Bioelektra Group

Advanced Recycling Technology

Single-Stream ***Recycling***

Leading the Way to ***Zero Waste***

CONTENT

Who we are

We are a business with a unique interest in delivering sustainable waste management solutions. Our aim is to recycle all reusable raw materials from waste and ultimately eliminating landfill waste.

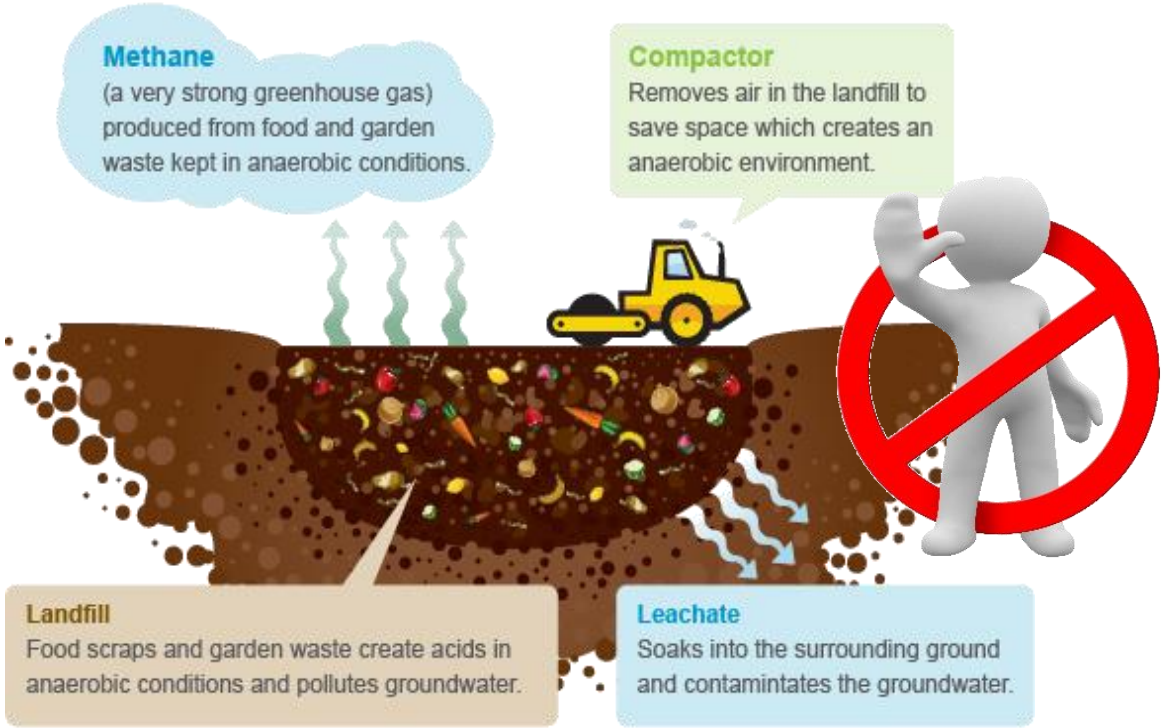
To do this we use our innovative technology for recovery of municipal waste, which was developed and patented. In our facilities we produce mechanical-heat treatment of waste with 6 independent RotoSTERIL BEG7000 machines functioning at an industrial scale.

Our main priority is to introduce to Australia the innovative RotoSTERIL technology to the mainstream municipal waste management. Today, the RotoSTERIL technology already meets all the European standards and the requirements of the Minister of Environment on waste management set until 2020 (high recycling levels, landfilling of any biodegradable or high-calorific waste prohibition).

Our technology is based on the mechanical heat treatment of waste (MHT). This method is based on a uniquely effective process during which the non-sorted municipal waste is sterilised with steam in the RotoSTERIL BEG7000. Next, the waste is effectively sorted into individual fractions intended for its further re-use.

