

# Technical concept for sustainable waste management in the tourism sector

TouMaLi International Conference  
Alexandria, Egypt

BlackForest Solutions GmbH, Beatrice Vanek

# Phases of concept development

1

2

3

Baseline  
analysis

Concept  
development

Implementation

# Phases of concept development

1

2

3

Baseline  
analysis

Concept  
development

Implementation

# 1 Baseline analysis

Desk research



Questionnaires

Supported by:  
Federal Ministry  
for the Environment, Nature Conservation  
and Nuclear Safety  
based on a decision of the German Bundestag

**TouMALI**  
PREVENTION OF MARINE LITTER

**Questionnaire hotel waste collection**

Name of hotel .....  
Date .....

Is the waste separated inside the waste room? ☐ yes ☐ no  
If yes, which streams? .....

Is the separation conducted correctly, the correct waste stored in the correct bin?  
☐ yes ☐ no

How many bags have been collected? .....

How many bins have been emptied, and how full have been the bins?

☐ 1<sup>st</sup> bin, filled .....%  
☐ 2<sup>nd</sup> bin, filled .....%  
☐ 3<sup>rd</sup> bin, filled .....%  
☐ 4<sup>th</sup> bin, filled .....%  
☐ 5<sup>th</sup> bin, filled .....%  
☐ more than 5 bins

Hotel visits



Waste  
characterization





# Data collection, desk research



# Initial data collection

## Interviews & Questionnaires

- General hotel information (n° of rooms, n° of beds, restaurants, kitchens,...)
- Waste collection information (company, informal sector involvement)
- Containers for waste collection in the hotel
- Waste collection from public areas, from rooms, from staff area
- Specific Monitoring of inorganic Waste
- Willingness for an improved waste management monitoring in the hotel industry
- Beach wrack and litter pollution

