

# SMALL-SCALE PRODUCTION OF **CHARCOAL BRIQUETTES**

*A Waste-to-Energy Concept*



- Materials used
- Equipment
- Production process
- Finances
- Possible Business Models



# Principle

- Simple technology to convert any dry biomass waste into charcoal briquettes (desired shape and size)
- Combined environmental sanitation, resource recovery and energy demand
- Employment/labor in various stages of production process and trade in final product
- An urban business concept utilizing readily and locally available resources and employment opportunities

## Long-term objective

- Rid urban settlements of a large bulk of the solid waste it produces at various sources: *biomass wastes*
- Provide an alternative and locally available source of energy: *charcoal*
- Set up a commercial production line of charcoal briquettes in order to meet market demand for fuel in urban settlements: *reduce need for conventional charcoal (cut down on deforestation and long transport routes)*
- Stimulate/provide employment: *collectors, producers, traders and others*

# Current Situation



- Large quantities of biomass waste are strewn on beaches, roadsides, open spaces and unused plots (*sources: gardens, ocean, roadside vegetation, groceries*)
- Beaches and roadsides strewn with litter (*unsightly, unhygienic, hazardous*)
- Wastes buried on the beach (*temporary removal*)
- Incineration is used to get rid of this continuously produced waste; typically incinerated with other wastes (*hazardous air pollution*)

# Development to-date

- *ARTI-TZ Ltd.* provides knowledge on the technology, purchases char-powder and charcoal from producers
- *ESEA Ltd.* acquired infrastructure to test technology on private premises at Kawe Beach
- Currently only 2 people collect material from Kawe Beach and a few houses to produce charcoal briquettes on a micro-scale
- The idea has potential to grow indefinitely, depending on investment and management capacity.
- Potential to introduce to and work through Municipal Solid Waste Management Departments



# The Equipment



The Kiln comprises *four inner drums and an outer barrel* with lid and chimney – this produces charred material



For compression of char-powder into briquettes, *a meat grinder with adapted front* is used (compressor can vary)

# The Production Process



Dry material is *collected*  
*and filled* in inner  
containers of kiln



Drums are *closed*  
*and packed* into the  
outer drum(kiln)

# The Production Process *(cont'd)*



Kiln is *compacted with dry material and covered with lid* and the chimney is placed



Kiln is *lit and left to burn* until all signs of smoke and heat disappear

# The Production Process *(cont'd)*



After cooling, drums are removed from kiln and *paralyzed matter inside drums are powdered*



Char powder is mixed with binder *(any starch porridge; paper pulp?)*

# The Production Process *(cont'd)*



*Moist char-powder  
is compressed...*



*... into briquettes using an  
extruder, and left to dry in the  
sun for minimum 4 days*