What we do

- We carry out our investments on a commercial basis with no need of any public funding
- Our operations generate profit which allows us to finance our investments
- We guarantee low investment costs compared to other recycling technologies of a similar level of effectiveness
- We guarantee a short time for the completion of the investment
- We offer competitive prices
- We own an innovative system of waste processing and a complete recycle of reusable materials
- We accept unsorted municipal waste
- We neutralise waste through sterilisation within hours of its delivery
- We mechanically segregate the mass into fractions intended to be recycled or reused
- We fully eliminate any waste storage



Let's protect the earth

Undoubtedly the ecological awareness of our society is increasing and this influences our attitude to waste segregation. However, the knowledge of the methods used in this process is held by only a few specialists. This fact drives us to approach and discuss these options with local authorities, businesses that use recycled materials as well as with any individuals interested in this subject. We approach the recycling issues as realists: being aware of the looming challenges and engaging in dialogue with any party interested. Operating in this sensitive industry, we closely monitor the actions of our competitors, as we are fully aware of the social aspect of our business activity.

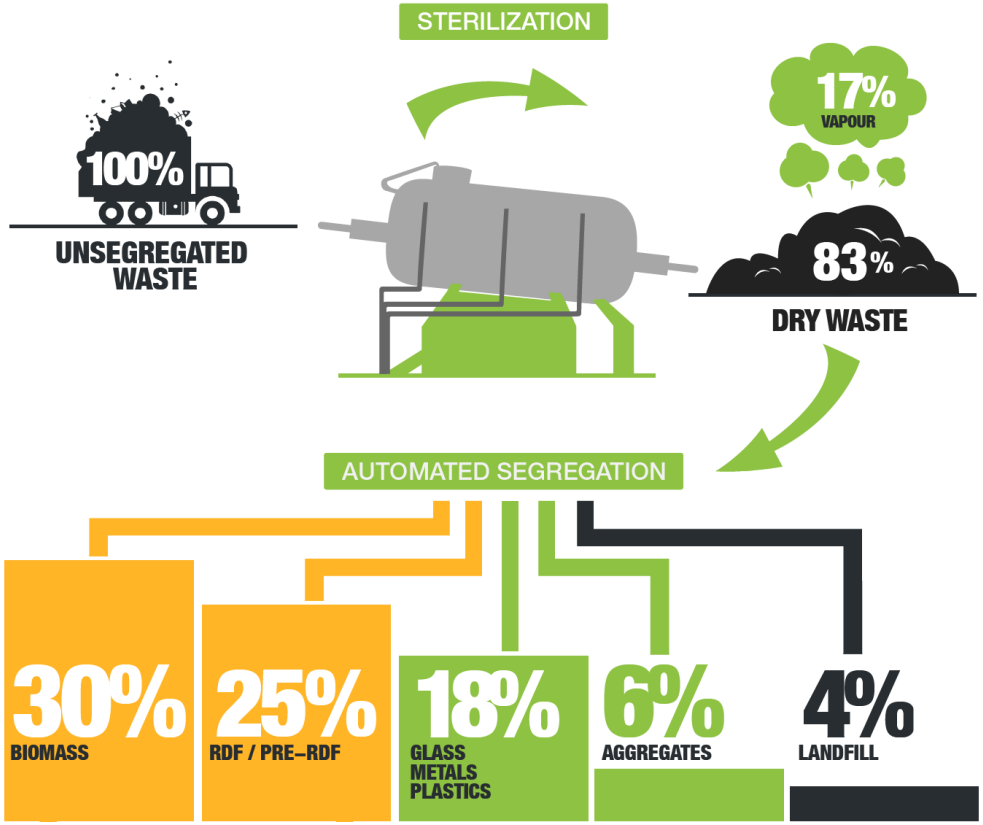
Our mission is to protect the Earth, which has been dramatically polluted. Only if we adopt the civilizational development for the right causes, we will preserve it for our future generations. This is the mission of the Bioelektra Group. The method we have created is ecological, environment friendly, emission-free, crucial for the society and, on top of that, economically attractive. These are the issues we bring up in our discussions with anybody who even today thinks of the future and wants to shape it based on the following principles: ecology and economic profitability.

