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Frontpage photo: Colourbox

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1 INTRODUCTION

Public procurement constitutes an estimated 18 % of all European procurement. This indicates a significant potential to use public procurement as a mean to influence raw material choices, manufacturing methods, design for optimized end of life management and eventually, impact on the environment. By adding criteria targeting these types of issues the purchasing power behind public procurement have the potential to influence the markets towards social and environmental goals. This is commonly known as Green Public Procurement¹ (hereafter GPP).

1.1 WHY IMPLEMENT PLASTIC WASTE PREVENTIVE GPP?

The plastic content in the waste streams is increasing due to an increased consumption of plastic in products, packaging and for construction purposes. Plastic is made of fossil fuels; a scarce natural resource. To increase resource efficiency plastic products should be captured and returned to the technical value chains (sometimes called the technological metabolism) when they reach their end-of-life stage. Further, plastic in the residual waste stream hinders waste incineration from becoming a carbon neutral energy source.

Reprocessing plastic waste saves around 80 % of the fossil fuel used for manufacturing virgin plastics. Furthermore, on average recycling results in net CO₂ savings of 1-1.15 tonne CO₂ per tonne of plastics (WRAP, 2010).

The EU LIFE+ project Plastic Zero addresses these challenges and has been steered towards three main goals:

- 1) To identify the main challenges and barriers for reducing plastic waste in mixed waste and residual waste streams, and hereby stimulate prevention and recycling of plastic waste
- 2) To promote recycling of plastic polymers as a substitute for virgin plastic
- 3) To divert plastic from the residual waste going to incineration (creating a carbon neutral energy source) and landfill.

Following the EU Waste Hierarchy², an important effort has been to target prevention of plastic waste, and for this purpose GPP could be a significant tool (Plastic Zero, 2010).

1.2 PURPOSE AND APPROACH

The Plastic Zero project has been surveying the experience of GPP in European cities, in order to investigate the plastic waste preventive potential within public procurement.

The main findings are described in the present report. It further comprises part of the foundation used to create the manual and tool *Green Public Procurement Manual on Plastic Waste Prevention* (Plastic Zero, 2014). That manual provides prioritised rules of thumbs and ready to copy-and-paste criteria for plastic waste preventive GPP.

The present report provides insight on relevant organisations working with GPP and approach potential barriers and challenges for the implementation of GPP in general and plastic waste preventive GPP in specific. Even though some of the enclosed information is based on European trends, focus is on the situation in Denmark. City

¹ GPP is by the European Commission formally defined as "Public procurement for a better environment". It is a voluntary instrument aiming to integrate environmental considerations into the public procurement process ([COM \(2008\) 400](#))

² The Waste Hierarchy by the European Parliament and the Council gives the following prioritising to waste prevention and waste management: a) prevention, b) preparing for re-use, c) recycling, d) other recovery, e.g. energy recovery and e) disposal (The Waste Directive (2008/98/EC)).

of Copenhagen has been chosen as case due to its status as partner in the Plastic Zero project.

A literature survey on European and Danish GPP policies and practices and a consultancy report (Econet, 2013) which identifies existing plastic waste preventive GPP examples in Europe forms part of the background information to this Report. The main references are however 13 semi-structured interviews, two tests³ and three site visits⁴ conducted by Pleastic Zero partners among Danish and other European practitioners within public procurement.

The report is structured in the following way: Chapter 2 and 3 describe the current institutional structure around GPP in Denmark and in City of Copenhagen. Chapter 4 focuses on identified barriers for the active use of procurement to prevent plastic waste. Chapter 5 looks into what it will take to establish awareness and practice for plastic waste preventive GPP in Denmark and in City of Copenhagen, and includes two Danish cases on public procurement with impacts on plastic waste.

1.3 DEFINITIONS

When we look into plastic waste preventive GPP, we need to establish a common understanding of what is meant by waste prevention. GPP criteria on recyclability and recycling are likewise included in the survey, why we also include a definition on that.