# Initial data collection

|                           | Data   | Hotel n° 1             | Hotel n° 2                     | Hotel n° 3                        | Hotel n° 4                       | Hotel n° 5                               | Hotel n° 6                  | Hotel n° 7                    |
|---------------------------|--|------------------------|--------------------------------|-----------------------------------|----------------------------------|--|-----------------------------|-------------------------------|
| General Hotel Information | Municipality   | Alexandria             | Alexandria                     | Alexandria                        | Alexandria                       | Alexandria                               | Alexandria                  | Alexandria                    |
|                           | Name of the Hotel  | Mecca Hotel Alexandria | Four seasons hotel Alex.       | Sunrise Alex Avenue               | Paradise Inn                     | Helnan Palestine Hotel                   | San Stefano Grand Plaza     | Cecil                         |
|                           | Address/governorate  | Alexandria             | Alexandria                     | Alexandria                        | Alexandria                       | Alexandria                               | Alexandria                  | Alexandria                    |
|                           | Year of construction   | 1972                   | 2008                           | 2008                              | 1999                             | 1994                                     | 1958                        | 1929                          |
|                           | Contact Person   | Mr. Kamal              | Ataf Saad                      | Mr. Mohamed Fathy                 | Mr. Wael                         | Eng. Ameera Fouad                        | Mrs. Noha Gabr              | Dr. Ala' Hisham               |
|                           | Position   | General Manager        |                                | HR Manager                        | General Manager                  | Head of Public Affairs                   |                             | Hygiene coordinator           |
|                           | Phone Number/ Email  | 1006160026             |                                | mohamed.fathy@sunrise-resorts.com | gm.mamoura@paradisainnhotels.com | alexandria@helnan.com                    | Noha@sangiovanni.com        | alaa.hesham@steigenburger.com |
|                           | Type of Hotel (Resort/ Business/ Both)   | Business               | Resort                         | Resort                            | Resort                           | Both                                     | Business                    | Business                      |
|                           | Category of Hotel (Specify how many stars does the hotel have)                               | 2 Stars                | 5 Stars                        | 5 Stars                           | 4 Stars                          | 5 Stars                                  | 3 Stars                     | 4 Stars                       |
|                           | The number of rooms  | 89Rooms                | 150Rooms                       | 161Rooms                          | 84Rooms                          | 220Rooms                                 | 32Rooms                     | 85Rooms                       |
|                           | The number of beds   | 230Beds                | 300Beds                        | 322Beds                           | 168Beds                          | 350Beds                                  | 64Beds                      | 170Beds                       |
|                           | Overnight stays (average)  |                        |                                | 65% All year                      | 95% High season 20-40% Low       | 75% High season 30% Low                  | 90-100% High season 50% Low | 100% High season 50% Low      |
|                           | High season (Specify months)   |                        |                                |                                   |                                  |  |                             |                               |
|                           | Low season (Specify months)  |                        |                                |                                   |                                  |  |                             |                               |
|                           | Type of arrivals? (Local/ International/ Both)   | Both                   | Both                           | Both                              | Both                             | Both                                     | Both                        | Both                          |
| Waste Collection          | Does the hotel have a private beach with access restricted to hotel guests only? (Yes/ No)   | No                     | Yes                            | Yes                               | Yes                              | Yes                                      | No                          | No                            |
|                           | Does the hotel have Certification/standards? (Yes/ No)                                       | No                     | No                             | Yes                               | No                               | Yes                                      | No                          | Yes                           |
|                           | If yes, please mention it and precise the date of certificate achievement                    |                        |                                | Travel life; Tovnord              |                                  | Green Star Hotel Certificate, April 2022 |                             | Green Star Hotel Certificate  |
|                           | Who is collecting the waste (municipality, a private company, etc)?                          | Municipality           | Private Company                | Private Company                   | Private Company                  | Private Company                          | Municipality                | Private Company               |
|                           | If the private companies are involved, please indicate them.                                 |                        |                                | Nahdet Misr                       | Nahdet Misr                      |  |                             |                               |
|                           | Do you have any estimation of the quantity of waste (tons/week)? (Yes/No)                    | Yes                    | Yes                            | Yes                               | Yes                              | No                                       | Yes                         | No                            |
|                           | If yes, please precise it.   |                        |                                | 1.75 tons/ week                   | 2.8 tons/ week                   |  | 0.1 tons/ week              |                               |
|                           | Are some recyclable fractions sold to private companies? (Yes/ No)                           | No                     | Yes                            | No                                | No                               | Yes                                      | No                          | No                            |
|                           | If yes, please indicate them.  |                        | Mixed waste is sold as a whole |                                   |                                  | Plastics and used cooking oil 6EGP/kg    | Only oils                   |                               |
|                           | For the collection of recyclable fractions, is the informal sector involved? (Yes/ No)       | No                     | No                             | No                                | No                               |  | Yes                         | No                            |
|                           | What are the current costs for waste management activities? (Logistics/ Disposal) (EGP/tons) | 8400 EGP/ Year         | 35000 EGP/ Year                | 42000 EGP/ Year                   | 25000 EGP/ Year                  | 30000 EGP/ Year                          | 7200 EGP/ Year              |                               |
|                           | Where are the collection waste   |                        |                                |                                   |                                  |  |                             |                               |

Supported by:



based on a decision of the German Bundestag

# Hotel visits

- Size of waste room
- Number of bins
- Organisation of waste separation
- Current waste management practices



Picture source: BFS, 2021



Picture source: BFS, 2021



# Phases of concept development

1

2

3

Baseline  
analysis

Concept  
development

Implementation

## 2 Concept development

Information on:

