Harnessing the power of public procurement to deliver a more sustainable economy: The example of well-designed guidelines for printing supplies

INTRODUCTION

The concept of Sustainable Public Procurement, whereby public authorities purchase goods and services that yield a reduced environmental impact throughout their life-cycle, has gained traction in Europe and globally over the last 15 years, driven by an acknowledgement of the power that public procurement has in delivering broader policy objectives.

More than 80% of Member States have a National Action Plan for Sustainable Public Procurement, which would make it seem on the surface that the concept is widely implemented. However, in practice, a number of barriers – both regulatory and market-based – are inhibiting its uptake in a systematic and comprehensive fashion. The truth is that cost remains the sole criteria for awarding contracts in more than half of all public sector purchasing decisions. This is because the public procurement ethos often attaches greater importance to short-term cost savings over longer-term gains and cost efficiencies. The application of Sustainable Public Procurement is also undermined by poor access among public purchasers to clear and verifiable criteria which would allow them to incorporate environmental considerations into their tendering processes.

With the concept of Sustainable Public Procurement firmly established, and real efforts being made to apply it in some Member States, the policy challenge becomes how to ensure that it is systematic, strategic and professionalized across the EU – so that its full impact is being realized.

This White Paper attempts to clarify the difficulties in Sustainable Public Procurement, and shed light on the contribution it could make in the context of Europe's transition to an inclusive circular economy. It also puts forward policy recommendations for how Sustainable Public Procurement could be more effectively implemented in a small number of very simple, cost-effective ways.

It uses the example of printing supplies – toner and ink cartridges – which are purchased by most public authorities in Europe. Up to 70% of the printing technology in a printer is in the cartridge[1], and the implications of procurers' choice of cartridge range from cost and environmental impact to performance and health and safety. All IT products have to meet the latest Energy Star criteria but there are currently no mandatory criteria for printing supplies.

The decision-making process when choosing printings supplies can therefore serve as an example of Sustainable Public Procurement in practice: how well-designed guidelines contribute to a circular economy and enhance resource efficiency while also providing the best value for taxpayers' money.

PUBLIC PROCUREMENT IS BEING UNDER-EXPLOITED IN THE TRANSITION TOWARDS A MORE RESOURCE-EFFICIENT, CIRCULAR AND INCLUSIVE ECONOMY

Why is Public Procurement such a powerful tool?

Sustainable Public Procurement – also referred to as Green Public Procurement, Environmentally Preferable Procurement, or Responsible Procurement – is a process by which public authorities seek to purchase goods and services that present a reduced environmental impact throughout their life-cycle.[2] This involves looking beyond short-term needs and considering the longer-term impact of each purchase in a way that promotes positive outcomes not only for the organization itself, but also for the economy, environment, and society.

[1] Based on Original HP color and monochrome All-In-One cartridges and the EP process steps required to print a page.
[2] Communication from the European Commission: Public procurement for a better environment, 2008

The role of sustainable and green public procurement as a policy instrument has been increasingly recognised over the past 15 years. Its potential was first highlighted in the 2003 European Commission Communication on Integrated Product Policy[3], which called on EU Member States to adopt national action plans for greening public procurement.

More recently, the concept of sustainable and green public procurement has been evolving to take into account the role that public authorities can play in supporting the transition towards a circular economy. The 2015 EU Action Plan for the Circular Economy[4] proposes actions to facilitate the integration of circular economy principles in public procurement to deliver a sustainable, low carbon, resource efficient and competitive economy. Through what can be referred to as circular procurement[5], public authorities should aim to keep products and materials in the value chain for a longer period and to recover raw materials after the lifetime of products for their next use.

Although sustainable public procurement is a voluntary instrument, it has a key role to play in the EU's efforts to become a more resource-efficient economy:

First, it can help **stimulate a critical mass of demand for more sustainable goods and services**. Each year, European public authorities spend approximately €1.8 trillion (the equivalent of 14% of the EU's Gross Domestic Product) on the purchase of goods and services such as office equipment, transport, energy, construction materials and building maintenance, furniture and cleaning and catering services[6]. By leveraging this purchasing power to choose goods and services with a lower impact on the environment, public authorities can make an important contribution to sustainable consumption and production.

