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# Business Opportunity Mapping in Solid Waste Management and Recycling Practices



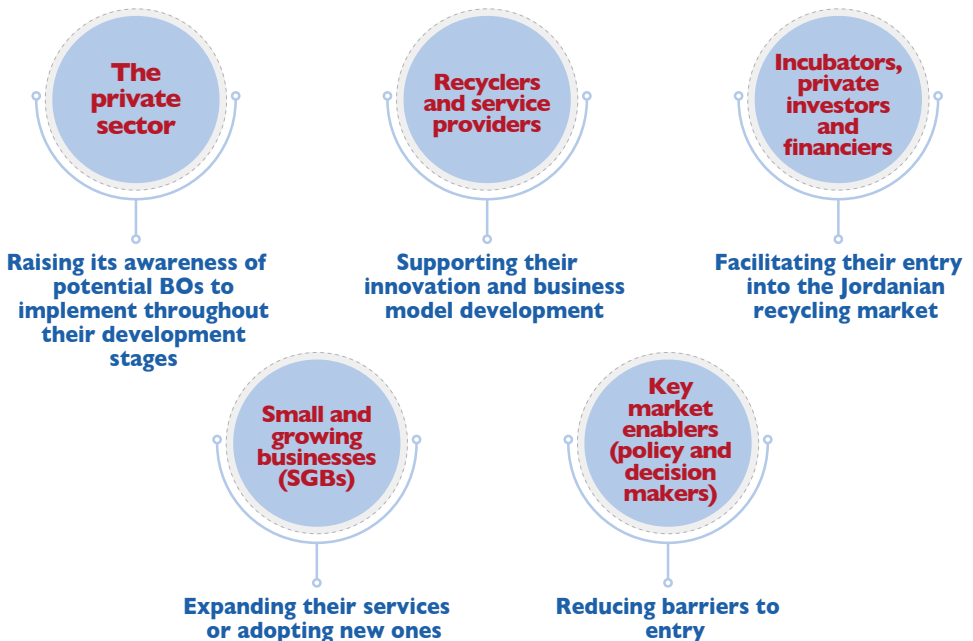
# Introduction

Every day, Jordan's Al Ghabawi landfill receives 3,200 tons of waste from Amman, and this number is growing by more than 5 percent per year. According to the estimates of the Greater Amman Municipality, the commercial sector is responsible for no less than 30 percent of this waste. Optimistic estimates put Amman's recycling rate between 7 and 10 percent of the total volume, which is lower than other cities in the region.

The lack of waste management programs and insufficient recycling practices on individual and entity levels have formed a significant barrier to recycling uptake. This emphasizes the necessary involvement of the private sector in solid waste management services and the swift implementation of government regulations to counter the negative impact of rising waste. In partnership with the Ministry of Environment and the Greater Amman Municipality, USAID Recycling in Jordan created the Business Opportunity Mapping (BOM) booklet in Solid Waste Management and Recycling Practices. This booklet aims to increase the competitiveness of recycling in Jordan by shedding light on available investment/business opportunities, which will help address the gaps between waste generators and recycling service providers and enhance recycling practices in the local market.

The BOM booklet seeks to support startups and small and medium-sized businesses (SMEs) to succeed and grow sustainably by providing easy access to valuable and precise market data concerning well-researched and vetted business opportunities (BOs) within the organic, plastic, paper/cardboard, metal, and other waste sectors. It also aims to bridge gaps within the value chains, facilitate local job creation for youth and women, and spur substantial socioeconomic and environmental benefits.

A specialized team of business, waste management, environmental, technical, municipal, and recycling experts built a shortlist of 10 BOs that would be of particular benefit following in-depth research, market analyses, and reviews of international value chain mapping studies.

