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PRODUCT
[sustainable public procurement | ecolabelling]



САНГИЙН ЯАМ



RESEARCH REPORT

Market Readiness Analysis on Sustainable Public Procurement in Mongolia

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ABBREVIATIONS

- MoF Ministry of Finance
- SSP Sustainable Public Procurement
- GDP Gross Domestic Product
- ECF Elemental chlorine free
- PCF Process chlorine free
- TCF Totally chlorine free
- OBAs Optical brightening agents
- FSC Forest Stewardship Council
- PEFC Program for the Endorsement of Forest Certification
- HHI Herfindahl-Hirshman Index
- ETIRA European Toner and Inkjet Remanufacturer Association
- OEMs Original equipment manufacturers
- ILO International labor organization
- SMEs Small and medium enterprises

INTRODUCTION

Background and Objectives

National government procurement has significant impact on the marketplace for goods and services. In 2014, the Mongolian government spending approximately represented 32% of GDP, while the public procurement of products and services accounted for about 12% of GDP. This amount of public procurement can provide significant opportunities to encourage sustainable production and consumption patterns in the Mongolian market. By introducing sustainable procurement, the government will reduce environmental impact, deliver financial benefits, and build up markets for sustainable products through its procurement.

UNEP provides support to countries to develop and implement Sustainable Public Procurement (SPP) policies by increasing awareness and building the capacities of policy makers and procurement managers.

The methodology applied at the country level is the “UNEP SPP Approach”, which is conceived as a series of steps followed by governments to first design and then implement an SPP action plan. One of the key steps of the UNEP SPP Approach is to undertake a market analysis; this report demonstrates the process and findings of the market analysis conducted in the Mongolian context.

The Market analysis is developed based on related information and findings within the Legal Review and the Prioritization Exercise, both of which are presented in separate reports. The purpose of the Market Analysis is to provide initial identification of priority product or commodity areas for SPP and recommendations related to specific sustainability standards or criteria for the priority products.

As a result of the Prioritization exercise, A4 copy paper, printer ink cartridges and lightweight concrete blocks were selected as priority product categories to be procured via pilot tenders. As such, this market analysis focuses on the three priority products, with the objective of:

- ✓ Identifying specific sub-categories of sustainable A4 copy paper, toner cartridges and light weight concrete blocks that will be purchased during the pilot tenders;
- ✓ Assessing the supply of sustainable A4 copy paper, toner cartridges and light weight concrete blocks;
- ✓ Identifying public procurement demand for A4 copy paper, toner cartridges and light weight concrete blocks;
- ✓ Defining sustainability criteria for each sub-category of the 3 products, and identifying relevant certification instrument and tools; and
- ✓ Identifying potential threats/opportunities for successful Sustainable Public Procurement;
- ✓ Assist in planning activities for the introduction of Sustainable Public Procurement.

In order to achieve the main objectives of the study, the research report consists of four sections and is broken down into the following parts:

- A. Research methodologies and a brief overview of the data used in the study are presented first.
- B. Then a series of three sections present the market analyses of A4 copy paper, toner cartridges and concrete blocks, with a focus on the current state and potential for development of the markets for sustainable alternatives within these categories. These

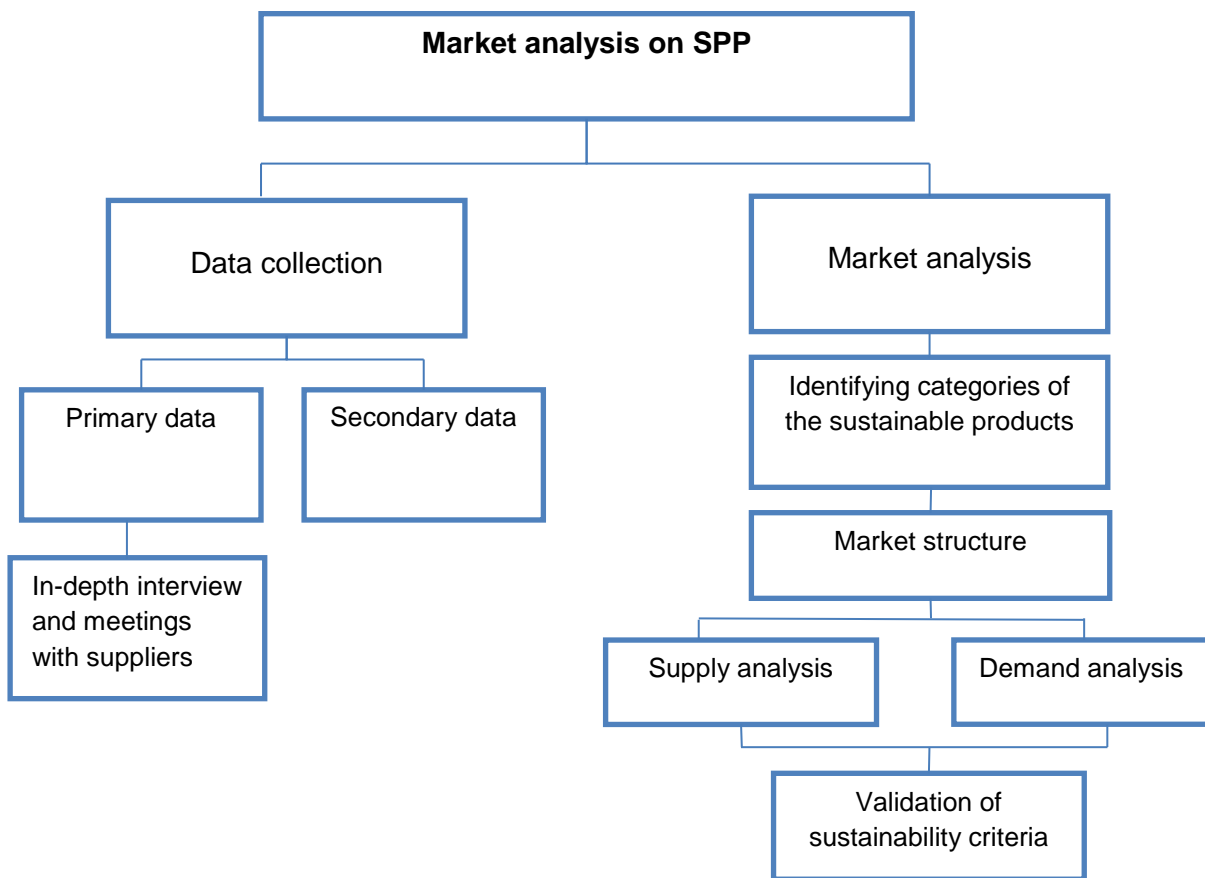
three sections illustrate the market structure, the supply analysis, the demand analysis and validation of sustainability criteria for sustainable products.

- C. Finally, conclusions and recommendations for the subsequent development of SPP are presented. The results of this Market Analysis will inform the development of an SPP Policy and Action Plan for Mongolia.

Research methodology

The market analysis study on sustainable public procurement consists of two steps: collecting research data and developing the market analysis. Research data and information have been collected from primary and secondary sources. Figure 1 shows an overview of the research methodology.

Figure 1. Research process mapping of the market research for the three selected products



The sources of data and information. The sources of primary data and information are based on in-depth interviews conducted with main suppliers, and secondary data and information have been collected from the monthly, quarterly and annual reports of the National Statistics Committee, the General Department of Customs, Bank of Mongolia, and Mongolian State Civil Service Commission. In addition, public procurement data is driven from the, “Demand and Supply Analysis of Four Product Markets: A4 copy paper, Printer ink cartridge, Computer and Fuel” research.

Literature. In the middle of 2015, MIRIM Consultant LLC conducted a research on “Demand and Supply Analysis of Four Product Markets: A4 copy paper, Printer ink cartridge, Computer and Fuel”, funded by EBRD. Within the framework of the research, 164 public organizations and

35 suppliers were surveyed in terms of demand and supply of A4 copy paper and toner cartridges.

In the case of concrete blocks, the Caritas Czech, an international organization, carried out a research named “Public survey on Ash based building materials” in 2015. About 140 suppliers, including manufacturers, construction companies and sellers, and 350 final consumers were surveyed in this research.

In addition, a number of large supplier companies conducted their own research for the supply of the above-mentioned products.

Research hypothesis and limitations. The main limitation of the study is the lack of data related to the public procurement of these three products. At MoF level, there is not detailed procurement data for A4 copy paper, toner cartridges and concrete blocks. Therefore, the research team used the procurement data of public organizations collected within the framework of another study named “Demand and Supply Analysis of Four Product Markets: A4 copy paper, Printer ink cartridge, Computer and Fuel” produced by EBRD.

Reduce. Re-use. Recycle.



**I. Market analysis for
A4 copy paper**

1.1 SUB-CATEGORIES OF A4 COPY PAPER, PRELIMINARY COMPENDIUM OF SUSTAINABILITY CRITERIA AND MEANS OF VERIFICATION

This section of the report aims to identify the specific sub-categories of sustainable A4 copy paper, to summarize the sustainability criteria of A4 copy paper and to determine means of verification for the sustainability criteria at international and national levels.

1.1.1 Identification of Sub-Categories of Sustainable Products

International sub-categories of A4 copy paper

Sustainable products are those products that provide environmental, social and economic benefits while protecting public health and environment over their whole life cycle, from the extraction of raw materials until final disposal. Therefore, the study aims to define categories of sustainable paper with respect to the combination of environmental, social and economic sustainability considerations.

Environmental sustainability: Environmentally sustainable paper can be defined as any effort undertaken to reduce deforestation for paper production, as well as consuming lower amounts of energy and water, producing fewer emissions and avoiding certain substances in paper production and bleaching. Currently, paper is made in many environmentally responsible forms. Paper can be manufactured from partly to fully recycled materials using pre- and post-consumer waste. It can also be derived from sustainable forests, where trees are farmed specifically for paper production. Paper can be produced without chlorine bleaching. Finally, paper can be produced from plant fibers other than timber such as cotton, hemp, bamboo or sugar cane. A4 paper is sub-categorized in terms of environmental sustainability as follows:

- *Paper produced from sustainable fiber sources:* Virgin fiber paper is most commonly used and comes directly from native forests. Virgin fiber paper contains the strongest fiber but has the most immediate impact on the forests. However, that impact is diminished if paper is produced from virgin fiber stemming from legally harvested woods and from sustainably managed forests.
- *Recycled Paper:* Generally, it is applied to any sort of environmentally-friendly paper. It can be made from paper used by the consumer (post-consumer recycling) or from scraps from the paper mills that were not used in making finished paper (called post-production or pre-consumer recycling).
- *Consuming lower amounts of energy and water:* Water and energy consumption levels can vary depending on the different paper production. Many studies show that the production of recycled paper requires less energy and water than those for paper based on virgin fiber.
- *Chlorine free:* Chlorine or chlorine substances and other chemicals (such as ozone or hydrogen peroxide) can be used in the bleaching process in order to obtain a final product with a high whiteness level. The usage of chlorine in the paper making process is extremely harmful to the environment. There are three types of sustainable bleaching: process chlorine free (PCF), elemental chlorine free (ECF), and totally chlorine free (TCF).
- *Avoiding other chemical substances:* Some of the synthetic polymers, colorants, dyes and other chemical that can be used in pulp and paper production have adverse impacts on the environment. Thus, avoidance of certain substances in paper production is important for environmental sustainability.
- *Optical brightening agents (OBAs):*

Whiteness -measurement of light reflectance across all wavelengths of light comprising the full visible spectrum and therefore it is the one that best correlates with human visual perception of the paper. The normal maximum whiteness level would be 100, but higher values can be obtained if papers have added OBAs. The function of an OBA is to reflect ultraviolet light from the light source as visible light in the blue spectral region giving measurements in excess of 100.

Brightness -measurement of light reflectance of the specific wavelength of blue light. Simply, brightness represents a narrower measurement of light reflectance than whiteness. The beginning brightness range for a base paper pulp is from 0-100 calculated normally. During the papermaking process, OBAs are frequently added to increase a paper's whiteness as well as brightness.

Shade -measurement of the color of paper. It is an important characteristic within the definition of a paper's whiteness and it is measured with the most universally accepted system of color measurement. It is commonly accepted that there are four groups of white shades: true white, cream white, blue white and red white.

Lower brightness/whiteness levels might also represent a lower need for strong bleaching of pulp and paper surface treatment, reducing related environmental impacts in the paper production process. OBAs have impacts on human health and the environment, especially aquatic systems. They may cause allergic reactions to people and are toxic to aquatic life as they are not biodegradable.

- *Environmentally-friendly packaging*: The packaging for the paper will not contain PVC or other chlorinated plastics.
- *Corporate environmental policy*: Supplier of paper can produce a sustainability report or environmental policy that is consistent with international standards.

Social sustainability: It is important that public money is used in a way that achieves as much public benefit as possible. This means money should not simply be focused on paying for a product, but should attempt where possible to achieve sustainable and wider benefits. In this respect, paper in terms of social sustainability can be defined as any effort that creates social value in national and local communities. A4 paper is sub-categorized in terms of social sustainability as follows:

- *Production of paper according to international labor standards and human rights laws*: Fair employment practices in paper supply chain – fair wages, workforce equality, diversity, avoidance of bonded labor, promoting workforce welfare etc. – generate social benefits.
- *Local sustainability*: Paper supply chains can contribute to local sustainability by building and maintaining healthy, strong communities, supporting social inclusion and enhancing the well-being of local residents by generating local employment.
- *Technical quality*: Paper must be fit for use with standard copy machinery.

Economic sustainability: Paper in terms of economic sustainability can be defined as a contribution to local economic outcomes including cost savings. A4 paper is sub-categorized in terms of economic sustainability as follows:

- Multipurpose copy paper suitable for copy machines, laser printers, fax-machines, ink-jet printers and 2-sided copying can save costs.
- Economic contribution of paper supply chain to national GDP.
- Job creation of paper supply chain in a country and opportunities for SMEs.
- Re-investing in operations of paper supply chain.

The table below summarizes the main sub-categories of sustainable paper as described above in terms of environmental, social and economic sustainability.

Table 1 Sub-categories of sustainable A4 copy paper

Environmental sustainability			
Sub-categories			Sub categories for SPP approach ^(a)
Sustainable fiber sources	Paper produced from virgin fiber stemming from legally harvested woods and from sustainably managed forests	⇒	<ul style="list-style-type: none"> - Recycled paper - Paper from legally and sustainably harvested wood - Paper produced through processes characterized by low energy consumption and emissions - Elemental chlorine free - Brightness - Recyclability (post-consumer) - Environmental management system
	Recycled paper		
Impact on climate change	Consuming little energy and water		
	Chlorine free		
	Avoiding other chemical substances		
	Optical brightening agents		
	Environmentally-friendly packaging		
	Recyclability (post-consumer)		
Impact on manufacturer /supplier	Corporate environmental policy		
	Environmental management system		
Social sustainability			
Impact on local communities	Production and supply chain of paper according to international labor standards and human rights laws	⇒	<ul style="list-style-type: none"> - Production of product according to international labor standards - Technical quality
	Local sustainability		
	Technical quality		
Economic sustainability			
Impact on local economies	Economic contribution of paper sector to national GDP	⇒	Cost-saving paper that is more efficient to operate
	Job creation in paper sector of the country and opportunities for SMEs		
	Multipurpose paper		
	Re-investing in operations of paper sector		

Source: Sustainable Procurement Guidelines, UNEP, 2010 and Green Public Procurement, European Commission

Local sub-categories of A4 paper

In Mongolia, there is no local production of copy paper. All grades of A4 paper in Mongolian paper market are imported from abroad. There are over 10 brands of A4 paper and non-brand A4 papers made in China that have been sold on the market which weigh 70-85 gsm. However, according to Custom Statistics for the first 10 months of 2015, “Double A”, “Yes Silver”, “Miilk”, “IDEA Work” and “CAMPAP” brands represent about 94% of total imported A4 papers.

In Mongolia, recycled papers are not imported, while papers made from sustainably harvested virgin fibers are mainly imported from Thailand, Finland, Russia, South Korea, China and Malaysia. The majority of A4 paper brands that are available in Mongolian paper market are elemental chlorine free and recyclable. However, the rate of post-consumer recycling is very low in Mongolia. According to the statistics provided by Ministry of Environment and Green Development of Mongolia, out of the 91,340 tons of paper waste, only 20 tons was collected in 2014 for cardboard, toilet paper, trug, etc.

Table 2 Paper waste and recycled paper

Year	Waste of paper and paper product, by ton	Recycled paper, by ton
2014	91340	21
2013	168849	22
2012	9432	717
2011	32429	31
2010	43282	40
2009	20598	9

Source: Database for Environment, Ministry of Environment and Green Development of Mongolia

Some brands of A4 paper in the market use renewable energy and water that is drawn from its rain water reservoir in pulp and paper production. Main local official distributors of copy paper in Mongolia have created a number of jobs, and support SMEs and individuals through their supply chains. Moreover, some of them spearhead funding programs to give assistance for the education of Mongolian children.

1.1.2 Preliminary Compendium of Sustainability Criteria and Means of Verification

In order to allow for the procurement of sustainable A4 paper, a better knowledge of the labels and certifications for sustainable paper is required.

Ecolabelling and Certification for A4 paper: There is a number of ecolabels for copy paper, such as the European Ecolabel, Nordic Ecolabel, Blue Angel, Austrian Umweltzeichen, Forest Stewardship Council (FSC), Program for the Endorsement of Forest Certification (PEFC), Eco Mark Japan, Thai Green Label, Chlorine-Free Products Association label, Green Seal ecolabel, Ecologo, ISO14000 family and others. The short descriptions of these Ecolabelling are attached in Annex 1.

Because the production of recycled paper and paper based on virgin fiber is different, the criteria of various ecolabels are not the same. The production of paper based on virgin fiber use a high amount of water and energy, and generate emissions to air and water. The European Ecolabel and Nordic Swan Ecolabel criteria focus on these issues as well as on the use of chemicals. On the other hand, the Blue Angel criteria for copy paper based on recycled paper concentrate on the use of chemicals in paper production and on technical performance.

Copy paper can also be marked with the logos of FSC or PEFC sustainable forest management systems. They can certify that paper contains a minimum percentage of certified sustainable wood fibers.

Moreover, copy paper can be labeled with Chlorine-Free Products Association labels, such as Totally Chlorine Free (TCF), Processed Chlorine Free (PCF) and Elemental Chlorine Free (ECF). TCF and ECF certify virgin-fiber paper, while PCF certifies recycled fiber.

According to Sustainable Procurement Guidelines of UNEP, two sets of sustainability criteria are presented in Sustainable Procurement. One is the basic sustainability criteria that address the most important environmental and social impacts. Another one is advanced sustainability criteria that is intended for use by procurers seeking to purchase the best environmental and socially responsible products available on the market. In this study, we will focus on basic sustainability criteria and their verifications for copy paper.

The table below summarizes the sustainability and verification criteria for copy paper used in United Nations and European Commission.

Table 3 Sustainability criteria and verification for A4 paper, international level

#	Sustainability criteria	Means of Verification
1	Recycled paper: Paper must be made from 100% recovered paper fibers.	Paper carrying any type I ecolabel, such as Blue Angel, or Recycled label can serve as means of proof if it is specified that the paper is made from 100% recovered fibers. Any other appropriate means of proof, such as a technical dossier of the manufacturer or a test report from a recognized body ¹ will also be accepted.
2	Paper produced from virgin fiber: In case of impossibility to purchase paper made from 100% recovered fibers due to higher cost and/or insufficient market supply, paper produced from virgin fiber stemming from legally harvested woods and from sustainably managed forests can be purchased. All virgin wood fibers for pulp production will come from forests that are managed so as to implement the principles and measures aimed at ensuring sustainable forest management.	Paper carrying the FSC or PEFC label, European label, Nordic Swan label will be deemed to comply. Any other appropriate means of proof, such as a technical dossier of the manufacturer or a test report from a recognized body will also be accepted.
3	Elemental chlorine free (EFC): The paper must be at least ECF.	All products carrying the European ecolabel, Blue Angel, Nordic Swan, Eco Mark Japan, Chlorine-Free Products Association (CFPA) will be deemed to comply. Any other appropriate means of proof, such as a technical dossier of the manufacturer or a test report from a recognized body will also be accepted.
4	Brightness: The brightness level must be <90 according to ISO 2470:1999 or equivalent. Above 90 the paper would need to be treated with optical brightening agents. Levels as low as 60 are of a good enough quality for everyday office use.	Bidders must provide written proof that they meet this criterion.
5	Technical quality: Paper must be fit for use with standard office machinery in accordance with relevant national or regional standards.	Paper certified that compatible with machinery accordance with DIN 190309, AFNOR Q11-013, or equivalent. Otherwise, a sample of the paper must be provided to the procurer in order to test the quality of paper.
6	Compliance with environmental legislation: Bidders shall not be permitted to take part in a contract if they: Have been found guilty of grave professional misconduct, including non-compliance with environmental legislation, or have not fulfilled obligations relating to the payment of social security obligations.	Bidders must provide a declaration that they meet this criterion.
7	Production of the product according to international labor standards: The bidder	The bidder is required to submit appropriate proof that these requirements have been met.

¹ Recognized bodies are test and calibration laboratories and certification and inspection bodies that comply with applicable regional, national and/or international standards.

	shall provide proof from an independent third-party certification body that the manufacturer of the product complies with international working standards (ILO Core Convention) throughout the whole supply chain.	
8	Written corporate environmental policy: The bidders will provide their own written corporate environmental policy.	The bidder is required to present the written corporate environmental policy, consistent with ISO 14001, or equivalent. Any other appropriate evidence will be accepted.
9	Operational, third party, environmental management system: The bidder will provide certificates of environmental management system for all companies in the supply chain.	The bidder is required to provide certificates of environmental management system for all companies in the supply chain that is certified by third-parties. For example, ISO 14001, European EMAS etc.

Source: Sustainable Procurement Guidelines, UNEP, 2010 and Green Public Procurement, European Commission

Currently, the Mongolian paper market does not have laboratories, instruments, or tools to certify and verify the sustainability of office paper imported. Also, there is not any national ecolabel relevant to A4 paper. Local importers and suppliers rely on international ecolabels and international standards shown on package. Main official distributors have attested copies of certificates such as the ISO 14000 series (environment), ISO 9000 series (quality) and technical data for office paper provided by manufacturers.





The majority of A4 paper brands available in Mongolian paper market have been certified with ISO 14001 (Environment Management System), ISO 9001 (Quality Management System) and ISO 9706 (Paper Permanence Standard). Some of them have the European label, FSC and PEFC label.






However, the majority of non-brand A4 copy papers made in China are produced from natural forest, and have not any ecolabel. Thus, non-brand A4 copy papers cannot be studied in this research.

Since 84% of total imported paper is imported only from Thailand as for the first 10 months of 2015, there is an exigency to take into consideration A4 paper ecolabels used in Thailand. A total of 7 ecolabels for paper are used in Thailand. Five of them are the above-mentioned, internationally- recognized ecolabels, while two of them are national labels, namely the Thai Green label and Singapore Green Label Scheme. Short descriptions of these two ecolabels are attached in Annex 1.

The table below summarizes the sustainability and verification criteria for the main multi-purpose A4 copy papers imported in Mongolia.

Table 4 Sustainability criteria and verification for A4 copy paper imported in the Mongolian market

Environmental sustainability criteria						
	Double A	Yes silver	Miilk	CAMPAP	IDEA Work	Paper one
Market share (as of the first 10 months of 2015)	86%	1%	3%	0.6%	3%	1%
Paper produced from virgin fiber stemming	Yes. 100% fiber from farmed tree	Yes 	Yes 	Yes 	Yes 100% fiber from farmed tree	Yes 

from legally-harvested woods and from sustainably harvested wood						
Elemental chlorine free	Yes	Yes 	Yes	Yes	Yes	Yes
Consuming low levels of energy and water in the production process	Yes. Renewable energy and rain water reservoir	Yes 	Yes. Recycled waste water is used	Yes	Yes 	Yes
Brightness, %	99-102	94	108-111	-	94.5	99
Technical quality	Yes	Yes 	Yes	Yes	Yes	
Environmental management system	ISO14001	ISO14001	ISO14001	-	ISO14001	ISO14001
Quality management system	ISO 9001	ISO 9001	ISO 9001	ISO 9001	ISO14001	ISO 9001
Long life	ISO 9706	ISO 9706	No	-	No	ISO 9706
Recyclability (post-consumer)	Yes		Yes	Yes	Yes	Yes
Social sustainability of key suppliers in Mongolia						
Social responsibility	Yes	Yes	Yes	Yes	-	-
Supply chain according to labor standards and human right laws	Yes	Yes	Yes	Yes	Yes	Yes
Economic sustainability of key suppliers in Mongolia						
Job creation in local economy	Yes	Yes	Yes	Yes	Yes	Yes
Cooperation with SMEs and individuals through paper supply chain	It works with about 300 SMEs and individuals across the country	It works with about 95 SMEs and individuals across the country	It works with about 65 SMEs and individuals across the country	Yes	Yes	Yes

Source: www.doublepaper.com, www.yes-paper.com, www.ideaonpaper.com, www.miilkpaper.co.kr, www.paperone.com and the findings of interview with key importers.

Mongolia has adopted some office paper standards, but these do not directly relate to sustainability.

Table 5 A4 paper standards in Mongolia

Document number and publication Year	Title
MNS ISO 8791-2000	Determination of the roughness/ smoothness of paper
MNS ISO 5633-2000	Determination of resistance to water penetration
MNS ISO 5636-1-2000	Determination of air permeance

Source: Mongolian Agency for Standardization and Metrology, www.estandard.gov.mn

Therefore, it can be concluded that the above-mentioned brands of A4 paper can be considered as providing sustainable A4 paper. According to the sustainability criteria, these brands can be ranked as follows (the most sustainable A4 paper is ranked first):

1. Yes Silver
2. Double A
3. Miilk
4. Paper one
5. CAMPAP
6. IDEA Work

1.2 SUPPLY ANALYSIS OF A4 COPY PAPER

This section aims to assess the capabilities of the local market to supply sustainable A4 copy paper at a competitive price and analyse the potential threats or opportunities for supplying sustainable A4 paper. In the range of this section, the main objectives will consist in:

- Determining the market structure of A4 copy paper;
- Identification of the level of availability and the market share of main A4 copy papers that are mainly sold in the market;
- Determining the market players;
- Identification the main obstacles limiting the supply of A4 copy paper; and
- Analysis of the potential for development of A4 copy paper.

1.2.1 The Market Structure of A4 Copy Paper

The markets in which firms operate vary a great deal. Some are highly competitive, while some appear to be almost free from competition. Four market types, such as perfect competition, monopolistic competition, oligopoly and monopoly are identified in general.

Perfect competition is the most extreme form of completion. Monopoly corresponds to an extreme absence of competition. The other two market types fall between these extremes.

Many factors must be taken into account to determine which market structure describes a particular real-world market. The following characteristics are considered to determine the market structure:

- The number of suppliers in the market;
- Suppliers' control over price;
- Product differentiation;
- Barriers to entry and firm turnover;

- Four-firm concentration ratio²; and
- Herfindahl-Hirshman Index (HHI)³.

The table below summarizes the influencing factors, along with the measure of concentration that determine which market structure describes a particular real-world market.

Table 6 Types of market Structures and their characteristics

Characteristics	Perfect competition	Monopolistic competition	Oligopoly	Monopoly
Number of firms in the industry	Many	Many	Few	One
Product differentiation	Identical	Differentiated	Either identical or differentiated	No close substitutes
Firm's control over price	None	Some	Considerable	Considerable or regulated
Barriers to entry	None	None	Moderate	High
4 firms' concentration ratio	0	Low	High	100
HHI	Less than 100	101-999	More than 1000	10,000

Source: [Parkin, 2012]

The main purpose of this section is to determine the A4 copy paper market structure. In order to characterize the market structure for A4 copy paper, each determinant of the market structure will firstly be qualified, secondly the market structure for A4 copy paper will be identified based on these results.

The number of suppliers for A4 copy paper. According to the Customs Data for the last three years, five companies such as Tavan Bogd Management LLC, Finpak LLC, CTSN LLC, Circle LLC, and Tenger-Altai Trade LLC- have been continuously importing and supplying A4 copy paper. As of the first 10 months of 2015, three companies – Tavan Bogd Management LLC, CTSN LLC, and Az Khur LLC – imported 90% of the total import of A4 copy paper. Including these main importing companies, it can be concluded, based on Customs Data, that there is a total of 20 supplier companies actively operating in the market.

Looking at the supply chain of main A4 copy papers in the local market, “Double A”, the paper most sold in the market, has one official distributor and about 50 dealers in Mongolia. The official distributor, Tavan bogd Management LLC, sells “Double A” through over 300 sales units across the country. The official distributor of “Miilk” brand, Az khur LLC, sells it through 65 sales units across the country. The official distributor of “Yes Silver” brand, Finpack LLC, sells it through 95 sales units across the country.

By comparing the custom data with supply chain information, and eliminating the duplicated number of suppliers, it is concluded that there are about **one large supplier, 4-5 medium**

² Four-firm concentration ratio is the percentage of the value of sales accounted for by the four largest firms in an industry. The range of concentration ratio is from almost zero for perfect competition to 100 percent for monopoly.