Second, public procurement can **provide a strong stimulus for eco-innovation** as an incentive for developing sustainable technologies and products. In sectors where public purchasers command a significant share of the market (e.g. public transport and construction, health services and education), their decisions have considerable impact. This means that green purchasing is a powerful instrument for stimulating innovation and encouraging companies to develop new products with enhanced environmental performance. In addition, because 'greener' goods are defined on a life-cycle basis, sustainable public procurement will affect the whole supply chain and also stimulate the use of green standards in private procurement.

Finally, there is considerable scope for sustainable and green public procurement to **achieve cost-efficiency**, particularly in sectors where green products are not more expensive than non-green alternatives. Cost-efficiency assessments must take into account the full life-cycle cost of the product including the purchase price and associated costs (delivery, installation, commissioning etc.), operating costs (including energy, spares, maintenance) and end-of-life costs such as decommissioning, removal and disposal.

What is standing in the way?

Greening public procurement has gained political traction in recent years. Today, 23 out of 28 EU Member States have adopted national action plans that include targets for measures to purchase goods and services with a reduced environmental impact throughout their life-cycle.[7] Still, the potential of sustainable and green public procurement remains only partially exploited due to a number of barriers, including short-term cost considerations, a lack of established environmental criteria, limited information and training, and the absence of co-operation between public authorities on procurement-related issues.

Competing economic pressures

Based on one of the latest studies on the uptake of Green Public Procurement in the EU 27[8], 55% of public tenders still use the lowest price as the sole award criterion. Green products are perceived to cost more and purchase price alone is still used to decide between offers, rather than the full life-cycle cost of the product or service. While applying

[3] Communication from the European Commission: Integrated Product Policy - Building on Environmental Life-Cycle Thinking, 2003
[4] EU action plan for the Circular Economy, 2015
[5] Public Procurement for a circular economy, European Commission brochure, 2017
[6] Communication from the European Commission "Making Public Procurement work in and for Europe", COM(2017) 572 final, 3.10.2017
[7] National GPP Action Plans (policies and guidelines), European Commission Working Document
[8] Uptake of Green Public Procurement in the EU 27, Centre for European Policy Studies and College of Europe, 2011

environmental criteria to procurement procedures can sometimes mean higher initial purchasing costs, the overall costs often actually decrease since the higher purchasing price of green goods and services are compensated for by lower operating, maintenance and disposal costs.

A lack of information and training
As pointed out in the European Commission's 2017 Communication on Strategic Procurement[9], many purchasers within public authorities have low awareness of the benefits of products and services with high environmental performance. This is also about practical training, because even when environmental criteria are incorporated into tenders, public buyers are not always able to assess and verify the information submitted by bidders accurately against them.

Limited established environmental criteria
This is not to criticize public procurement officials. For many product and service groups, public authorities do not have access to clear and verifiable criteria which allow them to incorporate environmental considerations into their tendering process. Purchasers therefore struggle to define what an "environmentally and/or socially preferable" product or service is, and how to include appropriate criteria to identify them in tenders. These criteria must be measurable and certified by third parties when possible.

Limited co-operation and exchange of best practice between authorities
Sustainable and Green Public Procurement is still not being implemented in a systematic way across Europe. In addition, within countries, contracting authorities are rarely buying together, despite the fact that purchasing in bulk could lead to better value for money and the opportunity to exchange best practice. Both formal and informal cooperation could help in the drive towards Sustainable Public Procurement.

TONER AND INK CARTRIDGES ARE A POWERFUL EXAMPLE OF HOW SPP NEEDS WELL DESIGNED GUIDELINES TO FULFIL ITS ROLE AS A KEY DRIVER OF EU CIRCULAR ECONOMY, WHILE OFFERING BEST VALUE FOR TAXPAYERS' MONEY

Printing supplies – toner and ink cartridges – are procured by most public authorities in Europe. It is estimated that approximately 120 million toner cartridges are sold in Western Europe each year. While they may be perceived as simple commodity products, a cartridge is not simply a plastic container that holds powder/ink, and the impact of choosing a cartridge is more important in terms of cost, environmental impact, performance and health and safety than one might initially imagine.

