

COMPANY PRESENTATION



“The environment protection is not only a regulatory constraint but principally a Moral Target”

Since 1976, year of foundation, **TECNOFER** has been designing and building plants for the regeneration of plastic films in LDPE, LLDPE, HDPE, PP and of bottles and other containers in HDPE-PP, PET, PVC, PS; ABS and other plastics from vehicles, coupled with plastic paper; fibres in PP.

At the beginning, the production of **TECNOFER** focused on the construction of plants for the Italian market, then during the Eighties and Nineties the company has expanded its market and now it is a well-known manufacturer with exports all over the world, whose plants are distinguished by high quality and reliability.

TECNOFER with more than 1000 installations currently in operation in more than 60 countries has gained a place of leadership in this evolving field, that requires a constant technological research and above all passion and application.

This goal is now attainable thanks to the highly specialized and flexible organizational **TECNOFER** structure: the R & D dept. mechanical design and technical area, electrical engineering / electronics area, software engineering, management and automation systems area, construction management dept., electrical switchboards and control machinery and equipment area, high precision machinery area, carpentry department, spare parts warehouse, painting area, laboratory for testing material, equipment test area, purchasing dept., administration & finance dept., customer's assistance and training dept., sales dept.

For many years Tecnofer's activity has been suggesting new business connected with environment protection needs.

The wide range of **TECNOFER** plants includes compact and transportable systems for the recycling of plastic materials as well as systems with multiple lines of high capacity.

➤ **TECNOFER** has extended its know-how for the development of new technological applications treating:

- ***Pulp waste from paper mill***
- ***Food packaging (separation of packaging and of the contained food)***
- ***Tetra Pak***
- ***Absorbent products (AHPs)***

TECNOFER has continually reinvested a high quote of its turnover in R&D.

The result is a continuous stream of innovations that for the final customer means an increasing in the profitability and efficiency of his system, while for **TECNOFER** this leads to a continuous business growth and to a consolidation of an excellent leadership.

TECNOFER "mission" includes the study and implementation of machinery always in step with the continuous variations occurring in the polymeric families and derived products marketed.

TECNOFER is therefore to be ever attentive to the needs of the market by anticipating trends and combining the best quality and flexibility, achieved through the ability to offer customized solutions based on a "turnkey" solution.

Considering these prerogatives **TECNOFER** has grown by investing in the best professionals and continuously implementing machinery proposed on the basis of changes in polymers thus gaining the trust of many internationally renowned companies, increasing and consolidating its image and its know-how.

Other strong points of the Company are represented by the dynamic staff, by the ability to assist the customer in choosing the most suitable equipment, to study a particular customization, evaluation and selection of facilities,

preparation of a business plan, identification of the management team, personnel training, after-sales assistance to the finished product marketing.

Particular attention is devoted to **TECNOFER** to the automation of the equipment with the objective to implement their automated management in favour of the quality, reliability and safety of machinery.

These objectives are integral part of the working system and involve two aspects: ecological, where regulations become more and more restrictive, and economical concerning the performance of the facilities.

The automation of **TECNOFER** lines allows to manage the process alarms in real time making much faster the personnel's maintenance interventions, thereby reducing downtime of the lines that are the major causes of production loss in plastic recycling plants. Each stage of the manufacturing process is then automatically optimized for the maximum productivity with lower consumption of energy and water.

The plant remote VPN control system offers the ability to control operation settings resulting in lower costs and shorter maintenance time and intervention.

The potentialities of the automation system introduced do not stop there, since according to customers' personalized requirements and to the added value that **TECNOFER** will further give to their supplies, thanks to the high integration of data available in the system, it will be possible an analytical use of the collected data at all levels of the processing system that can be used for production statistics, quality control, traceability and management of work.

The choice of a **TECNOFER** equipment is a safe and durable investment in the field of regeneration of plastics.

For more information please, visit our website www.tecnofer.biz, or contact us directly for planning a visit to our company in order to analyse your project and to provide the best solution for it.

***“The Environmental Protection
is a strategic variable
representing an opportunity and a means
for distinguishing and emerging
inside the global market”***

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PLASTIC FROM WASTE TO RESOURCE

Plastic is made up of a different sets of chemical compounds, sometimes mixed together, resulting from the processing of mineral oils. The starting materials are oil, natural gas and coal, that, as it is well known, involve heavy costs for extraction, transportation, processing, and they determine a pollution with high environmental impact.