³ Herfindahl-Hirshman Index (HHI) is the square of the percentage market share of each firm summed over the largest 50 firms in a market (or summed over all the firms if there are fewer than 50). The HHI became a popular measure for the degree of competition. A market in which the HHI is less than 1,000 is regarded as being competitive. A market in which the HHI lies between 1,000 and 1,800 is regarded as being moderately competitive. But a market in which the HHI index exceeds 1,800 is regarded as being uncompetitive.

suppliers and about 45 small suppliers that operate actively on the A4 copy paper market. A few companies hold the main share of the market, even though there are lots of suppliers in the market.

Product differentiation. Product differentiation gives the firm an element of market power. In the case of A4 copy paper, the main differentiable characteristics in the Mongolian paper market are brand, and weight of A4 paper. The main importers also answered that in the market A4 papers are differentiated by their brand name and they have certain differences between each other.

Suppliers' control over price. The one indicator measuring competitiveness in the market is checking whether the supplier itself sets the price of products, or whether the supplier is selling in accordance with the market price. In non-competitive markets suppliers have the ability to control the price of their product, whereas suppliers in competitive markets are price takers. The main risk of competition is therefore that firms cannot affect the market price and are not in a position to raise prices. By doing so, a firm would be unable to sell its output as consumers would buy goods from others.

According to the interview conducted with suppliers, most key suppliers use a "Cost-added pricing" strategy, while medium and small suppliers use a "Market pricing" strategy.

It therefore can be concluded that the main suppliers in the market can control the price of A4 paper, while the followers sell A4 paper in accordance with the price set by the main suppliers. Control over price by a few dominants implies that the A4 paper market may be a non-competitive market.

Barriers to entry. When a firm enters the market, the more obstacles there are, the more competitiveness is limited. In order to determine the barriers to entry in the market, the survey has solicited supplying companies to relate their experience when entering the market. Many of them responded that there was minimum challenge when entering the market, while few of them responded that there was moderate challenge. Based on the results above, there is a relatively low barrier when entering the market for the supply of A4 paper.

Four-firm Concentration Ratio. Four-firm concentration ratio is calculated by the import quantity of the four largest suppliers of A4 paper, which are Tavan Bogd Management LLC, Tenger Altai, Az Khur LLC and CTSN LLC. The concentration ratio is 92% for the first 10 months of 2015 and A4 paper market has a high concentration and is characterized by an oligopoly market structure in which a market is run by a small number of firms that, together, control the majority of the market share. Tavan Bogd Management LLC has supplied about 70% of total imports in the last 3 years. The other 3 main suppliers have supplied the other 20%, and the remaining 10% is supplied by other small suppliers.

Herfindahl-Hirshman Index. The HHI was determined by the market shares of 16 companies supplying A4 copy paper. The HHI index is 7,000 and the competition in A4 paper market is relatively low.

Four-firm Concentration Ratio and HHI results have shown that the A4 copy paper market has a high concentration, and that a few companies hold the main share of the market, however according to some indicators the results provided still lead to a monopolistic market structure. For instance, there is a large number of suppliers in the market, but their market share is very low.

According to the above-mentioned results, the A4 copy paper market has been identified as a non-competitive market. Namely, it has characteristics of an oligopolistic market with few dominant firms and many follower firms. Oligopoly, in which a market is run by a small number

of firms which together control the majority of the market share. Oligopoly companies can choose to produce the same products, or they can produce different products. The main suppliers in the A4 market have been competing by supplying different brands of paper.

The following table shows the summary of determinants for the A4 paper market’s structure.

Table 7 Market structure for A4 copy paper (2015.10)

Characteristics	Results
Number of firms in the industry	Few dominant firms and many follower firms
Product differentiation	Slightly differentiated
Firms’ control over price	Moderate
Barriers to entry	Low
4 firms’ concentration ratio	92
HHI	7100

Source: Researcher’s findings

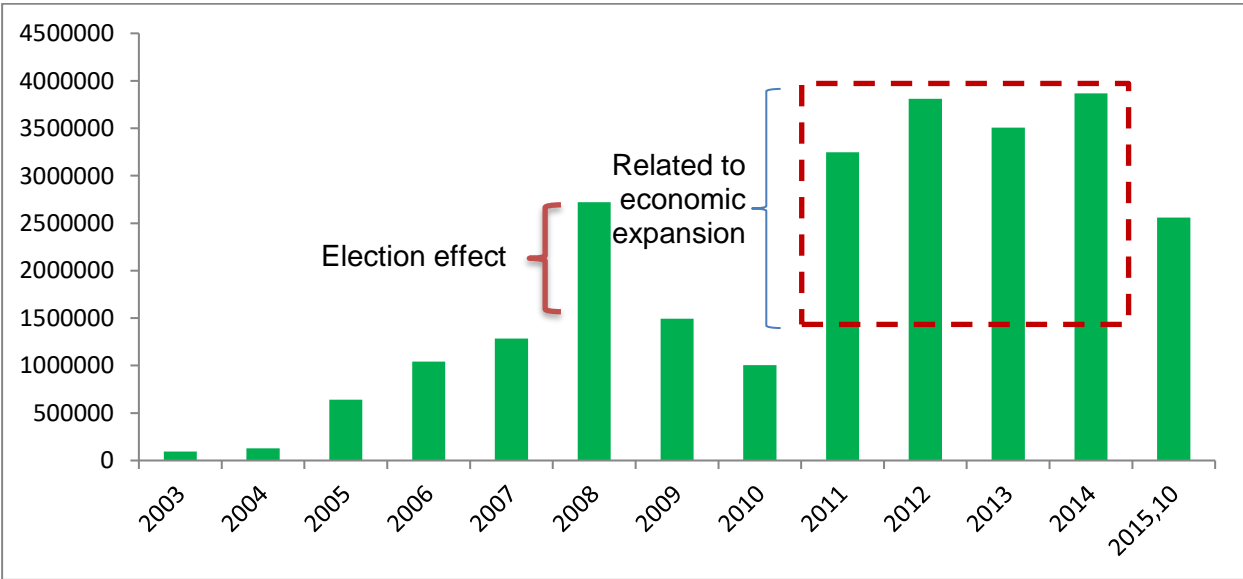
1.2.2 Sustainable A4 Copy Paper Supply

The level of availability for A4 copy paper

According to Customs data for the 2011-2014 period, 3.2-3.8 million kilograms of A4 copy paper were imported yearly. As for the first 10 months of 2015, 2.5 million kilograms of A4 copy paper were imported. The historical supply of A4 copy paper between 2003 and the first 10 months of 2015 is illustrated in Figure 2. From the figure below, one can see that A4 copy paper supply was relatively low in 2003-2005, and that the yearly average supply was 287,591 kg in those years, which is lower than the current monthly average supply of A4 copy paper. The supply of A4 copy paper increased continuously between 2005 and 2008, and A4 copy paper supply rose sharply in 2008 due to the election of parliament and local governments. After the election year, the supply of A4 copy paper decreased dramatically between 2009 and 2010. The yearly average supply of A4 copy paper in 2006-2010 (except 2008) is 1.2 million kilograms of A4 copy paper, which is 4 times higher from the average supply in the 2003-2005 period.

In 2011, the supply of A4 copy paper increased by 2 million kilograms compared to the previous year. In 2011-2014, the fluctuation of supply of A4 copy paper was relatively stable and the yearly average supply of A4 paper was 3.6 million kilograms in these years. This high level of supply of A4 copy paper may be caused by economic expansion in recent years.

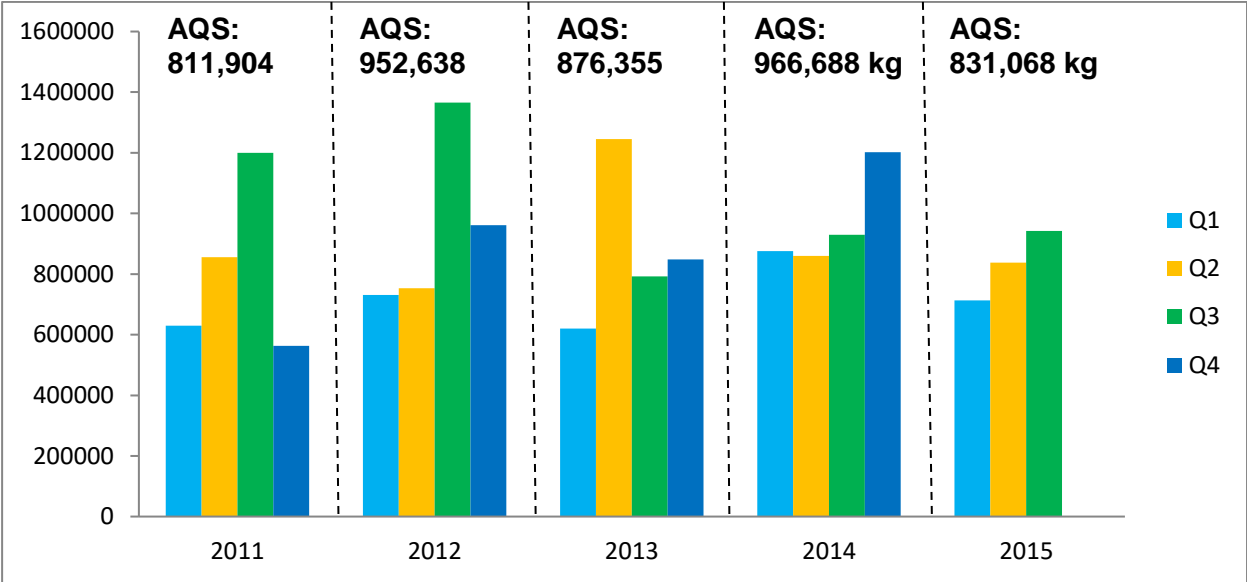
Figure 2 The historical supply of A4 copy paper, 2003-2015.10, in kilograms



Source: Customs data

When comparing the quarterly supply of A4 copy paper for the last 5 years, there is no clear tendency of seasonal effect in the supply of A4 copy paper. In general, A4 copy paper supply in the 1st quarter tends to be lower than for other quarters. As for 2011-2012, the trend for quarterly supply was similar. More precisely, A4 copy paper supply increased gradually in second quarters compared to first quarters, increased sharply in third quarters, and decreased in fourth quarters of 2011-2012. Quarterly supply of A4 copy paper was the highest in 2nd and 4th quarters in 2013 and 2014 respectively. The figure below shows quarterly supply of A4 copy paper for 2011-2015.

Figure 3 Quarterly supply of A4 copy paper, 2013.Q1-2015.Q3, in kilograms



Source: Customs data

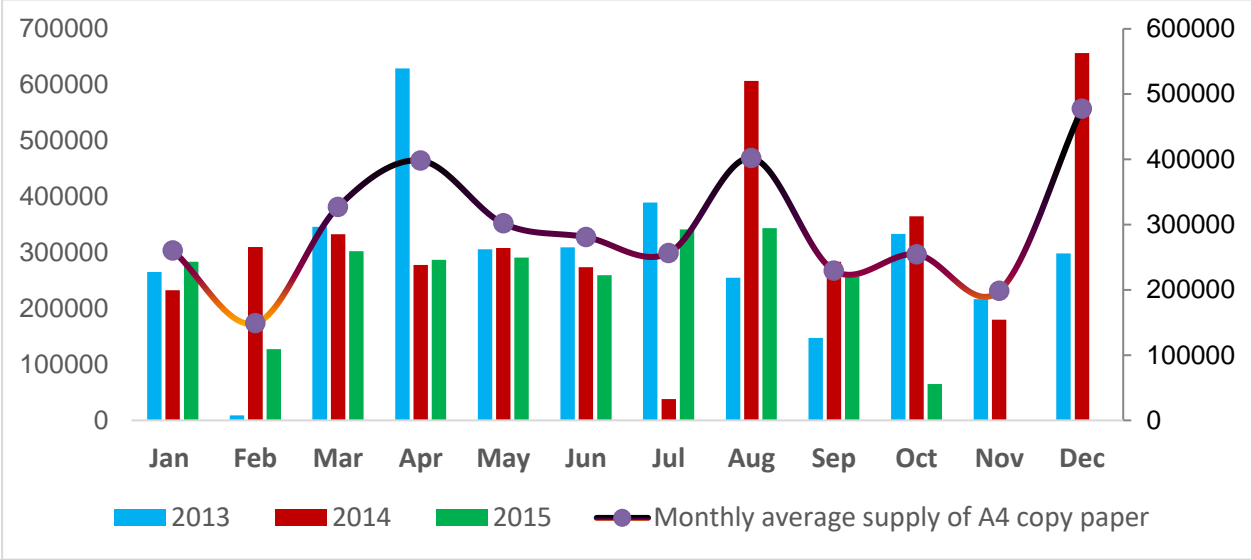
Note: AQS-average quarterly supply of A4 copy paper

An average 830,000-960,000 kg of A4 copy paper is supplied in the local market per quarter according to customs data.

Comparing the monthly supply of A4 copy paper for the last 3 years, monthly supply is almost similar throughout all months regardless of some extreme cases. However, the monthly average supply of A4 copy paper in the range of 2013-2015 shows that A4 paper supply tends to rise in April, August and December.

The figure below illustrates the monthly supply of A4 copy paper for 2013-2015.

Figure 4 Monthly supply of A4 copy paper, Jan 2013-Oct 2015, in kilograms



Source: Customs data

Table 8 Descriptive statistics of monthly supply of A4 copy paper for 2011-2015 presents the descriptive statistics for the monthly supply of A4 copy paper for 2011-2015. The average monthly supply of A4 copy paper was 322,229 kg and 255,832 kg in 2014 and the first 10 months of 2015 respectively.

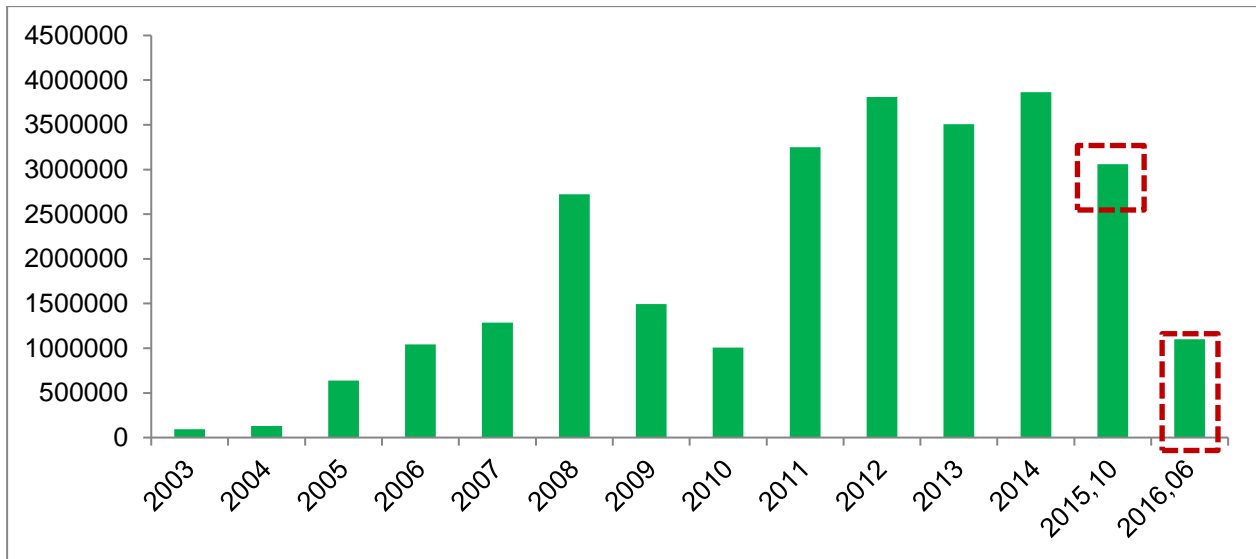
Table 8 Descriptive statistics of monthly supply of A4 copy paper for 2011-2015, by kilograms

	2011	2012	2013	2014	2015
Mean	270,635	317,546	292,118	322,229	255,832
Median	259,591	363,713	302,124	296,161	285,280
Standard deviation	137,857	170,804	146,911	167,912	90,059
Min	61,018	3,350	8,880	38,270	65,114
Max	584,838	558,590	629,461	656,947	343,861

Source: Customs data

Based on the historical data for A4 paper supply, the import planning of main suppliers and the socio-economic situation, projection for A4 copy paper supply was deducted for the last 2 months of 2015 and the first 6 months of 2016. A4 copy paper supply is expected to increase in the second quarter of 2016 due to the election of parliament compared to the same period in the previous year. There is also an expectation that the supply of A4 paper will decrease in the second half of 2016 due to economic recession.

Figure 5 Yearly supplies of A4 copy paper and projection for Nov 2015-June 2016, in kilograms



Source: Customs data and Researcher's calculation

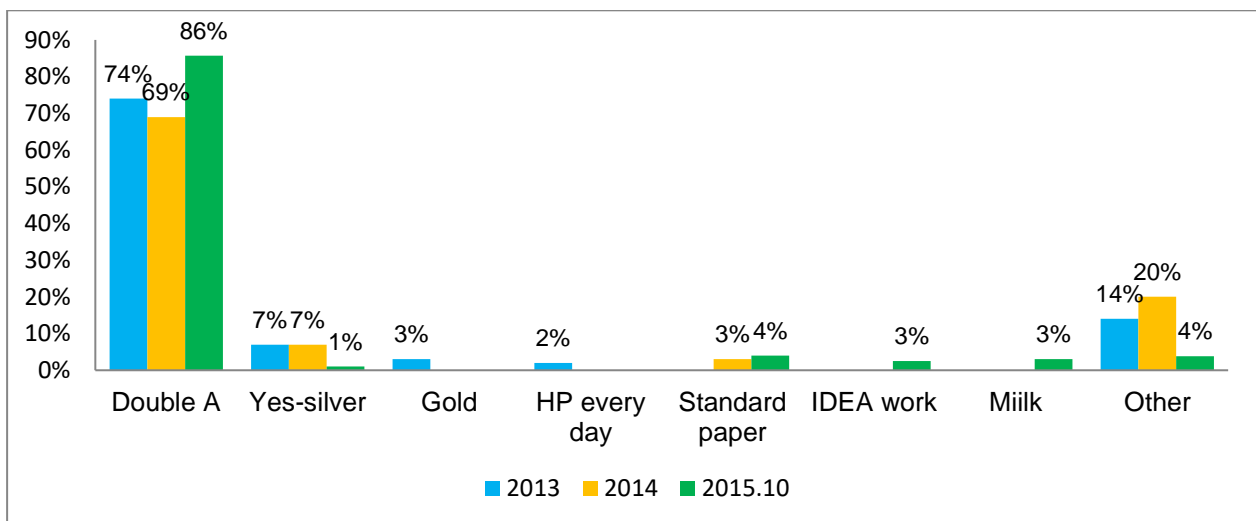
The forecast for A4 copy paper supply is estimated at 500,500 kg for the last two months of 2015 and 1,098,289 kilograms for the first six months of 2016.

Market share of main sustainable A4 copy papers

Currently there are 4 different types of A4 copy paper sold in the market in terms of thickness: 70gsm, 75gsm, 80gsm and 85gsm. About 90% of total imported A4 copy paper is 80gsm paper. As mentioned in the previous chapter, there are over 10 brands of A4 paper, and non-brand A4 paper made in China that have been sold on the market.

According to Customs Statistics, “Double A”, “Yes Silver”, “Miilk”, “IDEA Work” and “CAMPAP” brands were the main brands imported in the first 10 months of 2015. The figure below shows the market share for main types of A4 copy paper sold in 2013-2015.10.

Figure 6 Market share of main A4 copy papers for 2013-2015.10



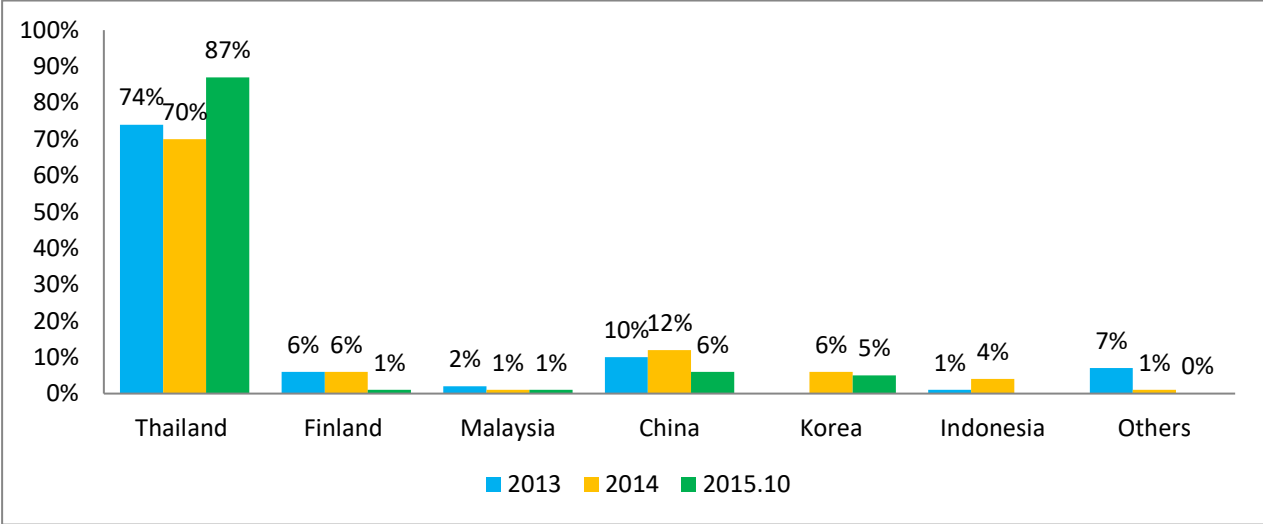
Source: Customs data

From the above figure, one can see that Double A, Yes-silver and Standard paper have been continuously supplied in the market for the last 2-3 years. IDEA work and Miilk papers entered

the market. As for the first 10 months of 2015, 86% of the total supply of A4 was provided by Double A, 3% was Miilk, 2.5% was IDEA work, 1.3% was CAMPAP and 1% was Yes-Silver.

A4 copy paper is mainly imported from Thailand, China, Korea, Malaysia, Indonesia, Hong Kong, Russia and Finland. The following chart illustrates the percentage of paper imported from each country for 2013-2015.10.

Figure 7 Country of origin for imported A4 copy paper, 2013-2015.10

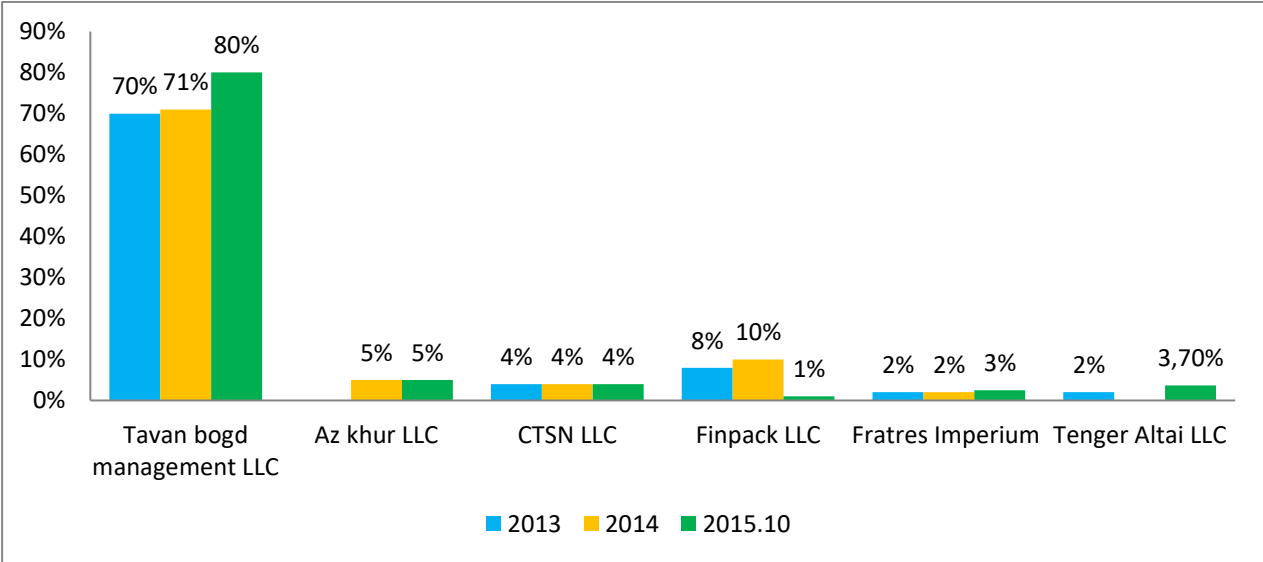


Source: Customs data

Main players of A4 copy paper and their market share

Currently, in the A4 paper market, Tavan Bogd Management LLC, Finpack LLC, CTSN LLC, Az khur LLC, Tenger Altai LLC and Fratres Imperium LLC are important players. The chart below shows the 6 main suppliers' market shares in 3 consecutive years.

Figure 8 Main players and their market share for A4 copy paper, 2013-2015.10



Source: Customs data

Importers tend to officially distribute 1 to 2 brands of A4 paper.

When determining of the distribution of the market, it can be deduced that there are about one key supplier, 3 medium suppliers and 2 lower medium suppliers and 45 small suppliers who operate actively on the A4 copy paper market.

All main suppliers import sustainable A4 copy paper which meets the main sustainability criteria introduced in Section 2.1. Key importers have already taken steps to supply A4 copy paper that satisfies sustainability criteria. Therefore, it is expected that sustainable A4 copy paper will be supplied in the future. However, recycled A4 copy paper will not be supplied in the short and medium term due to consumer buying behaviour.

Among local main suppliers of A4 copy paper, only Finpack LLC, a company introducing environmentally-friendly and green technology, has its own corporate environment policy. The table below summarizes the environmental, social and economic benefits offered by main local suppliers.

Table 9 Environmental, social and economic benefits of key suppliers

Criteria	Main suppliers					
	Tavan bogd management LLC	Finpack LLC	Tenger Altai LLC	CTSN LLC	Az khur LLC	Fratres Imperium LLC
Corporate environmental policy	No	Yes	No	No	No	No
Social responsibility	Support education and health of Mongolian children	Support education of Mongolian children	Support education sector	No	Support education sector	No
Job creation in national paper industry and opportunities for SMEs	Yes	Yes	Yes	Yes	Yes	Yes

Source: Interview survey with key importers

Identifying the main obstacles

This part of the study aims to identify the main obstacles limiting the supply of the sub-categories of A4 copy paper. First, we will consider the average price of A4 copy paper in Ulaanbaatar and how these prices compare with the international prices and with the conventional items. The price structure and profit margin will also be considered. Secondly, the strengths/weaknesses for the provision of sustainable A4 copy paper will be examined. Finally, we will discuss other major obstacles.

In Ulaanbaatar city, a variety of point of sales sell A4 paper in official stores, branches, stationery shops, shops providing copying services, supermarkets, markets, wholesale stores to postal shops. Among them, stationery shops and supermarkets made the most sales. In general, A4 copy paper reaches the final consumer through 2-3 supply chains of importers. All main importers sell A4 copy paper in their own official stores and branches. On the other hand, retail shop owners mostly buy A4 paper directly from markets, wholesale stores and importers.

Depending on units of supply chain, the price of A4 copy paper is different. As of October of 2015, the average retail price of 80gsm paper was MNT 7600 per ream and the average retail price of 70gsm paper is MNT 6700 in the case of importers. The table below shows the retail and wholesale price of A4 copy paper offered by the main importers.

Table 10 A4 copy paper price of key importers (2015.10)

Name of A4 copy paper	Retail price (MNT)	Wholesale price (MNT)	Name of importers
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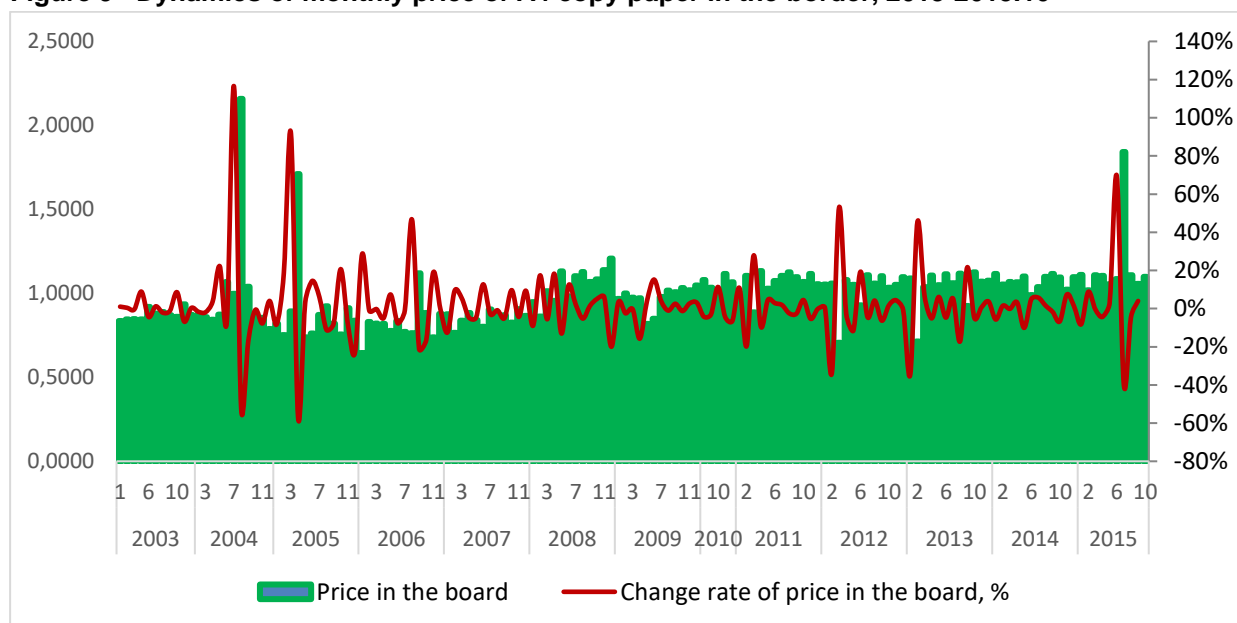
Double A (80gsm)	7900	7650	Tavan bogd management LLC
Miilk (85gsm)	7500	7200	Az khur LLC
Yes-Silver (80gsm)	7700	7400	Finpack LLC
Campap (80gsm)	7100	7100	Circle LLC
IDEA Work (80gsm)	7700	7500	Fratres Imperium LLC
Yes-Silver (70gsm)	6800	6600	Finpack LLC
Quality Blue (70gsm)	6600	6400	Tavanbogd Management LLC

Source: Interview survey with key importers

The average price of A4 copy paper sold in retail shops tends to be MNT 100-600 higher than the retail price of importers. Difference in price of A4 copy paper sold in retail shops mainly depends on the location of retail shops.