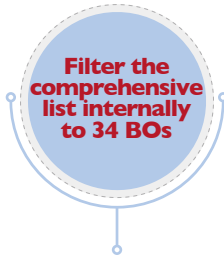


# Methodology

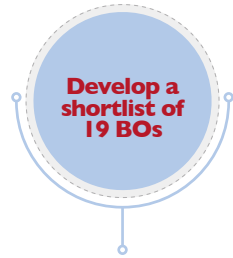
The methodology used to identify and validate the most promising BOs is illustrated in the figure below - featuring each step taken, the tools used, the key sources referenced and the output deduced:



**Review relevant databases and internal reports, as well as identify potential BOs**



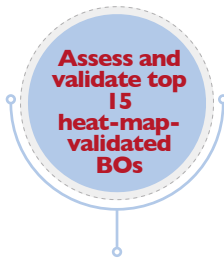
**Hold internal expert assessments using knock-out criteria**



**Generate shortlisted BOs through Focus Group 1**



**Determine the advantages and disadvantages of the 19 BOs using scoring criteria to develop a heat map through Focus Group 2**



**Assess and validate key challenges and success factors of the top-ranked 15 BOs through Focus Group 3**



**Conduct conclusive internal validation, review and analysis of the final top 10 BOs**



# **Business Opportunities**

# Top 10 Solid Waste Management and Recycling Business Opportunities in Jordan

**1- Recycling Plastic Waste into PET Bottle Bales**

**2- Selling Smart Vending Machines to Collect Recyclable Plastic and Aluminum Waste**

**3- Recycling Polypropylene/ Polystyrene (PP/PS) Textile Waste into PP/PS Yarns**

**4- Converting Aluminum and Copper Waste into Ingots**

**5- Producing Rubber Products from Tire Waste**

**6- Sorting and Dismantling Electric and Electronic Appliances**

**7- Recycling Paper/Cardboard Waste into Bales**

**8- Converting Food Waste into Vermicompost for Farms**

**9- Automating a Used Cooking Oil Collection System**

**10- Recycling Pet Flakes into Pet Pellets**

**\*Please do not treat this booklet as financial or business professional advice. Please consult your professional business and investment advisors should you decide to pursue any of the business opportunities in this booklet.**

# I- Recycling Plastic Waste into PET Bottle Bales for PET Recyclers

Plastic bales are formed by compressing waste PET bottles into blocks. Plastic baling is an innovative collection system with high waste collection rates and low transportation costs. The prepared-for-use nature of PET bottles gives them a competitive edge over loose plastic waste. This business opportunity bridges gaps in waste pre-processing activities, reduces plastic pollution, extends the lifespan of the local landfill infrastructure, increases return on plastic waste, adds value to waste collection and creates employment for unskilled labor.

## Market

**FINAL PRODUCT**  
PET bottle bales

**COMPETING PRODUCTS**  
Un-baled waste PET bottles



## Process



**COMPLEXITY**  
Moderate - Mechanical



**REQUIREMENTS**

**Technology**  
Collection  
Shredding  
Pressing

**Human Resources**  
Manual labor  
Sales personnel

## Business Linkage



**CLIENTS/MARKETS**  
PET processors and recyclers



**SUPPLIERS**  
Waste collectors or PET generators  
(industrial, commercial, residential and landfill sectors)

Available outside Jordan

Available in Amman

## Cost Benchmark



**CAPITAL EXPENDITURE**  
Machinery < JOD 500,000



**OPERATING EXPENDITURE**  
Waste handling and processing > JOD 10,000,000

## 2- Selling Smart Vending Machines to Commercial Facilities to Collect Recyclable Plastic and Aluminum Waste from End Users

Smart vending machines are an innovative system that encourages the collection of recyclable plastic and aluminum waste from end users in exchange for reward points or cash back. This business opportunity not only promotes dependency on local machine manufacturing instead of importing, but it also drives a socio-environmental impact by reducing plastic and aluminum waste leakage, increases return on plastic and aluminum waste, adds value to waste collection and creates employment for unskilled labor.



