PROJECT DESCRIPTION - GENERAL DATA OF THE PROCESS

1. GENERALS

Biosort Beringen NV, a subsidiary company of Bionerga NV (in the process of incorporation under Belgian law (vennootschap in oprichting/société en formation)), has decided to build an innovative sorting plant which sorts waste collection bags (collected by Limburg.net) by colour.

For its Optimo project Limburg.net aims to collect 5 different waste fractions in one and the same garbage truck. The waste collection bags have a certain colour for a certain waste fraction. Once collected house-by-house, the garbage truck transports the mix of waste collection bags to the new sorting plant where the bags are sorted by colour (or alternative). The new Optimo sorting plant will be located in Ravenshout – Beringen, next to the newly build biosteam plant of Biostoom Beringen (an affiliate of Bionerga).

Figure 1: Site location

Bionerga already operates several waste treatment plants of which:

- three waste-to-energy plants:
  - One in Beringen, which is under construction and will be taken over the first half of 2020,
  - One in Ostend, dating from 2009, and
  - One in Houthalen-Helchteren, dating from 1984, which is now requesting a new permit for the incineration of biomass waste;
- five composting plants (in Bilzen, Houthalen-Helchteren, Maasmechelen, Pelt and Sint-Truiden).

The new Optimo sorting plant in Beringen must sort the different waste collection bags efficiently without damaging the collection bags (resulting in the loss of containment). The new sorting plant must be energetically optimized, reducing the energy consumption to its minimum. The new sorting plant should be designed holistically with a focus on cleanliness, standardization, operability, availability, ergonomics, maintainability, safe to operate and should fulfill to all applicable legislation (CE machine Directive, noise, VLAREM, …). The installation will consist of one or more sorting lines comprising (but not limited to) :

- Traffic flow,
- Waste acceptance,
- Feeding system,
- Sorting system
  - Conveyor belts,
  - Identifiers,
  - Actuators,
  - Retour and or bypass conveyor (if applicable),
- Hydraulic system (if applicable),
- Pneumatic system (if applicable),
- Storage and distribution,
- Space for extensions,
- Steel structure,
- Crane(s) (if applicable),
- Visualisation and automation,
- Instrumentation,
- Low and medium voltage,
- Transformer stations,
- Industrial buildings,
- Infrastructure,
- Fire protection
- Utilities
- …

The figures mentioned in this document only serve to give an overall idea of the specifications of the new Optimo sorting plant. For indications concerning minimal, nominal and maximal operating conditions as well as for measuring points, modalities, scope of delivery, … a reference is made to the technical requirements.

2. MATERIAL INPUT

FRACTION	BAGS design scope bags/hour
Kicthen waste (organic household-fruit/veg)	800
P+MD	3 400
textiles	400
extra 1	500
extra 2	600
Residual waste	4 550
Garden waste	1 350
Total amount to be sorted	**11 600**
Residual waste without extra fractions	5 200

Table 1: Indication of the average mix of waste collection bags to be sorted.

Based on Table 1 it can be concluded that residual waste and P+MD represent almost 70% of the total mix of waste collection bags.

3. PROCESS BLOCK DIAGRAM

The new Optimo sorting plant will accept, store, transport and sort the mix of waste collection bags (delivered by garbage trucks) with a high sorting efficiency (min 96% sorting efficiency i.e. out of 100 green bags for example, at least 96 are found) and high sorting purity (min 98% sorting purity, i.e. in the receiving container for green bags, out of 100 bags, at least 98 are green). The design of the sorting plant takes 2 additional waste fractions into account.

The process block diagram shows the conceptual design / material flow of the new Optimo sorting plant.

