononyl phthalate (DINP)<br>– Diisodecyl phthalate (DIDP)<br>– Dihexyl phthalate (DHP)<br>– Diethyl phthalate (DEP)<br>– Di-n-octylphthalate (DNOP)<br>– Diisoheptyl phthalate (DIHP)<br>– Bis (2 –methoxyethyl) phthalate<br>– Diisopentyl phthalate<br>– N- pentyl-isopentyl phthalate |

| | |
|---|---|
| | 2. Machine metal surface shall not be treated with any of the listed heavy metals: cadmium, lead, mercury, or compounds of these.<br><br>3. Surface treatment agents must not contain pigments or additives based on lead, cadmium, chromium, mercury or their compounds. Additionally, Polybrominated biphenyls (PBBs) and related family compounds shall not be used.<br><br>**Verification:**<br><br>Tenderers shall provide a test report of an independent accredited testing body stating compliance to the technical specification. Machines holding a relevant ISO Type I ecolabel fulfilling the listed criteria will be deemed to comply. |

### Consequences

No accidental leakage or spillage of fuel coupled with reduced evaporative fuel loss and the avoidance of environmental impacts. This would result in a reduction of the risk of exposure to toxicity due to the avoidance of hazardous materials in the manufacture of the machine.

| **Consultation questions** |
|---|
| ○ What may be the possible hindrance to the practical implementation of this criterion? |

## 5.1.6 Machinery operation and maintenance

### Rationale

As described in the preliminary report, the operation of machinery is a major contributor to the overall impacts arising throughout its life span. Proper operation of machinery and equipment can result in a reduction in both fuel consumption and environmental impacts.

### Criterion Proposal

| **Core criteria** | **Comprehensive criteria** |
|---|---|
| **Technical Specification** | |

**TS 6. Operation and maintenance instructions**

The machinery shall be supplied together with its technical specifications and also user information relevant for operating the machinery with reduced fuel and energy consumption, maintaining, and extending its lifespan.

**Verification**:

The tenderer shall provide user instructions containing information about operating and maintaining the machinery.

## Consequences

The supplied equipment and machinery will be properly operated resulting in its optimization and minimized environmental impacts arising from its use.

## 5.2 Machinery used in the provision of services

This criteria set covers the requirements on machinery used for the delivery of public maintenance services. They comprise:

- Gardening services
- Cleaning services

As majority of the machinery applied for outdoor maintenance services are gardening machinery and equipment, this section shall focus principally on the services provided via same.

### 5.2.1 Machinery Engine Exhaust Emissions

#### Rationale

The maintenance of public spaces usually entails a lot of activities requiring different types of machinery and equipment in parallel. For this reason, municipal authorities and or service providers usually deploy a mix of machinery which is based on different technologies. The fleet composition usually changes over time as older machinery are retired and replaced by machinery based on current technologies.

Electric battery powered machinery is increasingly being used as it has zero emissions at its venue of use and very low noise levels. However, it does not constitute the only technology in any machinery fleet. To ascertain the level of penetration of these technologies and to enable the proposal of a criterion, an interview was conducted with the Waste and Public Space Maintenance Authority of the city of Seville. The interview revealed that for the professional maintenance of public spaces, a very significant proportion of the machinery deployed are still fossil fuel engine powered, and only a small fraction are electric battery powered. See also 5.1.1.

#### Criterion Proposal

| **Core criteria** | **Comprehensive criteria** |
|---|---|
| **Technical Specification** | |
| **TS 7. Machine Engine Exhaust Emissions**<br>X% of the machinery used in carrying out the service shall meet the requirements of engine emissions as stated in TS 1 in section 5.1.1.<br>**Verification**:<br>The tenderer shall present the list of the machinery intended to be used for providing the PSM service and their | **TS 7. Machine Engine Exhaust Emissions**<br>Y% of the machinery used in carrying out the service shall meet at requirements of engine emissions as stated in TS 1 in section 5.1.1.<br>**Verification**:<br>The tenderer shall present the list of the machinery intended to be used for providing the PSM service and their |

| | |
|---|---|
| certificates of conformity. | certificates of conformity. |
| **Award Criteria** | |
| | **AC 5. Exhaust Emissions**<br>Points will be proportionately awarded to the tenderer with a proportion of machinery fleet exceeding the requirements of TS 1.<br><br>**Verification:**<br>Same as for the technical specification above. |

## Consequences

This criteria proposal will enable the provision of PSM services with a reduction in direct release of environmental pollutants.

| **Consultation questions** |
|---|
| ○ Are there limitations for/to the application of this criterion (e.g. low number of machines capable of meeting the criterion?)<br>○ What would a reasonable X % and Y % be? |

### 5.2.2 Battery quality

#### Rationale

See 5.1.2.

#### Criterion Proposal

| Core criteria | Comprehensive criteria |
|---|---|
| **Technical Specification** | |
| **TS 8. Machinery battery rechargeability and quality**<br>All the machines shall be equipped with battery systems compliant with the technical specification TS 2 in section 5.1.2.<br><br>**Verification:**<br>Same as TS 2 in section 5.1.2 together with the list and technical data sheet of the machinery fleet to be employed for the service provision. | |
| **Award criteria** | |
| **AC6. Battery heavy metal content**<br>Points shall be awarded to tenders offering a service fleet proportionally to the share of machines that are equipped with battery systems compliant with AC 2 on machine battery heavy metal concentration as defined in section 5.1.2.<br>**Verification:**<br>See Award Criteria (AC 2) in section 5.1.2 together with the list and technical data sheet of the machinery fleet to be employed for the service provision. | |

#### Consequences

Please refer to "Consequences" in section 5.1.2.

| Consultation questions |
|---|
| ○ What are the potential implications of the introduction of this criterion from a potential tenderer's standpoint? |

### 5.2.3 Noise Emission

#### Rationale

The potential for providing a PSM service with machinery having additional reductions to the Noise Regulation's limit values exists as products performing below the limits imposed by the regulation are available as detailed in section 5.1.3 and in the Preliminary Report.

## Criterion Proposal

| Core criteria | Comprehensive criteria |
|---|---|
| **Award Criteria** | |
| | **AC 7. Noise Emissions**<br>Points will be awarded to those tenders offering a service fleet totally composed by equipment compliant with the TS 3 for Noise emissions on machinery noise emissions set in the section 5.1.3.<br><br>**Verification**:<br>The tenderer shall present the list of the machines of the service fleet and their certificates of conformity demonstrating that the machinery's noise emission performance limits are lower than the maximum included in the specifications in conformity with the criterion according to the following methods:<br>• weighted sound intensity level: accordance with EN ISO 3744 and/or EN ISO 3745 as stated in the EU Noise Directive 2000/14/EU |

## Consequences

A service provider maintenance fleet can be composed a machinery with varying noise emission performance. In order to ensure that the level of environmental performance of the fleet selected for the award of the contract is the best option, award criteria could lay down the requirements for this composition.

| Consultation questions |
|---|
| ○ Do you agree with this criterion? Otherwise what would be a reasonable percentage of the machinery fleet that could be compliant with TS 3 on machinery noise emissions?<br>○ Would it adversely affect the ability of tenderers to successfully apply for tenders?<br>○ Would using this percentage in grading system for this criterion help to move in the direction of the overall objective? |

### 5.2.4 Machinery Lubricant

#### Rationale

These criteria apply only if the service provider claims ownership of the lubricant(s), or employs the lubricants detailed in under criterion 5.1.4 in machinery deployed for the execution of the contracted service.

#### Criterion Proposal

| Core criteria | Comprehensive criteria |
|---|---|
| **Contract Performance Clause** | |
| **CPC 1. Machinery Lubricant**<br>The contractor shall ensure that the machinery employed for the service operate with lubricants with a minimum content of:<br>a)carbon derived from renewable raw materials; or<br>b)synthetic esters, poly-alphaolefins (PAOs) or poly-alkylene glycols (PAGs); or<br>c) a combination of a) and b),<br>at percentage<br>≥65% (m/m) for lubricants under PLL group,<br>≥70% (m/m) for lubricants under TLL group.<br><br>The yearly records on the machinery lubricants shall be made available to the contracting authority for verification purposes. The contracting authority may set rules for penalties for non-compliance. | |

#### Consequences

This criteria proposal will enable the provision of PSM services with a reduction in environmental pollution.

| Consultation questions |
|---|
| ○ Would you anticipate any negative consequence vis-à-vis sourcing issues related to this criterion? |

### 5.2.5 Machinery Materials

#### Rationale

See 5.1.5.