Our Technology

5 phases of effective processing and recovery of municipal solid waste – the RotoSTERIL technology

1. WASTE RECEPTION
2. STERILISATION IN AUTOCLAVES
3. WASTE UNLOADING
4. SEPARATION PROCESS
5. DELIVERING FRACTIONS TO RECYCLERS

Please view the complete waste recovery process video by following this link
https://vimeo.com/206132220



1. Waste reception, initial shredding and transfer to the feeder

The first phase is the initial mechanical processing of the waste which is mainly for removing any large waste components and shredding the waste to create a more homogeneous mass.

2. Sterilisation in autoclaves

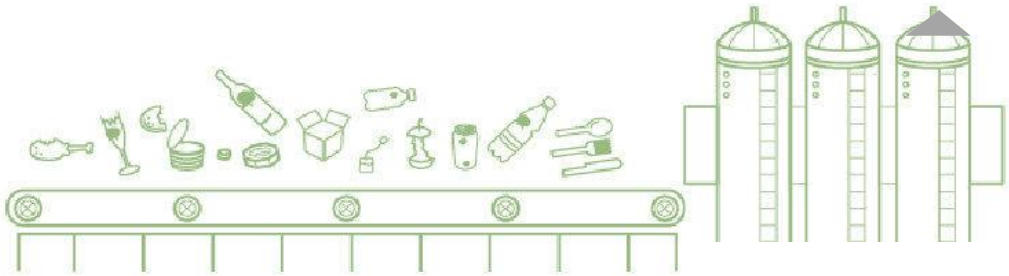
The waste is then loaded into the RotoSTERIL BEG7000 autoclave chamber, where it is subsequently sterilised. The autoclaving process is performed in a number of cyclic autoclave processes, i.e. the empty autoclave chamber is filled up with waste, the heat processing is initiated and once the process is completed, the sterilised mass is removed from the autoclave. This cycle is repeated a number of times. The process takes place in the conditions of high pressure (2-5 bar) and high temperature, involving the steam. The construction of the reactor chamber allows the mixing of the mass during the heat processing. These conditions are maintained for approximately 3 hours after which the pressure decreases and the waste is removed from the chamber.

The autoclaving process is carried out in the temperature of 120-150 degrees Celsius; thus, it is possible to effectively eliminate (sterilise) microorganisms from the waste. Eventually, all the unpleasant smell is also eliminated. The additional advantage of the heat processing is the fact that the volume of waste is reduced by 60% and mass by 15%. This facilitates the storing, transporting and further mechanical processing of the sterilised waste.

As a result of heat processing, the recyclable materials (cans, plastic bottles, metals, glass) are relatively clean as any labels or organic contaminants have been removed. At this stage, the processed mass contains fiberized paper, cardboard, kitchen waste, and a mineral fraction - mainly sand, stones and ceramics.

3. Unloading waste and its transport to the set of separators

After completing sterilisation process in autoclaves, waste is unloaded to the buffer zone, where it stabilises naturally. While the temperature of processed waste decreases, sterile water evaporates from the waste. Stabilised material has a great potential for further mechanical processing, recycling and recovery, as it is dry and can be easily separated.