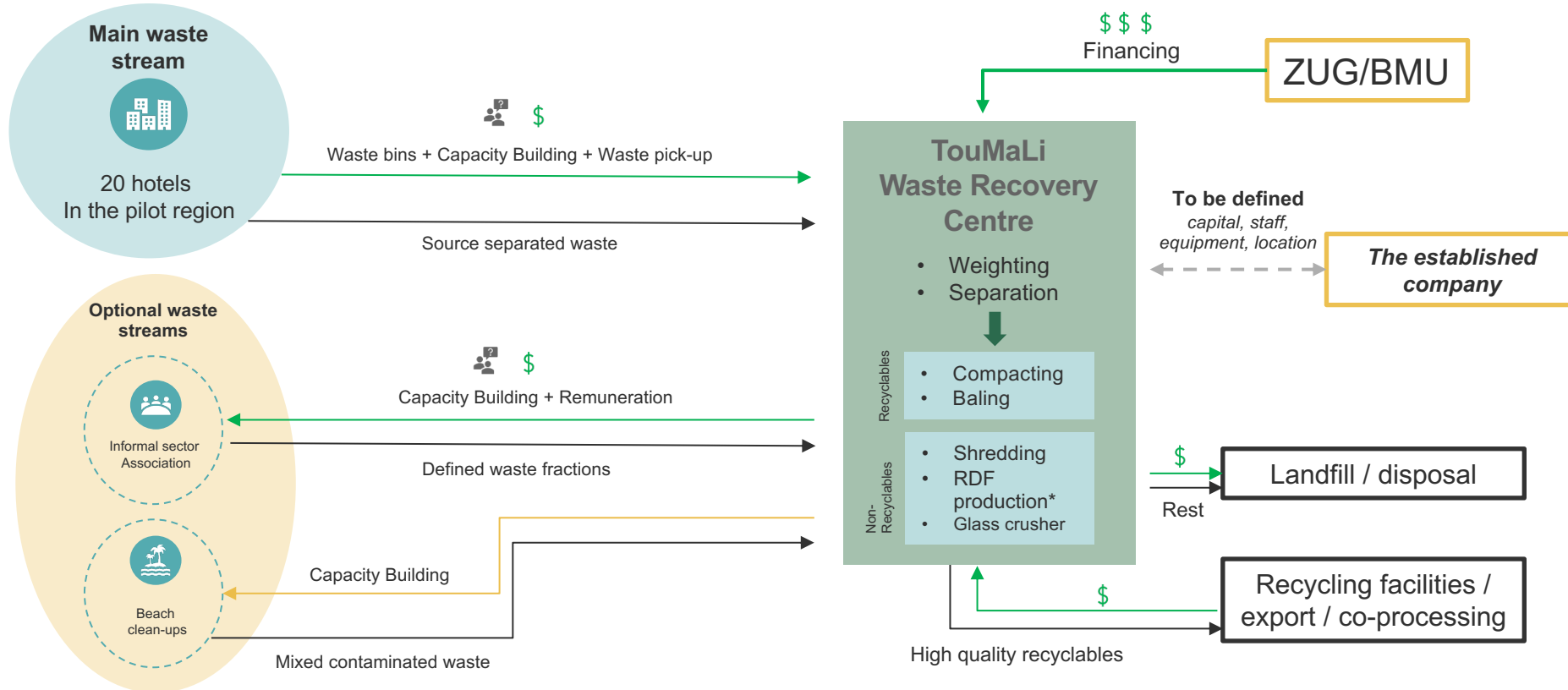
- Waste management in the hotels
- Waste rooms
- Bins in the hotels
- Waste amounts
- Waste characterization



### **Actionplan for hotels and beaches:**

- Waste collections
- Waste pre-treatment activities
- Capacity building
- Awareness campaigns