### Market

#### FINAL PRODUCT

Smart vending machines to collect and press recyclable plastic and aluminum waste

Export Potential



#### COMPETING PRODUCTS

Imported machinery



### Process



#### COMPLEXITY

Moderate - Mechanical



#### REQUIREMENTS

Technology Equipment Human Resources

Design  
Machining

Components  
Materials  
Tools

Manual labor for installation  
Technical operations and  
maintenance



### Business Linkage



#### CLIENTS/MARKETS

Waste generators  
at commercial facilities

(hospitality, education and retail sectors)

Available in Amman



#### SUPPLIERS

Equipment and technology providers

Available outside Jordan



### Cost Benchmark



#### CAPITAL EXPENDITURE

Tools and equipment  
< JOD10,000,000



#### OPERATING EXPENDITURE

Processing materials  
> JOD 500,000 ≥ JOD 10,000,000

### 3- Recycling Polypropylene/ Polystyrene (PP/PS) Textile Waste into PP/PS Yarns for Textile Manufacturers

Given that the textile industry boasts high demand in Jordan, the cost of raw materials (PP/PS textile waste) would be lowered. This business opportunity seeks to reduce waste diverted to landfills, extend the lifespan of disposal infrastructure and contribute to circular economy models, as well as increase return on PP/PS waste and create employment due to the high proximity to both suppliers and customers.

## Market

**FINAL PRODUCT**  
PP/PS yarns

Export Potential



medium

**COMPETING PRODUCTS**  
PP/PS yarns from virgin raw material



high

## Process

**COMPLEXITY**  
Complex - Mechanical

**REQUIREMENTS**

<b>Technology</b>	<b>Equipment</b>	<b>Human Resources</b>
Collection	Transportation vehicles	Manual labor
Sorting	Shredders and extrusion	Machine technicians
Shredding	Spinning machines	Production engineers
Re-melting		
Extrusion		
Spinning		

## Business Linkage

**CLIENTS/MARKETS**  
Fabric and readymade garment manufacturers  
(located in industrial parks across Jordan)

Available in Amman

**SUPPLIERS**  
Textile waste generators  
(commercial and residential sectors)

Available in Amman

## Cost Benchmark

**CAPITAL EXPENDITURE**  
Machinery  
JOD 500,000 □ JOD 10,000,000

**OPERATING EXPENDITURE**  
Waste collection and transportation  
JOD 500,000 ≥ JOD 10,000,000



# 4- Converting Aluminum and Copper Waste into Ingots for the Engineering Industry

Aluminum and copper ingots could be produced from aluminum and copper scrap to be sold as raw material to the engineering industry, which poses high demand in Jordan, thus lowering the cost of raw materials. This business opportunity seeks to reduce waste diverted to landfills, extend the lifespan of disposal infrastructure and contribute to circular economy models, as well as increase return on aluminum and copper waste and create employment for skilled and unskilled labor, given the high proximity to both suppliers and customers.



## Market

### FINAL PRODUCT

Aluminum and copper ingots

### COMPETING PRODUCTS

Industrially produced aluminum and copper

Export Potential



## Process



### COMPLEXITY

Complex - Mechanical



### REQUIREMENTS

#### Technology

- Separating
- Dismantling
- Shredding
- Classification/sorting
- Melting
- Blocking/compacting

#### Equipment

- Shredders
- Dismantlers
- Melting pots
- Blocking/compacting machinery
- Quality assurance testing tools

#### Human Resources

- Manual labor
- Machine technicians
- Material/metal engineers



## Business Linkage



### CLIENTS/MARKETS

Waste generators at commercial facilities

Available in Amman



### SUPPLIERS

Scrap dealers, waste generators (commercial, residential and industrial sectors)

#### informal collectors

(individual street waste pickers, itinerant buyers, scavengers in landfill sites, etc.)

Available in Amman



## Cost Benchmark



### CAPITAL EXPENDITURE

Machinery > JOD 10,000,000



### OPERATING EXPENDITURE

Labor and energy < JOD 500,000

## 5- Producing Rubber Products from Tire Waste for End Users

Many rubber products such as car floor, exercise and play mats and tiles can be produced from tire waste and eventually sold to end users. This business opportunity has high growth potential, low cost of raw materials and could be replicated and scaled up. Moreover, it avoids the negative environmental impact of burning tires or dumping them in landfills, as well as increases return on tire waste and the rubber industry, while creating employment for skilled and unskilled labor, given the high proximity to both suppliers and customers.