#### Criterion Proposal

| Core criteria | Comprehensive criteria |
|---|---|
| **Award Criteria** | |
| | **AC 8. Machinery materials**<br>Points will be awarded to those tenders which offer all machines satisfying the materials requirements detailed in TS 5.<br><br>**Verification:**<br>Same as TS 5 of Section 5.1.5 together with the list and technical sheets of the machinery fleet. |

#### Consequences

This criteria proposal will enable the provision of PSM services with reduced toxicity as a potential environmental impact.

| Consultation questions |
|---|
| ○ Are there limitations for/to the application of this criterion (e.g. low number of machines capable of meeting the criterion?)<br>○ Would setting percentages as parameters for this criterion help to move in the direction of the overall objective? |

## 5.3 Cost considerations

There is a dearth of information on the life cycle cost (LCC) of machinery. However, generally, similar to vehicles, in order to estimate the total LCC, operating and disposal costs should also be considered in addition to the purchasing price. Other costs that will be incurred in the operating phase of the machinery such as fuel or energy consumption, maintenance, and replacement (substitution of engine oil and spare parts) costs also have to be considered.

An assessment of combustion engine technologies indicates that four stroke engines are deemed to have better economic and environmental performance within the different kinds of fuel engines. Across all types of

engines both electric and battery operated products, e.g. robot mowers/automatic mowers, had significantly less exhaust and noise emissions.

However, these environmental gains are offset by their higher purchase costs. No specific data was found on the LCC of PSM machinery to enable a proposal to be made based on this criterion.

# 6 Draft Proposed EU GPP criteria for vehicles and service fleets

## 6.1 Vehicles for Cleaning and Gardening activities

### Procurement of vehicles with reduced environmental impact

The scope of these criteria comprises:

- Heavy duty vehicles, meaning vehicles of category N2 and N3, as defined by Directive 2007/46,
- Special vehicles and other special purposes vehicles as defined by Directive 2007/46:
  - Street Cleaning vehicles (sweepers)
  - Vehicles for winter maintenance (spreaders)

### 6.1.1 GHG emissions

#### Rationale

Technologies

There is currently a legal gap that hinders an EU-harmonised approach to formulate criterion based on energy consumption or $CO_2$ emissions performance for heavy duty vehicles and special purpose vehicles. The European Commission has already developed a simulation tool called VECTO (Vehicle Energy Consumption calculation Tool), which is aimed to support the certification, monitoring and reporting of CO2 emissions from heavy duty vehicles. However, not enough data based on VECTO are available to produce the necessary benchmarks, and in the case of special purpose vehicles, VECTO is not expected to model their duty cycles in the mid-term. Therefore, the only alternative is formulating criteria based on the available technology options that have demonstrated a better performance than the average.

For rigid trucks, a literature review has been carried out to identify the technologies that are able to reduce GHG emissions compared to a conventional diesel vehicle. The fuel consumption of heavy duty vehicles are highly dependent on the duty cycle, therefore, a distinction is made between urban and regional cycles. Table 2 gathers the information from the literature reviewed (JRC, 2016b), (ICCT, 2017), including the type of technology, and whether it is appropriate for one cycle or other, or both.

***Table 2. Technologies for rigid trucks*** (JRC, 2016b)***,*** (ICCT, 2017)

| **Type of technology** | **Technology** | **Urban cycle** | **Regional cycle** |
|---|---|---|---|
| Hybridisation | Stop/start battery systems | yes | Yes, but worse than urban |
| Hybridisation | Mild hybrid | yes | Yes, but worse than urban |
| Hybridisation | Full hybrid | yes | Yes, but worse than urban |
| Alternative fuels | Full electric and plug-in vehicle | yes | no |
| Alternative fuels | Fuel cell vehicle | yes | yes |
| Aerodynamics | Active flow control | no due to low speed operation | yes |
| Aerodynamics | Boat tails/ extension panels | no due to low speed operation | yes |

The use of natural gas vehicles does not result in better performance than their equivalent diesel vehicles, according to the latest published studies. A report from LowCVP, *Emissions Testing of Gas-Powered Commercial Vehicles,* (LowCVP, 2017) gathers the results of a test programme carried out on dedicated and dual fuel natural gas trucks, on three driving cycles: long haul, regional delivery and urban delivery. According to these tests, the dedicated natural gas rigid truck achieved a reduction of 4 – 5% for regional and urban delivery, and just 1% for long haul, compared to a similar Euro VI diesel truck. Overall, dual fuel trucks performed worse than the diesel counterparts due to the methane slips. Another source of information is the report delivered by Cenex and Atkins for the Department for Transport (DfT) in relation to the Low Carbon Truck and Refuelling Infrastructure Demonstration Trial Evaluation (Cenex and Atkins, 2016). The Low Carbon Truck Trial (LCTT) consists of 12 consortia projects with 35 participating companies (including fleets, emission testing companies, station providers, universities and product developers). A sample of 371 vehicles under different duty cycles was tested. The report concluded that the dedicated gas vehicles attained WTW emissions savings of up to 10% when the vehicle run on a biomethane blend of 15%. This would have resulted in an increase of 3% in WTW emissions without the biomethane blend, due to a lower efficiency compared to the diesel engines. The information available does not clearly identify dedicated natural gas vehicles running on fossil gas as a better technology than new diesel trucks, in terms of GHG emissions. Therefore, it is proposed that the contracting authority is allowed to include dedicated natural gas vehicles in the list of eligible technologies provided they have a supply of biomethane meeting at least 10% of their fuel demand.

Specific technologies for special purpose vehicles have been explored as well. Not much information has been found, but some models of sweepers

claim a reduction of fuel consumption for being equipped with a load-sensing-hydraulic system (Macro, 2017), (Bucher Municipal, 2017).

Tyre pressure monitoring systems (TPMS)

Tyre pressure monitoring systems (TPMS) are monitoring tools that help a driver to adjust their behaviour and can reduce fuel consumption by a few percent. Tyre pressure monitoring systems (TPMS) are mandatory for new passenger cars, but not for LCVs and heavy duty vehicles. TPMS can result in an average fuel consumption reduction of 1% (JRC, 2016a) at relative low cost (€220 without shipping and installation).

Lubricant oils

This criterion related to low viscosity lubricants (LVL) is relevant to improve the engine performance, and it is a cost-effective option (JRC, 2016a). However, the type of lubricant of the vehicle is seldom included in the technical sheets, and sometimes it is not a technical feature offered to the consumers. Therefore, it is proposed to be set at comprehensive level, and also as part of the maintenance criteria of the service categories.

Vehicle tyres/rolling resistance

Low rolling resistance tyres can reduce fuel consumption by a few percent. The best performing tyres according to the Tyre Labelling Directive are widely available, and besides, the Energy Efficiency Directive 2012/27/EU states:

*'Central governments that purchase products, services or buildings, insofar as this is consistent with cost-effectiveness, economical feasibility, wider sustainability, technical suitability, as well as sufficient competition, shall:*

*…*

*..- purchase only tyres that comply with the criterion of having the highest fuel energy efficiency class, as defined by Regulation (EC) No 1222/2009 of the European Parliament and of the Council of 25 November 2009 on the labelling of tyres with respect to fuel efficiency and other essential parameters. This requirement shall not prevent public bodies from purchasing tyres with the highest wet grip class or external rolling noise class where justified by safety or public health reasons'*

Given the market availability, it seems to be justified to also require public procurers to purchase vehicles equipped with new tyres of the highest fuel energy efficiency class, as part of the EU GPP criteria. Therefore it is included as a technical specification for core and comprehensive.

The Regulation (EC) No 1222/2009 does not apply to retreaded tyres, which shall comply with the provisions of UNECE Regulation 109 as a compulsory condition to be placed on the market. The use of retreaded tyres instead of new tyres brings environmental benefits due to the reduction of raw materials consumption and waste generation. Therefore, the technical specification can be complied with both low rolling resistance tyres and retreaded tyres.

Air conditioning

Air conditioning gases are relevant for heavy duty vehicles, because they are excluded from the MAC Directive (2006/40/EC) which provides a gradual phase-out of refrigerant HFC-134a from mobile air conditioners in passenger cars and light commercial vehicles. However, the HFCs used in these systems are affected by the phase-down put in place by the F-gas Regulation (Regulation (EU) No 517/2014), which will exert a strong pressure on prices of these gases as the supply will become more restricted. Therefore, there is a strong regulatory driver in place that favours the use of low GWP or even non-HFC (e.g. $CO_2$) technologies in this sector.

## Criteria Proposal

| **Core criteria** | **Comprehensive criteria** |
|---|---|
| **Technical specifications** | |
| **TS1. Technological options to reduce GHG emissions**<br>*(Same for core and comprehensive)*<br>***Note:** this criterion is applicable to heavy duty vehicles and special purpose vehicles such as sweepers and spreaders.*<br>The vehicle shall be equipped by one of the following technologies demonstrating WTW GHG emissions reduction<br>• Improvement in aerodynamics: active flow control (only for trucks used in regional duty cycles)<br>• Improvement in aerodynamics: Boat tails / extension panels (only for trucks used in regional duty cycles)<br>• Hybrid vehicles, both diesel and natural gas<br>• Full Electric vehicles<br>• Fuel Cell Electric vehicles.<br>• Plug-in hybrid: Vehicle equipped with a battery pack which can be charged from the grid and provides the energy for the electrical drive of the body and equipment<br>• Load-sensing-hydraulic system (for sweepers and spreaders): the flow-capacity of the pump will be regulated through the load-sensing-pressure.<br>*Note: The contracting authorities may include dedicated natural gas vehicles if they have a supply of renewable methane meeting at least 10% of their demand.*<br>**Verification:**<br>The tenderer shall present the technical sheet of the vehicle where these technical or fuel technology specifications are stated. | |

**TS2. Tyre Pressure Monitoring Systems (TPMS)** (*Same for core and comprehensive)*

LCVs and heavy duty vehicles shall be equipped with tyre pressure monitoring systems (TPMS) or with sensors that enable the monitoring at the operator site.