An average price of sustainable A4 copy paper in the border has been relatively stable for the whole decade. For ten consecutive years, the average price of A4 copy paper per kilogram was \$1, \$1.8 at most and \$0.6 at least.

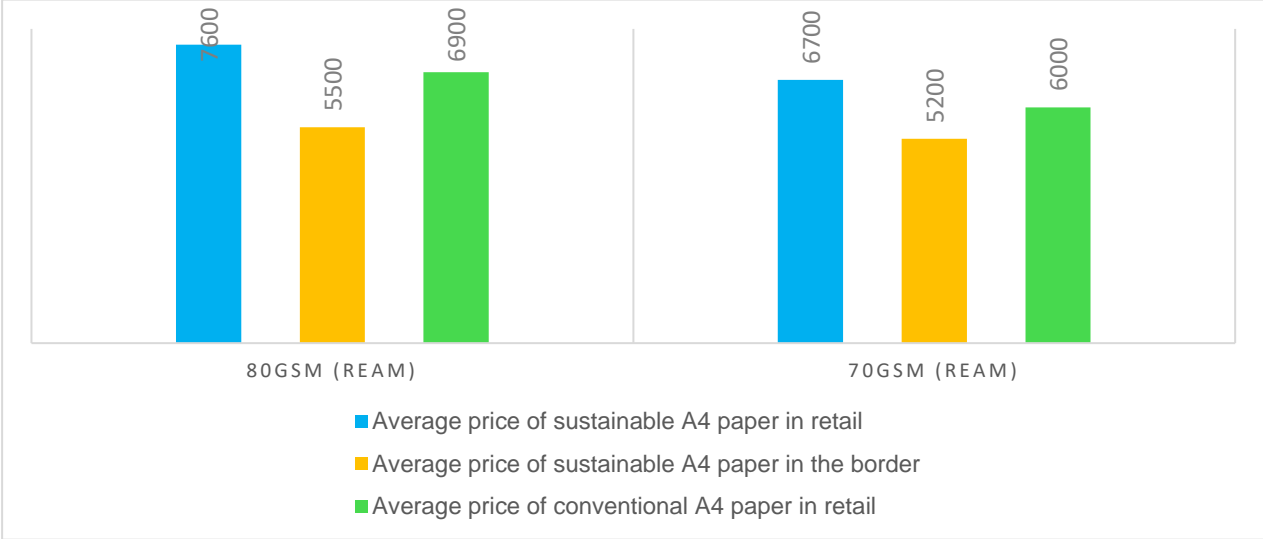
Figure 9 Dynamics of monthly price of A4 copy paper in the border, 2013-2015.10



Source: Customs data

The figure below compares the average retail price of sustainable A4 copy paper with its average price in the border and average retail price of conventional A4 copy paper. The average price of sustainable A4 paper copy papers is MNT 500-2000 higher than the average price of conventional (non-brand) A4 paper mainly imported from China. Thus, sustainable A4 papers have a price premium of about 15%. What is more, the average price of sustainable A4 paper is about MNT 2000-3000 higher than its average price in the border.

Figure 10 Average retail and border price of sustainable A4 paper and average retail price of conventional A4 paper, 2015.10 (in MNT)



Source: Customs data

In terms of price structure, most suppliers responded that they generally use a cost-added pricing strategy. Because consumers have only little knowledge of the difference in product quality, they tend to be very price sensitive. So suppliers pay attention to competitors’ price and try to set theirs a little lower, or at least to match competitors’ price by reducing their profit margin. Ulaanbaatar-based suppliers add an approximate 15%- profit margin.

Since 2014, the price of A4 paper has been changed 3 to 4 times. According to main suppliers, the main reasons for price changes are the currency fluctuation and the change in fuel price.

There is no international supplier for the provision of sustainable A4 paper. Since all importers and suppliers are national companies, the strengths and weaknesses of national companies over international suppliers for the provision of sustainable A4 copy paper will not be explored. However, other obstacles faced by national suppliers with regard to the supply of sustainable A4 copy paper were found:

- ✓ Consumers’ knowledge on the sustainability of A4 paper is low.
- ✓ It is hard to change the product that consumers are accustomed to buying.
- ✓ Consumers are price sensitive due to the changes in the product prices.
- ✓ A few companies hold the main share of the market.

A SWOT analysis has been developed in order to identify the limiting factors for the supply of A4 copy paper certified with ecolabels. According to the SWOT analysis, main factors that may have a negative effect on the supply of sustainable A4 copy paper are as follows:

- ✓ Suppliers’ knowledge on the sustainable A4 paper: Only the main importers have a good knowledge of the sustainable A4 paper. However, the knowledge of workers in the supply chain, of most small and medium suppliers, and of vendors regarding the product is relatively low. With better knowledge of sustainable products, they could influence consumers’ buying behaviour.
- ✓ Consumers are accustomed to buying certain type of A4 copy paper: Introducing new A4 paper into the market is a real challenge as consumers are accustomed to buying a certain type of A4 copy paper.
- ✓ Non-competitive market: A few companies hold the main share of the market even though there are lots of suppliers in the market. These main companies compete in

the market with different brands of A4 paper that are all considered as providing sustainable products.

- ✓ Types of sustainable A4 copy paper are limited in the market.
- ✓ A lot of conventional A4 papers having lower price may be illegally imported and sold in the market⁴.

Figure 11 SWOT analysis for supply of sustainable A4 copy paper

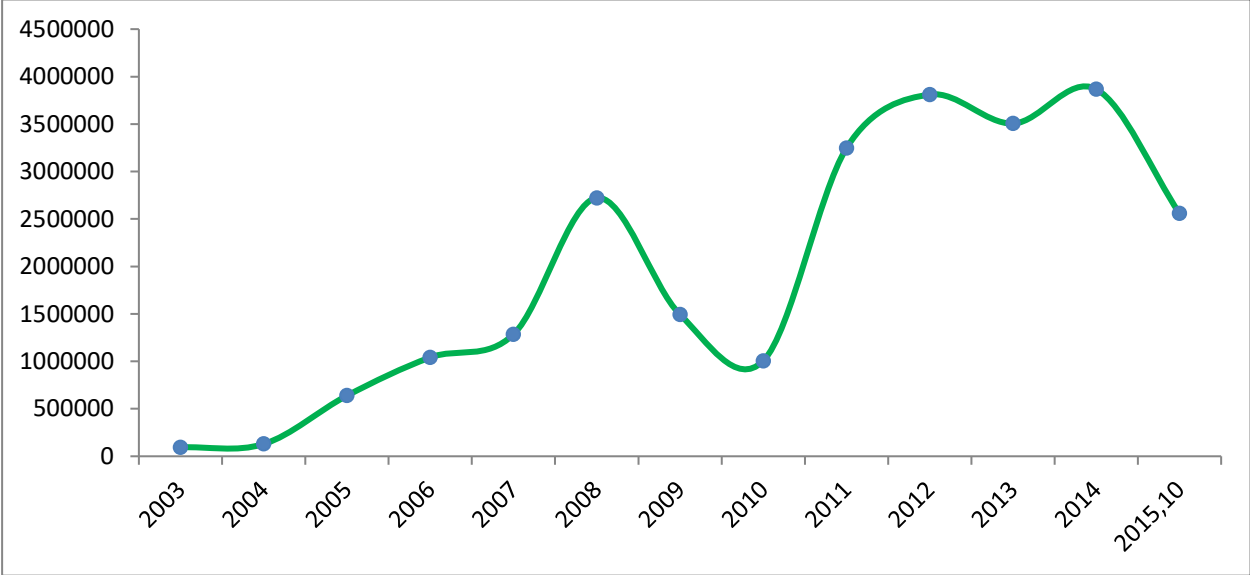


1.3 A4 COPY PAPER DEMAND

The evolution of national demand for the sustainable A4 copy cannot be determined due to a lack of data. Thus, the evaluation of yearly supplies of A4 copy paper is provided instead of national demand in the following figure.

⁴In reality, retailers carry conventional A4 copy paper with lower quality from China into the Mongolian market without registering in the Customs. However, there is any official data to confirm this information.

Figure 12 Yearly supplies of A4 copy paper, in kilograms



Source: Customs data

Since the national demand for A4 copy paper cannot be determined, this study focuses on public organizations’ procurement demand for A4 copy paper. Under the framework of demand analysis, the potential consumption and procurement of A4 copy paper for public organizations in Ulaanbaatar city has been determined.

As for the demand analysis in this study, public procurement data collected within the framework of the research, “Demand and Supply Analysis of Four Product Markets: A4 copy paper, Printer ink cartridge, Computer and Fuel”, conducted by MIRIM Consultant LLC and financed by EBRD in 2015, will be used. Public procurement information was collected from 68 public organizations in Ulaanbaatar city. 29 of them are at first level, 9 are at second level, 10 are at third level, 17 are public services, and 3 of them are state-owned or state-shared holding companies and industries. First-level categories include government agencies with rights of enacting laws and implementing policy (ministries and agencies) as well as judiciary organizations. Second level involves municipality and related affiliated agencies. Third-level organizations are basically district governments and related administrations. Public services are institutions providing education, culture, science and health services to the public.

Public organizations’ A4 copy paper consumption

A4 paper consumption of public organizations is estimated by comparing the monthly planned budgets of public organizations for A4 copy paper at each institutional level including variables of location and number of staff. Differences of A4 paper consumption between the institutional levels were identified and, furthermore, consumption rates were determined for each government officer distributed by institutional level and location. This estimate serves as a basis for summarizing A4 paper consumption in the public sector.

A4 office paper consumption and institutional categories. Public organizations involved in the survey had planned MNT 641 million for procuring A4 paper in 2015, which equals to 11% of total state budget for stationery. These organizations are consuming 84,527 reams of A4 paper a year. Monthly planned consumption of A4 paper for public organizations in Ulaanbaatar city are indicated in the table below.

Table 11 Planned monthly consumption expenditure of A4 paper in 2015

Level	No.PO	Monthly consumption expenditure (mln.MNT)	Monthly consumption (ream)	Monthly maximum consumption expenditure (mln.MNT)	Monthly minimum consumption expenditure (thous.MNT)	Monthly average consumption expenditure (thous.MNT)	Monthly median consumption expenditure (thous.MNT)
Level-I	29	37.8	4941	14	24.2	1304	712
Level-II	9	5.6	735	18	37.5	625	249.6
Level-III	10	2.8	371	1.3	17.5	283.4	107.7
PSO	17	2.9	385	0.85	13.2	173.6	31.8
SOE	3	4.2	205	3.7	44.3	1399.1	403.2

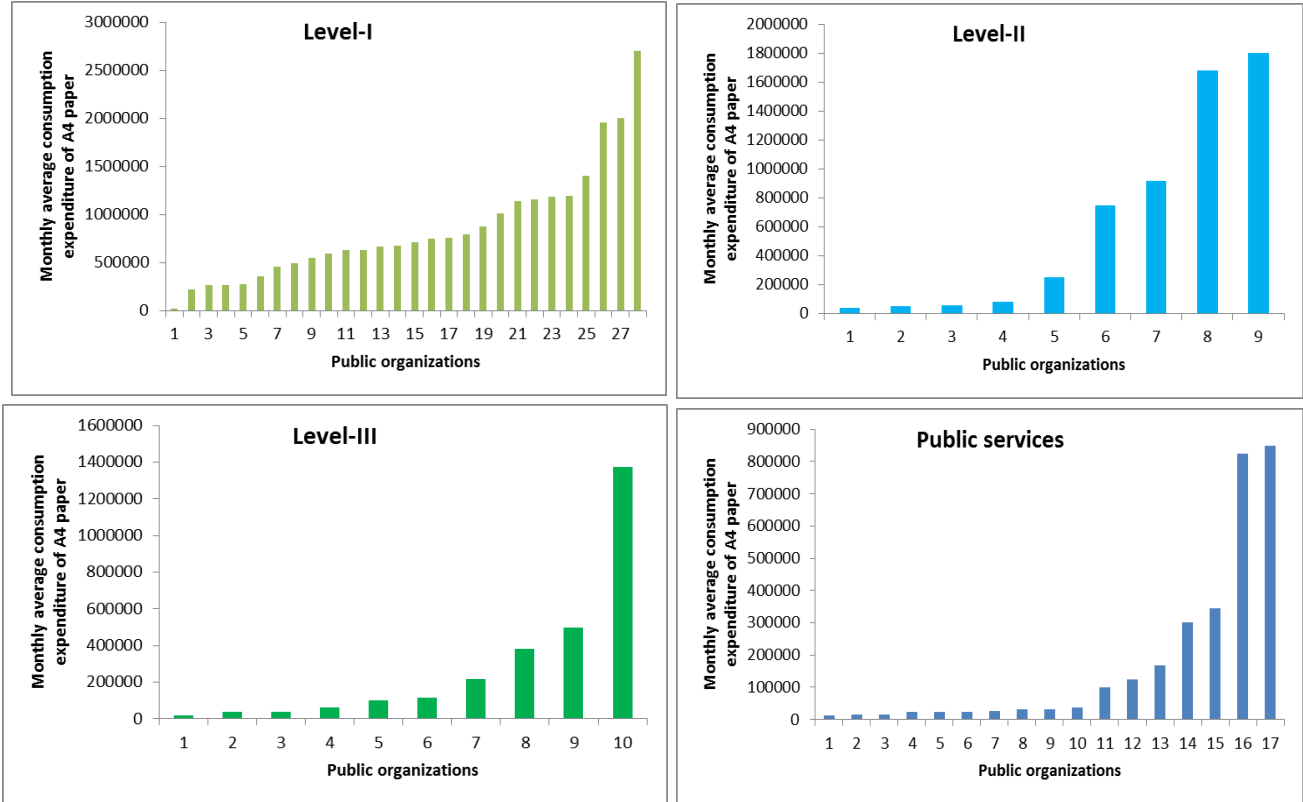
Source: (EBRD , 2015)

*Note: PSO-Public Service Organizations
 SOE-State Ownership Enterprise
 PO-Public Organizations*

The data in the above table shows that the average consumption of A4 paper decreases as the institutional level becomes lower. In other words, first-level organizations have the highest consumption of A4 paper, while public services have the lowest amount of consumption amongst others. Average monthly consumption of first-level organizations is 65 percent higher than consumption amount of second-level organizations’ consumption, 85 percent higher than third-level organizations and 95 percent higher than that of public services.

The distribution of average monthly A4 paper consumption at each level is illustrated in the figure below. Half of public organizations in the first level and the second level respectively use up to MNT 712,000 and MNT 250,000 of A4 office paper per month. Moreover, half of public organizations in the third level consume up to MNT 108,000 per month in A4 paper, while half of public services use up to MNT 318,000 per month of A4 paper..

Figure 13 Distribution of average monthly A4 paper consumption in 2015, by the level of public organizations



The table below presents the consumption of A4 copy paper only for 1st-level organizations. In the case of ministries, average and median A4 paper consumption are 127 reams and 104 reams; 353 at most and 60 at least for all ministries.

Table 12 Planned monthly consumption expenditure of A4 paper in 2015, by types of POs in the first level

Classification of organizations	No. POs	Monthly consumption expenditure (mln. MNT)	Monthly consumption (ream)	Monthly maximum expenditures (thous. MNT)	Monthly minimum expenditures (thous. MNT)	Monthly average expenditures (thous. MNT)	Monthly median expenditures (thous. MNT)
Ministries	15	14.6	1906	2700.0	456.0	971.9	792.8
Governmental agencies	10	20.4	2661	14000.0	24.1	2036.8	430.0
Organizations of legislative authority	4	2.8	374	1100.0	266.6	714.6	716.0

Source: (EBRD , 2015)

Consumption of A4 office paper per public officer. Cost and quantity of A4 office paper consumption for each public officer are estimated based on the number of workers in public organizations involved in the survey. An average of two reams of A4 paper per month is allocated for each officer in state central agencies. One ream of paper per month is allocated for each officer of municipality and its affiliated organizations. An average 0.4 ream of paper is consumed by each officer of local administrative organizations and 0.3 reams per month are used by each officer at public service organizations.

Table 13 Monthly average consumption of A4 office paper per public officer

Classification of organizations	No. organizations	No of workers	Monthly consumption expenditure per worker (MNT)	Monthly consumption per worker (ream)
State central administration organizations and their affiliated organizations (Level-I)	29	3065	12335	1.6
Municipal administration organizations and their affiliated organizations (Level-II)	9	933	6028	0.8
Local administration organizations and their affiliated organizations (Level III)	10	827	3432	0.4
Public service organizations	17	1170	2523	0.3
State-owned enterprises	3	1818	2309	0.3

Source: (EBRD , 2015)

Approximate estimation of A4 paper consumption. Based on the above-mentioned monthly consumption per officer, A4 paper consumption of all public officers in Ulaanbaatar can be assumed as follows. The total number of government officials in Ulaanbaatar was 89,430 in the beginning of 2015.

Table 14 Approximate estimation of A4 office paper consumption in total public organizations

Classification of public organizations	Classifications of civil service	Number of workers	Monthly consumption per worker (ream)	Projection of monthly consumption (ream)
--	----------------------------------	-------------------	---------------------------------------	--

State central administrations, the related agencies and other organizations*	Political position	436	1.6	698
	Public administration	4466	1.6	7146
	Civil special service	29171	0.8	23337
	Public service	25777	0.8	20622
Municipal administration organizations and affiliated organizations	Political position	203	1.6	325
	Public administration	3648	1.6	5837
	Civil special service	1602	0.8	1282
	Public service	24127	0.3	7238
Total		89430		66485

Source: Statistics of Composition and Movement of Public Officers in Mongolia, 2014

The potential monthly A4 paper consumption of all public organizations in Ulaanbaatar is 66,485 reams or 166,213 kg of paper. If the average price of a ream is MNT 7600, those organizations are expected to spend MNT 505 million for procuring A4 paper monthly.

Public organizations' A4 office paper procurement

Since it is not possible to determine the total A4 paper procurement quantity of all public organizations due to the lack of data, we use data collected by MIRIM Consultant LLC. A4 paper procurement data in 2014 was collected from 45 organizations out of 68 involved in the survey conducted by MIRIM Consultant LLC. As of the first three months of 2015, not all organizations had the information as some of them had not yet procured A4 paper. Therefore, estimates are mainly based on 2014 data.

In 2014, those 45 organizations procured 40,157 reams of paper with more than MNT 266 million. The table below shows quantity, average price and total cost of A4 paper procured by those 45 organizations in 2014 and in the first three months of 2015. 62% of A4 paper procured in 2014 is allocated to state central administrations and the affiliated agencies, 18% is procured by municipality and related organizations, 3% is procured by local administration and affiliated organizations, 8% is related to public services while 13% is procured by state-owned enterprises and industries.

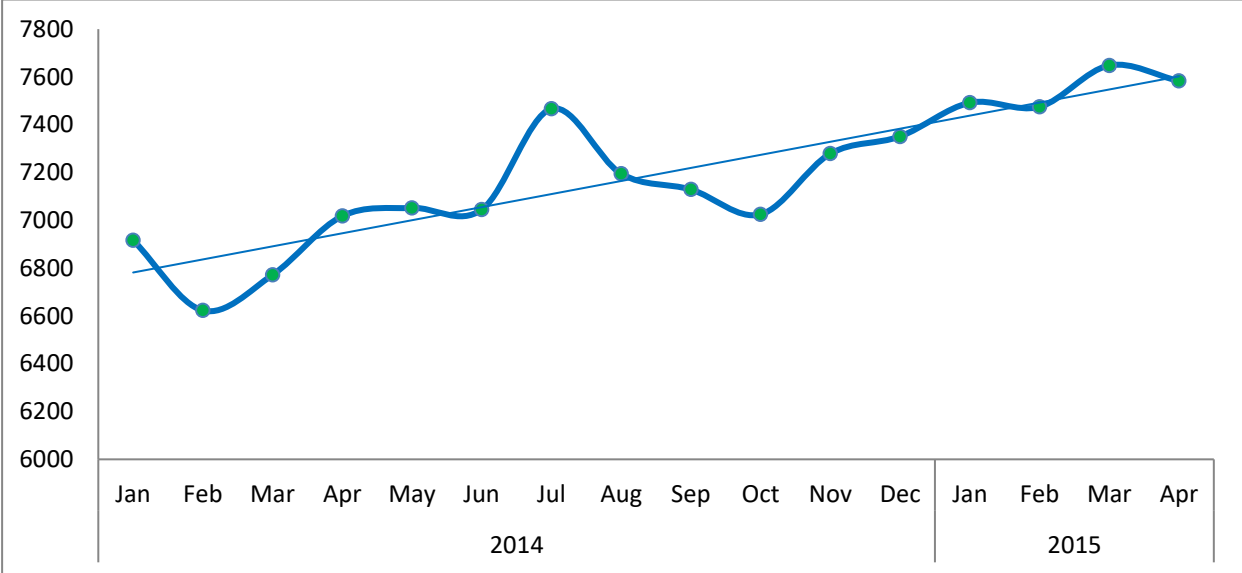
Table 15. A4 office paper procurement of public organizations in Ulaanbaatar, 2014-2015.Q1

Classification of public organizations	Number of organizations	2014			First Quarter of 2015		
		Procured quantity (ream)	Average price (MNT)	Total expenditure (mln. MNT)	Procured quantity (ream)	Average price (MNT)	Total expenditure (mln. MNT)
State central administration organizations and their affiliated organizations	25	24802	7136	164.4	310	7650	0.383
Municipal administration organizations and their affiliated organizations	6	6804	6942	47.8	1895	7489	14.3
Local administration organizations and their affiliated organizations	6	1315	7171	9.2	750	7581	5.6
Public service organizations	6	680	7100	4.7	358	7473	2.7
State owned enterprises	2	6556	6709	40.2	1477	6427	9.7
Total	45	40157	35058	266.3	4790	36620	33

Source: (EBRD , 2015)

A4 paper price and procurement dynamics. Dynamics of monthly average prices of A4 paper procured by 45 organizations between 2014 and the first quarter of 2015 are illustrated in the following figure. Average procured price was MNT 7192 in 2014-2015.04, the lowest price was MNT 6,622, while the highest price was MNT 7648. Average price by April, 2015 is 10 percent higher than that of January 2014.

Figure 14. Dynamics of monthly average price of A4 copy paper, 2014-2015.04

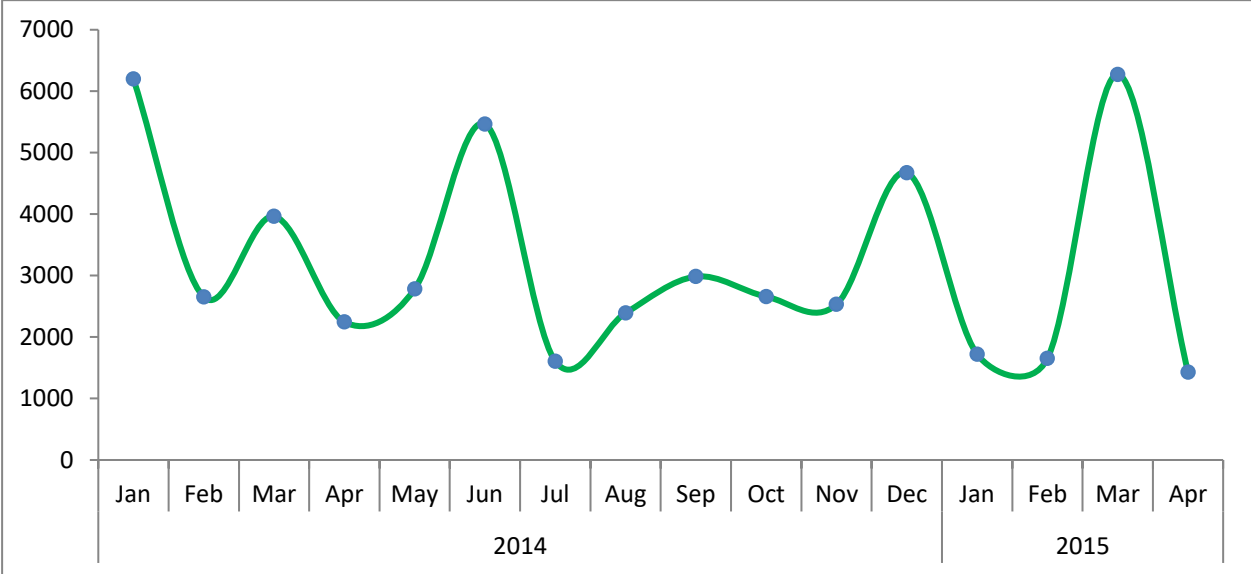


Source: (EBRD , 2015)

There is no notable difference between market price of A4 copy paper and the average procured price of public organizations.

Dynamics of A4 paper procurement carried out between 2014 and the first four months of 2015 are illustrated in the following figure. The figure shows that there is a monthly effect on procurement quantity. More specifically, public organizations involved in the survey tend to procure A4 paper with a 1-2 month frequency. Average monthly procurement quantity is 3202 reams, quantity of the lowest procurement is 1424 reams and the highest is 6273 reams for these public organizations.

Figure 15. Dynamics of monthly procurement of A4 copy paper, 2014-2015.04



Source: (EBRD , 2015)

Identifying the main obstacles and opportunities for the purchase of sustainable A4 copy paper

According to the data used in “Demand and Supply Analysis of Four Product Markets: A4 copy paper, Printer ink cartridge, Computer and Fuel”, by EBRD in 2015, 45 public organizations all consume the brands of A4 copy papers (Double A, Yes Silver and Miilk) that are in compliance with the sustainability criteria (See Table 3). However, employees procuring A4 copy paper in public organizations have very weak awareness of sustainable products. Therefore, main obstacles for the purchase of sustainable A4 copy paper may be the poor knowledge of procurement practitioners. In addition, delivery service and flexibility in payment term are important for the purchase of A4 paper of public organizations.

As introducing sustainable criteria in the public procurement, the government will make significant contribution in the sustainable development through government spending. Its value is huge. Not only reduce impact in environment but also protect public worker’s health and adopt responsible business and ethical business practice.

The price of sustainable paper is higher than that of the conventional paper in the market. However, most public organizations in Ulaanbaatar are accustomed to using A4 paper that is in compliance with the sustainability criteria regardless of the price difference. Therefore, price difference between sustainable and conventional papers may not be a problem for public organizations in Ulaanbaatar city. Based on this reasoning, it can be concluded that there is no notable problem for public organizations to re-structure the procurement process with regard to sustainability criteria.

1.4 CONCLUSIONS AND RECOMMENDATIONS DRIVEN FROM THE MARKET ANALYSIS ON A4 COPY PAPER

In Mongolia, there is **no local production of A4 copy paper**. All grades of A4 paper in the Mongolian paper market are **imported from abroad**. Recycled paper is not imported in the Mongolian market, whereas paper made from both sustainably harvested virgin fibers and natural forest⁵ are imported from Thailand, Finland, Russia, South Korea, China and Malaysia. In this research, non-brand A4 copy papers produced from natural forests were not studied because of the inconsistency of sustainability criteria.

The Mongolian paper market **does not have laboratories, instruments, or tools to certify and verify the sustainability** of the office paper imported. There is also **no national ecolabel** relevant to A4 paper. Therefore, international ecolabels and standards are applied for verifications.

Some brands of A4 paper available in the Mongolian paper market use renewable energy and water that is drawn from rain water reservoirs for pulp and paper production. The majority of the brands have been certified with **ISO 14001, ISO 9001 and ISO 9706**. Some of them bear the **European Ecolabel, FSC and PEFC labels**.