The European Waste directive states that waste prevention should be the first priority of waste management, and that re-use and material recycling should be preferred to energy recovery from waste, where and insofar as they are the best ecological options (Waste Directive (2008/98/EC)).

1.3.1 Waste prevention

Waste prevention is defined in the Waste Directive (2008/98/EC) as:

"...measures taken before a substance, material or product has become waste that reduce:

- a) the quantity of waste, including through the reuse of products or the extension of the life span of products;*
- b) the adverse impacts of the generated waste on the environment and human health; or*
- c) the content of harmful substances in materials and products."*

Prevention, in this report, refers to qualitative as well as quantitative waste prevention.

Quantitative waste prevention is an action, which prevents waste from being generated, e.g. by minimising material use or extending the lifetime of products.

Qualitative waste prevention is an action, where the adverse impact on the environment and human health caused by the waste is prevented. Qualitative waste prevention does not prevent waste from being generated, and unlike quantitative waste prevention it does not exclude the lower-ranking steps in the waste hierarchy. Measures b) and c) in the above definition are interpreted as qualitative waste prevention measures (European Commission, 2010a).

³ Six interviews and one test have been conducted among Danish practitioners, two interviews and one test among Swedish practitioners, three interviews among Latvian practitioners and two interviews among Finish practitioners.

⁴ One visit and meeting was conducted to ICLEI (Local Governments for Sustainability) Brussels Office October 2013; one to OWAM The Public Waste Agency of Flanders, October, 2013; and one to ÖkoKauf Vienna, the Green Public Procurement Program of Vienna, december 2013.

Danish Procurement Directive, the Utility Company Directive and the Tender Law (European Commission, Directive 2014/24/EU and Udbudsportalen, 2014).