**Verification:**

The tenderer shall provide the technical sheet of the vehicle where this information is stated.

| | |
|---|---|
| | **TS3. Low viscosity lubricant oils**<br>Unless the manufacturer recommends other type of lubricant, the vehicles shall use low viscosity engine lubricant oils (LVL). LVL are those corresponding to SAE grade number 0W30 or 5W30 or equivalent.<br>**Verification:** The tenderer shall provide the technical sheet of the vehicle where the proposed lubricants are recommended. |

**TS4. Vehicle tyres – rolling resistance** (*Same for core and comprehensive)*

The vehicles shall be equipped with

a) Tyres that comply with the highest fuel energy efficiency class for rolling resistance expressed in kg/tonne, as defined by Regulation (EC) No 1222/2009 of the European Parliament and of the Council of 25 November 2009 on the labelling of tyres with respect to fuel efficiency and other essential parameters. This requirement shall not prevent the public authority from purchasing tyres with the highest wet grip class where justified by safety.
   OR
b) Retreaded tyres

**Verification:**

The tenderer shall provide the label of the tyre according to Regulation (EC) No 1222/2009 for tyres under case a, or the Notice of approval according to Annex 1 of UNECE Regulation 109 for retreaded tyres (case b)

**Award criteria**

| | |
|---|---|
| | **AC1. Air conditioning gases**<br>Points will be awarded to those HDVs equipped with an air conditioning system that use a refrigerant with a global warming potential (GWP), related to $CO_2$ and a time horizon of 100 years, < 150.<br>**Verification**:<br>The tenderer shall provide the name, formula and GWP of the refrigerating gas used in the air conditioning system. If a mixture of gases is used (n number of gases), the GWP will be calculated as follows:<br>GWP= Σ(Substance X1 % x GWP(X1)) + |

| | |
|---|---|
| | (Substance X2 % x GWP(X2)) + …<br>(Substance Xn % x GWP(Xn))<br>where % is the contribution by weight with a weight tolerance of +/- 1 %.<br>Information on the GWP of gases can be found at:<br>http://www.grida.no/publications/other/ipcc_tar/?src=/climate/ipcc_tar/wg1/248.htm |

| **Consultation questions** |
|---|
| ○ Do you agree with the technologies proposed?<br>○ Are you aware of other technologic specific for special purpose vehicles?<br>○ Are you aware of any limitation for the application of this criterion: verification, not enough manufacturers, too expensive technology?<br>○ Do you agree with the ambition levels proposed for the different sets, core and comprehensive? |

### 6.1.2 Air pollutant emissions

**Rationale**

All new heavy duty vehicles placed on the market shall comply with Euro VI, which sets comparatively strict limits on air pollutants. Euro VI reduces the PM emission limits by 67% compared to Euro IV and V, and includes a PN (particle number) limit. It also decreases the NOx emission limit by 77% compared to Euro V. The standard also replaces the European Stationary Cycle and Transient Cycle used for testing by the World harmonized Transient cycle, which covers cold and hot start, and in general stricter testing conditions (load, idle time). Euro VI introduces in-service conformity testing using Portable Emission Measurement Systems, the first one to be carried out within 18 months of the approval and then every 2 years. Other changes are a new limit for ammonia emissions -due to the selective catalytic reduction systems using urea- and stricter limits for methane on CNG and LNG vehicles (ICCT, 2015).

Tests carried out by LowCVP (LowCVP, 2017) in heavy good vehicles showed that Euro VI had been effective in cutting overall NOx emissions by over 98% when compared to Euro V vehicles. Euro VI dedicated natural gas vehicles increase that reduction in NOx emissions to 99%. According to this report, NOx emissions of dedicated natural gas trucks were 140 mg/km in average, while diesel vehicles emitted 300 mg/km. Only electric

and hydrogen vehicles can reduce the emissions further, to zero tailpipe air pollutants emissions. Therefore, it is proposed to set an award criterion to promote those vehicles able to emit below Euro VI limits. Another award criterion is meant to give points to those vehicles that are able to run without emitting any air pollutant, i.e. zero tailpipe emission capable. This definition would include plug-in hybrid, pure electric and hydrogen buses. Given that VECTO is not available yet and therefore there is not a harmonised test method to measure the zero tailpipe emissions capability of heavy duty vehicles expressed in distance that the vehicle is able to run without exhaust emissions, the criterion is proposed to directly select the technologies.

## Criteria Proposal

| **Core criteria** | **Comprehensive criteria** |
|---|---|
| **Award Criteria** | |
| **AC2. Improved air pollutant emissions performance of Heavy Duty Vehicles (Same for core and comprehensive)**<br>Points will be awarded to vehicles that have an emission performance better than Euro VI/6, proportionally to the air pollutant emissions reduction.<br>Points will be awarded according to the following formula:<br>$$Points = \left(\frac{NOx_{max} - NOx}{NOx_{max} - NOx_{min}}\right) \times PNOx_{max} + \left(\frac{PM_{max} - PM}{PM_{max} - PM_{min}}\right) \times PPM_{max}$$<br>Where<br>NOxmax and NOxmin is the highest and lowest NOx emissions in mg/kWh among the offers presented to the call for tender.<br>PMmax and PMmin is the highest and the lowest PM emissions in mg/kWh among the offers presented to the call for tender<br>NOx and PM are the NOx and PM emissions of the offer evaluated<br>PNOxmax and PPMmax are the maximum points to be awarded for each air pollutant.<br>Verification:<br>The tenderer shall provide the Certificate of Conformity of the vehicle. For those vehicles having achieved the abovementioned standard following a technical upgrade the measures must be documented and included in the tender, and this must be verified by an independent third party. | |
| **AC3. Zero tailpipe emission capability** (*Same for core and comprehensive)*<br>Points will be awarded to those vehicles that are capable of running with zero tailpipe emissions of air pollutants, i.e. plug in hybrid electric vehicles (PHEV), battery electric vehicles (BEV), and fuel cell electric vehicles (FCEV).<br>**Verification:** | |

| |
|---|
| The tenderer shall provide the Certificate of Conformity of the vehicle. |

| **Consultation questions** |
|---|
| ○ Are you aware of any limitation for the application of this criterion: verification, not enough manufacturers, too expensive technology? |

### 6.1.3 Efficiency of particulate matter collection (for sweepers)

**Rationale**

Street sweepers are classified as special purpose vehicles, and the environmental issues associated to their life cycle are very similar to N vehicles. Apart from that, the street sweepers contribute to other air quality issues in urban areas. Part of the particulate matter (PM) emissions in cities come from non-exhaust sources, such as wear of vehicle parts, and of the road surface, and the resuspension of dust deposited on the pavement (Idaea - CSIC, 2016a).

Road sweepers are currently designed to reduce ambient PM10 concentrations, while that was not usually a common practice in the past (Idaea - CSIC, 2016a). The parameters that affect the potential reduction of PM10 emissions are the removal efficiency of the sweeper and its ability to retain the particles.

The LIFE project 'AIRUSE' is meant to identify the most effective mitigation measures to reduce PM levels in urban areas in Southern European and Mediterranean countries (European Commission, 2016). The deliverable *The scientific basis of street cleaning activities as road dust mitigation measure* (Idaea - CSIC, 2016b) described the three main types of road sweepers used in Europe.

- Mechanical broom sweepers remove debris by sweeping material with gutter brooms rearward into the path of a pick-up broom. The pick-up broom sweeps the material moving it upward with a conveyor system into a hopper.
- Vacuum sweepers have gutter brooms and strong vacuum head(s) for picking-up both large and small materials. While some models use water as a dust suppressor, others can operate in a dry mode.
- Regenerative-air sweepers are equipped with gutter brooms and a pick-up head. The gutter brooms direct materials towards the pick-up head. The regenerative-air process blows air into one end of the horizontal pick-up head and onto the pavement dislodging materials entrained within cracks and uneven pavement. The other end of the pick-up head has a suction hose that immediately vacuums out the materials within the pick-up head into a hopper.