# Concept overview

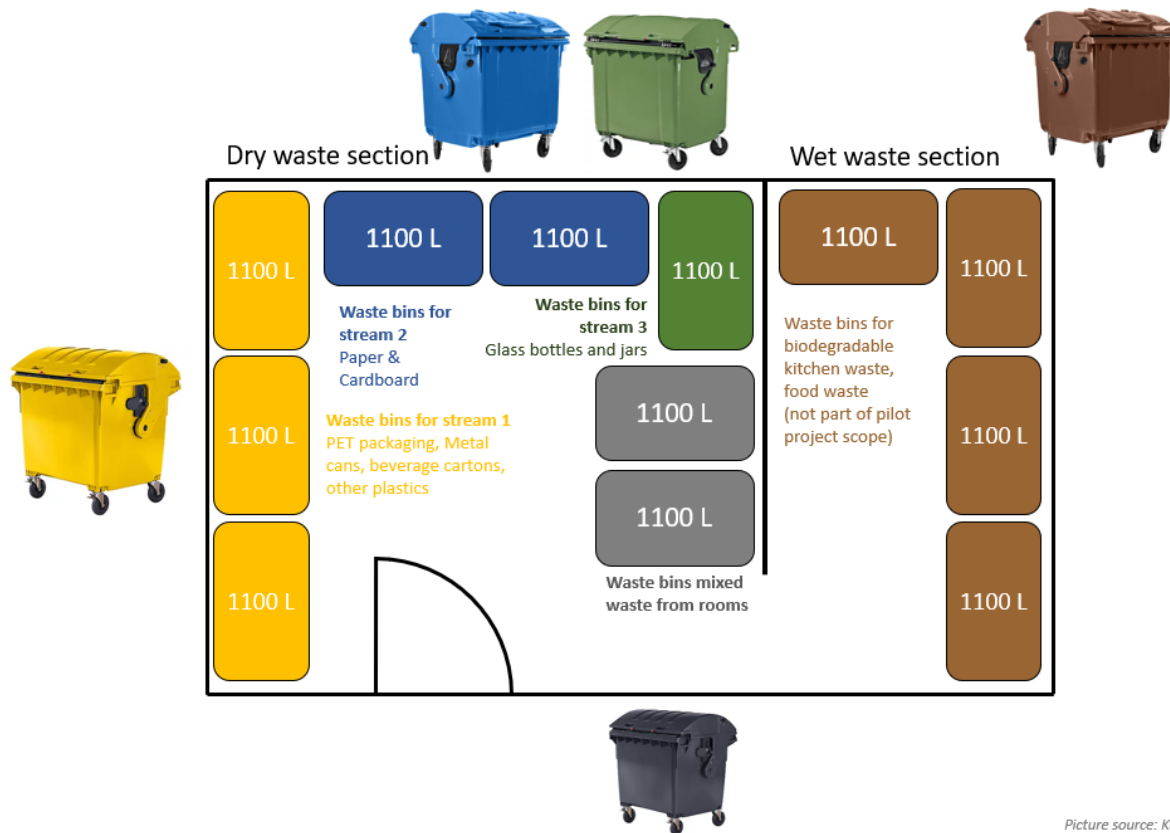


# Proposed waste streams in hotels





# Waste bin arrangement scenario



Picture source: Kaiser & Kraft

## Identification of waste reduction potentials

- In collaboration with the hotel MGMT
- Reduction of Single-Use-Plastics
- Preparation of guideline document