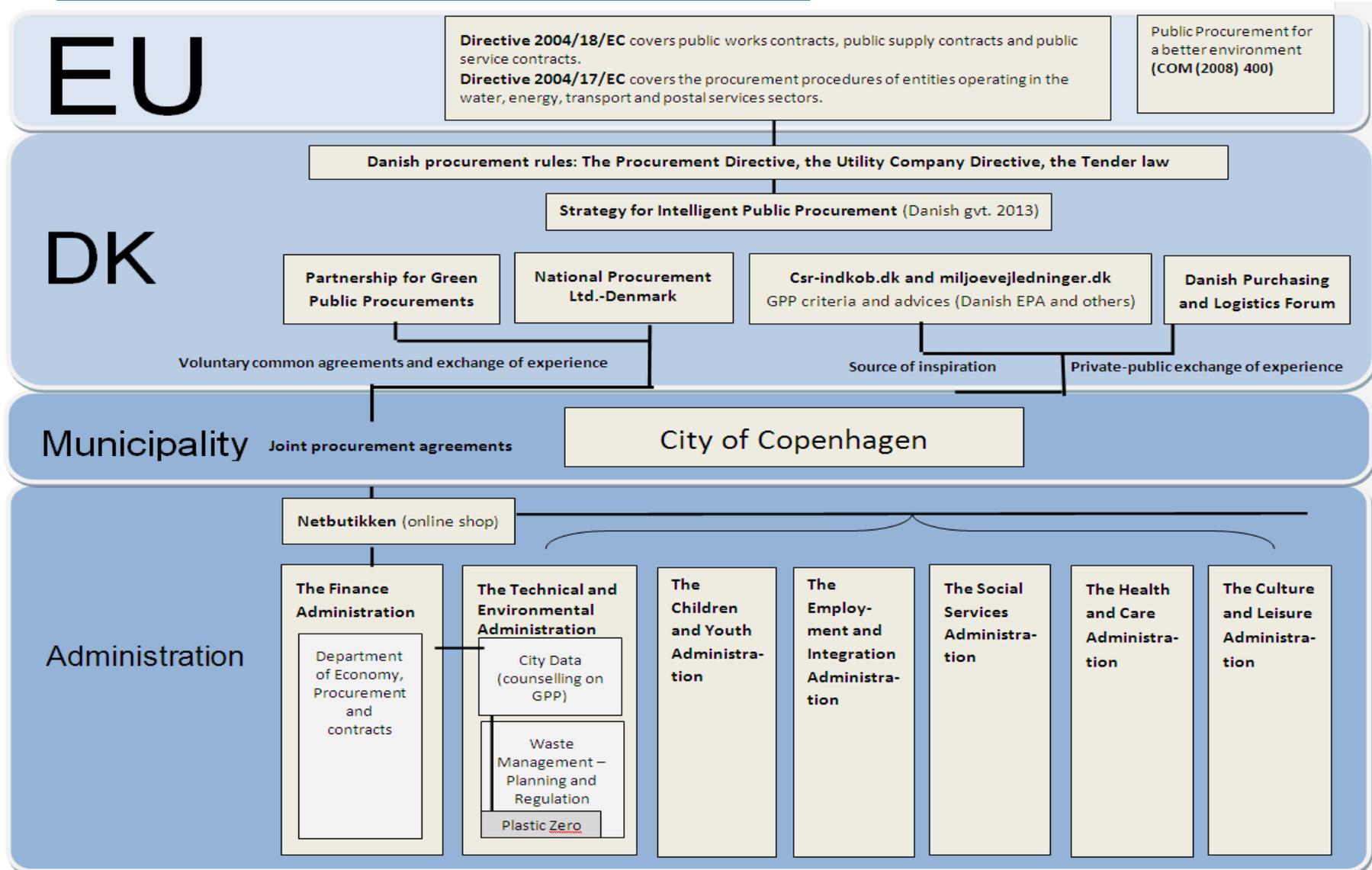
In fall 2013 the Danish Government launched *The Strategy for Intelligent Public Procurement* which emphasises sustainability and innovation towards quality development as two of its three overarching goals; cost effectiveness being the third. The objectives under sustainable procurements are: employment of environmental and energy criteria; focus on specific sectors; support to the development of new green solutions, Corporate Social Responsibility and social considerations. The strategy also promotes different methods with the potential to enhance GPP. Among others procurements based on Total Cost of Ownership, procurement based on operational needs, and upfront dialogue with the markets (Regeringen, 2013).

The Ministry for Environment, the Ministry of Finance, the National Procurement Ltd. – Denmark, and the State Procurement Office at the Danish Agency of Governmental Management are the bodies responsible for GPP in Denmark (European Commission n.d.). Efforts with GPP are coordinated by the Danish Environmental Protection Agency (hereafter Danish EPA). Danish EPA represents Denmark in a number of international networks and partnerships, mainly in the EU, e.g. "The Green 7", a group of seven leading countries within GPP. Danish EPA also develops inspiration materials on environmental guidelines and GPP criteria; it promotes eco-labels and it facilitates Danish networks for sustainable and green public procurement.

A range of joint voluntary agreements, forums and platforms exist with the aim to strengthen GPP among public and private organisations in Denmark. Some of them are hosted by the Danish EPA others formed jointly among public and private stakeholders. Distinctive examples which are also included in the organisation chart in figure 1 are:

- *National Procurement Ltd – Denmark* which hosts a range of both mandatory and voluntary procurement contracts. The organisation works with environment and climate related criteria under their policy for social responsibility, and counsels on GPP (National Procurement Ltd., homepage [1](#) and [2](#)).
- *Partnership for Green Public Procurement* is a cooperation between 11 public organisations (municipalities, ministries and regions) on joint binding GPP objectives. Members commit to follow the joint GPP objectives including specific criteria; they commit to explicitly highlight environmental considerations in their procurement policy; and they commit to publish their procurement policy on their own homepage (Partnership for GPP, [homepage](#)).
- *Danish Purchasing and Logistics Forum* (DILF) is the largest association for procurers, purchasers and logistics in Denmark (DILF, [homepage](#)).
- *The Responsible Procurer* is an internet based portal with CSR criteria including many environmental criteria for a broad range of products and services. The portal is initiated and regularly updated by The Danish Business Authority, Local Governments Denmark, Danish Regions, Ministry of the Environment, Ministry of Employment, Ministry of Finance, National Procurement Ltd. – Denmark and Cabi ([Udbudsportalen, Den ansvarlige indkøber](#), 2013).
- *Environmental Guidelines for Public Purchasers* are GPP guidelines for 46 different goods and services hosted by the Danish EPA ([Miljoevejledninger.dk](#), Danish EPA, 2009).

FIGURE 1: ORGANISATION CHART, GREEN PUBLIC PROCUREMENT IN DENMARK



Source: Plastic Zero

3 GREEN PUBLIC PROCUREMENT IN CITY OF COPENHAGEN

In City of Copenhagen the procurement costs was 11.4 billion in 2013 (City of Copenhagen, 2014).

The City Council, the Finance Committee and the Sector Skills Council share the political responsibility, the central administrations hold the overriding responsibility, whereas the management of the decentralized administrations and institutions share the day to day purchasing responsibility with the local day-to-day unit operators (City of Copenhagen, 2011).

City of Copenhagen is a member of the Partnership for Green Public Procurement and has committed itself to follow the jointly agreed GPP criteria within the categories listed in table 1. The table indicates the targets under the partnership, which hold a specific waste preventive potential.

TABLE 1: WASTE PREVENTIVE GOALS UNDER PARTNERSHIP FOR GPP

Targeted area:	Goals for waste prevention, reuse and recycling
<i>Food</i>	It is a target that all primary and transport packaging should be free of PVC, phthalates and other items on the list over undesirable substances cf. Danish EPA.
<i>Transport</i>	Members should set criteria for the disposal of old vehicles.
<i>Construction</i>	Members must set criteria for a number of areas, including <i>waste</i> and <i>recyclability</i> , and they may set criterion that building materials shall not contain PVC.
<i>Products for children</i>	All toys should be without phthalates, brominated flame retardants, heavy metals hazardous to health, organic solvents or azo colours. Diapers must comply with the criteria of the Nordic Eco-label "Svanen".
<i>Cleaning products and services</i>	Cleaning products must comply with the criteria of the Nordic Eco-label 'Svanen' or the EU Eco-label 'The Flower'.

Source: Partnership for Green Public Procurement, 2013

Under the Partnership City of Copenhagen has further committed to accentuate environmental considerations as a significant parameter in the procurement policy (Partnership for GPP, 2013). Through various policies and plans and by using some of the common contracts made by National Procurement Ltd. Denmark City of Copenhagen undertakes a range of further procurement with criteria on environmental impacts (please refer to City of Copenhagen, Procurement Policy 2011-2014).

3.1 THE PROCESS OF GREEN PUBLIC PROCUREMENTS IN CITY OF COPENHAGEN

The Technical- and Environmental Administration counsel all central procurement agreements in City of Copenhagen with respect to environmental impacts and inclusion of 'green' criteria. Considering the potential impact of green criteria in procurement agreements, the following figures give an indication on the potential prevalence of GPP in City of Copenhagen.

First, only the *central procurement agreements* which cover all seven City Administrations are currently subject to a formal procedure for counselling with respect to environmental impacts. These agreements cover 21% of the four procurement categories: construction (35%), central obligatory agreements (21%), decentralised obligatory agreements (19%) and purchases currently not

covered by agreements (26%)⁵. The objective in the procurement policy for 2014-2018 is however, to raise the amount of procurements covered by central obligatory agreements to 37%. This will be done by including some of the purchases not currently covered by agreements under the central obligatory agreements. Further, formalised procedures for environmental counselling on procurements related to construction and decentralised agreements are currently under development (Christensen, 2013 and City of Copenhagen, 2014). Second, is the question of compliance. An initial assessment of 10 central product groups⁶ covered by central obligatory agreements showed that approximately 49% of the purchases were bought without use of the procurement contracts. The political ambition is to eliminate the lack of compliance (Ibid.)