There exists a wide range of options for public authorities looking at purchasing a printer cartridge: New Original Equipment Manufacturer (OEM) cartridges, remanufactured and altered remanufactured cartridges, refilled cartridges, and cloned cartridges. There is also a sixth category, counterfeit cartridges, which are illegal but are sold on the European market (see complete cartridge type definitions in Annex). The characteristics, performance and environmental impact of these products can differ greatly - not only between categories, but even within them. Public buyers should be aware of what they are buying and of the potential impact of their purchasing decision.

[9] Communication from the European Commission: Making Public Procurement work in and for Europe, 2017

In this context, well-designed Sustainable Public Procurement guidelines for printing supplies can help public buyers make informed decisions and choose best performing products, while contributing to a circular economy, enhancing resource efficiency and providing the best value for taxpayers' money by:

1. Encouraging the adoption of easy-to-verify environmental criteria that can be integrated into SPP tenders to achieve the best possible environmental outcomes. Such criteria would set a level, non-discriminatory playing field for all legal printer cartridges which meet minimum environmental and health and safety standards.

2. Saving taxpayers' money by factoring in the total ownership cost of a cartridge and not only the upfront acquisition cost, while allowing public procurers to avoid the uncertainties linked to potential IP infringements when buying clones.

3. Encouraging industry to innovate and adopt long term commitments that reduce products' environmental footprint and contribute to healthier workplaces by meeting indoor air quality requirements.

Printing supplies is a very specific, but significant area where policies in support of Sustainable Public Procurement could make an important contribution to the development of a circular economy, as well as providing the best value for public money. It can also be done quickly and painlessly with well-designed and robust guidelines that would help identify best performing products and eliminate those cartridges that do not meet minimum criteria.

These guidelines should be based on science-based, internationally recognized ecolabels or international test standards. They should be simple and easy to follow by non-specialists, thereby providing clarity for buyers at all levels, and aiming at covering the full product life-cycle, in line with Circular Economy objectives.

Public buyers must choose a printer cartridge that meets their specific needs. Some manufacturers use names as eco-toners or green-toners to depict that the toners are environmentally sustainable, but the name alone does not give these features to the cartridge. Instead, public procurement guidelines, based on objective and robust criteria, including internationally recognized quality standards, would be the most reliable way to identify the best performing products by taking into account their value for money, reliability, quality and environmental impact over the full life-cycle. This, alongside a drive exclude products which violate patent holders' intellectual rights, would deliver the greatest impact in terms of supporting the transition to an efficient, sustainable and circular economy.
In this respect, the following elements are key:

Print quality and reliability determine the environmental impact and real cost of a printer cartridge

The quality and reliability of print cartridges are the most important factors that determine their overall life-cycle environmental impact and are key to customers' satisfaction. They should therefore be thoroughly evaluated when choosing printings supplies. Paper has the largest environment impact across the life-cycle of a printing system[10]. Inconsistent print quality with pages which cannot be used for the intended purpose can often lead to reprinting and increased ink, toner and paper consumption. Compared to an original OEM cartridge, remanufactured toner cartridges can lead to the use of up to twenty-seven times the amount of paper for reprinting due to inconsistent print quality[11].

Quality and reliability issues will impact productivity and operating costs of the printing device due to reprints, failures, as well as printer damage, maintenance and shortened lifespan:

[10]see www.hp.com/go/EMEA-LJLCA-2016

[11] 2016 Four Elements Consulting LCA study, commissioned by HP, compared Original HP 80A and 83A monochrome toner cartridges with a sample of remanufactured alternatives across eight environmental impact categories. For more, visit www.hp.com/go/EMEA-LJLCA-2016. The LCA leverages a SpencerLab 2016 study, commissioned by HP, comparing Original HP LaserJet toner cartridges with six brands of non-HP toner cartridges sold in EMEA. For details, see http://www.spencerlab.com/reports/HPReliability-EMEA-RM2016.pdf