The performance of the sweeper is usually defined by two parameters: the removal efficiency and the PM10 and PM2.5 emissions. Two different standardised test methods have been identified, one of them is a European standard, EN 15429-3:2015, and the other one is a German standard, VDI 2096:2014 (Idaea - CSIC, 2016b). The German standard also includes requirements that qualify a sweeper as low-emission. The EN standard has been developed by EUnited, and it is used for the certification scheme owned by this association (EUnited, 2017). AIRUSE project (Idaea - CSIC, 2016a) suggests that the German requirements are based on reference machines, meaning that the thresholds may depend on the features of the sweepers, such as size and load.

According to the municipal equipment industry, the German standard is no longer used by the manufacturers and there is just one laboratory that carries out this test.

The performance of sweepers tested according to the EN 15429-3:2015 are not released by manufacturers, who argue that the results are not comparable because they depend on the features of each sweeper, such as size and load. Therefore, this lack of data hinders any attempt of setting benchmarks that would require the test results of many different samples of sweepers to be deemed representative enough. However, the standard method enables the formulation of an award criterion that gives points proportionally to the removal performance of the sweeper.

Some performance data on removal efficiency have been found in the Airuse reports from test programmes developed by some municipalities and from the literature review. The results are not comparable since the test methods are different, and in some cases, they are not described in detail. The main conclusions were that the removal efficiency improves with increasing particle sizes, and that vacuum-assisted and regenerative air sweepers are, in general, more suitable for removing finer sediments, while mechanical sweepers are the best choice for larger particles (Idaea - CSIC, 2016a).

As mentioned above, PM10 and PM2.5 emissions are also measured to define the sweeper's performance. Regenerative air technology has enabled an important improvement on PM emissions of sweepers. A study carried out for the City Council of Toronto (City Council of Toronto, 2015) tested different technologies of sweepers under real conditions. The results showed that PM emissions of the regenerative air sweeper were 90% lower than the mechanical sweeper.

Given the situation described below, the criterion proposal is similar to the GHG emissions criterion, setting a list of technologies that demonstrate a better performance than the average. However, the information found so far does not suffice to propose specific technologies and that is why this first version only consists of the structure of the criterion.

## Criteria proposal for sweepers

| Core criteria | Comprehensive criteria |
|---|---|
| **Technical Specification** | |
| **TS5. Efficiency of the particulate matter collection**<br>The sweeper shall be equipped with at least one of the following technologies:<br>*(to be developed in next versions of the TR)*<br>○ Technology option 1<br>○ Technology option 2<br>○ …<br>**Verification:**<br>The tenderer shall present the technical sheet of the sweeper where these technical specifications are stated | |
| **Core criteria** | **Comprehensive criteria** |
| **Award criteria** | |
| **AC4. Efficiency of the particulate matter collection**<br>Points will be awarded to sweepers proportionally to the removal performance measured according to EN 15429-3.<br>**Verification:**<br>The tender shall provide the test reports of the sweepers according to the EN 15429-3 carried out by an independent laboratory. | |

| Consultation questions |
|---|
| ○ Do you agree with the structure of the technical specification proposal, or should it be based on performance?<br>○ Do you have information to support any technologies to be qualified to be part of the list?<br>○ If you think that the criterion should be based on performance, do you have data to help produce the benchmarks?<br>○ Are you aware of any limitation for the application of the award criterion proposed: not enough laboratories, too expensive tests? |

### 6.1.4 Water consumption (for sweepers that use water for dust suppression)

## Rationale

As mentioned above, some sweepers use water for dust suppression, which might entail significant water consumption. WRAP studied the water consumption of a construction site (WRAP, 2013) and the water consumption of the sweepers was estimated to be 11% of the total demand. The model used sprayed 35 litres of water per minute and the monthly consumption was 163 $m^3$. Although these figures cannot be considered representative of the water consumption profile of street cleaning services, they help to outline the impact that sweepers might have in water consumption.

WRAP case study proposed the use of sweepers equipped with water recirculation systems, since the estimated saving potential was 30% approximately. Some manufacturers offer models equipped with optional water recirculation systems, both in compact sweepers and truck mounted sweepers (Bucher Municipal, 2017), (Johnston, 2017).

It is proposed that a technical specification requiring a water recirculation system is set at comprehensive level, while an award criterion would promote these systems at core level.

## Criteria proposal

| Core criteria | Comprehensive criteria |
|---|---|
| **Technical specification** | |
| | **TS6. Water recirculation systems**<br><br>*If the contracting authority is requiring sweepers that use water for dust suppression*<br><br>Sweepers shall be equipped with a water recirculation system meaning a system that recirculate part of the water that is used for dust suppression. The water is sprayed and then removed together with the dust by the sweeper. The machine filters the wastewater and it is recirculated to the water tank<br><br>Verification:<br>The tenderer shall present the technical sheet where the water recirculation system is described. |
| **Award Criteria** | |
| **AC5. Water recirculation systems**<br><br>*If the contracting authority is requiring sweepers that use water for dust suppression*<br><br>Points will be awarded to sweepers that are equipped with a water recirculation system meaning a system that recirculate part of the water that is used for dust suppression. The water is spread and then removed together with the dust by | |

| | |
|---|---|
| the sweeper. The machine filters the wastewater and it is recirculated to the water tank<br>Verification:<br>The tenderer shall present the technical sheet where the water recirculation system is described. | |

| **Consultation questions** |
|---|
| ○ Do you agree with the criterion proposed? Do you have data on cost and water saving potential of the recirculation systems?<br>○ Are you aware of any limitation for the application of this criterion: verification, not enough manufacturers, too expensive technology? |

### 6.1.5 Distribution performance of spreaders

#### Rationale

Spreaders apply thawing agents such as salt or brine on traffic roads to ensure the safety of road traffic. The thawing agents are released in the environment and may have negative effects as explained in section 3.1.2. One way to minimise this impact is reducing the use of the thawing agent to the minimum necessary. This can be achieved by operating the spreader in such way, that a homogeneous distribution of spreading material is achieved within the set spreading dosage, width and spreading pattern track (EUnited, 2017).

The manufacturers of spreading machines associated in EUnited Municipal Equipment and the Engineering Center Bygholm in Denmark have developed an agreed test for spreading quality (EUnited, 2017). This test method is now being adopted by a CEN technical committee, and will become a European Standard soon. This will enable setting spreading performance requirements for spreaders based on harmonised test procedures which will produce comparable results. Currently, the draft *PrEN 15597 Winter maintenance equipment - Spreading machines (gritting machines) - Part 2: Requirements for distribution and their tes*t is undergoing the final deliberations and is expected to be approved soon.

#### Criteria proposal for sweepers

| **Core criteria** | **Comprehensive criteria** |
|---|---|
| **Technical Specification** | |
| **TS7. Distribution performance** | |

The spreader model shall comply with the requirements on distribution performance set by EN 15597-2, which comprises the following parameters:

- dosage
- spreader start
- lateral distribution

**Verification:**

The tenderer shall present the test report according to the standard EN 15597-2, showing that the test results on:

- Dosage test
- Spreader start
- Dynamic test lateral distribution

are that the "spreader is qualified"

The test shall be carried out by an independent laboratory.

| **Consultation questions** |
| --- |
| ○ Do you agree with the EN standard proposed for requirements and verification?<br>○ Are you aware of any limitation for the application of this criterion: not enough laboratories, too expensive tests? |

### 6.1.6 Noise emissions

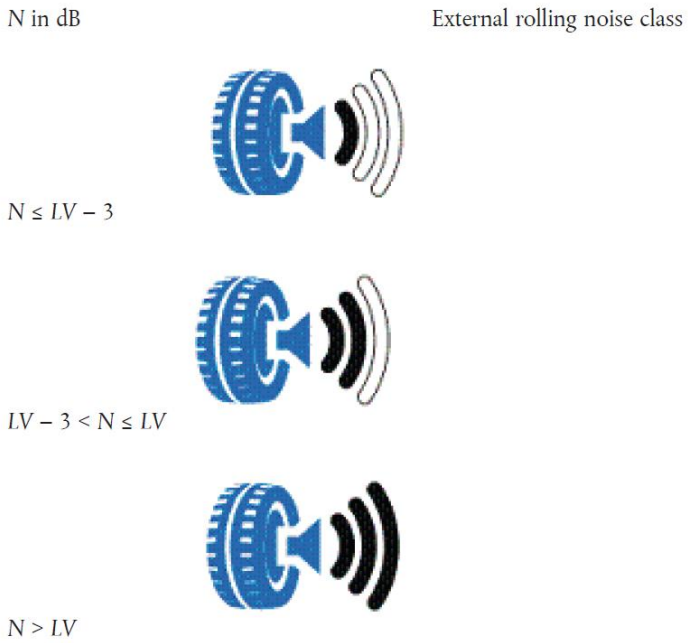
#### Rationale

Vehicle noise can have significant negative impacts on the health of residents, especially in case of traffic in or nearby residential areas. The market should therefore gradually reduce the noise levels of both the tyres and vehicle.