4. Separation process

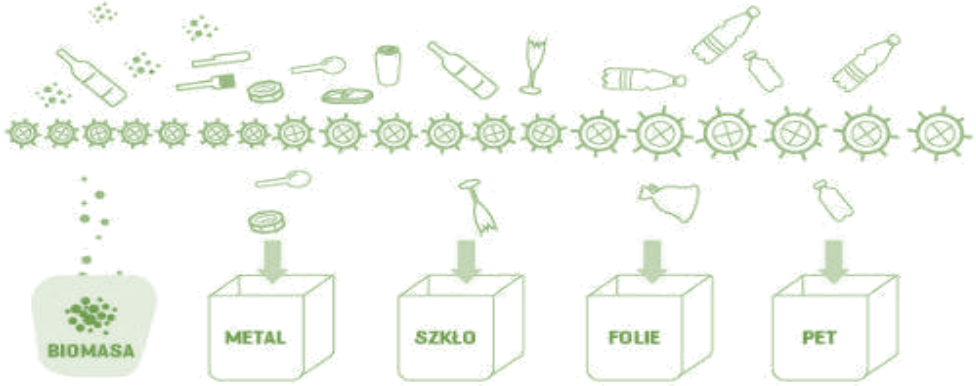
In the next step waste is transferred to be mechanically segregated on the separation line. There is a set of feeders, separators and sieves which separate particular fractions to the individual containers.

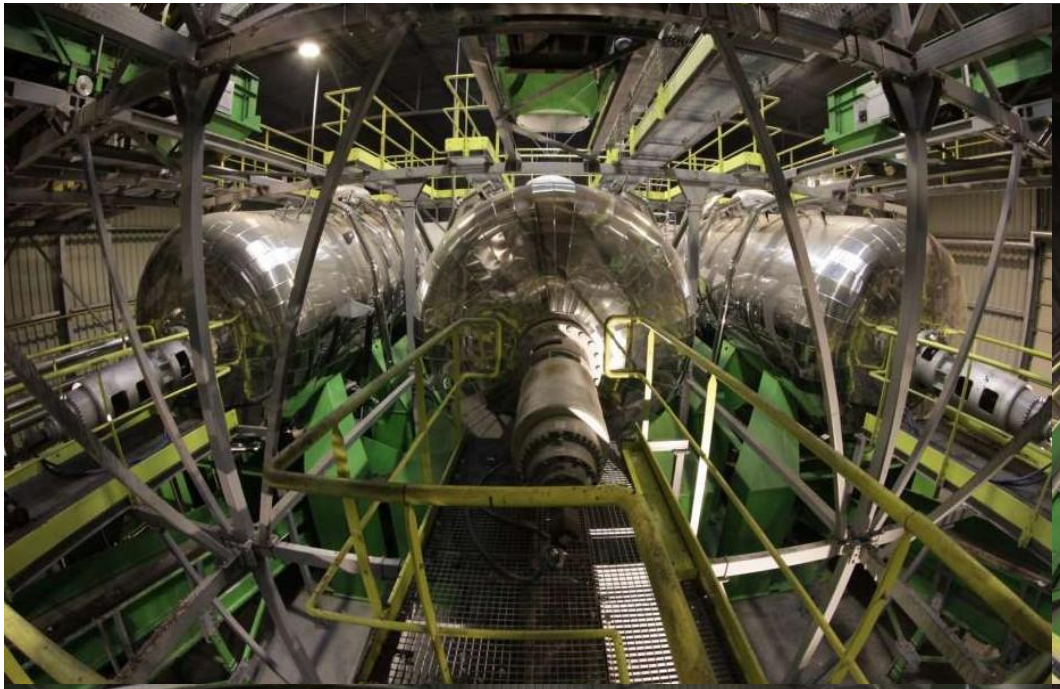
On the magnetic separators we isolate ferrous metals and aluminium. Alternative fuel (pre-RDF fraction) is isolated on the set of mechanical-pneumatic screens equipped with an eddy-current separator. The most demanding unit in technological line are the optical sorters, which separate plastics (with PET and PP fractions isolated), as well as glass, which takes the form of clean cullet, free of contaminants.