- Unlike New Original Equipment Manufacturer (OEM) Cartridges, using clone toner cartridges can result in 36% fewer usable pages due to poor quality prints[12], 20% higher costs due to reprints, failures and service[13]; and 3 times the service calls for repair[14].
- Clone cartridges can use 13 times the paper for reprinting due to inconsistent quality pages. Clone cartridges can use 25% more pages to get the same job done as Original toner cartridges [15].
- In a recent test by independent lab SpencerLab, OEM cartridges showed 100% reliability; in contrast, 71% of non-OEM toner cartridges[16] and 40% of non-OEM ink cartridges[17] exhibited reliability problems like "dead on arrival" or failing prematurely during use. These reliability problems waste the energy and materials put into remanufacturing and distributing the cartridges.
- A recent survey of Europe Middle East and Africa printer technicians[16] finds that using non-OEM toner supplies in OEM printers from HP can damage the printer. More than 80% of them said that using non-HP toner cartridges in HP LaserJet printers shortens the life of the printer.

Ensuring the proper end of life management of printing supplies is essential to progress towards a circular economy

Good waste management should lead to waste being prevented and reduced whenever possible or dealt with in the most resource-efficient and environmentally sound way, the goal being to avoid incineration and landfilling. This should apply to all cartridges.

Waste electrical and electronic equipment (WEEE), including cartridges, is currently considered to be one of the fastest growing waste streams in the EU. The sound collection, treatment and processing of printing supplies at the end of their life is essential to progress towards a circular economy. Cartridge suppliers will have to offer the free take-back and environmentally-sound end of life treatment of print supplies in all EU countries as of August 2018. OEMs already provide take-back and recycling programmes, which are critical to prevent cartridges from going to landfill. The majority of clone cartridges end up in the landfill or incinerator[18].

All producers of printer cartridges, whether OEM or third-party producer, must fulfil their legal obligations to reduce European e-waste, in compliance with the WEEE Directive, which sets requirements with regard to the collection and proper treatment of waste. Public buyers should look for and check that the printer cartridges they buy carry the WEEE logo and the producer is registered in national producer registry.

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[12] 2016 SpencerLab Monochrome Reliability study, commissioned by HP, compared Original HP mono cartridges with eight brands of non-HP cartridges sold in Europe, Middle East, and Africa for the HP Pro M127 and Pro 400 printers, HP 83A and 80A cartridges. For details, see spencerlab.com/reports/HPReliability-EMEA-2016.pdf

[13] HP calculations based on results from a 2016 SpencerLab Europe, Middle East and Africa Monochrome Reliability study comparing cartridges for the HP Pro M127 and Pro 400 printers, HP 83A and 80Acartridges. For details, see spencerlab.com/reports/HPReliability-EMEA-2016.pdf. Calculations include paper, cartridge replacement and labor for reprints. Page use assumes 33% external, 33% internal and 33% individual use. Labor rate from a 2016 Mercer Global Pay Study. Purchase price used in the calculations is the average street price as reported by Context. For HP cartridges, it is €162, and 58% lower price for non-HP. Actual prices, costs and savings may vary.)

[14] A 2016 Market Strategies International study commissioned by HP. Results based on 252 surveys from HP ServiceOne Partners who have at least 6 months of experience servicing HP monochrome and/or Color LaserJet printers with HP Original cartridges and non-HP toner cartridges installed in the past 12 months. Study was conducted in 27 countries: UK, IE, FR, DE, IT, LU, AT, CH, BE, PT, ES, NL, SE, RU, UA, PL, HU, CZ, HR, RO, ZA, SA, AE, EG, MA, QA, and TR. For details, see marketstrategies.com/hp/EMEA-Technician2016.pdf

[15] Life Cycle Environmental Impact Study for Europe, Middle East and Africa (EMEA) - HP LaserJet Toner Cartridges vs. New Build Compatible & Clone Cartridges - January 2018, By: Four Elements Consulting, LLC Seattle, WA (study commissioned by HP).