# Green Charcoal

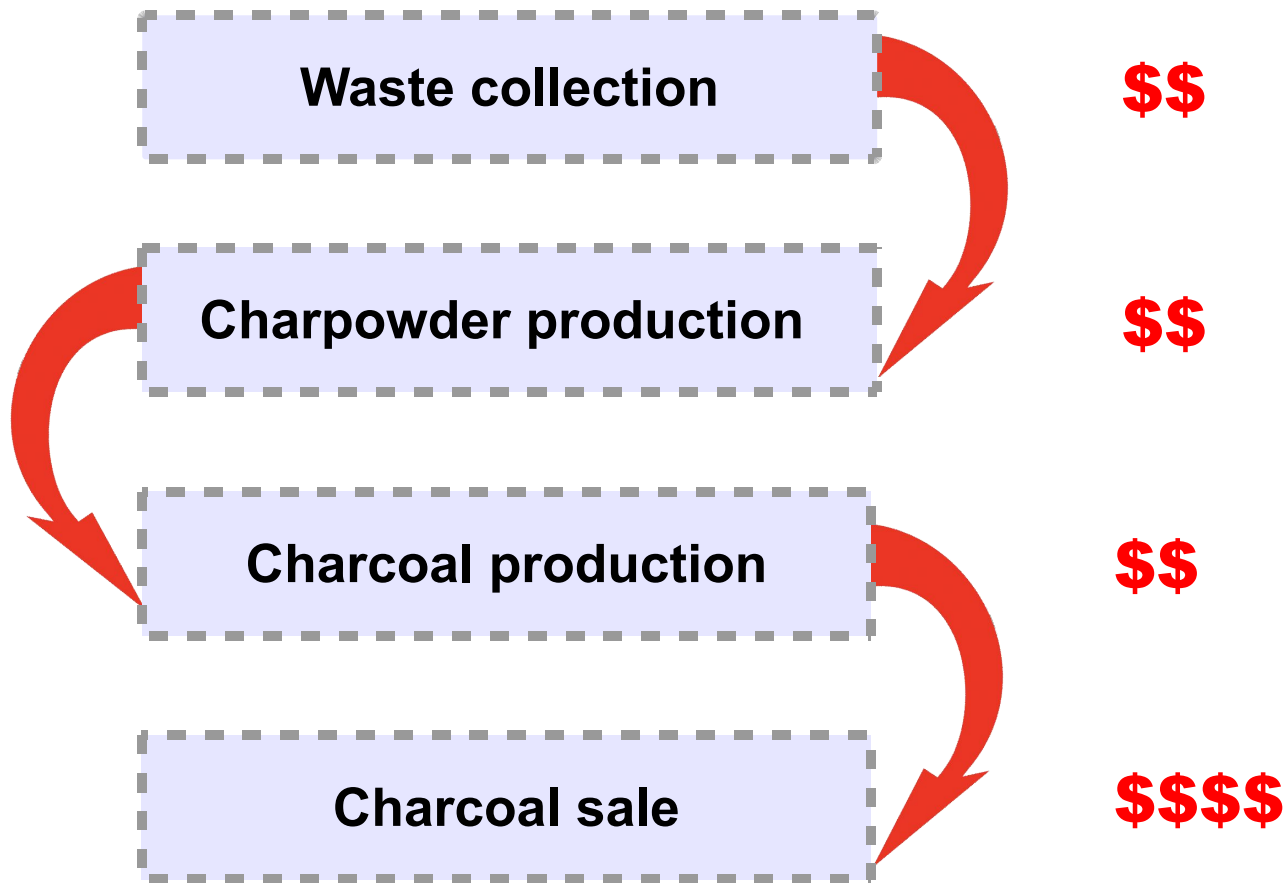


Dried briquettes are packed, ready for sale or use at home.