Tyre noise

Vehicle tyre noise is regulated by Regulation (EC) No 661/2009 and the labelling Regulation (EC) No 1222/2009, which obliges the tyre manufacturer to inform the customer about the external rolling noise class as follows:

***Figure 1: External rolling noise classes (LV = Limit Values)***




The Regulation (EC) No 1222/2009 does not apply to retreaded tyres, which shall comply with the provisions of UNECE Regulation 109 as a compulsory condition to be placed on the market. Similar to the rolling resistance criterion, it is proposed that this criterion can be complied with both low noise tyres and retreaded tyres.

Since currently all tyres have to meet the limits set by Regulation (EC) No 661/2009, only the top category of the labelling Regulation (N≤ LV -3) can provide an additional incentive. In Table 3 the limits values for C1 tyres according to Regulation (EC) No 611/2009 are listed. The proposed limits that are 3 dB below the limit values are presented in the last column. Compliance with these limits will mean the tyres fall within the best performing class of labelling Regulation (EC) No 1222/2009.

***Table 3: Limit values for C1 tyres according to Regulation 611/2009 and proposed limits***

| **Tyre class** | **Nominal section width (mm)** | **Limit values (dB(A))** | **Proposed limit (dB(A))** |
|---|---|---|---|
| C1A | ≤185 | 70 | 67 |
| C1B | >185 ≤215 | 71 | 68 |
| C1C | >215 ≤245 | 71 | 68 |
| C1D | >245 ≤275 | 72 | 69 |
| C1E | >275 | 74 | 71 |

The criterion is proposed to be a technical specification only at comprehensive level, for the sake of simplifying the core level which will focus on GHG and air pollutant emissions.

Vehicle noise

The Directive 2007/46/EC has been amended by Regulation (EU) No 540/2014, which will introduce stricter emissions limits for vehicle noise in three phases. In the case of heavy duty vehicles, Regulation (EU) No 540/2014 sets noise limits for N3 vehicles between 79 and 82 dB(A) for phase 1 and being applicable for new vehicles types from 1 July 2016. . Phase 2 (range 77 – 81 dB(A)) will be applicable for new vehicle type from 1 July 2020 and for first registration from 1 July 2022, and phase 3 (range 76 – 79 dB(A)) will be applicable for new vehicle type from 1 July 2024 and for first registration from 1 July 2026. The regulation does not include any provision to exclude vehicles for special purposes, in general. According to a report from TNO (TNO, 2012), there was technology commercially available for shielding and encapsulation for trucks in 2010, and there were models that fulfilled phase 3 limits available in the market. Therefore, the award criterion at comprehensive level is proposed to promote phase 3 compliant vehicles.

Road sweepers are subject to noise marking only, according to the article 13 of the Directive 2000/14/EC. However, the study on the suitability of the current scope and limit values of Directive 2000/14/EC carried out by TNO (TNO, 2016) recommends setting limit values to road sweepers. Apart from that, the Blue Angel criteria for sweepers (*RAL-UZ 59: Low-Noise and Low-Pollutant Municipal Vehicles and Buses)* are currently being revised to enhance the reduction of noise emissions; however the proposal is still being discussed. Since all the potential benchmarks are under discussion, no limit values are proposed for sweepers in this criterion proposal, only an award criterion that would give points proportionally to the noise levels.

**Criteria proposal for vehicles**

| Core criteria | Comprehensive criteria |
|---|---|
| **Technical Specifications** | |
| | **TS8. Tyre noise**<br><br>The vehicles shall be equipped with<br>a) tyres with external rolling noise emission levels 3dB below the maximum established in Regulation (EC) No 661/2009 Annex II Part C. This is equivalent to the top category (of the three available) of the EU tyre label external rolling noise class.<br>OR<br>b) retreaded tyres<br><br>The external rolling noise emissions will be tested according to the Annex I of Regulation (EC) No 1222/2009.<br><br>**Verification:** The tenderer shall provide the label of the tyre according to Regulation (EC) No 1222/2009 for tyres under case a) or the Notice of approval according to Annex 1 of UNECE Regulation 109 for retreaded tyres (case b) |
| **Award Criteria** | |
| | **AC6. Vehicle noise**<br>Points will be awarded to the vehicles with noise emissions compliant with the Phase 3 limits of Regulation (EU) No 540/2014. The noise emissions will be tested according to the Annex II of Regulation (EU) No 540/2014.<br><br>**Verification:**<br>The tenderer shall provide the Certificate of Conformity of the vehicle. |
| | **AC7. Sweepers**<br>Points will be awarded to the sweepers with lower guaranteed sound power level, according to the Directive 2000/14/EC<br><br>**Verification:**<br>The tenderer shall provide a copy of the CE marking together with the indication of the guaranteed sound power level according to the Directive 2000/14/EC of the sweeper. |

| **Consultation questions** |
|---|

- Are you aware of any limitation for the application of this criterion: for example not enough vehicles compliant with this criterion, too expensive technologies?
- Do you agree with placing noise criteria only at comprehensive level?
- Do you think that the criterion should set specific limit values for sweepers? If so, which ones?

## 6.2 Service fleets

Where services entailing the deployment of vehicles are contracted out, criteria have been recommended for service fleet employed in carrying out the service.

### 6.2.1 GHG emissions

**Rationale of the criteria proposal for service fleets**

Public space maintenance services are provided within a delimited urban area over a contract period. Therefore, it is feasible to request a fleet composition since all the vehicles of the fleet are to be providing the service contracted.

In terms of alternative fuels Eurostat statistics show that the share of alternative fuels is very limited in LCV and particularly narrow in heavy duty vehicles (JRC, 2016a). The average lifetime of vehicles is a key parameter in the replacement ratio of fleets. According to ACEA, the average lifetimes of LCVs and HDVs trucks in 2015 were 10.7 and 11.7 years, respectively (ACEA, 2017). Therefore, the criteria proposal should reflect this market situation. The thresholds of 12% and 25% of the fleet are meant to select the tenderers that have invested to renovate their fleets quicker, phasing out less efficient technologies.

Cyclelogistics has demonstrated its capability to operate in urban areas. According to CIVITAS 42% of all motorized trips in urban areas could be shifted to logistics by bicycle (this corresponds to 25% of all trips) (EPOMM, 2012). The project Cyclelogistics ahead gathered several examples of municipalities that use cargo bikes for street cleaning: Nîmes, Zadar, Strasbourg, Graz, San Sebastian, Sevilla (Austrian Mobility Research, 2014), (Traject Mobility Management, 2017). It also recommends that the municipalities make use of this measure to provide their municipal services (Wrighton, 2017). Therefore, it is proposed as technical specification, requiring that the fleet contains cycles and cycle trailers, within the framework of the emissions reduction plan set by the TS1 Environmental management practices.

## Criteria proposal for service fleets

| Core criteria | Comprehensive criteria |
|---|---|
| **Technical Specification** *(These criteria apply only if the operators owns or leases the service fleet)* | |
| **TS1. GHG emissions**<br>For HDVs and special purpose vehicles:<br>• 12% of the fleet to be used under the contract shall be vehicles equipped with one of the eligible technologies set by the TS1 of vehicles (see section 0)<br>For LCVs<br>• 12% of the fleet to be used under the contract shall comply with the TS1 CO2 emissions for the category 'Purchase, lease or rental of LCVs' of the EU GPP criteria for transport<br>For L-category vehicles:<br>• 12% of the L-category vehicles used in the service shall be electric.<br><br>**Verification:** same as the TS1 of vehicles together with the list and technical sheets or certificates of conformity of the whole fleet. | **TS1. GHG emissions**<br>For HDVs and special purpose vehicles:<br>• 25% of the fleet to be used under the contract shall be vehicles equipped with one of the eligible technologies set by the TS1 of vehicles (see section 0)<br>For LCVs<br>• 25% of the fleet to be used under the contract shall comply with the TS1 CO2 emissions for the category 'Purchase, lease or rental of LCVs' of the EU GPP criteria for transport<br>For L-category vehicles:<br>• 25% of the L-category vehicles used in the service shall be electric.<br><br>**Verification:** same as the TS1 of vehicles together with the list and technical sheets or certificates of conformity of the whole fleet. |
| **TS2. Cyclelogistics (same core and comprehensive)**<br>*(in cities where the urban infrastructure is suitable).*<br><br>The tenderer shall offer a service fleet that include the use of cycles and cycle trailers, which may be electrically power assisted cycles, to minimise the use of motorised vehicles, according to the plan to minimise the environmental issues set by the TS1 Environmental management practices within the common criteria for service categories (see section 7.2)<br><br>**Verification:** The tenderer will present the specifications of the service fleet and the description of the way that cycles and cycle trailers will be used to minimise the use of motorised vehicles. | |

**TS3. Vehicle tyres – rolling resistance** (*Same for core and comprehensive)*

All the vehicles shall be equipped with tyres compliant with TS2 on vehicle tyres as defined in in the section 6.1.

**Verification:**

Same as TS on vehicle tyres as defined in in the section 6.1 together with the list and technical sheets of the whole fleet.