Main local official distributors of copy paper in Mongolia have created a number of jobs and support SMEs and individuals through their supply chains. Moreover, some of them spearhead

⁵ Virgin fiber paper is most commonly used and comes directly from native forests. Virgin fiber paper contains the strongest fiber but has the most immediate impact on the forests. However, that impact is diminished if paper is produced from virgin fiber stemming from legally harvested woods and from sustainably managed forests.

some funding programs to give assistance for the education of Mongolian children. However, medium and small suppliers have not any activities related to social responsibility.

Most brands of A4 copy paper such as “Double A”, “Yes Silver”, “Miilk”, “CAMPAP”, “IDEA Work” and “Paper one” meet the main sustainability requirements (See Table 3). The provision of these types of A4 paper is very common across Ulaanbaatar city. 86% of the total supply of A4 (2.5 million kg) was branded Double A, 3% was Miilk, 2.5% was IDEA, 1.3% was CAMPAP and 1% was Yes-Silver.

Therefore, all basic sub-categories of sustainable A4 copy paper that are recognized at the international level are possible to obtain when practicing SPP in the context of Mongolia, namely:

- Paper produced from virgin fibres stemming from legally harvested woods and from sustainably harvested wood;
- Elemental chlorine free;
- Brightness;
- Environmentally friendly packaging;
- Technical quality;
- Environmental management system;
- Quality management system; and
- Recyclable (post-consumer).

As mentioned before, most verification means of sustainability criteria at international level can be applied to A4 copy paper. However, a certain period will be needed to implement sustainable criteria in public procurement.

The table below proposes sustainable criteria and their verification means that can be applied in sustainable public procurement within the specified timeframe.

Table 16. Sustainability criteria and corresponding verification for SPP of A4 copy paper

Environmental sustainability criteria			
Sustainability criteria	Short term	Medium term	Long term
	Verification	Verification	Verification
Recycled paper	This criterion does not seem appropriate due to the lack of provision of recycled paper	This criterion does not seem appropriate due to the lack of provision of recycled paper	-Any type I ecolabel, such as Blue Angel, or Recycled label. -Any other appropriate means of proof
Paper produced from virgin fibre stemming from legally harvested woods and from sustainably harvested wood	Appropriate means of proof, such as a technical dossier of the manufacturer or a test report from a recognized body	FSC or PEFC label, European label, Nordic Swan label	FSC or PEFC label, European label, Nordic Swan label
Elemental chlorine free	Appropriate means of proof, such as a technical dossier of the manufacturer or a test report from a recognized body	European ecolabel, Blue Angel, Nordic Swan, Eco Mark Japan, Chlorine-Free Products Association (CFPA)	European ecolabel, Blue Angel, Nordic Swan, Eco Mark Japan, Chlorine-Free Products Association (CFPA)
Brightness	Written proof that they meet this criterion.	Written proof that they meet this criterion.	Written proof that they meet this criterion.
Environmentally friendly packaging	Declaration by the packaging producer where the percentage of recycled content for	Declaration by the packaging producer where the percentage of recycled content for cardboard in	Declaration by the packaging producer where the percentage of recycled content for cardboard in

	cardboard in their packaging is specified	their packaging is specified	their packaging is specified
Technical quality	A sample of the paper must be provided to the procurer in order to test the quality of paper.	A sample of the paper must be provided to the procurer in order to test the quality of paper.	Paper certified that compatible with machinery in accordance with DIN 190309, AFNOR Q11-013, or equivalent.
Environmental management system	-Written corporate environmental policy, consistent with ISO 14001, or equivalent. - -Any other appropriate evidence	ISO 14001	ISO 14001
Quality management system	-	ISO 9001	ISO 9001
Long life	-	ISO 9706	ISO 9706
Recyclable (post-consumer)	Appropriate means of proof, such as a technical dossier of the manufacturer or a test report from a recognized body	Recyclable labels	Recyclable labels
Social sustainability of suppliers			
Social responsibility	-	Appropriate proof that the requirement has been met.	Appropriate proof that the requirement has been met.
Supply chain according to labour standards and human right laws	-	Appropriate proof that the requirement has been met.	Appropriate proof that the requirement has been met.
Economic sustainability of suppliers			
Job creation in local economy	Appropriate proof that the requirement has been met.	Appropriate proof that the requirement has been met.	Appropriate proof that the requirement has been met.
Cooperation with SMEs and individuals through paper supply chain	Appropriate proof that the requirement has been met.	Appropriate proof that the requirement has been met.	Appropriate proof that the requirement has been met.

Compared to the price of conventional A4 copy paper, the higher price of sustainable A4 copy paper is not a main obstacle to the introduction of sustainable criteria in public procurement because most public organizations are accustomed to using the brands of A4 copy paper in Ulaanbaatar. However, the price difference between sustainable and conventional A4 copy papers may be an obstacle to introducing SPP in the countryside.

Based on the lessons learned from research, the following is recommended to launch SPP for A4 copy paper:

- ✓ Build knowledge and capacity regarding SPP amongst procurement specialists in public organizations.
- ✓ SPP criteria need to be launched in stages. Namely, basic criteria on environmental sustainability need to be applied to public procurement in the short term. Criteria related to social and economic sustainability should be introduced in public procurement in the medium term. The main reason is that only few companies that hold the main share of the market will immediately meet all requirements in SPP. By introducing sustainability criteria in public procurement stage-by-stage, small and medium-scaled suppliers will be able to compete in this environment.

- ✓ SPP should be first introduced in bigger public organizations in the central regions of the country that have high consumption of A4 paper. Following this, it should be rolled out more widely.
- ✓ Build knowledge and capacity regarding SPP amongst small- and medium-sized suppliers. Currently, only the main importers in the market have a good knowledge of sustainable A4 paper. However, their workers in the supply chain, as well as most small- and medium-sized suppliers and vendors have little knowledge about the product. By increasing knowledge of sustainable alternatives, the provision and types of these products should become greater in size, and it should make them more competitive on the market.

Reduce. Re-use. Recycle.



II. Market Analysis for Toner Cartridge

2.1 SUB-CATEGORIES OF PRINTER INK CARTRIDGE, PRELIMINARY COMPENDIUM OF SUSTAINABILITY CRITERIA AND MEANS OF VERIFICATION

This section of the report aims to identify the specific sub-categories of sustainable toner cartridge, to summarize the sustainability criteria of toner cartridge, and to determine the means of verification for the sustainability criteria at international and national levels.

2.1.1 Identification of Sub-Categories of Sustainable Products

International sub-categories of toner cartridge

As mentioned before, the study aims to define categories of sustainable products by taking into account the combination of environmental, social and economic sustainability aspects. Categories related to social and economic sustainability are almost the same as copy paper. Therefore, this part mainly concentrates on the environmental sustainability for toner cartridge.

Environmental sustainability: Environmentally sustainable toner cartridges can be defined as any effort undertaken to reduce the environmental impact of toner cartridges. The main issues for toner cartridges are toxic chemicals and heavy metals used in the production, consuming significant amount of energy, generating a considerable amount of waste arising from empty toner cartridges and contaminating the natural environment due to their hazardous content. Ecolabels focus on the following environmental impacts:

- *Chemicals contained in the toner powder:* Chemicals can be harmful to both human health and the environment. Toner powder may irritate the human respiratory system and cause disease due to dangerous chemical components and the heavy metals used. Improperly discarding empty toner cartridges pollute the natural environment due to their hazardous pollutants.
- *Use of recycled materials, reuse and take-back systems:* The biggest environmental concern with cartridges is resource consumption. Original equipment manufacturers (OEMs) burn a significant amount of energy for the production of toner cartridges. On average, they consume about 3 litres of oil to produce a typical cartridge. Moreover, other national resources such as plastic, metal, rubber, foam and paper are used in the production of toner cartridges.

The next environmental issue arising from the use of cartridges is the waste stream which would normally go to landfill. According to the European Toner and Inkjet Remanufacturer Association (ETIRA), more than 500 million of printer cartridges end up dumped in landfills around the world.

Therefore, the reuse and recycling of cartridges could be significant in reducing environmental impacts. Reusing and recycling of cartridges not only avoid draining the planet natural resources, but also substantially reduce the number of cartridges going to landfill. There are two common approaches to reuse cartridges: remanufacture and take-back service. Remanufactured toners are used toner cartridges refilled with toner as well as replaced with expendable parts. Cartridges can easily be remanufactured up to 2-3 times. Take-back service is that many OEMs offer their customers to return used cartridges. All returned cartridges are recycled into useful materials, which then go on to become new products again. Any parts that cannot be recycled are treated and disposed of in a way that causes minimal environmental impact.

- *Case parts:* Chlorinated plastics such as PVC used in the cartridge parts or packaging, together with use of brominated flame retardants in the casing.

- *Environmentally-friendly packaging:* The packaging for toner cartridges will not contain PVC or other chlorinated plastics.
- *Release of volatile organic compounds (VOC) during the use:* VOCs are organic chemicals that have a high vapor pressure at ordinary room temperature. Some VOCs are dangerous to human health or cause harm to the environment. Harmful VOCs typically are not acutely toxic, but have compounding long-term health effects.
- *Corporate environmental policy:* Suppliers of toner cartridges can produce a sustainability report or environmental policy that is consistent with international standards.

Social sustainability: As defined in the A4 paper section, toner cartridges in terms of social sustainability can be defined as any effort that creates social value in national and local communities. In case of social sustainability, toner cartridges' sub-categorizations include corporate social responsibility, the ILO conventions as well as quality and technical issues. Social responsibility and the ILO core conventions are the same in the A4 paper section.

- **Quality and technical issues:** The majority of remanufactured cartridges now offer equivalent quality, performance and yield as original cartridges. Some companies still continue with bad practices today, but most have made a legitimate effort at selling a quality product. That is why it is advised to purchase remanufactured toner cartridges that have been tested by the supplier and meet one of the national or international quality standards for toner cartridges, such as ASTM F1856⁶, ASTM F2036⁷, DIN 155, DIN 33870⁸ and DIN 33871-1, or ISO/IEC 19752⁹, ISO/IEC 1979824¹⁰.

Some printing machines may not accept the usage of remanufactured cartridges due to the inclusion of a specific technology. Purchasers should check the printing machine before using such cartridges to ensure that the printer will accept the remanufactured cartridge.

In addition, OEMs tend to threaten that the warranty for printer will be invalid unless original cartridges are used in the printer. Therefore, it is important to purchase remanufactured cartridges from a company that guarantees to repair any damages due to its cartridge.

Economic sustainability: Cartridge can be defined in terms of economic sustainability as a contribution to local economic outcomes, including cost savings. Cartridges' sub-categorizations of economic sustainability are the same as in the A4 paper section.

⁶ ASTM F1856-Standard Practice for Determining Toner Usage for Printer Cartridges

⁷ ASTM F2036- Standard Test Method for Evaluation of Larger Area Density and Background on Electro photographic Printers

⁸ DIN is short for Deutsche Industrie Norm, the worldwide renowned German institute for standardization. DIN has elaborated several standards for remanufactured toner and inkjet cartridges. DIN standards 33870, 33871 and can be obtained from DIN. DIN 33870 Information technology; Office machines – Requirements and tests for the preparation of refilled toner modules for electro photographic printers, copiers and facsimile machines
DIN 33871-1 Information technology; Office machines – Requirements and tests for the preparation of refilled toner modules for electro photographic printers, copiers and facsimile machines

⁹ Information technology - Method for the determination of toner cartridge yield for monochromatic electrophotographic printers and multi-function devices that contain printer components.

¹⁰ Conformity assessment - General requirements for bodies operating certification of persons.

The table below summarizes the main sub-categories of sustainable toner cartridge as described above in terms of environmental, social and economic sustainability aspects

Table 17 Sub-categories of sustainable toner cartridge

Environmental sustainability			
Sub-categories			Sub categories for SPP approach ^(a)
Chemicals contained in the toner powder	Heavy metals in toner	⇒	-Heavy metals in toner -Azo-colorants in toner -Remanufacture (requirements for case parts) -Re-use/recycling -Take-back scheme -Environmental management system
	Azo-colorants in toner		
	Harmful and hazardous substances in toner		
Impact on climate change	Remanufacture (requirements for case parts)		
	Re-use/recycling		
	Take-back scheme		
	Environmentally-friendly packaging		
Impact on manufacturer /supplier	Corporate environmental policy		
	Environmental management system		
Social sustainability			
Impact on local communities	Production and supply chain according to international labor standards and human rights laws	⇒	- Production of product according to international labor standards - Technical quality
	Local sustainability		
	Technical quality		
Economic sustainability			
Impact on local economies	Economic contribution of cartridge sector to national GDP	⇒	Cartridges that are compatible with major printers
	Job creation of cartridge sector in a country and opportunities for SMEs		
	Cartridges that are compatible with major printers		
	Re-investing in operations of cartridge sector		

Local sub-categories of toner cartridge

80% of the total printer cartridges supplied to the market are imported from foreign markets. Toner cartridges supplied in the Mongolian market can be categorized as follows:

- ✓ Original equipment manufacturers’ toner cartridges;
- ✓ Remanufactured toner cartridges (cartridges that have been refilled with toner as well as replaced with expendable parts);
- ✓ Toner cartridges produced by local and domestic companies with imported components assembled in Mongolia;
- ✓ Re-charged cartridge (only toner has been replaced in original and remanufactured cartridge); and
- ✓ Imitated cartridge imported from China (Produced according to the original printer cartridge characteristics with cheap materials and components).

All kinds of original toner cartridges of large manufacturers are available in Mongolia. Most of them are imported from China and Hong-Kong. In this research, imitated cartridges illegally imported and re-charged cartridges will be not studied due to inconsistency with sustainability criteria.

Most imported original toner cartridges contain the allowed amount of chemicals. Moreover, imported original and remanufactured toners are mainly modules that are easily separable and have separable joints. However, there is not any take-back service for original cartridges even though the official distributors of most original equipment manufacturers are located in Mongolia. It means that all empty original and remanufactured cartridges go to landfills. Refilling of toner cartridges is common in the Mongolian market. Cartridges are typically refilled up to 2 times before disposal.

In the case of domestic manufacturers, there are about 5 manufacturers of printer cartridges operating in Mongolia. Depending on the printer cartridge type, 13 to 21 components are required for assembling printer cartridges. Manufacturers import printer cartridge components from Japan, Korea and China. One of them tries to produce cartridges that are consistent with environmentally sustainable criteria. The company use case and components imported from original manufacturers for the production of cartridges besides applying environmentally friendly packaging. This company also offers take-back service, and collected empty cartridges are remanufactured.

Main local official distributors of toner cartridges in Mongolia have created a number of jobs and support SMEs and individuals through their supply chains. Moreover, their efforts in providing social services in local communities have contributed to socio-cultural and education advancement.

2.1.2 Preliminary Compendium of Sustainability Criteria and Means of Verification

In order to ensure the sustainability of toner cartridges, we need to identify the labels and certifications for sustainable toner cartridge.

Ecolabelling and Certification for toner cartridge: There is a number of ecolabels for toner cartridge, such as the Nordic Swan, Blue Angel, Austrian Umweltzeichen, Eco Mark Japan, Thai Green Label, Ecologo, ISO14000 family, standards of ASTM International and DIN and others. Short descriptions for these ecolabels are attached in Annex 1.

According to the Sustainable Procurement Guidelines of UNEP, basic and advanced sustainability criteria may be used in Sustainable Procurement. In this study, we will focus on basic sustainability criteria and their means of verification for toner cartridges.

The table below summarizes the sustainability and verification criteria for toner cartridges used by the United Nations and the European Commission.

Table 18 Sustainability criteria and verification for toner cartridge, international level

#	Sustainability criteria	Means of Verification
1	<p>Heavy metals in toner: Toners must not be manufactured with a combined total of more than 100 ppm (parts per million) of heavy metals such as lead, mercury, cadmium, or chromium.</p>	<p>Cartridge carrying the Blue Angel, the Umweltzeichen (Austrian ecolabel), the Eco Mark Japan, Ecologo, Thai Green Label or the Nordic Swan can serve as means of proof.</p> <p>Any other appropriate means of proof, such as a technical dossier of the manufacturer or a test report from a recognized body will also be accepted.</p>

2	<p>Azo-colorants in toner: The content of the toner powder of primary unsulphonated aromatic amines soluble in 1M hydrochloric acid and expressed as aniline does not exceed 500 mg/kg, and there is no more than 10 mg/kg Benzidine, β-Naphthylamine and 4-Aminobiphenyl</p>	<p>Cartridge carrying the Blue Angel, the Umweltzeichen (Austrian ecolabel), the Eco Mark Japan, Ecologo, Thai Green Label or the Nordic Swan can serve as means of proof.</p> <p>Any other appropriate means of proof, such as a technical dossier of the manufacturer or a test report from a recognized body will also be accepted.</p>
3	<p>Requirements for case parts (for remanufactured toner cartridges):</p> <p>Plastic Parts shall</p> <ul style="list-style-type: none"> • Contain a maximum of 0.1% Polybrominated biphenyls (PBBs) and polybrominated diphenyl ethers (PBDEs); and • Not contain any chlorinated plastics. 	<p>All products carrying the Blue Angel, the Umweltzeichen (Austrian ecolabel), the Eco Mark Japan, Ecologo, Thai Green Label or the Nordic Swan can serve as means of proof.</p> <p>Any other appropriate means of proof, such as a technical dossier of the manufacturer or a test report from a recognized body will also be accepted.</p> <p>Bidders shall demonstrate compliance with the criterion of “quality and guarantee” in writing</p>
4	<p>Ease of re-use/recycling:</p> <p>Original cartridges shall</p> <ul style="list-style-type: none"> • Have modules that are easily separable by hand or with standard tools; • Not have non-separable joints, such as glued or welded joints between different materials (for case parts and chassis); • Not have integrated circuit chips or other devices or designs installed or implemented to prevent disassembly or re-use; and • Suppliers or manufacturers do not place or attempt to place physical, contractual, or legal restrictions upon the use of remanufactured cartridges by third parties. 	<p>Bidders must provide a written declaration of compliance with this criterion. Upon request, they may be asked to provide samples of the product and/or documentation from manufacturers of cartridges or their components.</p>
5	<p>Take-back scheme: Bidders shall ensure that empty and used toner cartridges are taken back for the purpose of reusing and recycling the toner cartridge.</p> <p>Information on the terms of the take-back scheme as well as the return station shall be included on the product packaging. Information/instructions on appropriate handling of the toner cartridges, for example, for opening and closing, shall also be provided on the product itself.</p>	<p>Bidders must provide appropriate documentation of the existence of a toner cartridge take-back scheme. Bidders must demonstrate the existence of appropriate information/instructions on handling cartridges.</p>
6	<p>Compliance with environmental legislation: Bidders shall not be permitted to take part in a contract if they:</p> <p>Have been found guilty of grave professional misconduct, including non-compliance with environmental legislation, or have not fulfilled</p>	<p>Bidders must provide a declaration that they meet this criterion.</p>

	obligations relating to the payment of social security obligations.	
7	Production of the product according to international labor standards: The bidder shall provide proof from an independent third party certification body that the manufacturer of the product complies with international working standards (ILO Core Convention) throughout the whole supply chain.	The bidder is required to submit appropriate proof that these requirements have been met.
8	Written corporate environmental policy: The bidder will provide own written corporate environmental policy.	The bidder is required to present the written corporate environmental policy, consistent with ISO 14001, or equivalent. Any other appropriate evidence will be accepted.

Source: Sustainable Procurement Guidelines, UNEP, 2010 and Green Public Procurement, European Commission

Currently, the Mongolian toner cartridge market does not have laboratories, instruments, or tools to certify and verify the sustainability of toner cartridges imported and locally produced. There is also not any national ecolabel relevant to toner cartridges. Local importers and suppliers rely on the international ecolabels and international standards on the package. Main official distributors have attested copies of certificates such as ISO 14000 series (environment), ISO 9000 series (quality) and technical data of cartridges provided by the manufacturer.

The majority of toner cartridges available in the Mongolian cartridge market has been certified with ISO 14001, ISO 9001, DIN and ISO/EIC family. Since Mongolia has not adopted any standards for toner cartridges, it is complicated to verify cartridges produced in Mongolia.

The table below summarizes the sustainability and verification criteria for the categorization of toner cartridges in Mongolia.

Table 19 Sustainability criteria and verification for the categorization of toner cartridges sold in the Mongolian market

Environmental sustainability criteria			
	Original toner cartridge	Remanufactured toner cartridge	Toner cartridges produced by domestic companies
Heavy metals and azo-colorants	-Some have ecolabels serve as a proof -Some distributors have technical data from OEMs	-Some suppliers have technical data from remanufacturers of cartridges -Some small and medium scaled suppliers have documentation for verification	No documentation for verification due to lack of laboratories and national standards
Requirements for case parts and other components (for remanufactured toner cartridges)		-Some suppliers have technical data from remanufacturers of cartridge -Some small and medium scaled suppliers have any documentation for verification	-One domestic manufacturer has a proof -Others do not have documentation for verification due to the lack of laboratories and national standards
Ease of re-use/recycling:	Yes		Yes

Take-back scheme	No	No	One manufacturer offers take-back scheme
Environmentally preferred packaging	Yes	Yes	Yes
Environmental management system	ISO14001	Some have ISO14001 and others do not	No
Quality management system	ISO 9001	Some have ISO14001 and others do not	No
Social sustainability of key suppliers in Mongolia			
Social contribution	Yes	Yes	Yes
Supply chain according to labor standards and human right laws	Yes	Some suppliers adhere to labor standards, while others ignore the standards	Yes
Technical quality	Yes	Yes	Yes
Economic sustainability of key suppliers in Mongolia			
Job creation in local economy	Yes	Yes	Yes
Cooperation with SMEs and individuals through supply chain	Yes	Yes	Yes

Source: findings of interviews with key suppliers.

2.2 SUPPLY ANALYSIS OF TONER CARTRIDGE

This section aims to assess the capabilities of the local market to supply sustainable cartridge, and to analyse the potential threats or opportunities for supplying sustainable cartridges. In this section, the main objectives are:

- Determining the market structure of toner cartridge
- Identification of the level of availability and the market share of main cartridges that are mainly sold in the market
- Determining the market players
- Identification of the main obstacles limiting the supply of toner cartridges
- Analysis of potential threats and opportunities for the local production
- Analysis of the potential for development of toner cartridges

2.2.1 The Market Structure of Toner Cartridges

The purpose of this section is to determine the competition level of the toner cartridge market. In order to determine the type of market, the following market determinants are necessary:

- The number of suppliers in the market
- Suppliers control over price and capability of influencing market price
- Product differentiation
- Barriers to entry into the market and firm turnover
- Four-firm concentration ratio
- Herfindahl-Hirshman Index

The total number of suppliers in the market. Data from Custom Registration (2012-2015.10) shows that 15 companies have been continuously supplying printer ink cartridges in the last three years. Moreover, 5 domestic manufacturers such as Tugs Dardas LLC, Future vision LLC, Digital Service LLC, Security Solution Service Consulting LLC are producing toner cartridges in Mongolia. From the interview with key suppliers, there is a large number of small suppliers supplying imitated cartridge in the market.

By comparing the above mentioned and eliminating the duplicated numbers of suppliers, it can be concluded that there are approximately 20 suppliers supplying cartridges in the market.

Product differentiation. There is a great number of printer cartridges sold in the market. In our research, it is impossible to include all types of printer cartridges, therefore, our research has selected the most common toner cartridges, and attempted to determine the differences between these cartridges. As mentioned before, toner cartridges sold in the market are differentiated. For example, certain cartridges have various alternatives such as original, remanufactured, imitated and domestically produced cartridges. Therefore, we can conclude that cartridges in the market have significant differences between one another.

When linking the types of cartridge with the categories of sustainability, original cartridges carry easily verifiable ecolabels, technical data from OEMs and standards such as ISO 14001 and ISO 9001 on the package. Some remanufactured cartridges have ecolabels and standards; the rest does not carry any ecolabel and ISO. Cartridges produced domestically do not have any ecolabels and standards. Furthermore, the take-back scheme does not work for all types of cartridges. Only one domestic producer offers a take-back scheme in Mongolian cartridge market (See Table 19).

Suppliers' control over price. Most main importers and key manufacturers have said that "They prefer to set the price using a cost plus profit method", while few of them responded that "They prefer offering discounts on the market price". From this, we can conclude that the suppliers can control the price of toner cartridges in the market.

Barriers to entry. Generally, half of the main suppliers involved in the survey said that there is minimum challenge when entering the market, while another half said that it is difficult to enter the market due to the supply of unguaranteed and cheap printer cartridge in the market. However, it depends on types of toner cartridges supplied in the market. The suppliers of original cartridge and domestic producers mainly said that surviving in the market was challenging.

Four-firm concentration ratio. The four largest suppliers of the printer cartridge are IT zone LLC, Altanzuun LLC, Tavan Bogd management LLC and BSB Computers LLC. They had the largest shares of imports in the first 10 months of 2015. The concentration ratio is 69%, therefore the printer cartridge has a moderate concentration in the market.

Herfindahl-Hirshman Index. HHI determined the shares of 20 companies in the market which supply printer cartridge. The HHI result is 1767 on a spectrum between 1000 and 1800, therefore we conclude that the competition in the printer cartridge market is moderate.

The four-firm concentration ratio and HHI results show that the toner cartridge market structure is a monopolistic competition market. Monopolistic competition is a market structure in which a large number of firms compete by making similar but slightly different products. Product differentiation gives firms in monopolistic competition an element of market power. The main suppliers in the printer cartridge market are competing in the market with similar cartridge products that have different origins.

The following table shows the summary of factors in the market structure of printer cartridges.

Table 20 Summary of cartridge market structure

Characteristics	Results
Number of firms in the industry	Many
Product differentiation	Differentiated
Firm's control over price	Some
Barriers to entry	Moderate
4 firms' concentration ratio	69
HHI	1767

Source: Researcher's findings

2.2.2 Sustainable Toner Cartridge Supply

The level of availability of toner cartridges

The level of availability of sustainable toner cartridges is determined by the addition of original and remanufactured cartridges imported from abroad and cartridges produced in Mongolia.

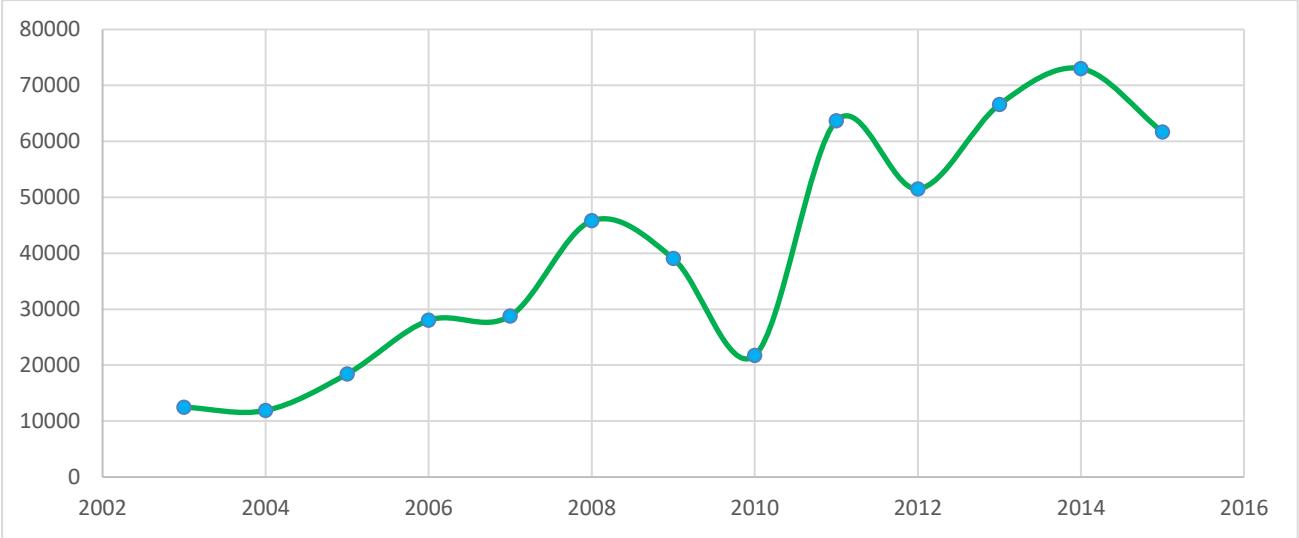
Imported sustainable cartridges

According to Customs data of 2011-2014, 51.5-73 thousand units of toner cartridges were imported in a year. As for the first 10 months of 2015, 61.6 thousand of toner cartridges were imported. The historical import of toner cartridges between 2003 and the first 10 months of 2015 are illustrated in the following figure. Toner cartridges' import was relatively low in 2003-2007, and the yearly average import was 19,900 units in those years. The import of cartridges sharply increased in 2008 compared to a year before, which might find its root in the election of parliament and local governments. After the election year, the import of cartridge decreased dramatically in 2009 and 2010 due to the economic recession. The yearly import of cartridge in 2010 decreased by 52% compared to 2008.

In 2011, the import of cartridges was 3 times higher than the previous year. In 2011-2014, the trend for the import of cartridges was relatively stable and the yearly average import of cartridges was 63,692 units in these years. This high level of import of cartridges may be have been caused by the economic expansion in recent years.

Interestingly, the fluctuations in historical import of cartridges are very similar with the fluctuations in A4 paper import.