A recent study on climate and environmentally friendly purchases within the Danish municipalities highlights that formal links and procedures between procurement bodies and environmental professionals are significant for the implementation of environmental criteria in public tenders (Niras, 2013 & 2013a). This corresponds with statements from several respondents interviewed by Plastic Zero. From the perspective of a former procurement officer in the Economic Administration, the environmental counselling has a rather significant say in the joint procurements within City of Copenhagen. *"Whether environmental criteria are included or not in the final tender must however, be balanced with the political decision on an annual streamlining of the cities procurement budget. This said, there is a rather broad consensus that more money can be spent on a product, as long as you get a better product. Better can e.g. be defined as a more environmentally friendly product"* (Pedersen, 2013).

4 BARRIERS TO PLASTIC WASTE PREVENTIVE GPP

In general plastic is not, and has not historically been a specific focus area in Danish procurement policies and practices, hence only a few cases can be found. This said, there is some focus on *qualitative* waste prevention (preventing harmful substances). PVC, phthalates and other potentially harmful substances are subject to GPP criteria in several cases (City of Copenhagen, 2011; Partnership for GPP, 2013; Danish EPA, 2009 and The Responsible Procurer, 2013). Furthermore *quantitative* plastic waste prevention (preventing amounts and enhancing recyclability) in some cases occurs as a side-effect from criteria originally targeting other issues (please refer to the case descriptions in section 5.1.).

4.1 LACK OF AWARENESS, KNOWLEDGE, POLITICAL FOCUS AND PROCEDURES

The barriers related to awareness, knowledge gaps and political focus are listed below.

- The main reasons why especially quantitative plastic waste prevention has not been a focus within GPP policies and practices are a general lack of awareness, knowledge and political focus. This leads to procurements where plastic and waste prevention has either not been considered at any stage of the process, or where other considerations have won priority. The former is more often the case.

Further, plastic waste preventive procurement is subject to the same barriers which challenge GPP in Denmark in general. They are:

⁵ These four categories cover only 8.6 billion of the total procurement cost which was 11.4 billion in 2013. The remaining amount covers procurement which is difficult to make subject to competition, e.g. free choice and inter-municipal payments (City of Copenhagen, 2014).

⁶ The 10 central product groups assessed are: illuminants, coffee, copy paper, rubbish bags and paper for cleaning, disposable tableware, domestic appliances, office supply, cleaning agents and equipment, kitchen equipment for catering centres (City of Copenhagen, 2014).

- *Division of sectors*; hereunder lack of links between the procurement and environmental departments. Lack of standardised procedures on how and when to include environmental counselling in procurement is mentioned as a general barrier, especially when it comes to the minor public organisations.
- *Division of budgets for procurement and for maintenance*; this increase the risk to procure a product or service at a low purchase price, but with high operating cost – also with respect to environmental impact.
- *A challenge to get started*; it takes knowledge, base-line studies, tools and methods for evaluation and documentation to start implementing a new focus area in tenders.
- *Documentation*; Tools of methods for documentation are lacking, e.g. product longevity, reduced amounts of waste, improved working environments or enhanced health.
- *Lack of financial means and economic prioritization*; many public procurement bodies are under constant requirements to streamline budgets.

The above listed barriers are common observations among the respondents interviewed as part of the Plastic Zero GPP survey. They are further verified in a recent survey on challenges for the implementation of GPP in the 29 municipalities within the Capital Region of Denmark (Niras, 2013 & 2013a and respondents).