[16] 2016 SpencerLab Monochrome Reliability study, commissioned by HP, compared Original HP mono cartridges with eight brands of non-HP cartridges sold in Europe, Middle East, and Africa for the HP Pro M127 and Pro 400 printers, HP 83A and 80A cartridges. For details, see spencerlab.com/reports/HPReliability-EMEA-2016.pdf

[17] Buyers Laboratory Inc. July 2017 study commissioned by HP compared Original HP ink cartridges (121XL, 122XL, 178XL, 300, 300XL, 301XL, 364, 364XL, 650, 950XL, 970XL, 971XL) with 21 brands of non-HP refilled and remanufactured ink cartridges sold in EMEA markets. Details: http://keypointintelligence.com/media/1609/hp-emea-refill-study_rep.pdf

[18] "*In speaking with the industry, it is clear that almost all new build compatible cartridges end up being thrown out by the users. There is no effort by the manufacturers of NBCs to collect and recycle these cartridges at end of life. Any collections of NBCs are unintended and accidental collections by the remanufacturing industry or OEMs under their collections programs. Remanufacturers will not remanufacture an NBC due to concerns about patents as well as concerns about the quality and reliability of such a product*" - Infotrends study "Western European Cartridge Collection and Recycling Report", January 2016.

Indoor air quality and users' safety must matter

People spend an estimated 90 % of their time indoors. In addition to high operating performance and product reliability, many organizations are including indoor air quality (IAQ) considerations as an essential factor in the purchase of devices designed for use in offices. To ensure that printing systems offer the best possible Indoor Air Quality performance, public buyers should check that they meet or exceed IAQ standards for substances and particle release, specified by ecolabels such as the German Blue Angel, the Nordic Ecolabelling or other equivalent eco-labels.

It is also essential to meet a high level of safety and public authorities should request that bidders provide information about the environmental, health, and safety hazards associated with the ink or toner, as well as instructions to ensure safe handling during the use of the product. Supplier should provide Material Safety Data Sheets (MSDSs) for offered print supplies containing toner or ink.

Life Cycle Analysis covers environmental impact of cartridges by looking at energy efficiency in printing, materials used in products or noise levels

OEMs strive to understand the environmental impact of their cartridges so that they can identify opportunities to improve them and measure progress. To this end, they employ a holistic technique for examining the environmental impact of a product or service throughout its lifespan- production, distribution, use and end-of-life. These studies adhere to the ISO14040 series standards to ensure that they are accurate and reputable.

According to such studies, remanufactured and refilled cartridges have an up to 42% larger carbon footprint than the original OEM cartridge[19]. Clones' carbon footprint is up to 45% higher than OEMs[20].

The most economically advantageous cartridges are not necessarily the cheapest tenders, and they may involve IP infringement-related risks

Procurers have a responsibility for making the most of scarce government resources. However, not only should public buyers consider the price of acquisition of a cartridge, they should also factor in the costs incurred from the performance and reliability of the product. Often a higher price of acquisition may prove to yield a lower cost of ownership in the long run, while a lower price of acquisition may generate additional expenses, such as repair, maintenance or replacement costs, that in the long term offset the benefits of the low purchase price.

A number of cartridges on the market are marketed as low-cost alternatives to original cartridges but may actually violate patents. These cartridges are not only illegal, they are also notoriously poor in terms of environmental, health and safety standards[21]. Spotting illegal cartridges is not always straightforward, which is why training is so important.

Eliminating illegal cartridges from the public sector would, on its own, be a major step forward in terms of Sustainable Public Procurement for printing supplies. It would also save taxpayers' money given the hidden costs that result from

[19] See "The environmental impact of reuse vs. recycling of toner and inkjet cartridges", EuroVAprint, March December 2017 (http://www.eurovaprint.eu/fileadmin/eurovaprint_files/pdfs/2017/LCA_position_paper.pdf).

[20].Life Cycle Environmental Impact Study commissioned by HP for Europe, Middle East and Africa (EMEA) - HP LaserJet Toner Cartridges vs. New Build Compatible & Clone Cartridges - January 2018, By: Four Elements Consulting, LLC Seattle, WA (http://www.hp.com/go/EMEA-LJLCA-NBC-2018).