**TS4. Tyre Pressure Monitoring Systems (TPMS)** (*Same for core and comprehensive)*

All the vehicles shall be equipped with systems compliant with TS3 on TPMS as defined in the section 6.1

**Verification:**

Same as TS on TPMS as defined in the section 6.1 together with the list and technical sheets of the whole fleet.

**TS5. Fuels** (*Same for core and comprehensive)*

*Note: this criterion is applicable only if the contracting authority qualifies dedicated natural gas vehicles as eligible technology and the tenderer offers dedicated natural gas vehicles to comply with TS1 of vehicles* (see section 0)*.*

At least 10% of the methane supply shall be renewable methane.

**Verification:**

The tenderer shall provide the contract(s) with supplier(s) and the description and technical specifications of the production and the dedicated fuel supply system.

**Award Criteria** *(These criteria apply only if the operators owns or leases the service fleet)*

**AC1. GHG emissions** (*Same for core and comprehensive)*

Points will be awarded to the fleet to be used under the contract with proportion of vehicles (%) larger than the TS2 GHG emissions, in proportion to the excess over the TS2.

**Verification:**

Same as TS1

**Consultation questions**

- Do you agree with the thresholds on fleet composition proposed?
- Do you agree with the criteria proposal on cyclelogistics? Are you aware of any limitation to its application?
- Are you aware of any limitation to the application of this criterion: for example not enough vehicles compliant with this criterion?

### 6.2.2 Air pollutant emissions

#### Rationale

Similarly to the GHG emission criteria, the criteria on air pollutant emissions and Euro compliance should be set as a proportion of the fleet. The average share of Euro VI heavy duty vehicles in the current fleets is 8% (data from ICCT, ACEA and OICA, EU-28 and EFTA average). More than 60% of the heavy duty vehicles using diesel is still equipped with Euro III (implemented in 2000), 11% with Euro IV (in 2005) and 15% complies with Euro V. The average age of the bus fleet has been increasing the last year to reach 55% of buses above 10 years and less than 10% below 2 years. With regards of LCVs, 55% of the diesel fleet in 2015 complied with Euro 4 or below and 15% met Euro 6. In the case of L-category vehicles, the shares of moped and motorcycles complying with Euro 3 in 2011 were 65% and 60% respectively (JRC, 2016a).

It is proposed that all vehicles comply with Euro V/5/3 at core level, in order to prevent the use of low performance vehicles. A minimum percentage of 40% of Euro VI/6/4 is proposed for core and 60% for comprehensive level. This will stimulate the acceleration of the replacement rate to increase the share of Euro VI/6/4 vehicles. These technical specifications are complemented with award criteria to promote a better performance of the fleet. It is also proposed a percentage of vehicles complying with Euro 6d-TEMP standard at comprehensive level, to incentivise the penetration of the Euro 6d stage. Euro 6d-TEMP standard is the one that requires a real driving emissions conformity factor of 2.1.

#### Criteria Proposal

| **Core criteria** | **Comprehensive criteria** |
|---|---|
| **Technical Specification** *(These criteria apply only if the operators owns or leases the service fleet)* | |
| **TS6. Air pollutant emissions**<br>All vehicles used in carrying out the service shall meet at least Euro V/5.<br>40% of vehicles shall have engines meeting Euro VI/6.<br>All L-category vehicles used in carrying out the service shall meet at least Euro 3<br>40% of L-category vehicles shall have engines meeting Euro 4.<br>Where vehicles are not certified as meeting Euro V or higher, but technical after-treatment has achieved the same | **TS6. Air pollutant emissions**<br>1. All vehicles used in carrying out the service shall meet at least Euro V/5.<br>60% of vehicles shall meet Euro VI/6.<br>10% of LCVs shall comply with the Euro 6d-TEMP standard.<br>All L-category vehicles used in carrying out the service shall meet at least Euro 3<br>60% of L-category vehicles shall have engines meeting Euro 4.<br>Where vehicles are not certified as meeting Euro V or higher, but technical after-treatment has achieved the same |

| | |
|---|---|
| standard, this should be documented in the tender.<br><br>**Verification:**<br>The tenderer shall present the list of the vehicles of the service fleet and their certificates of conformity. For those vehicles having achieved above-mentioned standard following a technical upgrade the measures must be documented and included in the tender, and this must be verified by an independent third party. | standard, this should be documented in the tender.<br>If there is no charging infrastructure available, or the expected use profile requires large ranges: The cars and vans may at the least be zero tailpipe emissions capable, meaning a vehicle that can run the minimum range of 40 km without emitting any tailpipe emissions.<br>**Verification:**<br>The tenderer shall present the list of the vehicles of the service fleet and their certificates of conformity. For those vehicles having achieved above-mentioned standard following a technical upgrade the measures must be documented and included in the tender, and this must be verified by an independent third party. |
| **AC2. Air pollutant emissions** (*Same for core and comprehensive)*<br>Points will be awarded to the fleet to be used under the contract with proportion of vehicles (%) larger than the TS6, in proportion to the excess over the TS6, or if the vehicles have an emission performance better than Euro VI/6 or are capable to run with zero tailpipe emissions.<br>*For HDV, zero tailpipe emissions capable means plug in hybrid electric vehicles (PHEV), battery electric vehicles (BEV), and fuel cell electric vehicles (FCEV).*<br>*For LCVs zero tailpipe emissions means a vehicle that can run the minimum range of 40 km without emitting any tailpipe emissions.*<br>**Verification:**<br>See above TS6 | |

### 6.2.3 Efficiency of particulate matter collection (for sweepers)

#### Rationale

Similar to the criteria proposed for GHG emissions of the fleet, the fleet of sweepers would be composed by a share of vehicles compliant with the requirements on efficiency of particulate matter collection for sweepers. No data on the market penetration of the compliant sweepers and on their average age have been found, and this hampers the development of a well-grounded proposal. For this reason, no specific fleet compositions are proposed in this draft, but it is left open for discussion and consultation.

#### Criteria proposal

| **Core criteria** | **Comprehensive criteria** |
|---|---|
| **Technical Specification** *(These criteria apply only if the operators owns or leases the service fleet)* | |
| **TS7. Efficiency of particulate matter collection**<br>X% of sweepers shall meet the TS5 of Efficiency of particulate matter collection for the sweepers' category (see section 6.1.3).<br>**Verification:**<br>The tenderer shall present the list of the sweepers of the service fleet and their test reports according to the standard EN 15429-3 carried out by an independent laboratory. | **TS7. Efficiency of particulate matter collection**<br>Y% of sweepers shall meet the TS5 of Efficiency of particulate matter collection for the sweepers' category (see section 6.1.3).<br>**Verification:**<br>The tenderer shall present the list of the sweepers of the service fleet and their test reports according to the standard EN 15429-3 carried out by an independent laboratory. |
| **AC3. Efficiency of particulate matter collection** (*Same for core and comprehensive)*<br>Points will be awarded to the fleet to be used under the contract with proportion of vehicles (%) larger than the TS7, in proportion to the excess over the TS7.<br>**Verification:**<br>See above TS7 | |

### 6.2.4 Distribution performance of spreaders

#### Rationale

The rational would be the same as for the vehicle criterion proposal. Given that the European standard is not approved yet, and that there are very few laboratories available, the criterion is proposed to be an award criterion to reward those fleets whose spreaders can demonstrate their distribution performance.

### Criteria proposal

| Core criteria | Comprehensive criteria |
|---|---|
| **Award Criteria** | |
| **AC4. Distribution performance of spreaders**<br>Points will be awarded to those tenders offering a service fleet proportionally to the share of spreaders that are qualified according to the EN 15597-2.<br><br>**Verification:**<br>The tenderer shall present the list of the vehicles of the service fleet and their test reports according to EN 15597-2 issued by an independent laboratory. | |

| Consultation questions |
|---|
| ○ Are you aware of any limitation for the application of this criterion: verification, not enough manufacturers, too expensive tests? |

## 6.2.5 Water consumption (for sweepers fleets that use water for dust suppression)

### Rationale

Same as for the vehicle criterion proposal.

### Criteria proposal

| Core criteria | Comprehensive criteria |
|---|---|
| **Award Criteria** | |
| **AC5. Water recirculation**<br>*If the contracting authority is requiring sweepers that use water for dust suppression*<br>Points will be awarded to those tenders offering a service fleet proportionally to the share of vehicles equipped with a water recirculation system.<br>**Verification:**<br>The tenderer shall present the list of the vehicles of the service fleet and their technical sheets | |

| Consultation questions |
|---|
| ○ Do you have data on cost and water saving potential of the recirculation systems?<br>○ Are you aware of any limitation for the application of this criterion: verification, not enough manufacturers, too expensive technology? |

### 6.2.6 Noise emissions

#### Rationale

Same as for the vehicle criterion proposal.