4.2 LACK OF TOOLS AND METHODS

There is a lack of tools and methods to identify relevant products and product parts for which plastic waste preventive criteria are relevant. This observation is highlighted by several respondents reporting that they find it difficult to include criteria on e.g. longevity, recyclability or reduced use of plastic materials without risking to violate the overarching public procurement principles of proportionality, transparency and non-discrimination. An example pointed to by one of the respondents is the challenge of including criteria on longevity in procurements. *“It can be difficult to evaluate whether the product from one bid is more durable than one from a competing bid. Longevity greatly depends on the specific location of use, and the general wear on the product”* (Dreyer, 2013).’

4.2.1 Total Cost of Ownership

Using a Total Cost of Ownership (TCO) approach to assess the entire life span cost of a product, including end of life management, is considered to be an obvious way forward. The TCO approach is politically promoted both within the Procurement Policy of City of Copenhagen, the Danish government’s Strategy for Intelligent Procurement and the new EU directives on public procurement (City of Copenhagen, 2011, Regeringen, 2013 and Directive 2014/24/EU). On the practitioner’s level TCO is likewise considered a procurement method with great potential to obtain positive impacts on the environment, the working environment and on cost savings. However, a significant challenge remains in identifying and streamlining efficient methods for procurements based on TCO. As one respondent explains *“We see a good portion of logic behind the TCO approach. However, we still need to invent a case specific method and documentation model every time we want to base procurement on TCO. Thus the TCO approach is often only considered in big procurements, and many small public bodies are sceptical whether they can successfully manage to apply the approach”* (Hoffmann, 2013).

The commonplace division between procurement and maintenance budgets is mentioned as another significant barrier for TCO.

4.2.2 Procurement based on operational needs

Procurement based on operational needs is likewise mentioned as a possible way to create innovation with respect to procurements with a waste preventive objective. Procurement officers, however, fear that they run a risk using this method. It is difficult to predict teething troubles following a new solution at the stage when contracts are created. Several respondents mention that procurement based on operational needs is currently a method praised in policy, but as of present the results are still untested in Denmark. The same experience was found in the ÖkoKauf Wien (EcoBuy Vienna) GPP program which has been running for 15 years. When procurement is used as a means to drive market innovation, upfront market dialogue is often preferred to procurement based on operational needs.

4.2.3 Minimum criteria

Within City of Copenhagen minimum criteria is the preferred method for GPP. This is due to the experience that award criteria are not an effective way to ensure environmental impact. *"The award criteria are generally weighted relatively low in the evaluation of bids, compared to e.g. costs. In such situations bids rarely win a contract based on their environmental features, even though these might be significant. By including minimum criteria, you make sure that all bids which are taken into consideration live up to the requirements"* (Christensen, 2013).

It is a general condition, that more criteria equals more work in the procurement process. The procurement officers use time to identify, formulate and verify the relevance of each criterion included in a tender. In some cases the price of the bid also rises depending on the workload associated with documentation. Thus, the criteria included need to have or be very likely to have a significant environmental impact or potential cost savings related to ownership and waste management in order to meet the demand for proportionality.

5 WHAT WILL IT TAKE TO IMPLEMENT PLASTIC WASTE PREVENTIVE GPP?

All respondents state, that there are no legal barriers for them to include the criteria they find relevant as long as they do not violate the principles of transparency, non-discrimination and proportionality. This can be illustrated with the case of the ÖkoKauf Wien GPP program which has working groups maintaining and developing detailed GPP criteria for 25 different product and service groups. The criteria are mandatory, binding for procurements in all departments under the Vienna City Administration. ÖkoKauf works from an overall political mandate but the inclusion of new GPP criteria relies on the professionalism of staff and external consultants (ÖkoKauf Wien, n.d. and site visit to ÖkoKauf Wien, 2013).

Several interview respondents explained that the most effective way to include new GPP criteria in local procurement practice is to obtain political focus and promotion on an issue. Political focus on GPP typically concentrates on one or a few specific topics at a time, but once a new practice has been established it tends to remain a practice, even when the political focus moves on.