[21] Regarding indoor air quality, 2017 WKI Blue Angel Indoor Air Quality compliance study, commissioned by HP. The study tested 4 New Build Compatible toner cartridge brands sold as substitutes for HP LaserJet Pro MFP M425dn with cartridge 280A. The tests were carried out in compliance with "Prüfverhahren fur die Bestimmung von Emissionen aus Harkcopygeräten for purposes of Blue Angel labelling of office equipment in accordance with RAL-UZ-205P. For details, http://h20195.www2.hp.com/v2/GetDocument.aspx?docname=4AA7-1981ENW
Regarding LCA analysis: Life Cycle Environmental Impact Study for Europe, Middle East and Africa (EMEA) - HP LaserJet Toner Cartridges vs. New Build Compatible & Clone Cartridges - January 2018, by Four Elements Consulting, LLC Seattle, WA (study commissioned by HP).
Regarding cartridges' end of life: Infotrends study "Western European Cartridge Collection and Recycling Report", January 2016.

reprints, cartridge failures and printer service costs. In addition, companies providing such products are often sold without Value Added Tax (VAT), providing them with an undue competitive advantage on complying businesses.

Well-designed SPP criteria encourage industry to innovate and adopt long term commitments that reduce products' environmental footprint and contribute to healthier workplaces by meeting indoor air quality requirements.

As already stated, well-designed SPP criteria can help stimulate a critical mass of demand for more sustainable print supplies. By leveraging this purchasing power to choose goods and services with a lower impact on the environment, public authorities can make an important contribution to sustainable consumption and production. Second, SPP criteria can provide a strong stimulus for eco-innovation. This means that green purchasing is a powerful instrument for stimulating innovation and encouraging companies to develop new products with enhanced environmental performance. In addition, because 'greener' goods are defined on a life-cycle basis, sustainable public procurement will affect the whole supply chain and also stimulate the use of green standards in private procurement.

Policy Recommendations: Unleashing the power of Sustainable Public Procurement

We recommend that governments consider three simple, low-cost and easy-to-implement policy measures to realize the potential of Sustainable Public Procurement for printing supplies and provide the best value for public money:

1. Introduce robust guidelines to create a level, non-discriminatory playing field for all legal printer cartridges which meet minimum standards.

2. Ensure that SPP criteria serve to disqualify infringing clones, which: (i) may involve intellectual property infringement risk; and (ii) would typically end up in landfill, increasing environmental impact.

3. Take this forward in collaboration with the private sector. Public-private partnership is required to create a level playing field to provide viable business conditions for manufacturers to invest in eco innovation.

Through these three steps, governments could take an important step towards Sustainable Public Procurement for printing supplies and their transition to an inclusive circular economy. Both the guidelines and the training of buyers could be developed and delivered through dialogue between the public and private sectors. This would reduce the burden on government even further.

ANNEX: cartridge type definitions

New Original Equipment Manufacturer (OEM) Cartridge	Refilled Cartridge	Reman	Altered Reman	Clone	Counterfeit Cartridge
A new cartridge introduced into the market by the printer OEM for use in printers bearing its own brand name.	User initiated process where users' own cartridge is refilled and returned for use. Can be performed at kiosk or by service provider. Simple refill, no relabeling or repackaging or replacement of the secure memory. The printer gets a cartridge that is used and has been seen previously by that printer.	Commercial process where used cartridges are centrally collected for refilling, relabelling, and repackaging under different brands and resold to a new user. The secure microcontroller remains the same. The printer gets a cartridge that is used but not one that the printer has seen before. For toner cartridges, some worn imaging components may be replaced in order to return the cartridge to working condition – OPC, developer roller, wipers, etc	Commercial process where used cartridges are centrally collected for refilling, relabelling, and repackaging under different brands and resold to a new user. The secure microcontroller has been copied by a third party and replaced, substituting that 3rd party's security elements and control data. The printer gets a cartridge that appears to be new and not one that the printer has seen before. For toner cartridges, some worn imaging components may be replaced in order to return the cartridge to working condition – OPC, developer roller, wipers, etc.	New products manufactured by third parties that attempt to imitate HP cartridges. These cartridges likely have a security chip or electronic circuit that is not made by HP. Due to significant R&D investments into and complex design of OEM printing systems, it is likely that such cartridges infringe OEM intellectual property. OEMs generally do not endorse these products, as clone cartridges do not always adhere to quality, safety, environmental standards and there is almost no	A non-OEM cartridge that is intentionally or unintentionally labelled, packaged and/or sold in such a way that it could deceive or mislead a customer into thinking that it is an OEM cartridge but which infringes the OEM brand or trademark.

		collection of used clone cartridges by clone manufacturers - and almost all clone cartridges end up being thrown out by the user.

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