#### Criteria proposal

| Core criteria | Comprehensive criteria |
|---|---|
| **Award Criteria** | |
| | **AC6. Noise emissions**<br>Points will be awarded to those tenders offering a service fleet totally composed by vehicles compliant with the AC6 on vehicle noise emissions set in the section 0.<br>**Verification:**<br>The tenderer shall present the list of the vehicles of the service fleet and their certificates of conformity. |

| Consultation questions |
|---|
| ○ Are you aware of any limitation for the application of this criterion: for example not enough vehicles compliant with this criterion, too expensive technologies?<br>○ Do you agree with placing noise criteria only at comprehensive level? |

### 6.2.7 Maintenance of the fleet

#### Rationale

Sections 0.1 and 0 describe the requirements on rolling resistance and noise proposed for tyres, and low viscosity of lubricants used in newly purchased vehicles. Both tyres and lubricants are replaced along the lifetime of the vehicle, and therefore the same requirements should apply in maintenance activities. For this purpose, contract performance clauses are proposed requiring the contractor to comply with the tyres and lubricants criteria over the service contract. In the case of rolling resistance of tyres, it is proposed to be part of both core and comprehensive levels to be fully harmonised with the provisions of the Energy Efficiency Directive on the purchase of tyres by governments.

## Criteria proposal

<table>
<tr><th>Core criteria</th><th>Comprehensive criteria</th></tr>
<tr><td colspan="2">Contract performance clause</td></tr>
<tr><td></td><td>CPC1. Low viscosity lubricant oils<br>Unless the manufacturer of the vehicle recommends other type of lubricant, the contractor shall replace the lubricants of the vehicles providing the service with low viscosity engine lubricant oils (LVL). LVL are those corresponding to SAE grade number 0W30 or 5W30 or equivalent.<br>The contractor will keep records which shall be made available to the contracting authority. The contracting authority may set rules for penalties for non-compliance.</td></tr>
<tr><td colspan="2">CPC2. Vehicle tyres – rolling resistance (Same for core and comprehensive)<br>The contractor shall replace the worn tyres of vehicles providing the service with<br>a) new tyres that comply with the highest fuel energy efficiency class for rolling resistance expressed in kg/tonne, as defined by Regulation (EC) No 1222/2009 of the European Parliament and of the Council of 25 November 2009 on the labelling of tyres with respect to fuel efficiency and other essential parameters. This contract performance clause shall not prevent the use of tyres with the highest wet grip class where justified by safety.<br>OR<br>b) retreaded tyres<br>The contractor will keep records which shall be made available to the contracting authority. The contracting authority may set rules for penalties for non-compliance</td></tr>
<tr><td></td><td>CPC3. Tyre noise<br>Note: This CPC does not apply to retreaded tyres.<br>The contractor shall replace the worn tyres of vehicles providing the service with new tyres with external rolling noise emission levels 3dB below the maximum established in Regulation (EC) No 661/2009 Annex II Part C. This is equivalent to the top category (of the three available) of the EU tyre label external rolling noise class.<br>The external rolling noise emissions will be tested according to the Annex I of Regulation (EC) No 1222/2009.<br>The contractor will keep records which shall be made available to the contracting authority. The contracting authority may set rules for penalties for non-compliance</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td colspan="2">Note on the purchase of maintenance services<br>The contracting authority may include these criteria within the call for tenders of</td></tr>
</table>

*vehicles maintenance services, however these criteria just cover a small part of the maintenance activities and cannot be considered as EU GPP criteria for vehicles maintenance services*

***Note on requirements for Central Government procurement on the purchase of tyres***

*Article 6 and Annex III of the Energy Efficiency Directive (2012/27/EU), which had to be transposed into national law by June 2014, set out specific obligations for public authorities to procure certain energy efficient equipment. This includes the obligation to purchase only those tyres that:*

'comply with the criterion of having the highest fuel energy efficiency class, as defined by Regulation (EC) No 1222/2009 of the European Parliament and of the Council of 25 November 2009 on the labelling of tyres with respect to fuel efficiency and other essential parameters. This requirement shall not prevent public bodies from purchasing tyres with the highest wet grip class or external rolling noise class where justified by safety or public health reasons'

*This obligation is limited to central government and for purchases above the thresholds set out in the procurement directives. Moreover, the requirements have to be consistent with cost-effectiveness, economic feasibility, wider sustainability, technical suitability and sufficient competition. These factors can differ between public authorities and markets. For more guidance on the interpretation of this aspect of Article 6 and Annex III of the EED regarding procurement of energy-efficient products, services and buildings by central government authorities, please see the Commission guidance document COM/2013/0762 final, Communication from the Commission to the European Parliament and the Council, Implementing the Energy Efficiency Directive – Commission Guidance.*

# 7 Draft of common criteria for service categories

## 7.1 Competence of tenderer and staff training

### Rationale

The selection criteria proposal requires a minimum experience on identifying, evaluating and implementing technologies and measures to reduce the water and energy consumption, GHG emissions and air pollutants emissions. This selection criterion is aimed at ensuring the competences of the tenderer to carry out the service according to environmental performance.

This is complemented with a staff training contract performance clause, which requires the staff to be trained in the operational procedures set out by the company to increase their environmental performance. This would ensure that these procedures are properly implemented properly by the staff carrying out the service.

### Criterion Proposal

<table>
<tr><th>Core criteria</th><th>Comprehensive criteria</th></tr>
<tr><td colspan="2">Selection criteria</td></tr>
<tr><td colspan="2">SC1. Competences of the tenderer<br>(Same for core and comprehensive)<br><br>The tenderer shall have relevant experience in each of the following areas, if applicable to the specific service provided:<br>- identifying, evaluating and implementing the best available technologies and measures to minimise the following environmental issues:<br>o water and energy consumption,<br>o GHG emissions and air pollutants emissions<br>o waste generation<br>o consumption of pesticides, including herbicides<br>o consumption of fertilisers,<br>o consumption of cleaning products<br>o consumption of de-icing products<br><br>- monitoring and reporting procedures of environmental issues listed above.<br><br>Verification:<br>Tenderers shall provide proof experience in carrying out similar contracts by submitting a list of their previous contracts carried out over the last 5 years, with the contact details of the relevant contracting authorities.</td></tr>
<tr><td colspan="2">Contract performance clause</td></tr>
<tr><td colspan="2">CPC1. Staff training (Same for core and comprehensive)</td></tr>
</table>

All staff involved in carrying out the service for the duration of the contract period shall be trained to perform their work according to the operational procedures set by the contractor to reduce water and energy consumption, consumable goods consumption and waste generation; requirements specific to each type of activity are additionally specified below.

**For the provision of Gardening services:**

The gardening staff shall be trained on gardening practices with less environmental impact to be applied in carrying out the service. This should include at least water and energy saving practices; waste minimization, management and selective collection, use of products based on renewable raw materials; chemical product and container handling and management; safe, legal use of pesticides including herbicides.

Training in critical applications, including the use of chemicals, is to be undertaken before the staff allowed to undertake that type of work.

The contractor shall present a training plan once the contract is awarded.

**For the provision of Cleaning services:**

The cleaning staff shall be trained on cleaning practices with less environmental impact to be applied in carrying out the service. This should include topics such as water and energy saving practices; waste minimization, PM10 street dust reduction, minimisation of consumable goods and safe use of chemicals.

Training in critical applications, including the use of chemicals, is to be undertaken before the staff allowed to undertake that type of work.

The contractor shall present a training plan once the contract is awarded.

**For the operation of machinery and vehicles:**

All operators of machinery and vehicles involved in carrying out the service shall be sufficiently trained to deliver the contracted service in an environmentally responsible manner through the efficient utilization of applicable machinery and vehicles.

All operators of machinery and vehicles involved in carrying out the service for the duration of the contract period shall receive regularly information on their fuel efficiency performance (at least once per month).

The yearly staff training records shall be made available to the contracting authority for verification purposes. The contracting authority may set rules for penalties for non-compliance.

## Consequences

The acceptance of this criteria would enable tenderers assess the skill level and ensure that their staff are equipped with the appropriate skills to deliver more environmentally neutral public space maintenance services.

| **Consultation questions** |
| --- |
| ○ Would you deem it necessary to add further requirements to this proposal?<br>○ What could /should be the minimum duration of training for all new staff in hours? |

## 7.2 Environmental management measures

### Rationale

The criteria aimed at promoting best operational practices need to be supported by management measures, meaning monitoring and planning. This would ensure a proper implementation and guarantee continuous improvement. An environmental management system (EMS) is a systematic way to minimise the environmental issues of an organisation. It is particularly helpful to ensure the environmental performance of services, where an important part of the criteria must rely on best practices, staff training and other operational requirements. Some national GPP criteria require the company to have a certified environmental management system.