### Market

#### FINAL PRODUCT

Various rubber products

#### COMPETING PRODUCTS

Virgin rubber sources

#### Export Potential



### Process



#### COMPLEXITY

Moderate - Mechanical



#### REQUIREMENTS

##### Technology

Tire steel wire separating  
Tire shredding  
Granulating  
Vulcanization  
Compression molding

##### Equipment

Transportation vehicles  
Granulators  
Shears  
Compressors

##### Human Resources

Manual labor  
Machine technicians  
Production engineers



### Business Linkage



#### CLIENTS/MARKETS

End users



#### SUPPLIERS

Tire waste generators from any transportation vehicle

(commercial, residential and industrial sectors)

Available in Amman

Available in Amman



### Cost Benchmark



#### CAPITAL EXPENDITURE

Machinery > JOD 10,000,000



#### OPERATING EXPENDITURE

Waste collection and processing  
JOD 500,000 ≥ JOD 10,000,000

## 6- Sorting and Dismantling Electric and Electronic Appliances

Junk appliances (known as e-waste) include used/waste equipment - such as ovens, refrigerators, freezers and dryers - that may be sorted and dismantled to produce precious and non-ferrous metals. This business opportunity has high growth potential and low cost of raw materials, increases return on precious and non-ferrous metals through simple material handling operations, bridges gaps in waste pre-processing activities and adds value to e-waste collection, while avoiding the negative environmental impact of burning e-waste or dumping it into landfills and creating employment for unskilled labor.



### Market

#### FINAL PRODUCT

Dismantled appliances  
(copper, steel, plastic, rubber, etc.)

Export Potential



#### COMPETING PRODUCTS

Local/international precious  
and non-ferrous metal suppliers



### Process



#### COMPLEXITY

Simple - Material handling



#### REQUIREMENTS

##### Technology

Collection  
Sorting  
Dismantling

##### Equipment

Transportation vehicles  
Shredders  
Pressing machines

##### Human Resources

Manual labor  
Technicians



### Business Linkage



#### CLIENTS/MARKETS

Engineering factories  
and traders



Available outside Jordan



#### SUPPLIERS

Landfills, waste collectors  
and waste generators

(commercial and industrial sectors)



Available in Amman



### Cost Benchmark



#### CAPITAL EXPENDITURE

Basic tools < JOD 500,000



#### OPERATING EXPENDITURE

Waste collection and transportation  
< JOD 500,000

# 7- Recycling Paper/Cardboard Waste into Bales for Paper/Cardboard Recyclers

Paper/cardboard bales are formed by compressing waste materials into blocks. Paper/cardboard baling is an innovative collection system with high waste collection rates and low transportation costs. The prepared-for-use nature of baled paper/cardboard waste gives it a competitive edge over loose paper/cardboard waste. This business opportunity bridges gaps in waste pre-processing activities, adds value to paper/cardboard waste collection, increases return on paper/cardboard waste, while driving a socio-environmental impact by reducing paper/cardboard waste leakage into landfills (where they could pose a fire hazard), extending the lifespan of the local landfill infrastructure and creating employment for unskilled labor.



## Market

### FINAL PRODUCT

Paper/cardboard bales  
Export Potential



### COMPETING PRODUCTS

Un-baled paper/cardboard waste



## Process



**COMPLEXITY**  
Simple - Mechanical



### REQUIREMENTS

#### Technology

Collection  
Sorting  
Classification  
Possible shredding and pressing

#### Equipment

Transportation vehicles  
Shredders  
Pressing machines

#### Human Resources

Manual labor  
Sales manager



## Business Linkage



### CLIENTS/MARKETS

Paper/cardboard processors, recyclers and exporters and small-scale local paper mills

Available in Amman



### SUPPLIERS

Paper/cardboard waste generators (commercial, residential and industrial sectors) scrap dealers, individual street waste pickers and landfill scavengers

Available in Amman



## Cost Benchmark



### CAPITAL EXPENDITURE

Machinery  
JOD 500,000 - JOD 10,000,000



### OPERATING EXPENDITURE

Waste collection and transportation  
JOD 500,000 ≥ JOD 10,000,000

# 8- Converting Food Waste into Vermicompost for Farms

Vermicomposting is a green process that uses earthworms to transform biodegradable food waste into a natural, nutrient-rich fertilizer that enhances the quality of farm production. This business opportunity encourages investment in food waste collection and separation at source, given its low capital expenditure, as well as decreases dependency on chemical fertilizers, reduces the volumes of food waste that end up in landfills, increases return on food waste and creates employment opportunities.