Picture source: BFS, 2022



Picture source: BFS, 2022

## Workshops and trainings

- Development of workshop material
- Arabic and English/French



Picture source: BFS, 2021

# Inclusion of hotel guests in waste reduction measures



Picture source: BFS, 2022



Picture source: lodgingmagazine.com



Picture source: femina.in



Picture source: Upcyclerslab.com

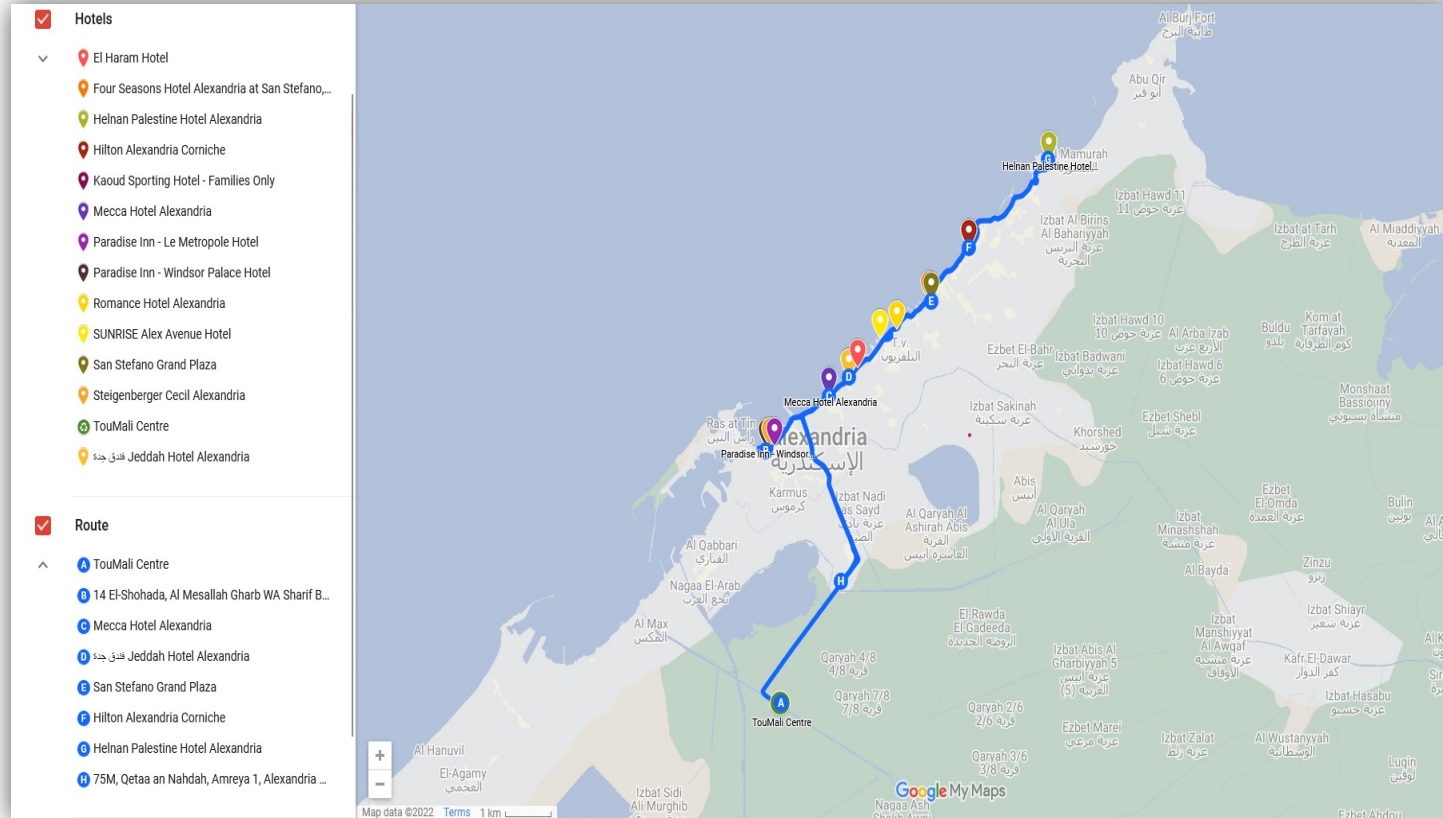
Separate waste bins in public areas and information material for hotel guests about the newly established waste management system.

Establishment of free and accessible tap water stations (frequent water quality controls) and reusable hotel - branded water bottles.

Awareness program about the consequences of waste cigarette butts and installment of ashtrays.

Awareness program for children with educational games about the environment, waste management and the marine ecosystem.