Figure 16. The historical import of toner cartridge, 2003-2015.10, in units

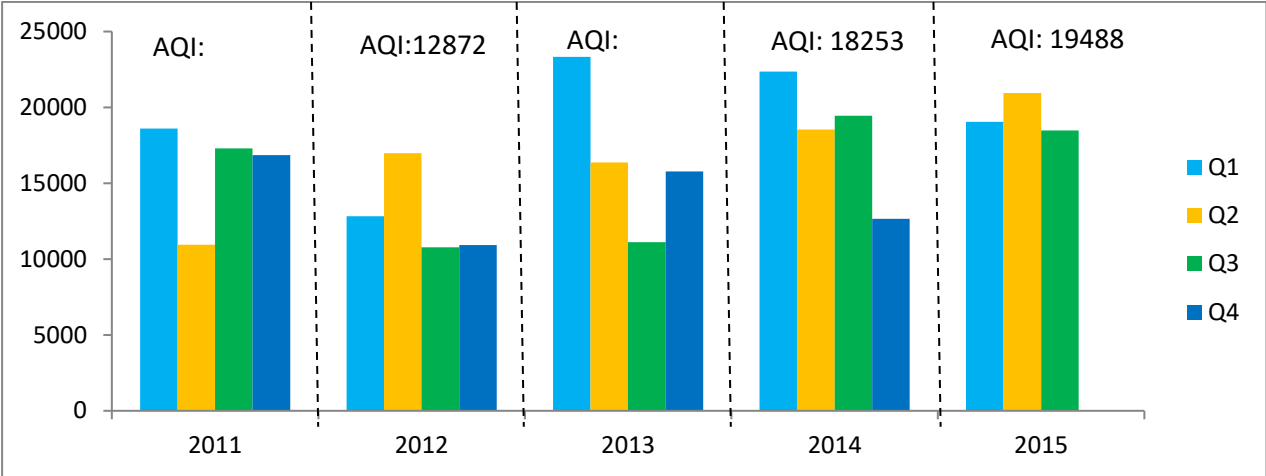


Source: Customs data

When comparing the quarterly import of cartridges in the last 5 years, there is no clear tendency of a seasonal effect in the import of cartridge. Generally, cartridge import in the first quarter

tends to be higher than in the other quarters. On average, 12872-19488 units of cartridges are imported into the local market per quarter according to customs data. The figure below shows quarterly import of cartridge for 2011-2015.

Figure 17. Quarterly supply of toner cartridge, 2013.Q1-2015.Q3, in units

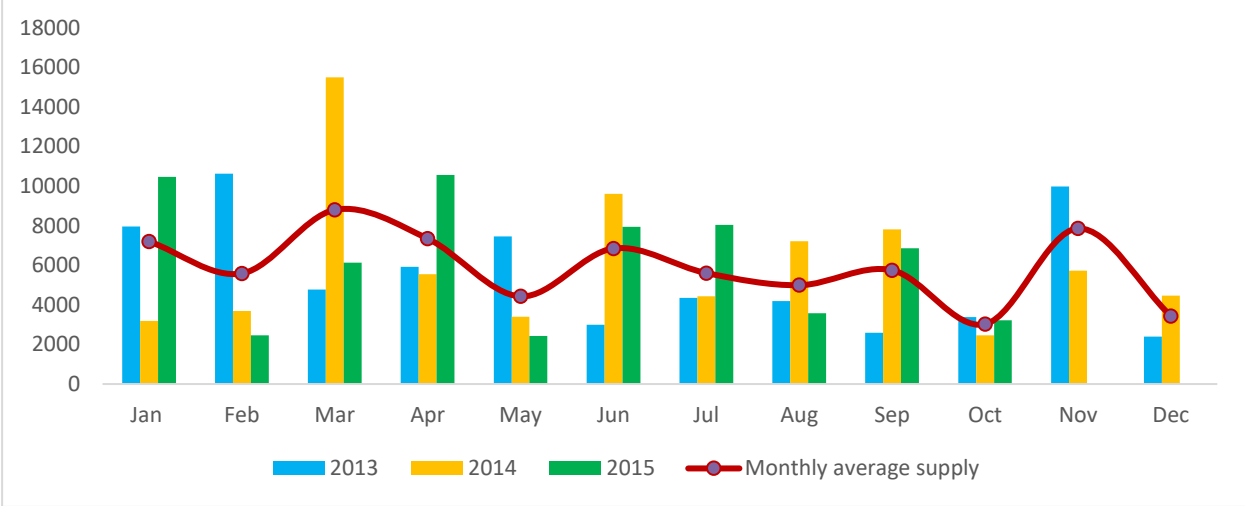


Source: Customs data

Note: AQI-average quarterly import of toner cartridge

When comparing the monthly import of cartridge for the last 3 years, the monthly import is almost similar throughout all the months regardless of some extreme cases. However, the monthly average import of toner cartridges in 2013-2015 shows that the import of cartridges tends to rise in March, June and November. The figure below illustrates the monthly import of cartridges for 2013-2015.

Figure 18. Monthly import of cartridges, Jan 2013-Oct 2015, in units



Source: Customs data

The table below presents the descriptive statistics for the monthly import of toner cartridges for 2011-2015. The average monthly import of cartridge was 6084 and 6168 in 2014 and the first 10 months of 2015 respectively.

Table 21 Descriptive statistics of monthly import of cartridge for 2011-2015, in units

Descriptive stats	2011	2012	2013	2014	2015
Mean	5307	4291	5548	6084	6168
Median	5367	3020	4558	5006	6494
Min	1797	1762	2403	2465	2432
Max	11265	10931	10619	15483	10563

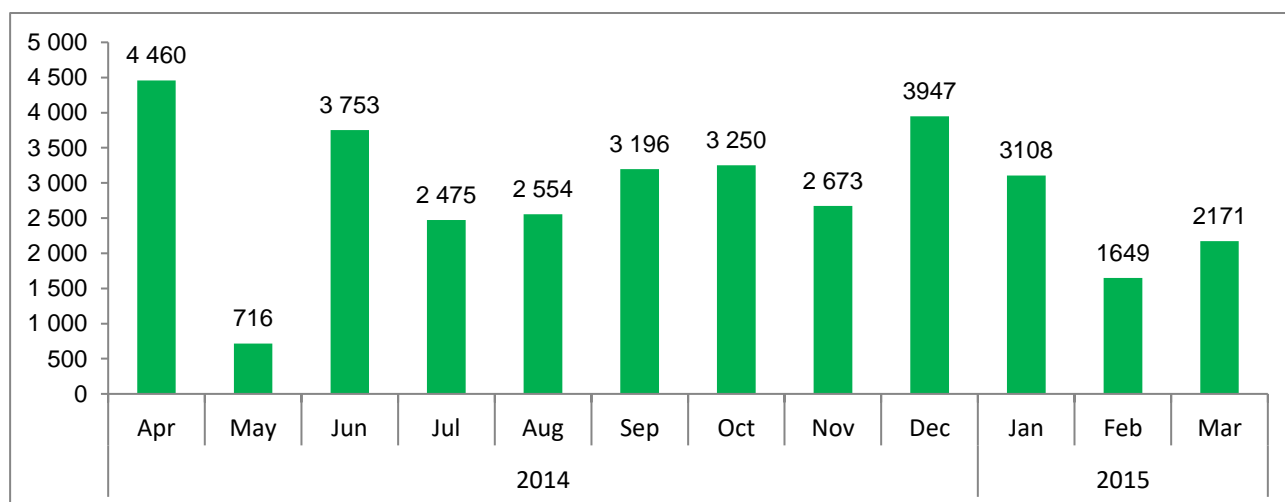
Total	63689	51487	66581	73012	61681
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Source: Customs data

Sustainable cartridges produced in Mongolia

As mentioned before, currently, 5 manufacturers of toner cartridges are operating in Mongolia. One of them is trying to produce sustainable cartridges. Therefore, the supply of this manufacturer was considered within the framework of the research. The manufacturer's capacity of production ranges from 1000 to 3000 units per month. Depending on the purchase orders, they have the opportunity to increase their production twice or three times by increasing workers' shifts. Generally, this domestic manufacturer is fully capable of producing all types of cartridges. Average supply of this manufacturer is 2800-3000 units per month. The figure below illustrates monthly cartridge sales of the domestic manufacturer from April 2014 to March 2015.

Figure 19 Monthly sales of the domestic cartridge manufacturer, Apr 2014-March 2015, in units

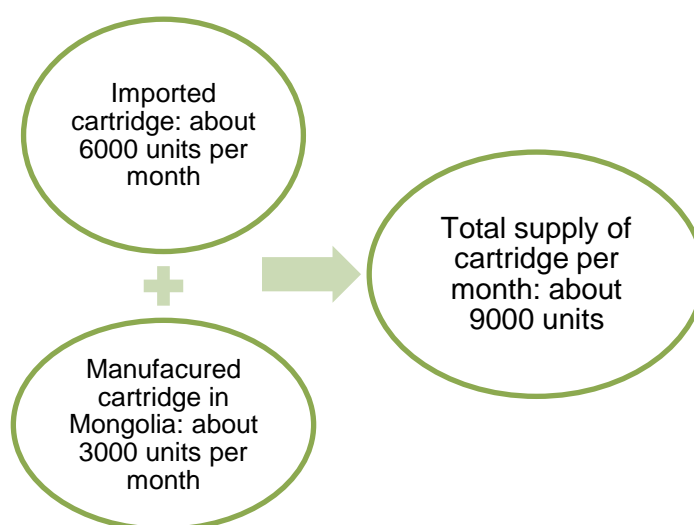


Source: Interview with domestic manufacturer

Total supply of sustainable toner cartridges in Mongolia

By integrating the import of cartridges and domestic manufacturing of cartridges, it can be concluded that about 9000 units of sustainable toner cartridges are supplied in the market monthly.

Figure 20. Monthly supply of cartridge in the market, in units

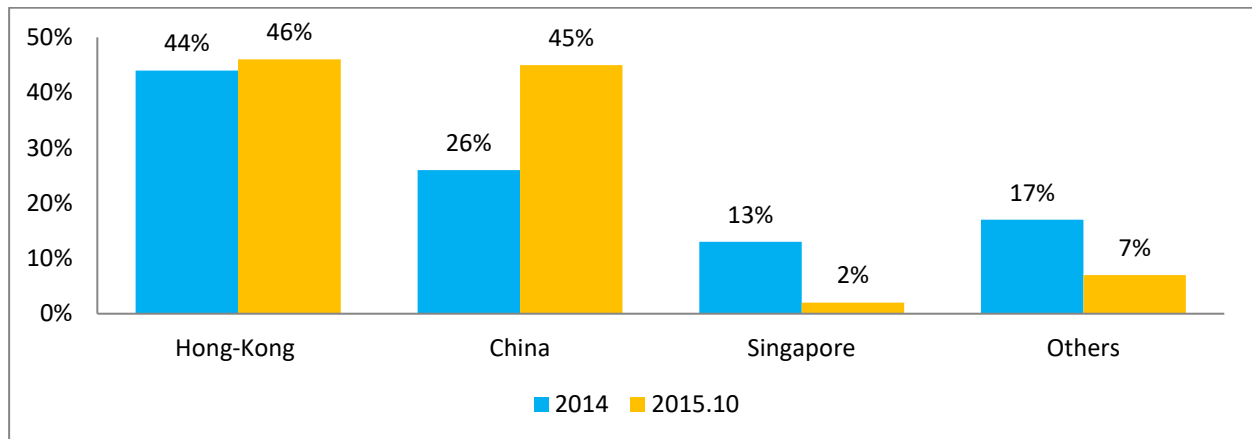


Market share of main cartridge models

Table below shows original cartridges sold by an authorized distributor. Authorized distributors own 3 or 4 different brands of cartridges. HP and Samsung brands for single and multifunction laser printers, the Canon brand for copiers, and the Epson brand for ink printers dominate in the market. Moreover, the Mongolian brand of Master toner is commonly sold in the market. It is difficult to identify market shares for cartridges due to the lack of information and to the diversity of cartridge types.

Toner cartridges are mainly imported from Hong Kong and China. The following chart illustrates the percentage of papers imported from each country for 2014 and the first 10 months of 2015.

Figure 21. Country of origin of imported cartridges, 2014-2015.10

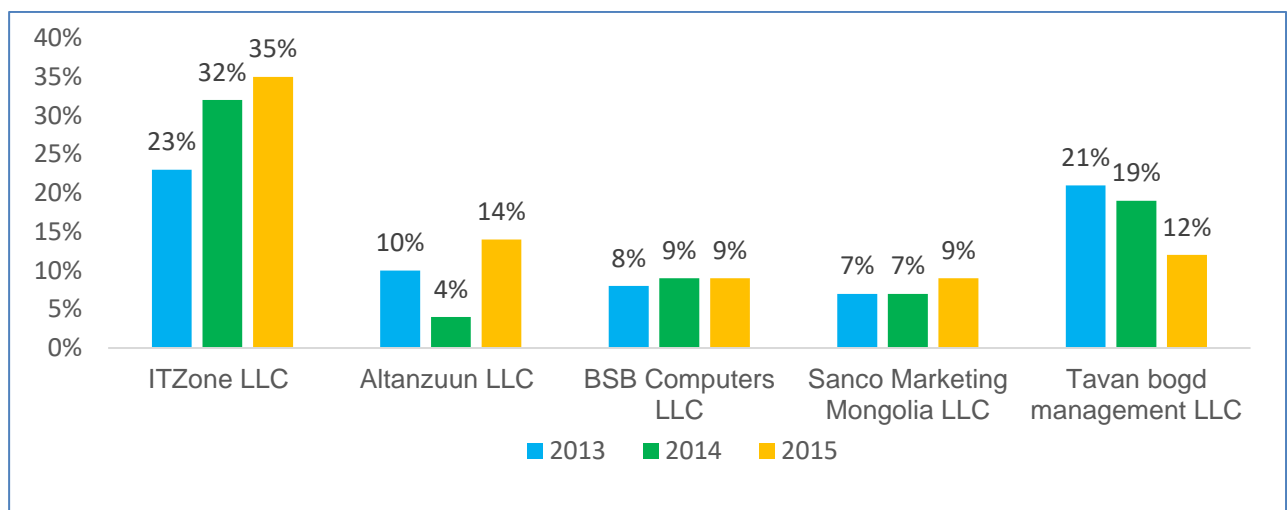


Source: Customs Data

Main players in the toner cartridge market and their market share

Currently Tavan Bogd Management LLC, IT Zone LLC, Altanzuun LLC, BSB Computers, Sanko Marketing Mongolia LLC, Tavanbogd LLC are big importers in the cartridge market and Tugs Dardas LLC is a key manufacturer. The chart below shows the 5 main suppliers' import shares for the 3 consecutive years.

Figure 22. Main players' import share of cartridge for 2014-2015.10



Source: Customs data

In the case of the domestic manufacturer Tugs Dardas LLC, the market share is about 25%.

Importers procure various kinds of cartridges rather than one kind of cartridge, depending on the kind of printer that is available in the market. But if the supplier is an Authorized Distributor

of a particular brand, they mainly sell that brand's products. IT Zone LLC sells mostly "Canon" and "HP" brands' products; Summit Computer Technology LLC sells mostly "Epson" brand's products; and Tavan Bogd LLC sells mainly "Xerox" products in the market.

As for determining the distribution of market shares, there can be a total of 20 suppliers supplying sustainable cartridge in the market.

Most suppliers mainly focus on the quality of cartridges instead of sustainability. Only one manufacturer offers a take-back scheme for empty cartridges. It is expected that cartridges which meet main criteria of sustainability such as re-used/remanufactured cartridge, recycled content and environmentally friendly packaging will be continuously supplied in the future. However, take-back scheme will not tend to be introduced in the near future.

Currently, no companies have their own corporate environmental policy. However, a few of them are going to build up their own corporate environmental policy. The table below summarizes environmental, social and economic benefits of local main suppliers.

Table 22 Corporate environmental, social and economic benefits of the main suppliers

Criteria	Main suppliers						
	Tavan bogd management LLC	ITZone LLC	Altanzuun LLC	BSB Computers LLC	Sanco Marketing Mongolia	Tugs Dardas LLC	Nomin Trading LLC
Corporate environmental policy	No	No	No	No	No	No	No
Social responsibility	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Job creation of paper sector in a country and opportunities for SMEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Source: Interview survey with key importers

Identifying the main obstacles

This part of the study aims to identify the main obstacles limiting the supply of the sub-categories of toner cartridges. First we will consider the average price range of cartridges in Ulaanbaatar and how these prices compare with international prices and with the price for conventional items. The price structure and profit margin will also be considered. Secondly, the strengths/weaknesses for the provision of the sustainable A4 copy papers will be examined. Finally, we will discuss other major obstacles.

In Ulaanbaatar city, all main importers sell cartridges through their own official stores and branches. Moreover, small suppliers mainly sell cartridges in their commercial spaces in computer markets. Depending on the origin and types of cartridge, the price of cartridge is very different. The table below illustrates price difference of the cartridge.

Table 23 Price range of cartridge and price of most common used cartridge in Mongolia

Types of cartridge	Original cartridge	Remanufactured cartridge	Cartridge made in Mongolia
Price range, MNT	50,000-270,000	45,000-75,000	26,000-84,000
Sample price (MNT)			
HP 78A	169,900	45,000	44,000
HP 12 A	154,900	45,000	27,500

HP 85A	149,900	45,000	44,000
Samsung 101S	129,900	55,000	62,700
Samsung 105S	129,900	75,000	66,000
Canon NPG-28	51,000	30,000	33,000
Canon NPG-32	80,000	55,000	41,600
Canon NPG-51	86,000	35,000	55,000

Source: Interview with key suppliers, www.itzone.mn, www.bsb.mn, www.pcmall.mn

According to the above table, price of original cartridge is 2.5 times higher than remanufactured cartridges and 2.7 times higher than domestic cartridges in average.

The table below compares the average price of sustainable remanufactured and original cartridges with average international prices. The gap between the retail price in the domestic market and the international retail price for remanufactured cartridges is relatively small.

Table 24 Comparison between average retail price in domestic market and international market for commonly used cartridges in Mongolia¹¹

Types of cartridge	Original cartridge		Remanufactured cartridge	
	Retail price in domestic market (MNT)	Retail price in international market (MNT)	Retail price in domestic market (MNT)	Retail price in international market (MNT)
HP 78A	169,900	120,000	45,000	40,000
HP 12 A	154,900	104,000	45,000	40,000
HP 85A	149,900	140,000	45,000	44,000
Samsung 101S	129,900	110,000	55,000	50,000
Samsung 105S	129,900	110,000	75,000	68,000
Canon NPG-28	51,000		30,000	25,000
Canon NPG-32	80,000		55,000	50,000
Canon NPG-51	86,000		35,000	31,000

Source: www.aliexpress.com, www.samsung.com, www.canon.com, www.hp.com, www.amazon.com

The average price of sustainable remanufactured cartridges tends to be higher by MNT 10,000-15,000 from the average price of conventional remanufactured cartridges. Key suppliers responded that they generally use a cost-added pricing strategy, and that they add about 15 per cent profit margin.

Since 2014, the price of A4 paper has been changed 3 times on average. According to main suppliers, the exchange rate is the main factor influencing the price.

There is no single international supplier for the provision of sustainable toner cartridges. Since all importers and suppliers are national companies, the strengths and weaknesses of national companies over international suppliers for the provision of sustainable cartridge has not been explored. However, there are other obstacles faced by national suppliers to supply sustainable cartridges:

- ✓ Consumers do not pay attention to the sustainability of cartridges. Many of them have never thought about the sustainability of cartridges.
- ✓ Illegally imitated cartridges at a low price are imported in the Mongolian cartridge market¹².

¹¹ As most cartridges are imported from China and Hong Kong, the price in China is regarded as the price in the international market

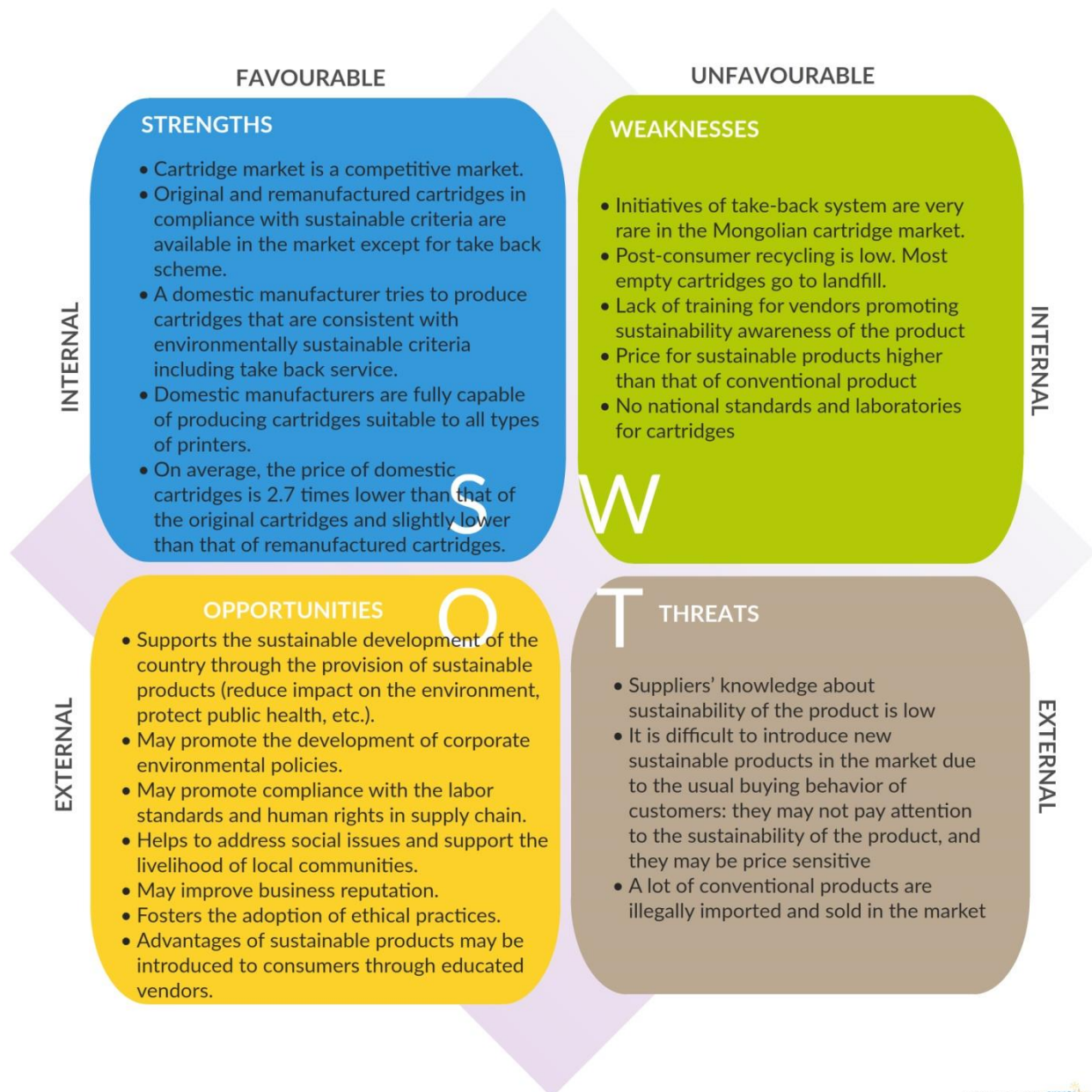
¹² However, there is no official information about market share of imitated cartridges. Three key suppliers involved in the interview said that about 20% of total cartridges that are sold in the market are imitated cartridges, sold at a cheap price. As for the public demand of imitated cartridges, it is also impossible to define the share due to the lack of information.

- ✓ Poor consumer awareness of the difference between remanufactured and imitated cartridges.
- ✓ Consumers lose their trust in remanufactured cartridges due to the lack of information about remanufactured cartridges, pre-existing prejudices about the quality of the products or because of a previous bad experience.
- ✓ There is no standard for evaluating and testing cartridges made in Mongolia and cartridge refilling services.

In addition, not only small and medium suppliers but also main importers' perception of sustainable cartridge is very low. They mainly focus on the quality and technical aspects.

The SWOT analysis below was developed in order to identify the limiting factors for the supply of sustainable cartridges.

Figure 23. SWOT analysis for supply of sustainable cartridges



Potential threats and opportunities for the local production

Currently, national manufacturers provide about 15% of state procurement of cartridges according to interviews conducted with suppliers. The main threat faced by national

manufacturers is that their products cannot be verified by the recognized bodies due to the absence of laboratories, national labels and standards for toner cartridge in Mongolia. Consumers and competitors (other suppliers), therefore do not trust the quality of product made by national producers.

On the other hand, it is an opportunity for the creation of a national label and standard, or of a national laboratory for verification. If national producers could verify their products compliance with sustainability criteria, there would be significant opportunities for national producers arising from the introduction of sustainability criteria in the State procurement of cartridges.

Another issue faced by national producers is that imitated cartridge are sold at a low price in the market and compete with national cartridges.

2.3 TONER CARTRIDGE DEMAND

An evolution of national demand for the sustainable cartridge cannot be determined due to a lack of data. This study focuses on public organizations’ demand of cartridge. Through the demand analysis, the potential consumption and procurement of cartridge for public organizations in Ulaanbaatar city has been determined. As mentioned in A4 paper demand section, public procurement data collected for cartridges in the “Demand and Supply Analysis of Four Product Markets: A4 copy paper, Printer ink cartridge, Computer and Fuel” research conducted by EBRD will be used.

Public organizations’ toner cartridge consumption

Toner cartridge consumption of public organizations is estimated by comparing the monthly planned budgets of public organizations for cartridge at each institutional level. Differences of cartridge consumption between the institutional levels were identified and furthermore, consumption rates were determined for each government officer, spread by institutional level. This estimate serves as basis for summarizing the cartridge consumption in the public sector of Ulaanbaatar city.

Cartridge consumption of public organizations. Based on the data for cartridge consumption collected from 68 public organizations, they planned MNT 506 million for procuring cartridge in 2015, which represents about 9% of the total state budget for stationery. Monthly planned consumption of cartridge for these public organizations in Ulaanbaatar city is indicated in the table below.

Table 25 Planned monthly consumption expenditure of toner cartridges in 2015

Classification by stages	Number of organizations	Monthly consumption expenditure (mln. MNT)	Monthly maximum consumption expenditure (thous.MNT)	Monthly minimum consumption expenditure (thous.MNT)	Monthly average consumption expenditure (thous.MNT)	Monthly median consumption expenditure (thous.MNT)
1st level	28	16.3	1799	24.9	584.3	503.3
2nd level	9	7.3	4500	41.6	811.2	200
3rd level	10	1.7	894.6	11.6	168.5	82.5
PSO*	17	1.7	566.1	8.8	102.5	45
SOE**	3	5.8	5416.6	150	196.3	323.3

Source: (EBRD , 2015)

*Note: PSO-Public Service Organizations
 SOE-State Ownership Enterprise
 PO-Public Organizations*

The data in the above table shows that the average consumption expenditure of toner cartridge decreases as the institutional level becomes lower. In other words, the gap between the consumption expenditure of cartridge among public organizations is very different. Median

monthly consumption of first-level organizations is 61% higher than the consumption amount of second-level organizations' consumption, 84% higher than third-level organizations and 91% higher than that of public services.

The distribution of the monthly average consumption expenditure for toner cartridges at each level is illustrated in the figure below. Half of public organizations in the first level and the second level respectively planned to spend up to MNT 503,300 and MNT 200,000 for toner cartridges per month. Moreover, half of public organizations in the third level planned to spend up to MNT 82,500 for cartridge per month, while half of public services planned to spend up to MNT 45,000 for cartridge per month.

Planned monthly consumption expenditure for toner cartridges was identified in organizations in the first level. Planned monthly average consumption expenditure for toner cartridge is MNT 672,000 for ministries, while planned monthly average consumption expenditure for cartridge is MNT 483,600 for governmental agencies.

Table 26 Planned monthly consumption expenditure for toner cartridges in 2015, by types of POs in the first level

Classification of organizations	No.PO s	Monthly consumption on expenditure (mln. MNT)	Monthly maximum expenditures (thous. MNT)	Monthly minimum expenditures (thous. MNT)	Monthly average expenditures (thous. MNT)	Monthly median expenditures (thous.MNT)
Ministries	15	10	1799	304	672	586.6
Governmental agencies	13	5.8	1333	24.9	483.6	394.6

Source: (EBRD , 2015)

Consumption expenditure of toner cartridge per public officer. Cartridge consumption cost per officer is calculated with the ratio of monthly consumption cost of the organization and number of total workers in the organization. According to EBRD, 2015, on average, an officer of state central administration agency consumes MNT 8,266 worth of cartridges in a month, while each officer of municipalities is allocated MNT 7,825 worth of cartridges per month. Each officer of local administrations uses MNT 2038 worth of cartridges per month, while each officer in public services consumes MNT 1120 worth of cartridges a month in average.

Approximate estimation of toner cartridge consumption. Based on the above mentioned monthly consumption need per officer, cartridge consumption of all public officers in Ulaanbaatar can be assumed. The total number of government officials in Ulaanbaatar was 89,430 by the beginning of 2015.