There are, as explained above, no rules or practices that hinder procurement officers in including GPP criteria with plastic waste preventive impacts. What is needed in order to include procurement criteria on plastic is knowledge about environmental impacts, relevant methods for documentation and costs. Political focus eases the process.

When asked what it will take to include plastic waste preventive criteria in future procurements several suggestions are mentioned by respondents:

- Access to a list of product and service groups where plastic waste preventive criteria are likely to have a significant impact.
- Use of disclosure requirements and access to product sheets from the suppliers.
- Access to legally correct, ready to copy-and-paste criteria.
 - Hereunder a wish for a prioritized ranking of criteria based on possible impact and/or market availability.
- Access to easily comprehensible environmental justifications for the criteria.
 - Hereunder cause and effect information.
- Access to exemplary cases.
 - Hereunder access to business cases or arguments for saved costs by implementation of plastic waste preventive criteria.
- Enhanced dialogue with the markets on availability and feasibility of products and services with plastic waste preventive features.

The recommendations above have been sought implemented in the *Green Public Procurement Manual on Plastic Waste Prevention* (Plastic Zero, 2014).

Some of the more systemic drivers for implementation of plastic waste preventive GPP criteria are:

- A general increase in awareness on the resource efficiency potentials within waste prevention and recycling; and access to counselling on these issues. As mentioned above standardized procedures for environmental counselling has an important impact. However, the professional environmentalists do of course also need to have the necessary awareness, knowledge and tools to address (plastic) waste prevention.
- Well-tested and generally applicable TCO tools including end of life management and waste prevention as parameters.
- The implementation of waste management systems which prioritise sorting and recycling is by some respondents highlighted as an important incentive to e.g. include criteria on recyclability when procuring the products.

The current introduction and implementation process of the Danish resource strategy *Denmark Without Waste* (the Danish Gvt., 2013) which includes objectives on respectively significantly higher recycling rates in 2022 along with waste prevention may, along with the emerging resource efficiency awareness in society as such, result in future increased focus on and practical use of (plastic) waste preventive GPP.

5.1 DANISH EXAMPLES WITH PLASTIC WASTE PREVENTIVE IMPACTS

The following two Danish cases have been chosen due to their innovative character. The plastic waste preventive impact was a specific objective in the first case, whereas it has evolved as a side-effect in the second case.



Source: Colourbox

5.1.1 Case 1: Incentives for recycling of waste containers

Procurement objectives

In City of Copenhagen there is an annual flow of approximately 4-5,000 worn out waste containers from the households. In the procurement of a service for operation of these waste containers an objective was to get the operator to deliver the worn out containers back to the producer for direct recycling. A criterion was included stating that 'The container should be in polyethylene (PE) and be recycled into regenerate'. The contract was designed in a way which gave the operator the choice to handle the waste containers as he wished. If he delivered them for incineration he himself had to pay the fee, if he sold them to the recycler, he could keep the revenue. This model was based on the knowledge that recyclable-plastic is valued among producers of waste containers.

Results

The worn out waste containers were delivered directly back to the producer for recycling into new waste containers.

Environmental impacts

The waste containers in City of Copenhagen are made from one or few plastic polymer types and can thus be considered highly appropriate for recycling seen from an environmental and technical perspective. Reprocessing of plastic waste saves around 80 % of the fossil fuel used for manufacturing of virgin plastics. Furthermore, on average recycling results in net CO₂ savings of 1-1.15 tonne CO₂ per tonne of plastics (WRAP, 2010).

Lessons learned

Using the economic incentive for recycling rather than setting up minimum criteria within the tender means that City of Copenhagen need not monitor and control all the time, the economic incitement 'does that work'. On the cost side, the bidder included an assessment of the revenue from selling to recyclers. Based on this he could lower the overall price in the bid. The risk of price fluctuation is held by the operator. This way of creating incentives for recycling can only work if the procuring body knows that there is economic revenue from selling the specific waste product to recyclers (Domela, 2013).