# Waste collection route





# Technical process – PART 1

## STORING & BALING



**PET packaging**  
**Beverage cartons**  
**Metal cans**  
**other plastics**



**Paper &**  
**Cardboard**



## SALE TO OFFTAKERS

- Recycling
- Export
- RDF

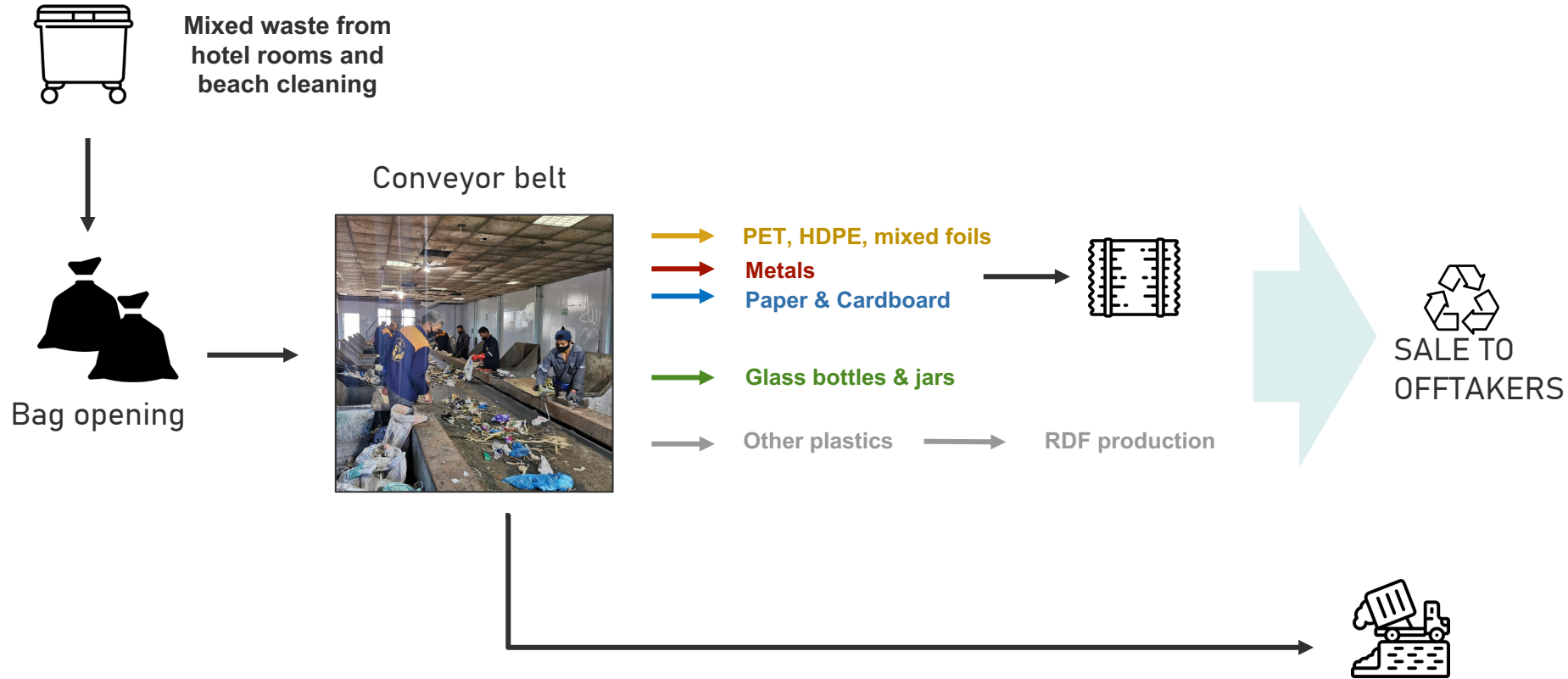
## STORING



**Glass**  
**bottles**  
**and jars**



# Technical process – PART 2



## Preparation of business plan - OPEX, CAPEX analysis

- Price determination of equipment:
  - Bins for hotels
  - Waste collection vehicle
  - Small sieve
  - Sorting table
  - Bailer
  - Other machinery, equipment, safety gear
- Revenues of material sales