Table 27. Approximate estimation of cartridge consumption in total public organizations in UB

Classification of public organizations	Classifications of civil service	Number of workers	Monthly consumption expenditure per worker (MNT)	Projection of monthly consumption expenditure (mln. MNT)
State central administrations, related agencies and other organizations*	Political position	436	8266	3.6
	Public administration	4466	8266	36.9
	Civil special service	29171	7825	228.3
	Public service	25777	7825	201.7
Municipal administration organizations and affiliated organizations	Political position	203	8266	1.7
	Public administration	3648	8266	30.1
	Civil special service	1602	2038	3.3
	Public service	24127	1120	27
Total		89430		532.6

Source: Statistics of Composition and Movement of Public Officers in Mongolia, 2014 and (EBRD, 2015)

Note: *- Universities, science and research institutes, sport and cultural organizations, and museums

Potential monthly consumption expenditure for cartridge is MNT 383 million for all public organizations in Ulaanbaatar, which represents 11% of total import of toner cartridges.

Public organizations' toner cartridge procurement

Cartridge procurement of public organizations is considered for each institutional category in this section. Since it is also not possible to determine the total procurement quantity of toner cartridges for all public organizations in Ulaanbaatar due to lack of data, we also use data of EBRD, 2015. Cartridge procurement data in 2014 and first quarter of 2015 was collected from 57 organizations including all ministries and 15 governmental agencies. However, in the case of the first quarter of 2015, not all these organizations have the information as some of them have not procured cartridges yet. Therefore, required estimates are based mainly on 2014 data.

In 2014, these 57 organizations procured 6569 cartridges for a total cost of MNT 410 million. The table below shows quantity, average price and total cost of cartridge procured by those 57 organizations in 2014 and in first quarter of 2015.

Table 28 Cartridge procurement of public organizations in Ulaanbaatar, 2014-2015.I

Classification of public organizations	Number of organizations	2014			First Quarter of 2015		
		Procured quantity (unit)	Average price (MNT)	Total expenditure (mln. MNT)	Procured quantity (unit)	Average price (MNT)	Total expenditure (mln. MNT)
State central administration organizations and their affiliated organizations	25	3958	67707	254.5	779	62844	42
Municipal administration organizations and their affiliated organizations	6	1960	64502	120.6	390	53718	20.7
Local administration organizations and their affiliated organizations	6	324	52570	17.3	82	51181	4.1

Public service organizations	6	327	54025	17.2	62	48695	2.8
Total	45	6569	-	410	1313	-	69.6

Source: (EBRD , 2015)

Identifying the main obstacles and opportunities for the purchase of sustainable toner cartridges

According to EBRD, 2015, 80% of public organizations involved in the survey consume remanufactured cartridges, while up to 10% of them use domestic cartridges. A few of them use original cartridges. All public organizations use refilling service one to two times before disposal.

Public employees procuring toner cartridges in public organizations have very weak awareness of sustainable products. They do not know whether sustainable cartridges have been previously purchased. Purchasers in public organizations aim to purchase cartridges with best quality for the given budget. The main obstacles, therefore, for the purchase of sustainable cartridges may be the poor perception of procurers. Another issue related to the purchase of sustainable cartridge is the commonly used refilling service. Although the refilling service contributes to decreasing waste, toner powder used in refilling service has not been tested. It may contain chemicals that are higher than the allowed amount. During usage and replacement processes, toner powder may disperse and negatively affect human health.

By introducing sustainable criteria in the public procurement, the government will make significant contributions to sustainable development through government spending. Its value is huge. Not only will it reduce the impact on the environment, but also will it protect public worker's health and foster the adoption of responsible business and ethical business practice.

Therefore, it is necessary to re-structure the procurement process with regard to sustainability criteria.

2.4 CONCLUSIONS AND RECOMMENDATIONS DRIVEN FROM THE MARKET ANALYSIS ON TONER CARTRIDGES

In Mongolia, **80% of the total printer cartridges** supplied in the market are **imported** from foreign countries, whereas the rest are produced domestically. Sustainable toner cartridges supplied in the Mongolian market can be categorized as follows:

- ✓ **Sustainable original toner cartridges:** This type of cartridge is imported from OEMs to Mongolian market by official distributors. Most of original toner cartridges in the market meet sustainability criteria, except for the take-back service (See Table 19). They are verified with ecolabels, technical data from OEMs and standards such as ISO 14001, ISO 9001, DIN and ISO/EIC family. In the case of the price, the original cartridges are 2.5 times higher than sustainable remanufactured cartridges and 2.7 times higher than domestic cartridges on average.
- ✓ **Sustainable remanufactured toner cartridges:** Small- and medium-scaled suppliers and individuals mainly import this type of cartridges to the market. Currently, some of these suppliers have documentation for sustainability verification, while others do not. **Some remanufactured cartridges have an ecolabel and standards such as ISO 14001 and ISO 9001** on the package. In addition, there is **no take-back service** for remanufactured cartridges. However, suppliers importing remanufactured toner cartridges involved in the survey stated that they could get technical data for sustainability verification from producers if needed. In terms of price, remanufactured

cartridges are **relatively cheap** compared to original cartridges. Remanufactured cartridges are **commonly consumed** in Mongolia due to their cheaper price.

- ✓ **Toner cartridges** produced by local and domestic companies with imported components **assembled in Mongolia**: About 5 domestic manufacturers of printer cartridges are operating in the Mongolian market. **One of them tries to produce cartridges that are consistent with environmentally sustainable criteria**. The company uses case and components imported from original manufacturers for the production of cartridges, and employs environmentally friendly packaging practices. This company also offers take-back service for remanufacturing. Generally, the price of toner cartridges produced domestically is **slightly cheaper** than the price of remanufactured cartridges.

Main local official distributors of toner cartridges in Mongolia have created a number of jobs and **support SMEs and individuals** through their supply chains. Moreover, their efforts to provide social services in local communities have contributed to socio-cultural and education advancement. However, medium and small suppliers do not have any activities related to social responsibility.

In Mongolia, some basic **sub-categories of sustainable toner cartridges** that are recognized at an international level are possible to apply when practicing sustainable public procurement in the context of Mongolia at present, namely:

- Heavy metals and azo-colorants;
- Environmentally preferred packaging;
- Quality management system (for original cartridge);
- Ease of re-use/recycling;
- Environmental management system (for original cartridge); and
- Technical quality.

Most original and some remanufactured toner cartridges imported to Mongolia **already meet some sustainability requirements** (See Table 19 Sustainability criteria and verification for the categorization of toner cartridges sold in the Mongolian market). As mentioned before, most validation of sustainability criteria at international level can be applied to toner cartridges. However, a certain period will be needed to append a few sustainable criteria in public procurement.

The table below proposes sustainable criteria and their verification means that can be applied in sustainable public procurement within a certain period of time.

Table 29. Sustainability criteria and their means of verification for SPP implementation of toner cartridges

Environmental sustainability criteria			
Sustainability criteria	Verification		
	Original toner cartridge	Remanufactured toner cartridge	Toner cartridges produced by domestic companies
Heavy metals and azo-colorants	<p>Short term: Appropriate means of proof, such as a technical dossier of the manufacturer or a test report from a recognized body will be accepted.</p> <p>Medium term: Cartridge carrying type I ecolabel</p>	<p>Medium term: Appropriate means of proof, such as a technical dossier of the manufacturer or a test report from a recognized body will be accepted.</p>	<p>Long term: Appropriate means of proof, such as a technical dossier of the manufacturer or a test report from a recognized body will be accepted.</p>

	such as the Blue Angel, the Umweltzeichen (Austrian ecolabel), the Eco Mark Japan, Ecologo, Thai Green Label, and the Nordic Swan can also serve as means of proof.		
Requirements for case parts and other components (for remanufactured toner cartridges)		<p>Medium term: Appropriate means of proof, such as a technical dossier of the manufacturer or a test report from a recognized body will be accepted.</p> <p>Long term: All products carrying the Blue Angel, the Umweltzeichen (Austrian ecolabel), the Eco Mark Japan, Ecologo, Thai Green Label or the Nordic Swan can also serve as means of proof.</p>	<p>Medium term: Any other appropriate means of proof, such as a technical dossier of the manufacturer or a test report from a recognized body will be accepted. Bidders shall demonstrate compliance with the criterion of “quality and guarantee” in writing</p>
Ease of re-use/recycling:	Medium term: Bidders must provide a written declaration of compliance with this criterion. Upon request, they may be asked to provide samples of the product and/or documentation from manufacturers of cartridges or their components.		Medium term: Bidders must provide a written declaration of compliance with this criterion. Upon request, they may be asked to provide samples of the product and/or documentation from manufacturers of cartridges or their components.
Take-back scheme	Medium term: Bidders must provide appropriate documentation of the existence of a toner cartridge take-back scheme. Bidders must demonstrate the existence of appropriate information/instructions on handling cartridges.	Medium term: Bidders must provide appropriate documentation of the existence of a toner cartridge take-back scheme. Bidders must demonstrate the existence of appropriate information/instructions on handling cartridges.	Medium term: Bidders must provide appropriate documentation of the existence of a toner cartridge take-back scheme. Bidders must demonstrate the existence of appropriate information/instructions on handling cartridges.
Environmentally preferred packaging	Short term: Bidders must provide appropriate documentation	Short term: Bidders must provide appropriate documentation	Short term: Bidders must provide appropriate documentation
Environmental management system	Short term: ISO14001	Medium term: ISO14001	Medium term: Written corporate environmental policy, consistent with ISO 14001, or equivalent. Any other appropriate evidence
Quality management system	Short term: ISO9001	Medium term: ISO9001	-

Social sustainability of key suppliers in Mongolia			
Social contribution ¹³	Short term: Appropriate proof that the requirement has been met.	Long term: Appropriate proof that the requirement has been met.	Long term: Appropriate proof that the requirement has been met.
Supply chain according to labor standards and human right laws	Short term: Appropriate proof that the requirement has been met.	Long term: Appropriate proof that the requirement has been met.	Long term: Appropriate proof that the requirement has been met.
Technical quality	Short term: A sample of toner must be provided to the procurer in order to test quality	Short term: A sample of toner must be provided to the procurer in order to test quality	Short term: A sample of toner must be provided to the procurer in order to test quality
Economic sustainability of key suppliers in Mongolia			
Job creation in the local economy	Short term: Appropriate proof that the requirement has been met.	Medium term: Appropriate proof that the requirement has been met.	Medium term: Appropriate proof that the requirement has been met.
Cooperation with SMEs and individuals through the supply chain	Short term: Appropriate proof that the requirement has been met.	Medium term: Appropriate proof that the requirement has been met.	Medium term: Appropriate proof that the requirement has been met.

Note: Short term – criteria can be employed in public procurement in the short term; medium term – the criteria can be employed in public procurement in the medium term; and long term – the criteria can be employed in public procurement in the long term.

Based on lessons learned from research, the following actions are recommended to launch SPP for toner cartridges:

- ✓ Build knowledge and capacity regarding SPP amongst procurement specialists in public organizations.
- ✓ Currently, original toner cartridges meet almost all sustainability criteria. However, the high price of the original toner cartridges is the main obstacle to the introduction of sustainable criteria in public procurement. Therefore, sustainability criteria applying to toner cartridges need to be introduced in public procurement in stages, with basic criteria on environmental sustainability being applied in public procurement in the short term, and more advanced criteria being applied in due course.
- ✓ Criteria related to social and economic sustainability should be introduced in public procurement in the medium term. The main reason for this is that only few companies, which hold the majority of the market share, currently meet all requirements of SPP. By introducing sustainability criteria into public procurement stage-by-stage, small- and medium-scaled suppliers will be able to compete in this environment.
- ✓ SPP should first be introduced in larger public organizations that have high consumption of toner cartridges in the central regions of the country. Following this, it should be rolled out more widely.
- ✓ Build knowledge and capacity regarding SPP amongst small- and medium-sized suppliers of remanufactured cartridges, in order to increase the competitiveness of such suppliers.

¹³ It can include all activities related to the local sustainability such as building and maintaining healthy, strong communities, supporting social inclusion and enhancing the well-being of local residents by generating local employment. Currently, the main local suppliers in Mongolia have created a number of jobs, and support SMEs and individuals through their supply chains. Moreover, some of them spearhead funding programs to give assistance for the education of Mongolian children.

- ✓ Build domestic laboratories and standards for toner cartridges in order to encourage the development of national manufacturers and their ability to compete on a sustainability basis.

Reduce. Re-use. Recycle.



III. Market Analysis on Lightweight Concrete Blocks

3.1 SUB-CATEGORIES OF CONCRETE BLOCKS, PRELIMINARY COMPENDIUM OF SUSTAINABILITY CRITERIA AND MEANS OF VERIFICATION

This section of the report covers the identification of international and national ecolabelling schemes relevant to sub-categories of concrete blocks.

3.1.1 Identification of Sub-Categories of Sustainable Products

International sub-categories of Concrete blocks

Evaluation criteria for sustainable construction materials are verified by independent ecolabelling and standard organizations based on third-party monitoring systems, driven by pure business relations independently from the interests of enterprises and professional associations. Hence, in this part, we will take into account **internationally recognized ecolabelling schemes**.

Environmental sustainability: The production of construction materials seriously takes into account environmental sustainability. As such, the priorities for environmental sustainability are:

- appropriate natural resource use,
 - waste management,
 - and energy and water saving issues.
- *Forest protection technology:* Lightweight concrete blocks **replace wooden materials, and last longer**, which helps to preserve this natural resource.
 - *Greenhouse gas reduction:* **Fly ash based lightweight concrete blocks reduce air and soil pollution**, and **save the use of non-renewable natural resources** such as sand by 50-100%, and water by 15-25%. Moreover, buildings constructed with lightweight concrete blocks have a **good thermal insulation** that additionally allows to save energy during the operational use of the building, which in turn helps to reduce the greenhouse gas emission.
 - *Water consumption:* The production of sand-based lightweight concrete blocks requires high water consumption, while the production of fly ash based lightweight concrete blocks **saves 25% of water**, as fly ash from thermal power plants already contains 40% of water. It is also required to use grey-water or recycled water during the production of fly-ash lightweight concrete blocks.
 - *Efficient energy use:* The production of fly-ash-based lightweight concrete blocks uses a small amount of energy, and **saves the cost required for sand milling** and, compared to wooden materials, reduces of **up to one half the energy consumption** during the operational use of the building.
 - *Air and soil pollution reduction:* The **re-use of fly ash** in the production of lightweight concrete block **eliminates the threat of air and soil pollution that might result from fly ash**. It also allows reusing fly ash from thermal power plants.
 - *Waste management:* Lightweight concrete block production and building may use a **zero-waste** technology.
 - *Allowed level of poisonous chemical substances:* Radiation is an important issue in the production of fly-ash based lightweight concrete blocks at international level. For Mongolia, the allowed level for all construction materials is ≤ 370 Bq/kg.
 - *Material durability:*

- **Long lasting:** Lifecycle of buildings constructed by using lightweight concrete blocks is long, thus the environmental impact is lower.
 - **Good thermal insulation:** The thermal insulation of lightweight concrete blocks is good, which is very cost effective for operational energy use.
 - **Noise insulation:** By international standards, the average allowed noise level is measured in terms of duration. Lightweight concrete blocks are also considered as a good noise insulation material.
- *Environment protection policy:* Producers of lightweight concrete blocks are required to develop and implement environmental policies.

Social sustainability: Social sustainability in the construction material production is rather considered at the operational usage stage. For example, it takes into account the impact on consumers' health, and the support of local development, such as:


- *Local sustainable development support:* It is important that the producer collects raw materials from local areas and implements social responsibility policies benefiting the local population.
- *Safety of workers:* It is required to reduce the workplace-related diseases and to follow Safety and Health Standards.
- *Support the improvement of consumer living standards:* Fire and earthquake resistance: Considers the potential damage a material may have on the human body during the material's intended use.




Economic sustainability: The economic sustainability includes solutions, initiatives and benefits to reduce the construction material costs at the production, building and usage stages.

- *Consider solutions to decrease costs at all levels of construction:* Savings on building lifecycle, design, building repair and maintenance related costs are considered for lightweight concrete blocks.
- *Benefits for the local economy:* The benefits for the local economy may include the increase in the number of workplaces, tax payments and the support of local SMEs.

Currently, **no single enterprise** producing lightweight concrete blocks in Mongolia **has received an internationally recognized ecolabel**. Information on ecolabels and standards for sustainable building and sustainable construction materials can be found in Appendix 1. The following table shows international ecolabel criteria (The European Ecolabel, The Nordic Swan, Scandinavia, The Blue Angel, Umweltzeichen BREEAM – Building research establishment's environmental assessment method LEED and LBC label) that can be used for the sustainable procurement in Mongolia.

Table 30. International sustainability criteria for light concrete blocks

International categories			Public procurement categories
Environmental sustainability			
Water saving	Water consumption saving		<ul style="list-style-type: none"> - Reduction of water consumption - Energy savings - Recycling of material - Use of recycled material - Use of quickly renewable natural resources - Material with low greenhouse gas emission
	Creation of a water-saving environment		
Energy saving	Optimal energy consumption		
	Usage of renewable energy		
Material and resource	Recycling of materials		
	Construction waste management		
	Use of recycled materials		
	Use of quickly renewable natural resources		

Material quality	Material with low greenhouse gas emission		- Monitoring of internal chemical and pollution sources
	Monitoring of internal chemical and pollution sources		
Social sustainability			
Support of local sustainable development	Implementation of social responsibility policies		<ul style="list-style-type: none"> - Presence of social responsibility policy - Presence of Safety and Health Standards policy - Support to improve consumer life quality
	Implementation of policy to reduce workplace-related disease and to follow Safety and Health Standards.		
	Support to improve consumer life quality		
Economic sustainability			
Benefits to local economy	Increase in the number of opportunities in the workplace		<ul style="list-style-type: none"> - Increase in the number of opportunities in the workplace - Taxes to be paid in order to support the local economy - Support of local SMEs
	Taxes to be paid in order to support the local economy		
	Support of local SMEs		
Consider solutions to decrease the costs of construction materials	Long durability of material		<ul style="list-style-type: none"> - Support of local SMEs - Considerations for solutions to decrease the costs of construction materials
	Labor facilitating solutions in material design		
	Post-construction maintenance		

Source: Promoting sustainable construction in the EU, Green labels, Certification Systems and Green Procurement, Dr. Onegis Brilhante and Julia M. Skinner MSc, 2015

Local sub-categories of Concrete blocks

Currently, there are no criteria to determine the sustainability of products in Mongolia. Instead, there are **labels, standards and laws** to ensure the **safety and quality** of raw materials for construction.

The Mongolian National Chamber of Commerce and Industry, within its activity to support green economy and business, distributes the “**Organic Product**” label to environmentally friendly products and services.

This label is distributed to various food products as well as to products originating from environmentally friendly agriculture, and which have been processed with technology that is harmless to human health and livelihoods, vegetation and animals. Hence, it is inappropriate to consider this label as a sustainable product criterion. Currently there are **no other labels and certifications** which may help to verify production criteria, and most producers are only following **national standards** in their activity.

Standards for lightweight concrete blocks cover allowed levels for each raw material, nature of the product, nomenclature, marking, reception, and storage descriptions; however, there are **no relevant articles** in related Mongolian standards **that can meet criteria for the international ecolabelling of sustainable products**. The main standard in Mongolia for the lightweight concrete block production industry is “Thin concrete. Composition and durability–Technical requirements – MNS 0831:2001”.

Table 31. Mongolian standards for materials and lightweight concrete blocks

#	Materials	MNS standards
Material standards		
1	Lime powder	MNS 347:2002,
2	Cement	MNS 3091:2008
3	Gypsum	-
4	Aluminum powder	-

5	Water	MNS 3821:85
6	Sand	MNS 392:98
7	Substitution materials: Fly ash and slag (Either fly ash and slag are substituted, or a percentage of the cement or sand)	MNS 3925: 2015
Standards of lightweight concrete block specification		
1	Characteristics of the design and product: Cellular concrete. Test methods	MNS 1527:86
2	Standards for labelling and marking of product	MNS222.2
3	Standards for acceptance testing and criteria for ready, mixed concrete	MNS 2228.2
4	Cellular concrete. Design and product- Specification	MNS 0831:2001

Source: www.e-standart.mn

Compared to regular insulation materials, lightweight concrete blocks show higher energy savings are non-flammable, durable, non-toxic, easy to build and maintain, and have better thermal and noise insulating qualities. They also can be used for any layout. The quality criteria for lightweight concrete blocks are described in MNS 0831:2001 standard as follows.

Table 32. Specification for lightweight concrete blocks

#	Criteria	Measurement	Value
1	Compressive strength	MPa	≥1,5
2	Density	Kg/m ³	300-1000
3	Fire resistance rating	Class	A
4	Radionuclide concentration	Ac [Bq/kg]	≤370

Source: MNS 0831:2001 Cellular concrete. Design and product- Specification

Although Mongolia has no official description and criteria for sustainable products, the initial stage has already started with **recently approved sustainable and green development programs** already underway, and which includes the following statements:

- By 2011, basic conditions for green economy in Mongolia will be created (Article 2.1),
- Third objective of the strategy – to gradually reduce greenhouse gas emission and to create a basis to shift to low carbon economy (Article 3.3).

The policy emphasizes the urgent need to conduct trainings to improve the knowledge of participants, to conduct promotional activities, to introduce energy-saving technologies in all domestic production and to define industrial waste management.

3.1.2. Preliminary Compendium of Sustainability Criteria and Means of Verification

There are many ecolabels and standards related to sustainable construction materials. Sustainable construction material eco labels are extensively used in the EU and in the USA. For, example, the leading labels for sustainable construction materials in the EU are the European Ecolabel, the Nordic Swan, Scandinavia, the Blue Angel and Umweltzeichen. In addition, the main labels for sustainable construction are the BREEAM, LEED, LBC, and National Green Building (See Annex 1).

These labels usually reflect water saving, energy saving, sustainable use of natural resources, waste management and reduction of greenhouse gas emission. For example, the main criteria of a leading sustainable construction label – LEED, are sustainable field, water saving, energy and air impact, material and resources, internal environment quality, planning renewal and regional advantages.

Table 33. Categories and main verifications

No	Categories	Main verifications
1	Energy saving: - Optimal energy	Verifications are granted based on consumed energy measurement and energy source. It also has to comply with

	<ul style="list-style-type: none"> - consumption, - Use of renewable energy, 	<p>related local standards, laws and regulations. The source depends on renewable and bio fuel. The most recognized verification labels are Energy star, EU Energy label, LEED and Miljobyggnad.</p> <p>In case of Mongolia, the optimal energy consumption is calculated by using simulation software.</p> <p>According to the currently followed construction heat preservation norm - BNbD 23-02-09, the heating energy classification is determined by energy spent to heat 1 sq.m of the building for one year. Passport evaluation and calculation of construction energy is conducted by the Construction Energy Saving Center in accordance with internal norms and regulations.</p>
2	<p>Water saving: Criteria for</p> <ul style="list-style-type: none"> - Lower use of water and - Creation of a water saving environment evaluated by a score system. 	<p>International water-saving labels consider the use of grey-water technology in material production as well as creation of low-water consumption environment and use of low-water consumption technology. For example, a leading water saving label – WaterSense verifies that the regular water usage is decreased by 20 times. Other important labels such as LEED, BREEAM and LBC label are granted for optimal water consumption.</p> <p>In the case of Mongolia, there is no standard to calculate the savings in water consumption. Therefore, factories are following MNS 3821:85 standard on pure water and security.</p>
3	<p>Material and resource management: Evaluations are made using scores and indicators for</p> <ul style="list-style-type: none"> - Recycle of construction materials - Use of fast renewable material - Recycle - Construction waste management - 	<p>There are two main indicators for Ecolabelling in material and natural resource uses: - optimal use of non-renewable natural resource and - use of recycled materials. The main verifications are European Eco label, The Nordic Swan, LEED, BREEAM, LBC label: National Green Building label. Only in European Union, there are 80 standards for using ash in construction material.</p> <p>In Mongolia, there are only two standards: - “MNS974:2008 standard for use of ash in concrete” and – “2015 Technical requirements and experiment methods for use of ash from thermal power plants to produce construction material”.</p>
4	<p>Internal environment quality</p> <ul style="list-style-type: none"> - Materials with low greenhouse gas emission - Indoor chemical and pollutant source control - Heat transfer resistance - Noise insulation - Fire and earthquake resistance - Material longevity 	<p>The determination of construction material quality takes into account low greenhouse gas emission, heat preservation, noise insulation and longevity of materials. The main verification labels are the European Ecolabel, LEED, BREEAM and LBC label: National Green Building label.</p> <p>In Mongolia, there are no standards for calculation of these indicators.</p>

Source: Promoting sustainable construction in the EU, Green labels, Certification Systems and Green Procurement, Dr. Ogenis Brilhante and Julia M.Skinner MSc, 2015

3.1.3 Product life cycle and life cycle assessment

The lifecycle of lightweight concrete blocks is continuous. The **used lightweight concrete blocks can be recycled** for use in construction materials, however, there are **no such cases in Mongolia**. But by 2020, there will be **a need for recycling materials** from demolished buildings considering the **forecast in construction and housing planning**. Therefore, there is the need to support, through sustainable procurement, construction materials produced from this type of recycled material.

Figure 24. Life cycle of a lightweight concrete block

The **use of ash** in the production of lightweight construction blocks allows for the **replacement of depletable natural resources** such as sand and water by up to 100% and 40% respectively. This will not only **decrease the environmental impact on the climate, water and soil pollution** caused by ash waste from thermal power plants, but will also create advantages such as improvements in **heat preservation** and an easier use of this material in construction.

The **use of ash** in lightweight construction blocks **will help to meet previously-mentioned criteria** for “energy and water saving, presence of material and resources management and meeting internal environment quality”.

In order to demonstrate sustainable product quality, a comparison of lifecycles of lightweight concrete blocks with and without fly ash is developed in the table below. It demonstrates potential environmental and economic impacts for each life cycle stage of concrete blocks.

Table 34. Environmental and economic impacts: Lightweight concrete blocks vs fly-ash-based lightweight concrete blocks

LIGHTWEIGHT CONCRETE BLOCK			FLY-ASH-BASED LIGHTWEIGHT CONCRETE BLOCKS		
Life cycle stages		Impacts	Life cycle stages		Impacts
Raw materials acquisition					
Sand	➡	Environmental impact: <ul style="list-style-type: none"> ➤ It absorbs polluting elements in the long run 	Fly ash: Fly ash from thermal power plants are used and it replaces sand by 100%	➡	Environmental impact: <ul style="list-style-type: none"> ➤ Reduction of environmental impact caused by waste ash from thermal power plants.
Cement: 70% of supply is from domestic market and the rest is imported.			Cement: Cement can be replaced by ash by up to 40%.		
Lime powder: It is completely supplied from domestic market.			Lime powder: 100% supplied by domestic suppliers.		
Gypsum and aluminium powder: It is completely supplied by imports			Gypsum and aluminium powder: 100% imported		
Water: Use well water and river water			Water: Use well water.		
Manufacturing (recycle)					
Pre-production processes are “ transporting and storing ”.	➡	Environmental impact: <ul style="list-style-type: none"> ➤ Use natural resources such as sand or gravel. 	Pre-production stage includes raw material transportation and storage process.	➡	Economic benefits: <ul style="list-style-type: none"> ➤ Replacement of sand and cement will reduce the raw material cost. ➤ Saves energy costs associated with sand milling and processing, thus the production cost reduction.
Basic steps in manufacturing processes are “ dosing, mixing and pouring into mold ”.		Economic impact: <ul style="list-style-type: none"> ➤ The high energy required to grind sand. 	Production goes through 3 stages such as “ mixing, battering and molding ”		
Use/Maintenance					
Lightweight concrete blocks used for both internal and external construction especially, suitable for void filling.		Economic impact: <ul style="list-style-type: none"> ➤ Concrete blocks without fly ash are comparatively heavy. Thus, it is required to spend more 	Can be used for any type of construction and building and is usually used for shelling		Economic benefits: <ul style="list-style-type: none"> ➤ Easier to use in production. ➤ Improved heat preservation, lower

		resources.			energy cost.
Recycle/Waste management					
Recycling: Recycling and re-using as a building material			Re-use: With the end of the building lifecycle, the material can be used again in production mixture		Social benefits: <ul style="list-style-type: none"> ➤ Improved waste management ➤ Opportunity to support sustainable procurement.

3.2 SUPPLY ANALYSIS OF LIGHTWEIGHT CONCRETE BLOCKS

3.2.1 The Market Structure

The market for lightweight concrete blocks is characterized as highly competitive, with many similarly priced identical products and a wide variety of replaceable products. The replaceable products include polysterol concrete, aerated concrete, etc.

The lightweight concrete block production market is close to a perfect competition. About 60% of domestic use (600000 m³) used to be supplied from China. The launch of production factories by MAC LLC and Dornyn Tsas LLC in 2015, created an opportunity to completely meet the demand of the domestic market. The lightweight concrete block market is 100% dependent on the construction sector's growth and decline.

Table 35. Market structure of lightweight concrete blocks

Characteristics	Results	Market structure
Number of firms in the industry	Many	Competitive market
Product differentiation	Identical	
Firms' control over price	Moderate	
Barriers to entry	Few	
4 firms' concentration ratio	47%	
HHI	844	

Domestic producers of lightweight concrete blocks produce their products using European technology on Chinese equipment.

Currently, most enterprises producing lightweight concrete blocks are SMEs. However, the sales and competitiveness of SMEs are expected to decrease in the near future as larger enterprises are entering the market. The Mongolian government has invested this industry in order to establish national manufacturers that produce concrete blocks and cement.