***A waste to energy product: 100% recycling***

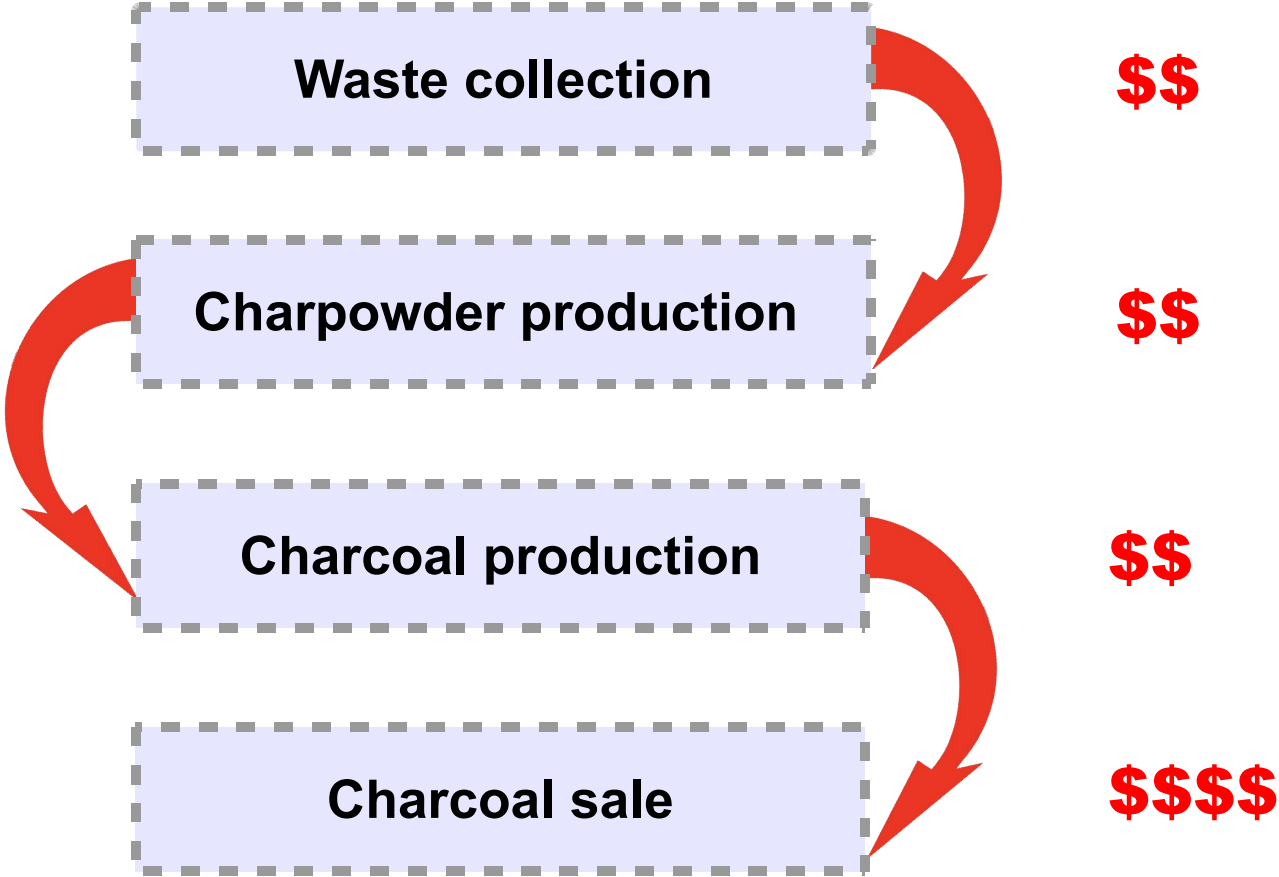
# Business model 1

*Independent Processes*



# Business model 2

*Combined Processes*

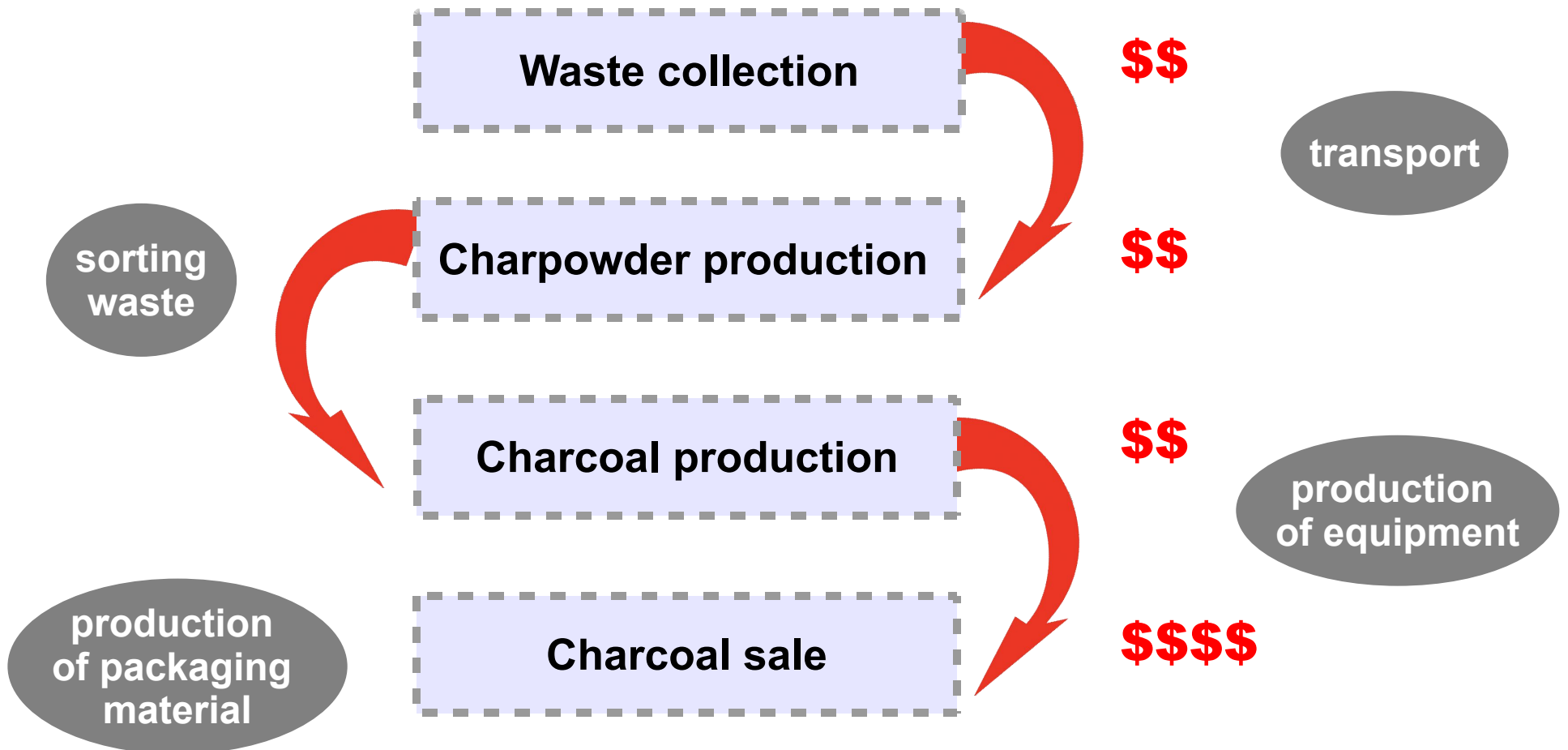


# Business model 2

## Process



ECOSYSTEMS EAST AFRICA LTD.



# Possible business model

## *Financial*



<b>Investment costs</b>		TSH
<i>fixed</i>		
Kiln (with drums)		350,000.00
Extruder		130,000.00
Training (10 pax)		300,000.00
<b>Total</b>		<b>780,000.00</b>

<b>Production costs</b>		TSH
<i>variable</i>		
Transport		?
Packaging		?
Labor		?
Premises		?
<b>Total</b>		<b>?</b>

### **Types of funding:**

- Public-Private Partnerships
- Social Responsibility budgets
- Private Investments
- Micro-finance loans

### **Sources of funding:**

- Telecommunication
- Wood works
- Municipalities
- Private investors