| 3 Overview: Costs and Income                 |            |                |        |             |                    |                              |      |        |           |          |
|--|------------|----------------|--------|-------------|--------------------|------------------------------|------|--------|-----------|----------|
| 3.1 CAPEX                                    |            |                |        |             |                    |                              |      |        |           |          |
| Total Costs                                  |            | Price per unit | Amount | Total (€)   | Comments           | Revenues vice per Unit       |      | Amount | Total (€) | Comments |
|  |            |                |        |             |                    | Sales prices for recyclables |      |        |           |          |
| Bins   |            |                |        |             |                    |                              |      |        |           |          |
| Hotel Beach                                  | 215.00     | 20             |        | 37.396.00   |                    | PET                          | 0.25 | 75.16  | 18.79     |          |
| Wellness area                                | 215.00     | 20             |        | 4.300.00    | Trio bin 45 L each | HDPE                         |      |        | 0.00      |          |
| Outdoor area                                 | 215.00     | 20             |        | 4.300.00    | Trio bin 45 L each | LDPE                         |      |        | 0.00      |          |
| Kitchen                                      | 16.20      | 20             |        | 324.00      | Duo bin 60 L each  | Paper                        |      |        | 0.00      |          |
| Hotel restaurants & bar                      | 215.00     | 20             |        | 4.300.00    | Duo bin 60 L each  | Glass                        |      |        | 0.00      |          |
| Laundry service                              | 16.20      | 20             |        | 324.00      | Duo bin 60 L each  | Aluminium/Tin                |      |        |           |          |
| Furniture and stock                          | 16.20      | 20             |        | 324.00      | Duo bin 60 L each  |                              |      |        |           |          |
| Maintenance service                          | 16.20      | 20             |        | 324.00      | Duo bin 60 L each  |                              |      |        |           |          |
| Offices and administration                   | 215.00     | 20             |        | 4.300.00    | Duo bin 45 L each  |                              |      |        |           |          |
| Conference rooms                             | 215.00     | 20             |        | 4.300.00    | Duo bin 45 L each  |                              |      |        |           |          |
| Lifts and stairs                             | 215.00     | 20             |        | 4.300.00    | Duo bin 45 L each  |                              |      |        |           |          |
| Interim storage                              | 150.00     | 40             |        | 6.000.00    | 1000 L bins        |                              |      |        |           |          |
| Public beach                                 | 23.50      | 20             |        | 470.00      | 240 L bins         |                              |      |        |           |          |
| Sorting cabins                               | 25.000.00  | 1              |        | 25.000.00   | EU Standard        |                              |      |        |           |          |
| Bale press                                   | 20.000.00  | 2              |        | 40.000.00   | EU Standard (D60)  |                              |      |        |           |          |
| Foundation, infrastructure, office           | 100.000.00 | 1              |        | 100.000.00  | Local costs        |                              |      |        |           |          |
|  |            |                |        | Total       | 203.866.00         |                              |      |        |           |          |
| Optional Equipment                           |            |                |        |             |                    |                              |      |        |           |          |
| Shredder                                     |            | 0              |        | 0.00        |                    | PRO (optional)               |      |        |           |          |
| Recycling line (extrusion/moulding)          | 10.000.00  | 0              |        | 0.00        | Precious Plastic   | Contributions                |      |        |           |          |
|  |            |                |        |             |                    | 0                            |      |        |           |          |
| Vehicles                                     |            |                |        |             |                    |                              |      |        |           |          |
| Forklift                                     | 30.000.00  | 1              |        | 30.000.00   | EU Standards       | Services charged to Hotels   |      |        |           |          |
| Truck(s)                                     | 65.000.00  | 2              |        | 130.000.00  | EU Standards       | Service fees                 |      |        |           |          |
|  |            |                |        | Total       | 160.000.00         |                              |      |        |           |          |
| Unforeseeable related to machinery/equipment | 10%        |                |        | 16.000.00   |                    | Total per y 18.79            |      |        |           |          |
|  |            |                |        | Total CAPEX | 379.866.00         |                              |      |        |           |          |
| 3.2 OPEX                                     |            |                |        |             |                    |                              |      |        |           |          |
| Total Costs                                  |            | Price per unit | Amount | Total (€)   | Comments           |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
| Utilities                                    |            |                |        |             |                    |                              |      |        |           |          |
| Electricity                                  |            |                |        | 0           |                    |                              |      |        |           |          |
| Fuel   |            |                |        | 0           |                    |                              |      |        |           |          |
| Disposal cost of non-processables            |            |                | 154.18 | 0           |                    |                              |      |        |           |          |
| (Optional) informal sector remuneration      |            |                |        |             |                    |                              |      |        |           |          |
| Penal (optional)                             |            |                |        |             |                    |                              |      |        |           |          |
| Labour costs                                 |            |                |        |             |                    |                              |      |        |           |          |
| Shift leader                                 |            | 1              |        | 0           |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |
|  |            |                |        |             |                    |                              |      |        |           |          |