As for fly-ash-based lightweight concrete block producers, there is a limited supply to the market, and lower market recognition that results in weaker competition. According to the results of 2015 "Market research for ash based building material" conducted by MIRIM Consultant LLC, producers were avoiding to inform consumers that their products contain fly ash. This was due to lower consumer knowledge on fly-ash-based products and eco products in general.

Table 36. Market structure of fly-ash-based lightweight concrete blocks

Characteristics	Results	Market structure
Number of firms in the industry	Few (0-30)	Oligopoly market with few competitors in the industry and highly concentrated.
Product differentiation	Identical	
Firm's control over price	Moderate	
Barriers to entry	Few	
4 firms' concentration ratio	13%	

Due to the lack of statistical data on the producers of fly ash lightweight concrete blocks, the market competition was determined by using a test model.

In order to determine the market share and competition, investment as well as technical and workforce costs were required to build a new lightweight concrete block factory and were used as a basis.

Investment: In order to build a factory with an annual output of 400000 m³ of lightweight concrete blocks, about MNT 650 million will be required for the equipment and about MNT 1.3 billion will be required for the factory building. An additional MNT 150-200 million of financing is required to prepare main raw material. The total required investment is about MNT 1.95 billion.

Technology: The above-mentioned investment is necessary since the autoclave lightweight block production requires digesting technology. In the case of fly ash use, special trucks to transport dry ash and storage silos are additionally required.

Workforce: For a factory with an annual output of 400000 m³ of lightweight concrete blocks, 25-30 persons are required as workforce. Of these persons, 10 workers such as general technologists, production technologists, and electricity engineers, and electricians, mechanical engineers for equipment, technicians and assistants are needed to undergo special vocational training.

The competitive nature of the lightweight concrete block market is comparably open, and the start-up amount of MNT 2 billion is one of the proofs.

3.2.2 Determination of lightweight concrete blocks and market prospects

The Sustainable Development Report by the World Business Board says that concrete is the second-most used substance in the world after water. The world produces an average 2.35 billion tons of concrete a year. By 2030, this number may increase to 5 billion tons due to a wide use of this type of material in China and India¹⁴. Mongolia annually consumes about 1358 000 m³ of lightweight concrete blocks, and the launch of production factories by MAC LLC and Dornyn Tsas LLC created an opportunity to completely supply the domestic market with national production.

As for the production of cement – the main raw material for lightweight concrete blocks – Khutul “Tsement-Shokhoi” state-owned company increased its annual capacity by 1 million ton and Monpolimet LLC and MAC LLC have launched their cement production factories in 2015 each with an annual production output of 1 million tons. This will not only allow to meet the domestic demand but **will also give an opportunity for export**. Currently, 30% of the cement used in the production of lightweight concrete blocks is imported. If, in 2014, the domestic consumption of cement was 1.2 million tons, the full scale operation of the above-mentioned factories will allow to produce 1.7 million tons of cement domestically by 2017. The 100% domestic supply of raw materials used for lightweight concrete blocks will allow to fully control the product quality.

Table 37. Materials and components of lightweight concrete blocks

#	Materials	Measurement	Component		Material manufacturer	
			1 m ³ concrete block (kg)	1 m ³ concrete (percent)	Domestic	Import
1	Lime powder	kg	620 ¹⁾	19.85	100 %	-
2	Cement	kg	100	20	70 %	30 %
3	Aluminum powder	kg	1.2	0.15	-	100 %
4	Water	liter	2)	-	100 %	-
5	Sand	kg	100	60	100 %	-
6	Substitution materials: Fly ash, slag	kg	1309 ³⁾	Fly ash and slag can be substituted, or a percentage of the cement and sand	100 %	-

Source: Green Building/Construction Practices, Training handbook

The lightweight concrete blocks contain 60% sand, 20% cement, 15% lime and 5% of other additives (lime, aluminum, water etc.). The use of fly ash will allow eliminating the usage of sand by 50-100% and of cement by 25-30%.

¹⁴ <http://www.inhabitat.com/>

3.2.3 The level of availability and market share of selected products

First produced in Mongolia in 1967, lightweight concrete blocks are now produced by 33 autoclave factories, out of which 30 are located in Ulaanbaatar and three are located in the countryside. The combined production output of these factories is 1358 000 m³ which is enough to completely cover the demand of capital Ulaanbaatar city and aimags in the central region.

Table 38. Number of lightweight concrete block suppliers in the industry

#	Year	Number of building companies	Number of manufacturers of lightweight concrete blocks
1	2012	5430	28
2	2013	6529	30
3	2014	8940	30
4	2015	10111	32

Source: www.1212.mn

Five enterprises such as MAC LLC, Dornyn Tsas LLC, Arga baril LLC, Khaan almaz LLC and Cottage LLC can currently supply about half of the annual domestic needs. The average annual production output of other enterprises reaches 40000 -50000 m³.

Table 39. Role players in lightweight concrete block industry

#	Company name	Price (m ³)	Capacity (annual)
1	MAC LLC	145000	270000 m ³
2	Dorniin tsas LLC	130000	200000 m ³
3	Arga baril LLC	100000	125000 m ³
4	Mongol tashuur construction LLC	110000	40000 m ³
5	Manufacturer of lightweight concrete block in Uliastai LLC	110000	40000 m ³
6	Erdes concrete LLC	110000	40000 m ³
7	Sutain ach LLC	110000	40000 m ³
8	Silicat LLC	120000	50000 m ³
9	Chilagu LLC	120000	45000 m ³
10	General etalon LLC	110000	50000 m ³
11	Undram gan LLC	135000	40000 m ³
12	Jawkhlant LLC	115000	52000 m ³
13	Dulguun bars LLC	115000	40000 m ³
14	Altai gatsuurt LLC	110000	40000 m ³
15	Cottage building LLC	100000	60000 m ³
16	Khaan almaz LLC	100000	72000 m ³
Total			1204000

Source: Building Material Manufacturing's Association

Despite a high interest in using fly ash in the production of lightweight concrete blocks, the supply of fly ash from thermal power plants is insufficient. Although the amount of total dry ash produced by thermal power plant reaches about 289.9 thousand tons per year, only 30,000 tons out of the total fly ash produced (about 10% of the total ash) can be used in the production of lightweight concrete blocks. The remained fly ash is currently not used as fly ash from thermal power plants cannot satisfy technical requirements in cold season.

In 2015, 5% of thermal power plant ash was used. Lightweight concrete block production used only 3% of fly ash, which equals to 50000m³ of the totally produced 1358000m³ of lightweight concrete blocks. In 2015, Thermal power plant-4 had sales contracts with 15 enterprises: 10 cement factories and 5 lightweight concrete block factories.

Table 40. Fly ash suppliers /Thermal power plants-TPP/

№	Name	Location	Capacity MW	Annual consumption of coal, /thous.ton/	Annual production of fly ash, and types (annual)	
					Dry fly ash /thous.ton/	Wet or dry slag /thous.ton/
A. Thermal power plants /In operation/						
1	TPP-2	Ulaanbaatar	36	191,5	-	19,1
2	TPP -3	Ulaanbaatar	198	1067,5	-	106,7
3	TPP -4	Ulaanbaatar	580	2899,7	289,9	116,0
4	TPP in Darkhan	Darkhan	48	351,9	-	35,1
5	TPP in Erdenet	Erdenet	36	222,4	-	22,4
6	TPP in Dornod	Choibalsan	18	39,4	-	3,9
7	TPP in Ukhuaa khudag	Umnogovi Tsogttsetsii	18	35		4,8
8	TPP in Umnugovi	Dalanzadgad	9	270,6	-	27
9	TPP in Amgalan	Ulaanbaatar	300	218,2		30
Total					289,9	365,0
B. Thermal power plants, /plans to build/						
1	TPP-5	Ulaanbaatar	820	3620,0	353	145
2	TPP in Shiwee ovoo	Govisumber Choir	750	4000,0	390	160,0
3	TPP in Chandgan tal	Khentii Chingis	650	3450,0	336	138
Total					1079	283
Grand total					1369	648

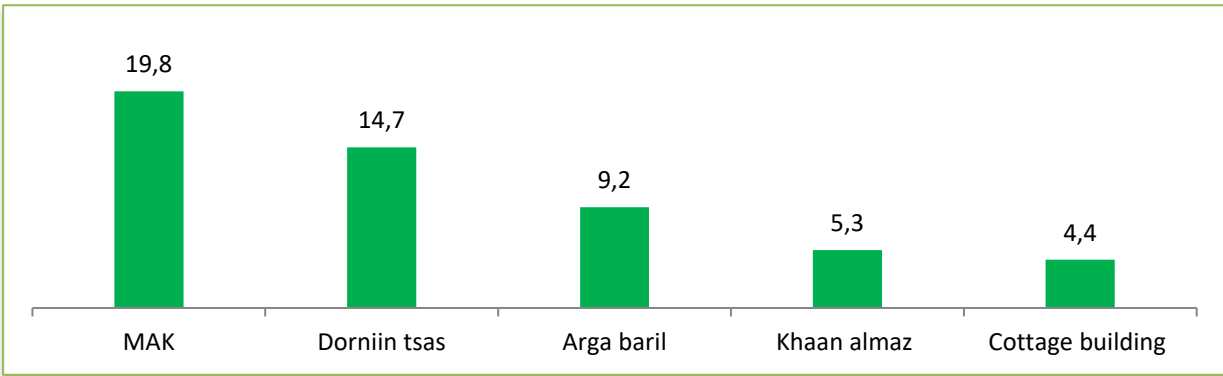
Source: Building Material Manufacturing's Association

In 2015, fly-ash-based lightweight concrete blocks represented 3.6% of the domestic market for concrete blocks. By 2020, this number may reach 10% if the ash supply originating from thermal power plants is intensified, and if the current growth trend is preserved. If this product is supported through SPP, there will be no barriers for producers to shift to this production technology.

3.2.4 Main Players in the market and their market share

The lightweight concrete block industry is an SME-type industry, thus detailed statistical data on products and production is unavailable. Therefore, the main players for 2015 are determined based on their production capacities. Main players hold 53.4% of the market share and these players are branches of larger enterprises. For example, MAC euro block factory belongs to Mongolyn Alt Corporation, Arga Baril LLC belongs to Nuudelchin Group, Khaan Almaz LLC belongs to Shine Mongolyn Khaad Group, Dornyn Tsas LLC belongs to joint Mongolian-Chinese GS Dornyn Hogjil LLC. According to forecast, these entities are to continue with their leading positions for a long time.

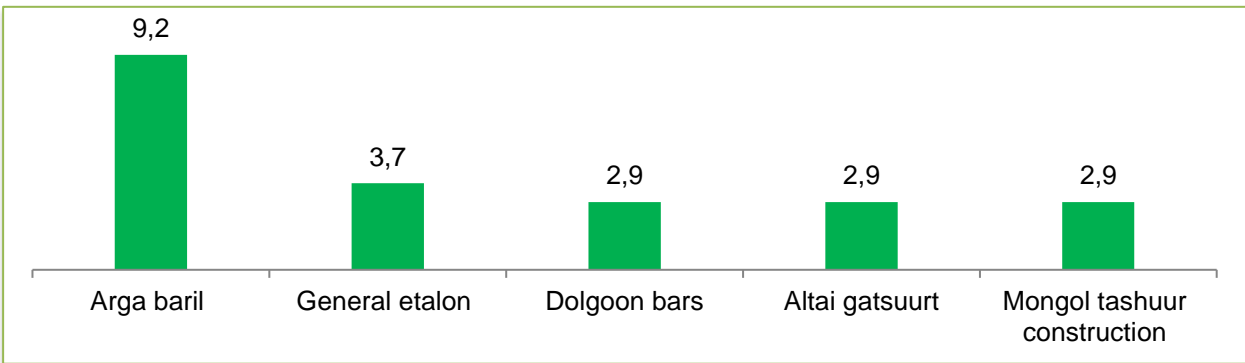
Figure 25. Role suppliers of lightweight concrete blocks (percent)



Source: Building Material Manufacturing's Association

The main suppliers of fly-ash-based lightweight concrete blocks hold 21.6% of the market share. These suppliers use fly ash in 10% of their products and natural raw materials for the remaining percentage of products. In order to increase the production output and the level of fly-ash-based blocks, consumption must be supported and the dry ash output demanded by the market must be increased.

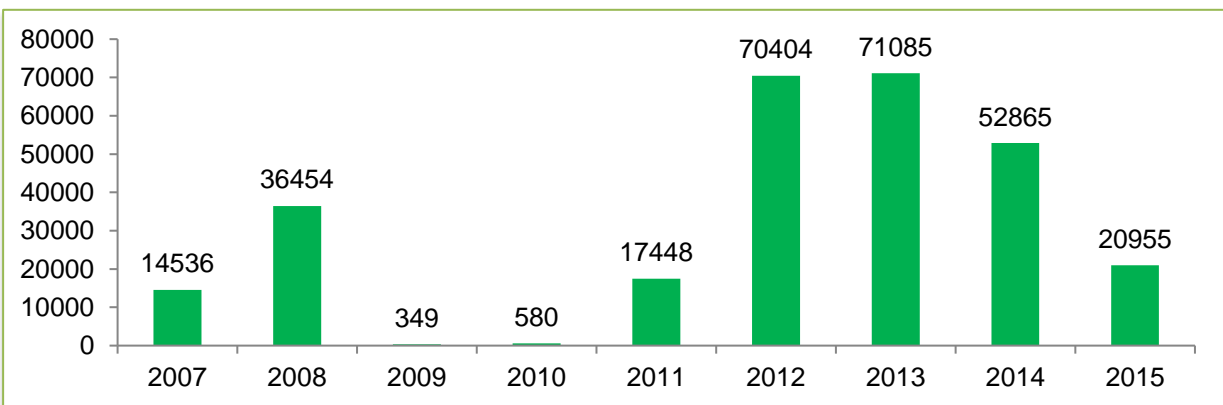
Figure 26. Main suppliers of fly-ash-based lightweight concrete blocks (percent)



Source: Building Material Manufacturing's Association

Lightweight concrete block production is directly tied to the construction sector's growth and decline. The following figure shows that the volume of imported lightweight concrete blocks increased in 2012-2014 during the construction boom of this period.

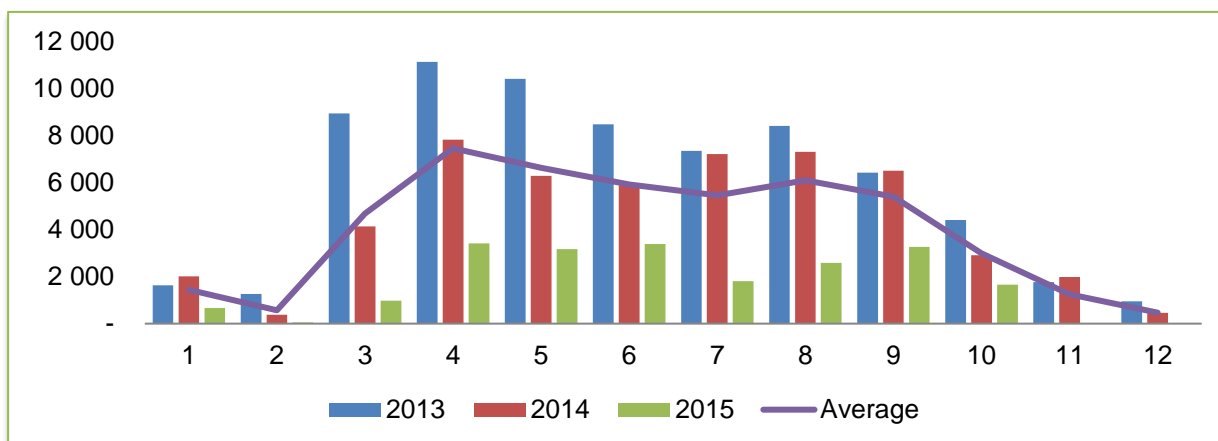
Figure 27. Annual import volume of lightweight concrete blocks



Source: Building Material Manufacturing's Association

The monthly data show that the most dynamic period for the import of lightweight concrete blocks falls in the period from March to November when the construction sector is the most active.

Figure 28. Monthly import volume of lightweight concrete block



Source: Building Material Manufacturing’s Association

This shows that domestic factories cannot fully meet demand in the peak period.

Social responsibility and sustainable development policies of leading domestic companies are as follows:

Table 41. Sub-criteria for the corporate social responsibility, by companies

Sub-criteria	Main suppliers				
	MAC LLC	Dornii tsas LLC	Arga baril LLC	Khaan almaz LLC	Cottage building LLC
Sustainability development policy	Yes: Supporting and contributing to the development of Mongolia	No	No	No	No
Environmental protection policy	Yes	Yes	Yes	Yes	Yes
Social responsibility policy	Contributing to the development of education, health and infrastructure sector and supporting livelihood of herders	NA	Supporting vulnerable groups in society and local SMEs	Supporting education sector and increase employment	Supporting education sector
Occupational and health safety policy	Yes	Yes	Yes	Yes	Yes

3.2.5 Main obstacles limiting the supply of selected products

The price of domestically produced lightweight concrete block was relatively stable for the last 3 years at the price of MNT 110000. Imported products from China are sold at the average price of MNT 90000. There is no substantial price difference between sand- and ash-based products.

Table 42. Lightweight concrete block price (MNT thousand)

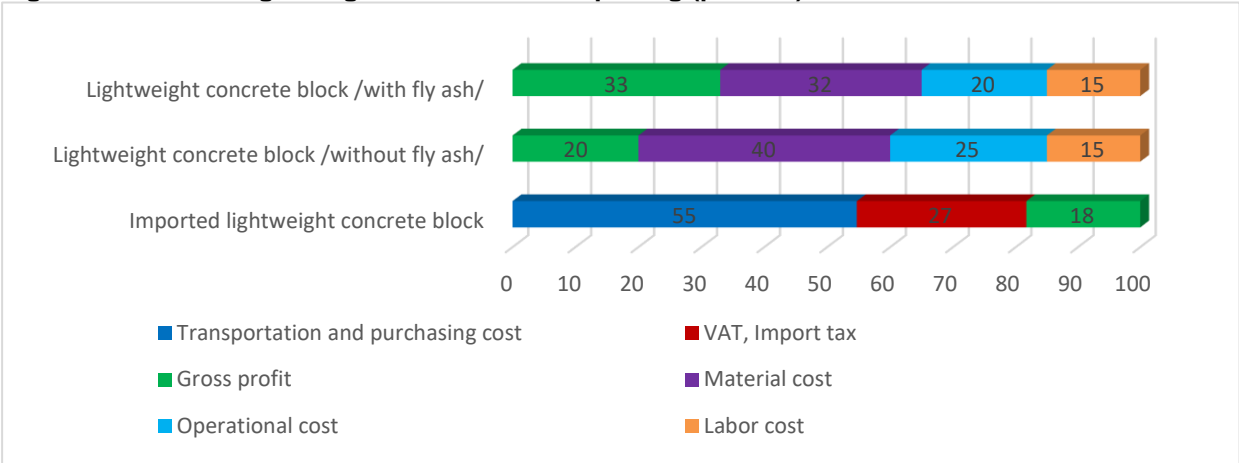
Product prices	Average market price	Wholesale price	Retail price
Imported products	90,000	80,000	95,000
Products (without fly ash)	125,000	110,000	120,000
Products (without fly ash)	110,000	95,000	120,000

www. customs data

The price difference between fly ash-free and fly ash-based lightweight concrete blocks is approximately 13.6%.

The following figure illustrates the pricing components for lightweight concrete blocks with fly ash (or without).

Figure 29. Product/lightweight concrete block/ pricing (percent)



Source: Ash based green product, Caritas Czech, 2015

The pricing and financial calculations are based on a model factory due to the large number of domestic SMEs producing lightweight concrete blocks, coupled with the lack of statistical data on product prices. This part forecasts the economic impact of fly ash based lightweight concrete blocks or sustainable products. The calculation of economic benefits took into account the fact that the factory will use 100% of its capacity with an annual average production output of 50000 m³.

For the last five years, lightweight concrete blocks have been sold at MNT 110000-145000 depending on the market demand.

The use of ash from thermal power plants in the production of lightweight concrete block not only replaces sand and cement, but can also reduce the use of such depletable natural resources like sand. Compared to fly ash free lightweight concrete blocks, fly ash based blocks can increase revenue by 13.3% per each cubic meter. This revenue is generated by the raw material cost difference only. Enterprises' capacity with annual average production output is 50000 m³.

Table 43. Product cost

No	Product type	Measurement	Volume (annual)	Gross cost (MNT)	1m ³ Product (per m ³)
1	Lightweight concrete block /without fly ash/	M ³	50 000,00	2 594 775 820,00	51 895,52
2	Lightweight concrete block /with fly ash/	M ³	50 000,00	2 249 644 750,00	44 992,90

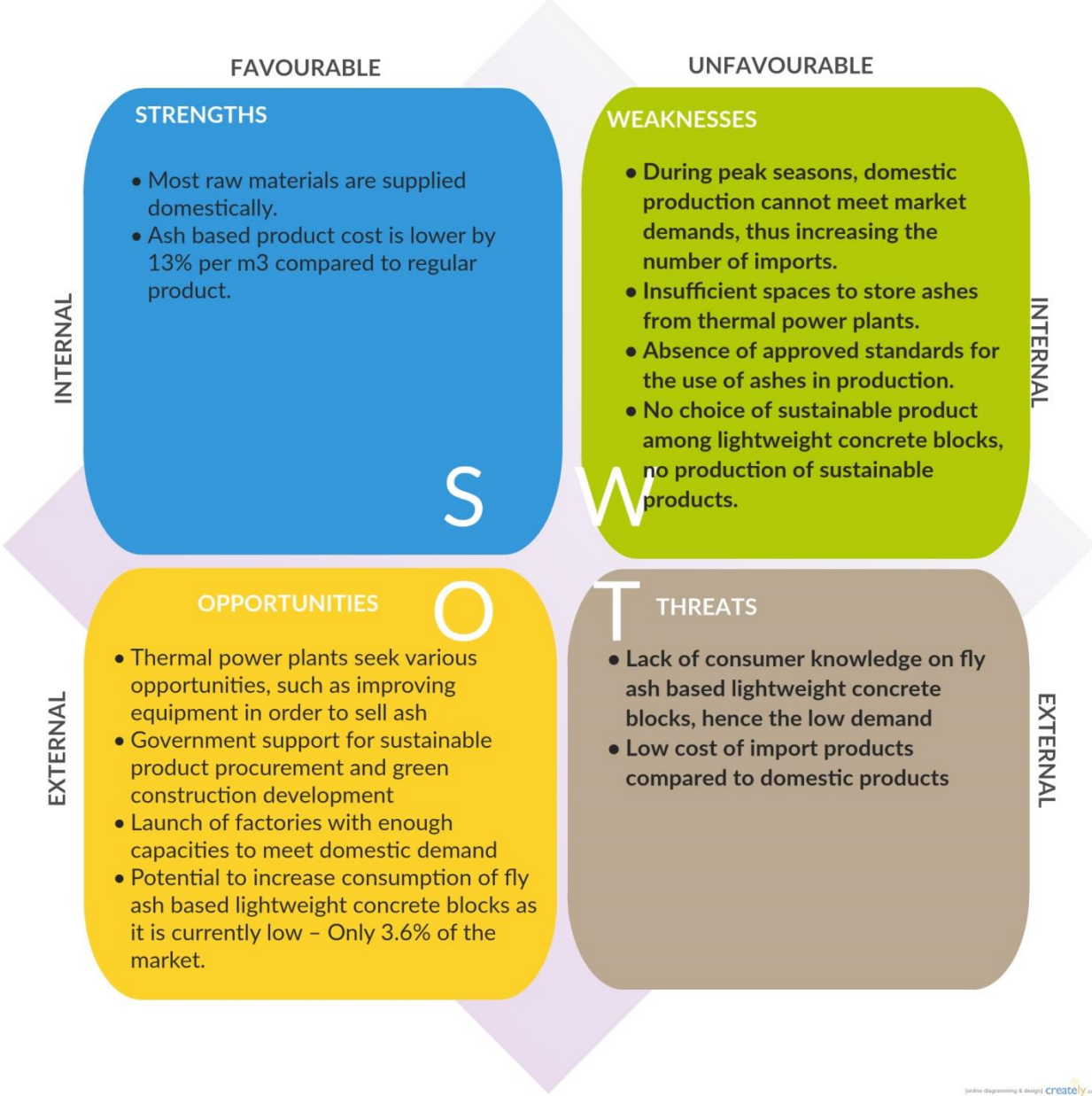
Source: Ash based green product, Caritas Czech, 2015

Therefore, according to calculations, fly ash based blocks bring MNT 345 131 070 more revenue compared to regular blocks. The 2015 market price for domestically produced lightweight concrete blocks with no fly ash was MNT 125000 per m³, while, according to customs data, imported block cost was MNT 90078 per m³. Further development of fly ash based lightweight concrete block production and, hence, the cost reduction will allow to fully compete with imported products.

The use of ashes from thermal power plant allows production output to increase by about 20%. For example, the daily output will be increased from the current 84 m³ to 114 m³. This can be seen from the case study conducted by Caritas Czech on Dulgoon Bars LLC, showing that

production output can be increased by replacing sand with ash, which allows to reduce costs associated with sand milling, to save water consumption and to reduce production time.

SWOT analysis of lightweight concrete blocks



3.3 DEMAND ANALYSIS OF LIGHTWEIGHT CONCRETE BLOCKS

3.3.1 Public organizations’ consumption of selected products

The average annual consumption of lightweight concrete blocks in Mongolia reaches 1,358,000 m³ and, until 2014, almost half of this consumption or 650,000 m³ of lightweight concrete blocks were imported from China. The launch of large production factories by MAC LLC and Dornyn Tsas LLC created an opportunity to fully meet demand with domestic products. As of 2015, the average domestically produced lightweight concrete block cost MNT 125000 per m³, while the declared customs cost of imported products was at MNT 90078 per m³. The total spending on lightweight concrete block consumption was MNT 58550.7 million for imported blocks and MNT 88500.0 million for domestically produced blocks.

In 2014, construction works cost reached MNT 2.1 trillion in Mongolia, of which only 3% or MNT 72,019.1 million was accounted by public procurement. This is 44% lower compared to 2013, the previous year. For the first three quarters of 2015, construction and maintenance works reached MNT 1,3 trillion, in which public procurement accounted for 2% or MNT 23,2 billion..

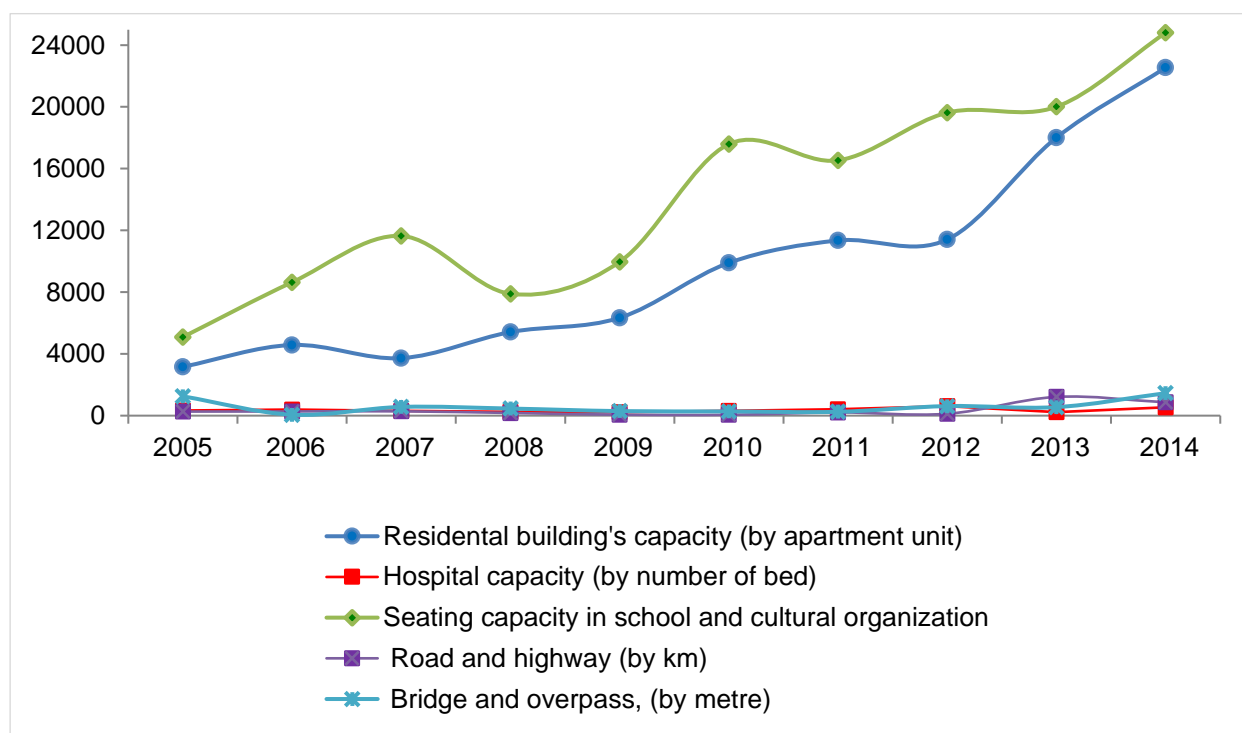
Table 44. Finished construction and repair works, annual (MNT million)

#	Performed by:	2012	2013	2014	2015 /3 rd quarter
Construction and repair works in total		1,034,140.63	1,845,871.37	2,146,796.3	1,345,582.6
1.	Local organization	919,681.94	1,719,508.77	2,013,445.4	1,305,365.2
1.1	Governmental	32,124.99	128,128.62	72,019.1	23,232.3
1.2	Private	830,916.95	1,566,501.22	1,915,282.9	1,269,369.8
1.3	Foreign-invested	56,640	24,878.94	26,143.4	12,763.2
2.	International organization	114,458.69	126,362.6	133,350.9	40,218.4

Source: National Statistical Office, www.1212.mn

The total capacity of buildings and constructions made by public procurement for the last 10 years shows a continuous growth in 2005-2007 and 2009-2014. In 2008, due to the economic crisis, the total construction and repair works fell by 19% compared to the previous year.