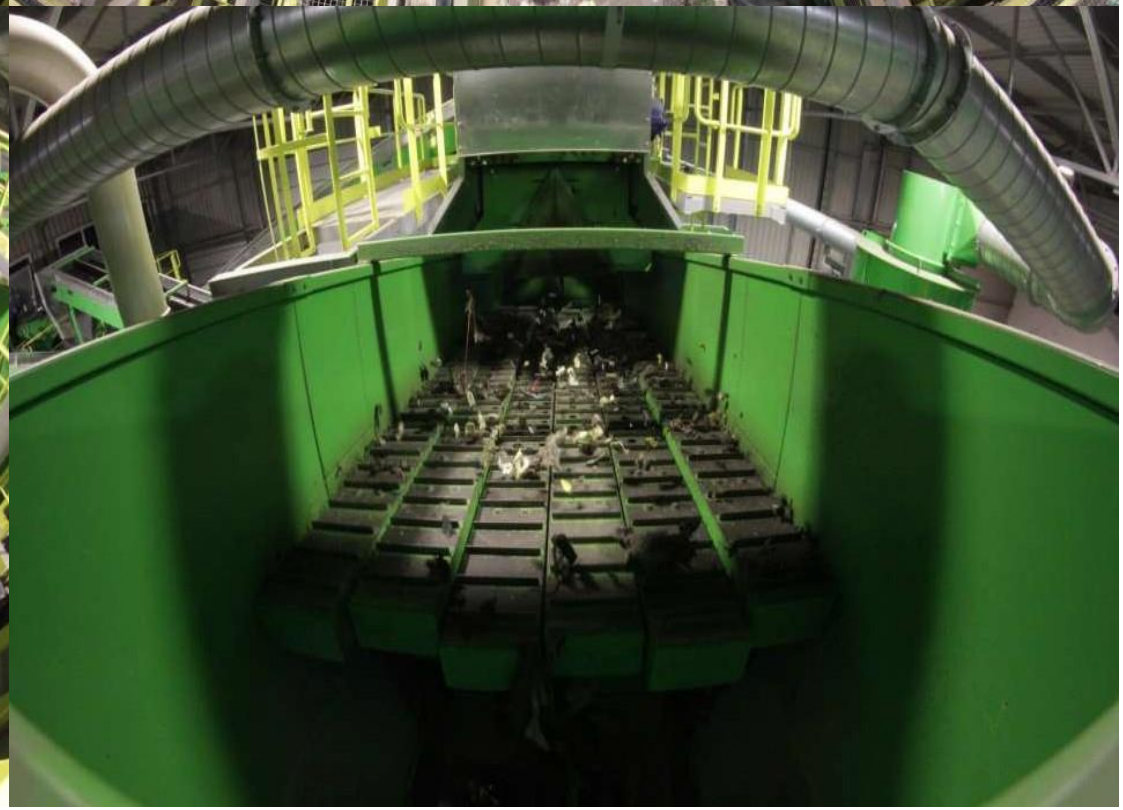
They key element of our technology is isolation of biodegradable fraction - a biomass. It is sterile, doesn't contain non-organic contaminants and has high energetic values.

5. Delivering fractions (materials) to the recyclers

The fractions are subsequently dispatched to entities recycling secondary raw materials. In favourable conditions, we can achieve almost 100% recyclability of the reusable materials.





“Protecting the environment it’s profitable”

With every tonne of the waste processed and the precious resources recycled, we protect our environment. Our unique method for managing municipal waste is highly competitive compared to other technologies thanks to both its low investment requirements and high recycling effectiveness. The use of our technology can significantly reduce the level of public spending on waste management both in big cities and single municipalities.

Additionally, all resources obtained in the recycling process are transferred to appropriately authorised entities. Non-organic fractions are used to produce new raw materials and products while the biomass, which is produced from the biodegradable organic mass, is converted in special facilities into “green energy” and is a source of renewable energy.

The Resources we Recover

BIOMASS

- Consists primarily of organic waste including paper, sterile and odourless.
- Homogenous product, regardless of the waste morphology.
- Safe levels of heavy metals concentration.
- Calorific value: 10 GJ/ tonnes
- Methane yield: 110 m3/ tonnes
- Less than 4 % of impurities (mostly mineral).