## Market

### FINAL PRODUCT

Vermicompost  
Export Potential



### COMPETING PRODUCTS

Other types of compost and fertilizers



## Process



### COMPLEXITY

Moderate - Biological process



### REQUIREMENTS

#### Technology

Composting  
Worm digestion

#### Equipment

Plastic or metal  
Containers

#### Human Resource:

Manual labor  
Biochemists



## Business Linkage



### CLIENTS/MARKETS

Farmers, nurseries and organic farm investors

Available in Amman



### SUPPLIERS

Food processing industries, vegetable and fruit markets, caterers and municipalities

Available in Amman



## Cost Benchmark



### CAPITAL EXPENDITURE

Vermi-worms and equipment  
< JOD 500,000



### OPERATING EXPENDITURE

Material handling and processing  
< JOD 500,000

## 9- Automating a Used Cooking Oil Collection System from Hotels and Restaurants for Recycling

Used cooking oil can be automatically collected for safe and efficient filtration. This business opportunity is considered an innovative collection system with a high waste collection rate. Moreover, it boasts a high potential for export, which could promote dependency and return on local machine manufacturing, as well as decrease disposal of oil in sinks, thereby protecting the municipal sewage system, while adding value to used cooking oil collection and creating employment opportunities.



### Market

#### FINAL PRODUCT

Automated used cooking oil collection system

Export Potential



#### COMPETING PRODUCTS

Imported equipment



### Process



#### COMPLEXITY

Moderate - Mechanical



#### REQUIREMENTS

Technology	Equipment	Human Resources
Design Machining	Spare parts Sensors	Technicians for installation Technical operations Maintenance



### Business Linkage



#### CLIENTS/MARKETS

Waste generators

(mainly commercial facilities like restaurants, hotels and caterers)

Available in Amman



#### SUPPLIERS

Equipment/material and component suppliers

Available in Amman



### Cost Benchmark



#### CAPITAL EXPENDITURE

Tools < JOD 500,000



#### OPERATING EXPENDITURE

Material and components  
JOD 500,000 ≥ JOD 10,000,000

# 10- Recycling Pet Flakes into Pet Pellets

Recycled PET pellets can be produced from PET waste (flakes) to be sold to recycled PET manufacturers. This business opportunity increases the local production of recyclable plastic products, supports the plastic value chain by bridging gaps in waste processing activities and increases return on PET plastic waste, while driving socio-environmental impact by reducing PET plastic waste leakage into the environment and creating employment opportunities.



## Market

### FINAL PRODUCT

Recycled PET pellets  
Export Potential



### COMPETING PRODUCTS

PET pellets from virgin raw materials



## Process



### COMPLEXITY

Moderate - Mechanical



### REQUIREMENTS

#### Technology

| Pelletizing

#### Equipment

| Pelletizing machines

#### Human Resources

| Machine technicians  
| Engineers



## Business Linkage



### CLIENTS/MARKETS

Recycled PET manufacturers  
and industries

Available outside Jordan



### SUPPLIERS

PET flakes manufacturers

Available in Amman



## Cost Benchmark



### CAPITAL EXPENDITURE

Machinery > JOD 10,000,000



### OPERATING EXPENDITURE

Material processing > JOD 10,000,000



This booklet is made possible by the support of the American people through the United States Agency for International Development (USAID). The contents of this booklet do not necessarily reflect the views of USAID or the United States Government.

for more information, please email **USAID Recycling in Jordan** at **[JOR-JRA-Recycling@chemonics.com](mailto:JOR-JRA-Recycling@chemonics.com)**