# Phases of concept development

1

Baseline  
analysis

2

Concept  
development

3

Implementation



# 3 Implementation

- Tendering process / offers for machinery
- Initiate the ordering process
- Preparation of waste rooms
- Conduction of workshops and trainings
- Installation of facility



Roll-out of the “on ground” TouMaLi activities

Thank you for your attention!

# BFS' role within the project

1. Development of the technical concept (hotels, waste collection, waste recovery centre)
2. Roll-out of separation at-source at kitchens and hotel facilities to prevent contamination (ensure high quality) of recyclables.
3. Training on and promotion of waste reduction measures
4. Operation of local measures and efficient recycling of the different pre-sorted fractions of waste



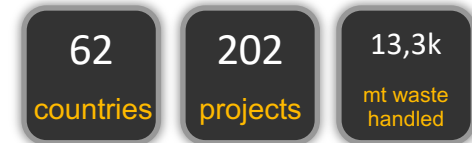
## THE RFS GROUP

The **RainbowForest Group** changes the world with a new generation of purpose-driven, impact-oriented ventures, tackling the most pressing environmental challenges of our times.

## BLACKFOREST SOLUTIONS

**BlackForest Solutions (BFS)** is a Berlin-based company active in more than 60 countries. We transfer technical waste management knowledge worldwide to support our partners and jointly make environmental justice in low-and mid-income countries a reality.

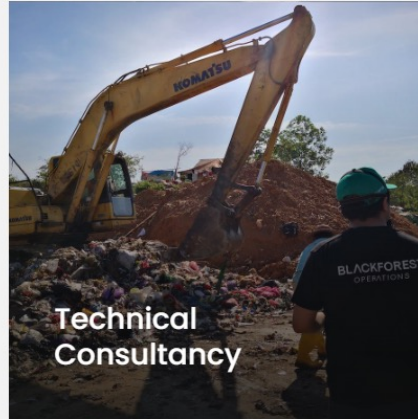
## BFS in FIGURES



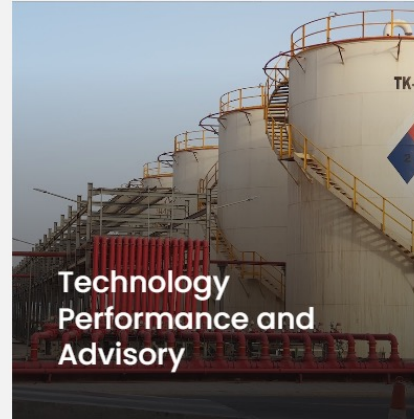




- Hazardous waste export and disposal
- Onsite sampling & repackaging [of hazardous waste]
- Basel Convention notification services
- Dangerous Goods logistics management



- Baseline assessments
- Technical concept creation
- Capacity building programs
- Recyclable material sourcing



- On-site operational support
- Technical process optimisation
- Forensic investigations and technical due diligence
- Technical upgrade and commissioning



- Market entry strategies
- Technology mediation services
- Global project development support
- M&A process support