METALS

- More than 95 % of aluminum and ferrous metals are separated
- Dry organic residuals in folds (nooks & crannies) of cans do not affect further processing
- Complete removal of labels and paints

GLASS

- More than 97 % of glass is separated
- Up to 5 % of impurities (mostly pieces of black rubber)
- Complete removal of labels and paints

PLASTICS

- More than 90 % of plastics are separated
- Depending on morphology any of the following is separated:
  - PET
  - PE
  - PS
  - PVC
- Dry organic residuals in folds (nooks & crannies) of bottles do not affect further processing
- Complete removal of labels and paints

Pre-SRF FRACTION

- During the technological process we also separate pre-SRF fraction. It is a material for alternative fuel production and recovery in form of energy

PAPER (CELLULOSE)

- 30 – 50 % of paper is separated mostly from multilayer packaging.
- Most of the paper is recycled as biomass.
- Low levels of mineral residues do not affect further processing.
- No paint and grease remains.

Powering the Plant

Energy and Labour Required

Heat:

- 0,8 GJ/ tonne of waste
- Heat can be generated by any available source.

Water:

- No water is used for technological process, Water can be used for certain heat sources (i.e. desalination of boilers).

Labour:

- Autoclaves work 24/7, thus 3 shifts are necessary, 35 people for 100,000 t.p.y facility,
- Additional 12 - 20 people for every additional 100,000 t.p.y.

Electricity:

- 80 kWh/ tonne of waste.

A.R.T Facility

The autoclave -RotoSTERIL BEG7000- is pre-built and fits on a low-loader. No special transport is needed. The installation is pretty much plug & play. If an industrial hall is already available the installation can be up and running in record speed. It can also be dismantled within days. We handle a variety of business models that could facilitate shorter term campaigns. That opens up some exciting prospects. Think of cleaning up problem sites, landfills, solving temporary issues of oversupply. Setting up a smaller facility to locally treat waste could weigh up to long distance transports.

Facility Options

- 100,000 tonnes of yearly capacity
  - Smallest preferred facility size.
- 200,000 tonnes of yearly capacity
  - Allows for designing combined heat and power unit that would use fuel from waste (both RDF and biomass).
- 300,000 tonnes of yearly capacity
  - Allows for designing combined heat and power plant, which would use only safe biomass as fuel.
- 1,000,000 tonnes of yearly capacity
  - Redefines local economy by creating enough resources for every recycling facility to follow up the project.

Required Land Size

Area:

- 3-5 hectares for the first 100,000 tonnes per year of yearly capacity.
- 2 hectares for every additional 100,000 tonnes of
- Yearly capacity.

Building:

- 8,000 m2 for 100,000 tonnes per year of yearly capacity.
- 12 m in height required.

Construction time:

- 9-12 months from time of permitting.


CONCEPT 01
Architectural concept - Facility of mechanical heat treatment of waste
www.kk.com.pl


Bioelektra Group
CONCEPT 02
Aerial View
Section A-A
Architectural concept - Facility of mechanical heat treatment of waste
www.kk.com.pl


CONCEPT 01
Aerial View
Architectural concept - Facility of mechanical heat treatment of waste
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CONCEPT 04
Aerial View
Building with Rammed Earth
Architectural concept - Facility of mechanical heat treatment of waste
www.kk.com.pl

Key benefits of the RotoSTERIL technology:

- Short technology process - within a few hours the fractions are ready for further recycling
- Waste mass reduced by 15% - due to dehydration
- Total separation of organic biodegradable fraction (biomass) from non-organic
- Waste odour fully eliminated
- Resources recovery of over 95%
- Reduction of landfilling to 4% of safe post-processing waste
- Over 90% of recovered recyclable materials
- Over 95% cleanliness of resources
- Whole technology placed in an enclosed facility
- All recovered and safe fractions leave the facility, eliminating any landfilling
- Minimal human contact with unprocessed waste during the process
- Fully automated technology process
- Small size of facility
- Environmental permit with a facultative Environmental Impact Assessment – due to the technology low adverse impact on the environment

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