5.1.2 Case 2: Cleaning service with reduced packaging

Procurement objectives

In the municipality of Lolland, Denmark, procurement based on operational needs was conducted for cleaning services in 2011 (Danish Environmental Protection Agency, 2013). The tender was developed with the objectives of improved working environment, improved resource efficiency with respect to the external environment, hygiene, good quality and low cost to be fulfilled by the bidder.

Results

Cleaning agents have been reduced by 30-50%, use of water has been reduced by 1,425 m³/year and 85 MWh/year of electricity has been saved by the municipality. Fewer cleaning assets with a higher longevity are used. An estimated EUR 174,218 in working hours has been saved by reducing sick leave and by optimizing staff procedures. The saved amount of packaging has not yet been reported but is anticipated from the decline in use of cleaning agents and assets.

Environmental impacts

Accredited institutions have calculated that the product service cleaning system can save up to 90% chemicals, 85% water and 70% CO₂ compared to conventional cleaning systems.

Lessons learned

Substantial amounts of resources and costs can be saved through innovative solutions where procurement is based on operational needs rather than specific technical criteria.

6 CONCLUSION

Public procurement constitutes a significant share of all procurement in the EU, in Denmark and in City of Copenhagen. Thus, public procurement has a potential to influence markets towards social and environmental goals, a practice commonly called Green Public Procurement (GPP). The EU LIFE+ project Plastic Zero, has been surveying GPP in Europe with specific focus on plastic waste preventive potentials. This report has paid specific focus to GPP in Denmark and in City of Copenhagen, and to barriers and potentials for GPP as a mean for plastic waste prevention.

It can be concluded that there is a wide and developing organisational structure around GPP in Denmark. Within City of Copenhagen several policy elements and procedures related to GPP can be identified. However, plastic and waste prevention is not, and has not historically been a specific focus area in Danish procurement policies and practices. This said, some focus on *qualitative* waste prevention (preventing harmful substances) has been identified, and *quantitative* plastic waste prevention (preventing amounts and enhancing recyclability) occurs as a side-effect in a few cases.

The rather weak Danish focus on waste prevention and recyclability of plastic products seems to be reflected at European level (Interview respondents and Econet, 2013).

There are no legal barriers to include plastic waste preventive criteria in public procurement as long as the principles of transparency, non-discrimination and proportionality are followed. The main barriers are rather found in a general lack of political focus, professional awareness and knowledge, and in a lack of tools and methods for identification and documentation of plastic waste preventive possibilities within public procurement. Plastic waste preventive procurement is further subject to the same barriers which challenge GPP in Denmark in general. For example: lack of standardised procedures and links between the procurement and the environmental departments; division of budgets for procurements, maintenance and waste management; lack of tools to document impacts; and lack of financial means and economic prioritizing.

Even though the above range of practical barriers have been identified, political focus and promotion of (plastic) waste prevention is reported as the most critical requisite in order to get started.

At the practitioners level the following means for successful implementation of plastic waste prevention and enhanced recycling in GPP, were identified: access to a list of product and service groups where plastic waste preventive criteria are likely to have a significant impact; use of disclosure requirements and access to product sheets from the suppliers; access to legally correct, ready to copy-and-paste criteria; access to easily comprehensible environmental justifications for the criteria; access to exemplary business cases; and enhanced dialogue with the markets on availability and feasibility of products and services with plastic waste preventive features. These recommendations have been sought implemented in the *Green Public Procurement Manual on Plastic Waste Prevention* (Plastic Zero, 2014).

One of the systemic drivers for implementation of plastic waste preventive GPP is increased societal awareness on resource efficiency, waste prevention and recycling, access to counselling on these issues and socio-technical systems that can keep the materials in closed loops.

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