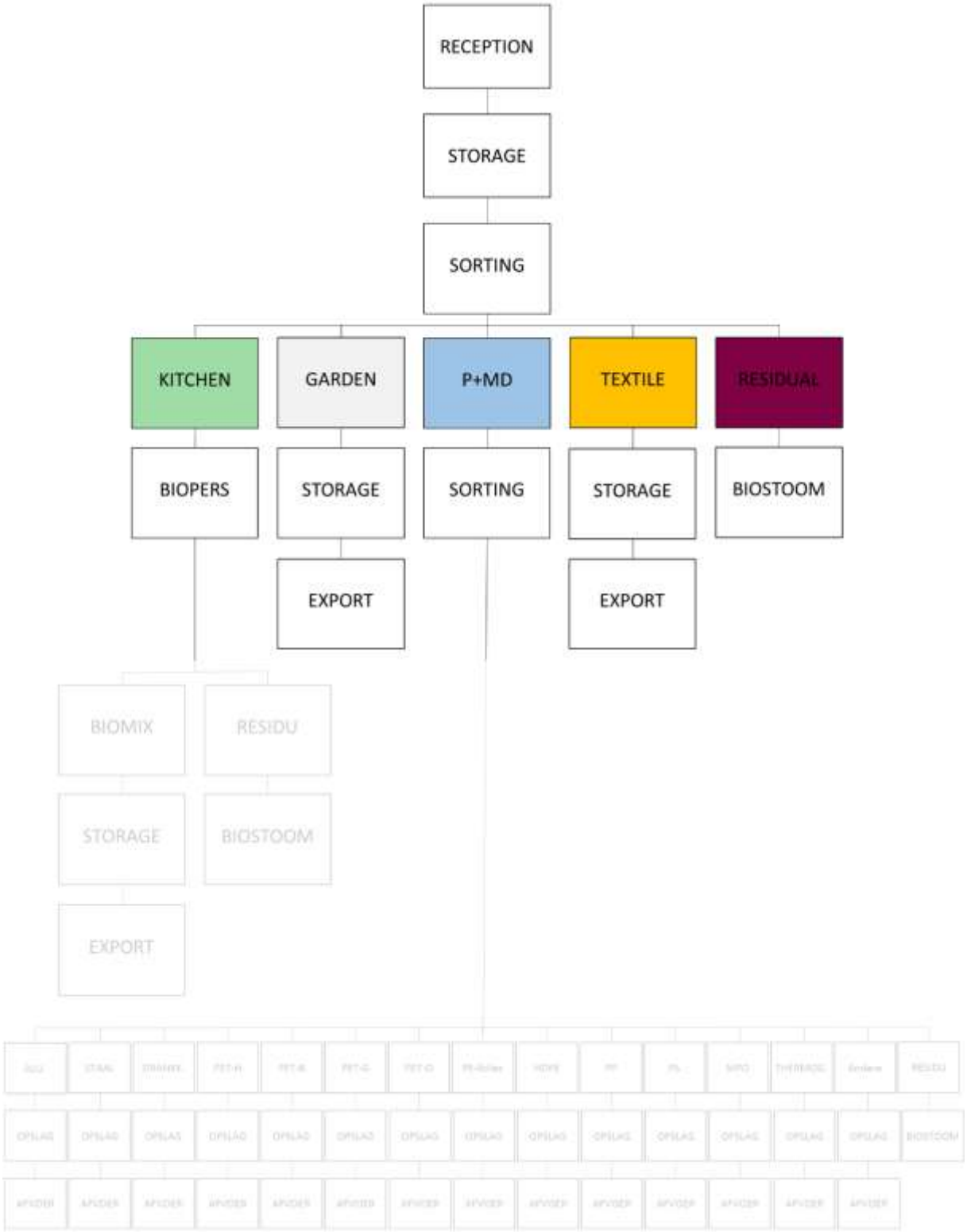

Figure 2: Process block diagram

The waste is discharged and stored into a modular bunker. An automatic transportation system transports the waste collection bags from the bunker onto the feeding system, where the waste collection bags are fed on the conveyor belt to the sorting zone. On this conveyor belt the waste collection bags are prepared in order to optimize the sorting process. Besides the 5 waste fractions (kitchen, garden, P+MD, textile and residual) the plant will be designed so that 2 more fractions can be added to the plant. The required space and tie-ins should already be foreseen.

After sorting, each type of waste collection bag (with a respective colour grade) will be assigned to its respective storage and or treatment system:

Waste Fraction	**Color grade of the bags***	**Transported to**	**Back-up**
Kitchen waste	White	Biopers treatment plant	Inbound Biopers and container
Garden waste	Green	Container (storage)	NA
P+MD waste	Blue	P+MD sorting plant	Inbound P+MD and container
Textile	Orange	Container (storage)	NA
Residual waste	Grey	Biosteam plant	Container (storage)
Additional fraction 1	NA	Container (storage)	NA
Additional fraction 2	NA	Container (storage)	NA

**: If needed the sorting can be done based on a QR code (or other) instead of color sorting, to be indicated by the contractor.*

Following conveyor belts (including the weighing) should be included:

- From the sorting plant towards
  - the Biopers plant (for treatment of kitchen waste)
  - the container for garden waste
  - the P+MD plant (for sorting of P+MD)
  - the container (for textile) and
  - the biosteam plant (for residual waste);
- From the Biopers plant towards
  - the conveyor belt for residual waste (towards the biosteam plant) (for the residu from the Biopers).

4. ADDITIONAL REQUIREMENTS

Due to the fact that the waste collection bags are collected house-by-house on a daily basis (week days (ca. 250 days/year) and a limited amount of “catch-up days” (ca. 10 days/year)) the availability of the waste acceptance should be 100%.

Additionally, the bunker is considered to be a modular system to handle future fluctuations.

All sorted fractions should be weighed with an accuracy of ±0,4%,

- For kitchen waste, P+MD and residual waste (Optimo and residu Biopers) this measurement must be done on its respective conveyor belt,
- For garden waste and textile this measurement will be done on the weighing bridge.

In order to monitor the sorting purity an extra check on correct bag (color) – with or without action – should be performed on each sorted fraction.

For the bags with residual waste and the bags with garden waste, the sorting plant should rip the bags and sort them out before the containment goes to the respective storage and or treatment process, but after the sorting process. The same request is optionally put forward for the bags with kitchen waste.

On the last material flow (residual waste bags or other fraction depending on the design) additional actions are requested:

- Sorting out loose recyclable material due to loss of containment (e.g. P+MD).
- Perform an additional analysis of the amount of bags that lost their containment.

5. LICENSES

The integrated building and environmental permit is being requested. Approval of the permit is expected by the end of February 2020.

6. TIMING

An execution period (from Financial Close until 1st Provisional Acceptance) of 12 months is strived for. The Contractor is, however, responsible for the basic and detailed project planning. Close communication between different suppliers involved in the Project will be required.