Figure 30. Capacity of finished building construction, annual basis



Source: National Statistical Office, www.1212.mn

In 2014, the total capacity of houses, schools and cultural buildings constructed by public procurement grew by 25% compared to the previous year. During the same period, the capacity of medical facilities increased by 530 beds or by 1.3 times, while the bridge construction grew by 1454 meters or by 1.6 times. In 2014, a total 866 km of roads was constructed, which is 29% lower compared to the previous year.

Table 45. Capacity of finished building construction in the last 2 years

No	Type of building	2013	2014
1	Residential building capacity (by apartment unit)	18012	22546
2	Hospital capacity (by number of bed)	228	530
3	Seating capacity in schools and cultural organizations	20012	24806
4	Road and highway (by km)	1213	866
5	Bridge and overpass, (by metre)	552	1454

Source: National Statistical Office, www.1212.mn

3.3.2 Public organizations' procurement demand of selected products

Demand for sustainable product procurement

Fly ash based lightweight concrete blocks account for only 3.6% of the total market because of low demand and, thus, inducing a low production volume. The low production volume of fly ash based lightweight concrete blocks or sustainable products results in insufficient use experience. Therefore, since it is difficult to determine the public procurement demand for sustainable lightweight concrete blocks based on previous consumption data, the calculations were made based only on procurement plans.

As previously mentioned, the public procurement accounted for only 2-3% of the total construction and maintenance works for 2014-2015. 2016 budget plan shows an increase for the public procurement of construction and maintenance works up to MNT 290811,1 million, which is by 2-3 times higher compared to the spending in the last 3 years. 40% of this procurement will be spent on school and kindergarten constructions. Only 1% of these procurements will be spent on housing construction, which might be related to low demand for houses.

Table 46. Planning to finish building construction and type of building construction, (by state budget)

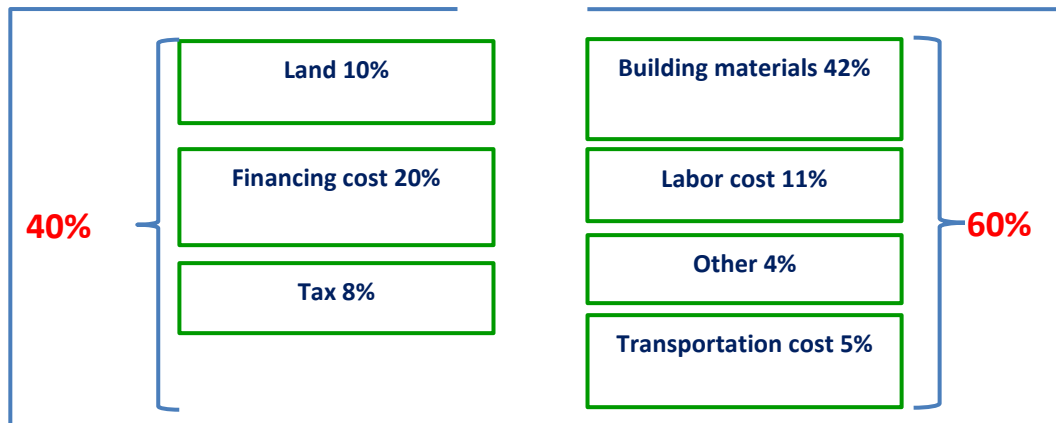
No	Type of building	State budget, 2016 (MNT million)
1	Office building /capacity/	42,997.4
2	Apartment building /capacity/	2,863.8
3	Cultural building /capacity/	22,086.8
4	Hospital, /number of bed//	34,235.9
5	School and kindergarten, /number of seat/	116,543.4
6	Road and highway, km	56,513.8
7	Bridge and overpass, metre	15,570
Total		290,811.1

Source: The State Budget of Mongolia, 2016

In order to determine the costs for construction materials in the total budgeted cost for construction, we will use the volume of construction materials cost.

60% of the total construction cost goes to main cost items, such as construction materials and labour. The construction materials account for approximately 42% of the total budgeted cost. Based on planned public procurement for 2016, it is possible to say that MNT 122140.6 million will be spent for construction materials.

Figure 31. Construction cost estimates



Source: Supply and demand research for construction industry, Ulaanbaatar

In order to have detailed information on demand for lightweight concrete blocks, we need to determine the percentage of lightweight concrete blocks in construction material. However, due to construction purposes, the number of floors, the types and other factors, the usage volume of lightweight concrete blocks vary. Therefore, in accordance with the discussion and decision made by the study team, detailed calculations for demand were made based on the information from real life cases where the team had several meetings with some construction companies.

Companies such as Ulzii concrete LLC and Golomt construction LLC, which do not only produce lightweight concrete blocks, but also conduct construction works, participated in the case studies (See Appendix 3 for detailed information about case studies). According to the internal studies of these companies, 15-20% of construction materials use concrete, of which 4-5% is used for shelling.

Lightweight concrete blocks can be used for all types of shelling works. If demand for lightweight concrete blocks required for shelling is at 5% in average, then MNT 6,107.1 million out of MNT 122140.6 million worth construction materials can be spent on lightweight concrete blocks. Moreover, there can be created demand of MNT 6.1 billion for fly ash based lightweight concrete blocks through SPP.

3.3.3 Main obstacles and opportunities for the purchase of selected products

With regard to the supply of raw material:

Although total ash resource is sufficient for the current production volume, the absence of economically efficient technology for the use of wet ash limits the useable ash. In order to continuously develop fly ash based material production, the need for technology to process wet ash must be introduced, and the need for necessary equipment to transport and store the ash in large amounts must be met by companies.

With regard to product manufacturing:

Although these factories are highly interested in using fly ash in lightweight concrete blocks, this type of block accounts for only a 3.6%-share of the total market due to low demand. The absence of standards, regulations and rules for the use of ashes at different levels, for different purposes as well as for controlled use, creates difficulties in production. Therefore, supporting actions by the government are needed to create a standard for ash use and to constantly maintain ash resources. If the government supports the fly ash based product consumption through SPP, producers will see no problem in using fly ash in lightweight concrete blocks.

With regard to consumption:

Almost half of the market participants believe that the use of fly ash in construction materials has a negative impact, based on the findings of market research relevant to fly ash based building material¹⁵. This might have resulted from the low knowledge of consumers on ash use, as well as from the lack of scientifically proven, reliable information on ashes which could be disseminated by thermal power plants through media channels. Therefore, before we increase the production of sustainable products, it is important to provide information to market participants showing that the use of fly ash in construction material not only has no negative impacts on health and environment, but also has several social, environmental and economic benefits.

3.4 VALIDATION OF SUSTAINABILITY CRITERIA FOR SUB-CATEGORIES OF SELECTED PRODUCTS

We have selected 14 criteria for the procurement of sustainable lightweight concrete blocks, based on internationally recognized labels and standards, as well as on domestic standards of Mongolia. Currently, 5 leading suppliers that supply 53.4% of the market meet only 6 criteria as a minimum and 10 criteria as a maximum out of the total 14.

Table 47. Means of verification for sustainability criteria

Sub-categories of sustainable products	MAC LLC	Dorniin tsas LLC	Arga baril LLC	Khaan almaz LLC	Cottage building LLC
Environmental sustainability					
Reduction of water consumption	x	x	x	x	x
Energy efficiency	x	x	√	x	x
Renewable energy consumption	x	x	x	x	x
Recycling of waste materials	x	x	x	x	x
Construction waste management and waste treatment technology	Xecc AAC Systems	√	√	√	√
Use of recycled materials	x	x	√	√	√
Use of renewable resources	x	x	x	x	x
Indoor chemical and pollutant source control	√	√	√	√	√
Social sustainability					
Implementation of corporate social responsibility	√	x	√	√	√
Implementation of occupational safety and health policy-reducing workplace injuries	√	x	√	x	x
Supporting consumers' livelihood	√	√	√	√	√
- Compressive strength	400-500kg/m ³	M25-M75	MNS 6054:2009	MNS 831:2001	MNS 831:2001
- Cold resistance		F15-F75			
- Heat Transfer Coefficient	0,09-0,13 Bt/m ² °C	0,12-0,24 Bt/m ² °C			
Economic sustainability					
Increase employment	√	√	√	√	√
Support local economy- pay taxes and fees	√	√	√	√	√
Reduce building material-handling costs	√	√	√	√	√
TOTAL	8/14	6/14	10/14	8/14	8/14

Source: The analysis based on company's website information and results of in-depth interview. www.MAC.mn, www.dorno.mn, www.nuudelchin.mn, www.mmkgroup.mn, www.barilga.mn

¹⁵ MIRIM Consultant LLC- Market research for ash based building material, 2015

√ - Currently implementing

✗ - Not yet implemented

points mostly on criteria related to natural, environmental sustainability, as according to the producers' description an eco-product is a product 'made from 100% natural raw materials'.

Table 48. The sustainability criteria and means of verification

Environmental attributes	Sustainability criteria	2016	2017	2018	2019	2020
Environmental sustainability						
Reduction of water consumption	Implement a grey-water system			●	→	→
	Use of water-efficient building material (Wet fly ash or slag...)	●	→	→	→	→
Efficient energy use	Use of energy-efficient technologies		●	→	→	→
	Use of renewable energy				●	→
Recycling of waste materials	Recycling and reuse of building materials					● →
Construction waste management and waste treatment technology	Implementation of waste treatment technology	●	→	→	→	→
Use of recycled materials	Utilization of fly ash from thermal power plants	●	→	→	→	→
Use of renewable natural resources	If natural resources such as gravel and sand are used, rehabilitation must be completed in the area or other equivalent field			●	→	→
Indoor chemical and pollutant source control	Radionuclide concentration ≤370 Bq/kg	●	→	→	→	→
Social sustainability						
Implementation of corporate social responsibility	The number of corporate social responsibility initiatives in last 2 years	●	→	→	→	→
Implementation of occupational safety and health policy reducing work-related illness and injuries	The number of workplace injuries	●	→	→	→	→
Supporting consumers' livelihood	Implement ISO 9001			●	→	→
Economic sustainability						
Increase employment	Raw materials based on local source	●	→	→	→	→
Support local economy - pay taxes and fees	Paid all taxes and fees	●	→	→	→	→
Reduce building material-handling costs	Use of job simplification technique	●	→	→	→	→

Note:

●→ **Blue arrow** shows the criteria that can be currently used in SPP;

●→ **Red arrow** shows the criteria that require a certain time to use in SPP.

Evaluation criteria for the 14 categories selected for public procurement are shown in the above table. In other words, in order to be described as a sustainable product supplier, compliance with related laws, regulations and standards of Mongolia as well as with 15 criteria mentioned

above is required. It is believed that these 15 criteria can be fully met by enterprise within a 5-year term. For some of these criteria, 1-2 years are needed for enterprises. The most time demanding four criteria are the introduction of grey-water technology, the use of renewable energy, the recycling of old building materials and the restoration of fields used for their natural resources.

3.5 CONCLUSIONS AND RECOMMENDATIONS DRIVEN FROM THE MARKET ANALYSIS ON LIGHTWEIGHT CONCRETE BLOCKS

The average annual consumption of lightweight concrete blocks is 1,358,000 cubic meter tons, 53.6% of which are supplied by MAK LLC, Dornyn Tsas LLC, Arga Baril LLC, Khaan Almaz LLC and Cottage LLC, most of whom have an annual average production output of 40,000-50,000 cubic meter tons each. Out of the six raw material components for lightweight concrete blocks, only aluminum powder is 100% imported, while the other five components are supplied by the domestic market. The forecasted demand for lightweight concrete blocks is worth MNT 1.6 billion based on the government procurement plan for 2016.

Awareness regarding the use of fly ash in the production of concrete blocks is very low among block producers. Also, the producers and building material consumers may have a wrong understanding of the characteristics and impacts of fly ash based concrete blocks, and may assume that fly ash based concrete blocks include a considerable amount of radionuclides. In reality, fly ash based concrete blocks include twice less radionuclides than the approved amount. Therefore, due to a wrong understanding and lack of information, fly ash based concrete blocks are not perceived as well as non-fly ash based ones

Based on this reasoning, suppliers tend to lure consumers, by selling fly ash based concrete block at the same price as non-fly ash concrete blocks. Therefore, the prices for fly ash based and non-fly ash lightweight concrete blocks are almost the same in the market even though fly ash based concrete blocks are produced at a lower cost compared to non-fly ash concrete blocks. Moreover, demand for fly ash based concrete blocks is relatively low due to the wrong understanding among public and similar price to that of non-fly ash concrete blocks. Currently, demand for fly ash based products account for **only 3.6% of the market** (annual average – 50,000 cubic meters). The share of fly ash based blocks is forecasted to **increase up to 10%** by 2020 if the current market trend is preserved.

Based on the lessons learned from research, the following is recommended to launch SPP for lightweight concrete blocks:

1. Education and capacity building on fly ash based concrete blocks is vital in the current situation. Therefore, it would be advisable to provide information about the advantages of fly ash based concrete blocks to the relevant stakeholders such as producers, traders, and consumers.
2. Also, the following points should be included in public procurement procedures with respect to lightweight concrete blocks:
 - In tendering, it should be considered an asset if **entities' operations or products are certified with ecolabels or standards**, (i.e. preference should be given to entities certified by ecolabels when such vendors participate in public tenders);
 - Points should be given during the procurement process to **entities focusing on sustainable development concepts** in their products and production processes
3. **Evaluation criteria** for public procurement must be gradually introduced in the procurement process year after year. as shown in Table 48 (please see Section 3.4.). Procurement must be aimed at **supporting domestic producers** since they do have a

capacity to fully meet domestic market needs, as well as at **supporting SMEs** in order to **prevent the creation of a monopolized market**. The **technology to process wet ash** must be adopted, and the need for necessary **equipment to transport and store the ash in large amounts** must be met by companies. Supporting actions by the government, such as subsidies, incentives etc., are needed to create a standard for ash use, and to constantly maintain ash resources. If the government supports the fly ash based product consumption through SPP, producers will see no problem in using fly ash in lightweight concrete blocks.

CONCLUSIONS AND POLICY RECOMMENDATIONS FOR OVERALL RESEARCH

The key objectives of this research were to assess: (i) the existing **productive capacities** for sustainable A4 paper, toner cartridge and lightweight concrete blocks; and (ii) the **responsiveness of the market** to potential SPP tenders.

Generally, it has been demonstrated that the A4 paper market in Mongolia has the full capability to respond effectively to SPP tenders because **most A4 paper imported into the market already meet the basic requirements** to be considered sustainable A4 paper.

The markets of **toner cartridge and lightweight concrete blocks** also have the potential to respond to SPP tenders; however, taking into account the findings of this study, it is clear that these two markets currently have a **limited ability** to provide sustainable options.

The market for sustainable alternatives is shaped by a number of factors, including: legal requirements (e.g., laws mandating green purchasing); business entities' ethics and environmentally responsible behavior; consumer demand, created through awareness of the benefits of sustainable goods.

Since government spending was estimated at between 20-30% of Mongolian GDP in recent years, the government has a great buying power. It can therefore be a driving force in creating sustainable markets. Through the public procurement of goods that meet sustainable requirements, the government will make significant contributions to sustainable development. The value of sustainable purchasing is huge, not only in reducing impact on the environment but also in protecting public worker's health and adopting responsible business and ethical business practice.

Recommendations

Based on the findings of the study, the following is recommended to launch SPP:

1. **Develop a specific policy for sustainable public procurement.** It is needed to clarify that sustainable public procurement does not limit competition nor violate the country's international trade obligations. Moreover, it identifies the **sustainable product criteria** that will concern environmental, social and economic sustainability.
2. **Develop evaluation methods** for sustainable product criteria. In the Mongolian case, currently, using ecolabels and narrow product criteria in public procurement will not work due to the **limited availability of products carrying eco-labels**. If a public tender were to require any specific label, it could be perceived as discriminatory or as "limiting competition." Therefore, an SPP policy needs to **set standards that stipulate analogous criteria to common ecolabels**.
 - **A4 copy paper:** All basic sub-categories of sustainable A4 copy paper that are recognized at an international level are **possible to apply** when practicing SPP in the Mongolian context, and many products meeting basic requirements are already present in the Mongolian market. Although most sustainability labels used in an international context can be applied to A4 copy paper in Mongolia, a **certain period is needed** to officially mandate their introduction in public procurement (see Table 16, section 1.4. for more information). In the case of A4 copy paper, the **cost of shifting to sustainable products is low**.
 - **Toner cartridge:** Some basic sub-categories of sustainable toner cartridges that are recognized in an international context are **possible to apply** in Mongolian sustainable public procurement at present, namely, the avoidance of heavy metals and azo-colorants, environmentally preferred packaging, quality management system (for original cartridges), ease of re-use/recycling, and technical quality. Most original and some remanufactured **toner cartridges imported to Mongolia already meet some sustainability requirements**. Evaluation methods recognized at an international level can be applied to toner cartridges in Mongolia; however, a certain **adaptation period** is needed to add sustainable criteria in public procurement (see Table 29, section 2.4., for more information).
 - **Lightweight concrete blocks:** Some basic sub-categories of sustainable concrete blocks are **possible to apply** in Mongolian sustainable public procurement at present, namely, reduction of water consumption, use of recycled materials, construction waste

management or waste treatment technology, indoor chemical and pollutant source control. The products that meet these sustainable criteria have **already begun to be produced in Mongolia**. However, the **methods of verifying such sustainability criteria are still under development** (see Table 48, section 3.4, for more information).

3. Develop a **database of sustainable products**. The maintenance of a database of all **sustainable goods and their suppliers** that are available in Mongolian market will greatly assist in developing SPP practice in Mongolia. The database should be updated regularly.
4. Provide **education and capacity building** for all procurement officers to familiarize them with the sustainable product criteria and evaluation process.

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ANNEXES


Annex 1. Ecolabels for A4 copy paper, toner cartridges and concrete blocks





Ecolabels for A4 office paper and toner cartridges		
Label	Logo	Short description
		The EU Ecolabel is part of a broader EU Action Plan on Sustainable Consumption and Production and Sustainable Industrial Policy adopted by the European Commission on 16 July 2008, which


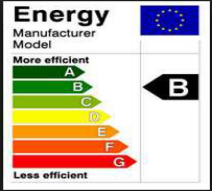




European Ecolabel		also links the EU Ecolabel to other EU policies such as green public procurement (GPP) and Eco-design of energy-using products.
Nordic Ecolabel		The Nordic Ecolabel is a voluntary ecolabelling scheme that evaluates a product's impact on the environment throughout the whole life cycle.
Blue Angel		Nordic Ecolabelling has set environmental requirements concerning the origin of the raw wood material, the emissions to air and water, the use of energy as well as the chemicals used in the production of the pulp and paper.
Austrian Umweltzeichen		This label provides the general public with information on the environmental impact of consumer goods that arises from their production, usage and disposal and attracts the attention of consumers to alternative environmentally friendly products.
Forest Stewardship Council (FSC)		The Forest Stewardship Council (FSC) is an international not for-profit, multi-stakeholder organization established in 1993 to promote responsible management of the world's forests. Its main tools for achieving this are standard setting, certification and labelling of forest products.
Program for the Endorsement of Forest Certification (PEFC)		The Program for the Endorsement of Forest Certification (PEFC) is an international, non-profit, non-governmental organization which promotes sustainable forest management through independent third-party certification. It is considered the certification system of choice for small forest owners.
Eco Mark Japan		It is the mark that is attached on a product which is available in our daily lives as well as certified as contributing to environmental preservation in terms of less environmental burden. It is also aimed for the consumers to make an environmental - friendly product choice, and also to consider the relation of life and environment.
Thai Green Label		The Green Label is an environmental certification awarded to specific products that are shown to have minimum detrimental impact on the environment, in comparison with other products serving the same function. The Thai Green Label Scheme applies to products and services, not including foods, drinks, and pharmaceuticals.
Singapore Green Label Scheme		The Singapore Green Labeling Scheme (SGLS) aims to help the public identify environment-friendly products that meet certain eco-standards specified by the scheme and seeks to encourage the level of eco-consumerism in Singapore as well as to identify the growing demand for greener products in the market. The scheme hopes to encourage manufacturers to design and manufacture with the environment in mind. It was launched in May 1992 by the Ministry of the Environment. It was handed over to the Singapore Environment Council (SEC) on 5 June 1999 and is currently under the authority of the SEC.

Chlorine-Free Products Association label		Processed Chlorine Free (PCF) audits require a chain of custody for all raw materials, measures the impact of a manufacturing process on the environment: water and energy use, chemistry, carbon gas releases, reviews environmental policy and permit compliance, reviews ethical management practices and compliance, financial performance, product stewardship, public information, funding of research and development, and employee recognition.
Green Seal ecolabel		Green Seal utilizes a life-cycle approach to ensure tangible reductions in the whole environmental footprint. They are ANSI-accredited and meet ISO and GEN requirements. Products only earn Green Seal certification after a rigorous evaluation, including an on-site audit.
Ecologo		Ecologo has been recognized or referenced in more than 350 specifications and standards, and UL Environment has public affairs and outreach teams dedicated to continuing to enhance market adoption.
ISO14001		ISO 14001 is an internationally accepted standard that outlines how to put an effective environmental management system in place.
ISO9001		The ISO 9001 standard provides a framework of globally recognised principles of quality management, including: customer focus, leadership, involvement of people, process approach to management, continual improvement, factual approach to decision making and mutually beneficial supplier relationships.
		SCG Papers' Green Process refers to all operations that result in paper as the outcome. Each process must be environmentally and socially responsible, and use natural resources as wisely as possible to ensure low levels of consumption, high levels of recycling, and optimum management of by-products and production waste.

International eco label for sustainable building

Eco labels	Main criteria
 <p>LEED- Leadership energy and environmental design- USA</p>	<p>LEED consists of credits which earn points in 7 categories:</p> <ol style="list-style-type: none"> 1. Site selection 2. Water efficiency 3. Energy and Atmosphere 4. Materials and Resources 5. Indoor environmental quality 6. Regional priority 7. Innovation and design <p>One hundred points are available across these categories with mandatory prerequisites such as minimum energy and water-use reduction, recycling collection, and tobacco smoke control.</p>
	<p>BREEAM is the world's foremost environmental assessment method and rating system for buildings. It has served as the basis for many of the green building certification systems and since its establishment</p>

 <p>BREEAM – Building research establishment's environmental assessment method-USA</p>	<p>it has been used throughout the UK, EU, EFTA member states, EU candidates, as well as the Persian Gulf.</p> <ol style="list-style-type: none"> 1. Low carbon technologies 2. Energy efficiency 3. Water use 4. Internal environment (health and well-being) 5. Pollution 6. Transport 7. Materials 8. Waste 9. Ecology 10. Management processes
 <p>LBC label: Living building challenge</p>	<p>The Living Building Challenge performance standard is regarded by many in the industry to be the most rigorous and difficult green building certification to achieve. To be Challenge-certified, a green building or home must meet a series of strict performance requirements that include net zero energy, net zero waste and net zero water.</p>
 <p>Germany-Passivhaus label for Building</p>	<p>Passivhaus Label requirements for certification Obtaining the Passivhaus label is based on precise specifications including:</p> <ul style="list-style-type: none"> - It is granted to new homes with heating needs which are less than 15 kWh / m² /year. - The Primary Energy Demand, the total energy to be used for all domestic applications (heating, hot water and domestic electricity) must not exceed 120 kWh per square meter of treated floor area per year. - In terms of Air tightness, a maximum of 0.6 air changes per hour at 50 Pascals pressure (ACH50), as verified with an onsite pressure test (in both pressurized and depressurized states). - Thermal comfort must be met for all living areas during winter as well as in summer, - with not more than 10 % of the hours in a given year over 25 °C
 <p>National Green Building label</p>	<p>Assessment Indicators A building is rated on five indicators on a scale of 1 (worst) to 10 (best). The key performance indicators are: Energy, Environment, Health, User quality, and Long term value which assesses the building quality. Each indicator is divided into the following sub indicators</p> <ul style="list-style-type: none"> - Energy (energy performance, demand reduction) - Environment (water, environmental care, materials) - Health (noise, air quality, thermal comfort, lighting and visual comfort) - User quality (accessibility, functionality technical quality, safety) - Long term value (adaptability and future amenities, flexibility, perceived value)
<p>International eco label for sustainable building materials</p>	

 <p>U.S . Environmental Protection Agency (EPA), Energy Star</p>	<p>U.S . Environmental Protection Agency (EPA), Energy Star</p>	<p>Energy Star was first established in 1992 as a voluntary labeling programme and is a widely recognized government-run product certification label for energy efficient products. It is a joint programme of the U.S. EPA and DOE.</p> <p>Energy Star-certified products include appliances, heating and cooling equipment, lighting, home electronics, commercial roofing and office equipment. Energy Star standards are generally updated and tightened every two years.</p> <p>The Energy Star label can be found today in Australia, Canada, Japan, New Zealand, Taiwan and the EU.</p>
 <p>EU energy efficiency label for products</p>		<p>The mandatory energy efficiency of appliances/products in EU is rated in terms of a set of energy efficiency grades (classes) from A to G on the label, where A is the most energy efficient level and G the least efficient.</p>
 <p>WaterSense</p>	<p>WaterSense</p>	<p>WaterSense is a partnership programme also by the US EPA. WaterSense seeks to protect the future of the nation's water supply by offering people a simple way to use less water with water-efficient products, new homes, and services. It was established in 2006 and seeks to help consumers make smart water choices that save money and maintain high environmental standards without compromising performance. WaterSense products and services that have earned the label have to be at least 20% more efficient.</p>
 <p>cradle to cradle</p>		<p>This is a certification and label based on criteria that addresses the materials contained in a product, the material re-utilization cycle, the amount of energy and water used in manufacturing, and corporate social responsibility.</p>
 <p>Green Seal</p>		<p>Green Seal is a third-party certification and labelling programme that covers a wide range of products with sector-specific requirements, particularly consumable items for building operations. Green Seal has been certifying products since 1992 and is an ISO 14024 Type I programme. Green Seal considers the impacts of a product over its entire life cycle when developing a standard.</p>
 <p>BCA GREEN MARK Green Mark, certification for buildings</p>		<p>The BCA Green Mark Scheme rates buildings according to five key criteria including: energy efficiency, water efficiency, environmental protection indoor environmental quality, and other green and innovative features that contribute to better building performance.</p>
 <p>BIFMA: Business and Institutional Furniture</p>		<p>The BIFMA is buildings according to four key criteria including:</p> <ol style="list-style-type: none"> 1. Energy (energy performance, demand reduction) 2. Environment (water, environmental care, materials) 3. Health (noise, air quality, thermal comfort, lighting and visual comfort) 4. User quality (accessibility, functionality technical quality, safety)

Manufacturer's Association	
GREENGUARD Label 	<p>The GREENGUARD Label is administered by a third-party company (UL Environment, a business unit of Underwriters Laboratories) and is focused specifically on emissions, toxicity and indoor air quality, tested in accordance to CA 01350. GREENGUARD certification is a standard that helps architects and contractors find products like paints, flooring, materials and even furniture that have low VOC (Volatile Organic Compound) emissions and are safe for indoor air quality. These GREENGUARD-certified paints are a good example of where you might see this label in practice and how it might be useful to you.</p>

Annex 2. Mongolian standards for concrete block

№	Main suppliers	Standards
1	MAK LLC	MNS 831:2001
2	Dorniin tsas LLC	MNS 831:2001
3	Mongol tashuur construction LLC	MNS 6424:2013, MNS 5526:2005
4	Uliastai khungun concrete block LLC	MNS 831:2001
5	Erdes concrete LLC	MNS 831:2001
6	Sutain ach LLC	MNS 5771-2007
7	Silikat LC	
8	Chilagu LLC	MNS 831:2001
9	General etolan LLC	MNS 831-2001, Chalk MNS 347-2002 , Concrete MNS 3091-2008, Sand MNS 0392-1998, Water MNS 3821-85
10	Arga baril LLC	/MNS 6054:2009//
11	Undram gan LLC	MNS 5771- 2007
12	Eco panel LLC	MNS 831:2001
13	Javkhlant LLC	MNS 831:2001
14	Dulguun bars LLC	MNS 831:2001
15	Altain gatsuurt LLC	MNS 831:2001
18	Khaan diamond LLC	MNS 831:2001