Although EMS is a very useful tool to develop systematic improvement processes, the leeway offered by the ISO standards may hinder their application in real practice. Their requirements are so general that their interpretation may be difficult for the non-expert users. In addition, EMS might be particularly difficult to be achieved by SMEs which may lead to their exclusion of the tender process. It is therefore proposed a technical specification inspired on the plan-do-check-act (PDCA) principles which constitute the basis of the management systems, and structured as follows:

- Monitoring the environmental issues by means of environmental indicators: in this case, the environmental issues are water and energy consumption, GHG and air pollutant emissions, consumable goods consumption and waste generation.
- Implementation of the operational procedures to minimise the environmental aspects: this would mean a plan to minimised the environmental issues identified that covers the service provided over contract period
- Evaluation of the implementation of the procedures and correction of the deviations found: there must be a systematic way to ensure the proper implementation of the emissions reduction plan and the minimisation of indicators. For this purpose, it is necessary to carry out a regular evaluation of both indicators and plan, and to set corrective and preventive actions where needed. This is proposed to be done by tracking the evolution of the indicators over the contract duration, and checking how the emissions reduction plan is deployed real practice.

The technical specification is complemented with a contract performance clause to ensure the implementation of the environmental management measures. It also works as a tool for the contracting authority to reward those contractors that achieve more ambitious targets, by means of bonuses. Besides, the technical specification indicates that the contracting authorities may award points to environmental management measures that entail a significant improvement compared to the conventional practices.

## Criterion Proposal

| Core criteria | Comprehensive criteria |
|---|---|
| **Technical Specification** | |
| **TS1. Environmental management measures**<br>(*Same for core and comprehensive)*<br><br>The tenderers shall have written procedures to:<br>1. monitor, record and implement minimising measures for the following:<br>• GHG and air pollutant emissions<br>• Energy consumption<br>• Water consumption<br>• Products consumption (e.g. cleaning products, fertilisers, pesticides, de-icing products)<br>• Waste generation<br>2. evaluate the deployment of the plan and operational procedures, by tracking the evolution of indicators and the implementation of the measures in real practice.<br>3. implement the necessary actions to correct deviations from the plan, and if possible prevent them in the future.<br><br>**Verification:**<br>The tenderer shall provide a copy of the said written procedures.<br><br>Environmental management systems certified against ISO 14001 or EMAS will be deemed to comply, if they cover the environmental objectives listed in the technical specification. The tenderer shall provide the environmental policy showing the commitment to achieve these objectives, together with the certificate issued by the certification body<br><br>*Note: the contracting authority may points at award stage to those tenders offering significant improvements in their environmental management measures.* | |
| **Core criteria** | **Comprehensive criteria** |
| **Contract performance clause** | |
| **CPC2. Environmental management measures**<br>*(Same for core and comprehensive)*<br><br>The contractor shall document and report, over the contract duration:<br>- the results of the monitoring of indicators and<br>- the results of the evaluation and the correction and prevention actions, where applicable,<br>according to the written procedures provided for the verification of the TS1 Environmental management measures<br>These reports shall be made available to the contracting authority for verification purposes.<br>The contracting authority may set rules for penalties for non-compliance and bonuses | |

for exceeding the objectives set by the plan to minimise the environmental issues.

## Consequences

The incorporation of this criterion would encourage contractors providing public space maintenance service to implement the basis of, or have, a third party certified environmental management system, leading to improvements in environmental performance in a systematic way.

| **Consultation questions** |
| --- |
| ○ Do you agree with the environmental issues proposed to be monitored?<br>○ Which functional unit should be used to monitor the environmental issues? Would it be per area of maintained space a correct magnitude?<br>○ Have similar criteria been set in previous tenders and, if so, what were the verification procedures? |

# 8 Bibliography

ACEA. (2017). Average Vehicle Age. Obtenido de http://www.acea.be/statistics/tag/category/average-vehicle-age

Austrian Mobility Research. (2014). Cyclelogistics ahead - Final report.

Bucher Municipal. (2017). Products brochure. Obtenido de http://sweeper.buchermunicipal.com/sites/default/files/sweeper/additional_information_download_items/bm_gesamtbrosch%C3%BCre_en_low_0.pdf

CE Delft, TNO and ECN. (2013). Natural gas in transport : an assessment of different routes.

Cenex and Atkins. (2016). Low Carbon Truck and Refuelling Infrastructure Demonstration Trial Evaluation.

Chiffi, & Galli. (2014a). A guide to effective strategies for introducing and supporting Cyclelogistics in urban areas.

City Council of Toronto. (2015). Street Sweeper Evaluation Results and Operational Considerations.

DOE. (2016). US Department of Energy - Solid-State Lighting R&D Plan June 2016.

EPOMM. (2012, December). Cycle Logistics- Moving goods by cycle : e-update . Retrieved 2016, from http://www.civitas.eu/sites/default/files/1212_epomm_enews_cyclelogistics.pdf

EUnited. (2017). Common Test for Spreaders of Winter Maintenance Equipment (WME) Section members. Obtenido de http://www.eu-nited.net/municipal_equipment/wme/common-spreader-test-wme/index.html

EUnited. (2017). Successful EUnited PM Test. Obtenido de http://www.eu-nited.net/municipal_equipment/sweepers-rcvs-winter-maintenance-equipment-important-topics/list-labelled-machines-eunited-pm10-test-sweeper-list-of-tested-/successful-eunited-pm-test-to-become-official-european-standard-kopie.html

European Commission. (2016). AIRUSE - Testing and Development of air quality mitigation measures in Southern Europe. Obtenido de http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=4253#BENEF

Eurostat. (2015e, December 7). Waste generation by economic activity and households, 2012 (1000 tonnes).png. Retrieved March 15, 2016, from http://ec.europa.eu/eurostat/statistics-explained/index.php/File:Waste_generation_by_economic_activity_and_households,_2012_(1000_tonnes).png

ICCT. (2015). Accelerating progress from Euro4/IV to Euro 6/VI vehicle emissions standards.

ICCT. (2017). Fuel Efficiency Technology in European Heavy-Duty Vehicles: Baseline and Potential for the 2020–2030 Time Frame.

Idaea - CSIC. (2016a). Review of the impact of street cleaning on PM10 and PM2.5 concentrations in Central & Northern Europe.

Idaea - CSIC. (2016b). The scientific basis of street cleaning activities as road dust mitigation measure.

Johnston. (2017). Specification configuration of sweepers. Obtenido de http://www.johnstonsweepers.com/configurator/configurator.php

JRC. (2012). EU GPP Criteria for Street Lighting & Traffic Signals. European Commission.

JRC. (2016a). Preliminary report for the revision of the EU GPP criteria for road transport.

JRC. (2016b). Report on VECTO technology simulation capabilities and future outlook.

LowCVP. (2017). Emissions Testing of Gas-Powered Commercial Vehicles.

Macro. (2017). Macro Smart Machines. Obtenido de http://www.macroclean.it/en/m60-street-sweepers/

McKinsey&Company. (2012). Lighting the way: perspectives on the global lighting market. McKinsey.

OECD. (2002). OECD Workshop on waste prevention: towards performance indicators. Paris: OECD headquarters, .

Ricardo. (2013). Preparing a low CO2 technology roadmap for buses.

Ricardo AEA. (2012). Opportunities to overcome the barriers to uptake of low emission technologies for each commercial vehicle duty cycle.

TNO (CIVITAS WIKI). (2016, 2 27). Smart choices for cities - Clean buses for your city. Retrieved 2016

TNO. (2012). Reduction of vehicle noise emission - Technological potential and impacts.

TNO. (2016). Study on the suitability of the current scope and limit values of Directive 2000/14/EC.

Traject Mobility Management. (2017). Final Publishable Report of the Cyclelogistics Ahead.

UITP. (2015). BUS SYSTEMS IN EUROPE : TOWARDS A HIGHER QUALITY OF URBAN LIFE AND A REDUCTION OF POLLUTANTS AND $CO_2$ EMISSIONS.

WRAP. (2013). Case Study: Water Efficiency on construction sites - Technological solutions offer savings at high-staff level site.

Wrighton. (2017). Cyclelogistics Ahead – Monitoring and Evaluation Report.

Cañedo-Argüelles, M., Hawkins, C.P., Kefford, B.J. et al. (2016) Saving freshwater from salts. Science, 351, 914–916.

Corsi, S.R., Graczyk, D.J., Geis, S.W., Booth, N.L. & Richards, K.D. (2010) A fresh look at road salt: aquatic toxicity and water-quality impacts on local, regional, and national scales. Environmental Science & Technology, 44, 7376–7382.

Kaushal V.R., Band, L.E. & Fisher, G.T. (2005) Increased salinization of fresh water in the northeastern United States. Proceedings of the National Academy of Sciences of the United States of America, 102, 13517–13520.

Kefford B.J., Buchwalter, D., Ca~nedo-Arg€uelles, M., Davis, J., Duncan, R.P., Hoffmann, A. & Thompson, R. (2016) Salinized rivers: degraded systems or new habitats for salt-tolerant faunas? Biology Letters, 12, 20151072.

Ramakrishna D.M. & Viraraghavan, T. (2005) Environmental impact of chemical deicers – a review. Water, Air, and Soil Pollution, 166, 49–63.

Sweep project