The manifold possibilities of compositions in the manufacture of plastics result in a great variety of generated materials (polymers, copolymers, blends of polymers, etc.).

Raw plastic materials are provided to users (those who give a definite shape to the object) in the form of powders, granules or in liquid state, in any case partially polymerized.

From these products are formed objects and semi-manufactured goods, which will be processed with different technologies, depending on the needs of the finished product.

The plastic is widely used as part of many consumer products, and this for its characteristics of flexibility, strength, chemical stability and low production cost.

Anyway this material presents a serious problem, it is not biodegradable, for the fact that it cannot be divided into elements that can be re-entered into the natural cycles and for this reason it is one of the main polluters of the planet.

It has been calculated a minimum of a century to over a thousand year because the plastic substances can be reabsorbed into the environment.

The increasing use of solid plastics in all sectors, especially in packaging of common use, leads to a higher and higher production of waste that becomes difficult to be recycled with traditional systems such as the landfills.

Separate collection of plastic packaging, initially only for bottles and containers, is gradually increasing due to growing awareness on the Environment issue, as well as for the real opportunities of doing business in the recycling field, beyond the resources allocated by state agencies and communities.

Today it is also possible recycling plastic packaging used for food, such as bags, boxes, trays and film, therefore the collection is for bottles for water, soft drinks, milk and beverages in general, detergent, containers of products for personal hygiene, plastic food trays (including polystyrene), shopping bags, plastic film for packaging.

The plastic to be recycled is first conveyed in collecting centres and then it is sent to the factory where it is freed from foreign materials and separated on the basis of belonged polymer.

Once the plastic is sorted the further step is the process of regeneration, which can be done in three ways:

1. separation of plastics based on polymer and re-use of each of the homogeneous polymer families thus obtained, in place of virgin plastic (it can be done new bottles, containers, tiles, pipes, fibres for upholstery, pile fabrics, etc.);
2. plastic processing without any particular selection process: you get mixed plastics used to produce highly resistant elements for street furniture (benches, fences), street posters and games for children;
3. energy recycling through which heat and electricity are obtained from burning plastic, suitably selected.

Benefits arising from the RECYCLING of plastics:

- * **Energy saving: with regenerated plastic is consumed much less energy.**
- * **Environmental benefits: absence in landfill of a material significantly "massive", no accumulation in the environment (rivers, seas, forests, etc.), no processes of transformation of oil.**
- * **Economic advantage: saving disposal costs, no import of raw materials.**

Plastic packaging can be recycled to make: clothing (pile), outdoor furniture (exhibitors, planters, gazebos, seating, stands, tables, basket, playgrounds etc.) and interior furniture (seats, etc.), construction (paving , road noise barriers, walkways to the beaches and gardens, pipes for transportation of waste water, etc.), gadgets, objects, packaging (pallets, plastic bags for waste, etc.), fences, sports (climbing panels etc.).

PLASTIC POLYMERS (international coding)



(polyethylene terephthalate– PET)

PET = it is the plastic used for drinks and water bottles



(high density polyethylene – HDPE)

HDPE = it is used for manufacturing milk bottles, cans, containers for paint, caps, tapes, cushioning materials.



(polyvinyl chloride– PVC)

PVC = it is used for manufacturing film, bottles and containers for detergent, shampoo and cosmetics, bags, packaging for fruit and vegetable, eggs etc..



(low density polyethylene – LDPE)

LDPE = it is used for manufacturing plastic bags, agricultural mulching, rubbish bags, industrial bags.



(polypropylene – PP)

PP = it is used for manufacturing pottery, film, packaging for ice cream and yogurt, disposable syringes, paint and garbage buckets.



(polystyrene– PS)

PS = it is used for manufacturing glasses, cutlery and plates, cups of ice cream and yogurt, caps, packaging.

TECNOFER plants bring to new life million tons of plastic every year



For update data see www.tecnofer.biz

COLLECTION, SORTING AND RECYCLING

Plastic waste is deposited into special containers placed in certain areas of towns, called ecological islands, when it is not foreseen the collection door to door.

Special vehicles periodically empty the containers and transport the product to the sorting centre.

For industrial, agricultural or supermarkets waste are used collection systems operated by licensed trucking firms, which make withdrawals from the user and take the waste to the sorting centre.

For large retailers also may be awarded contracts for loan for use for small presses with which the service personnel can bale the plastic packaging, reducing their volume and thus facilitating the transport.

This product will go to the sorting plant and then finally to the stage of recycling.

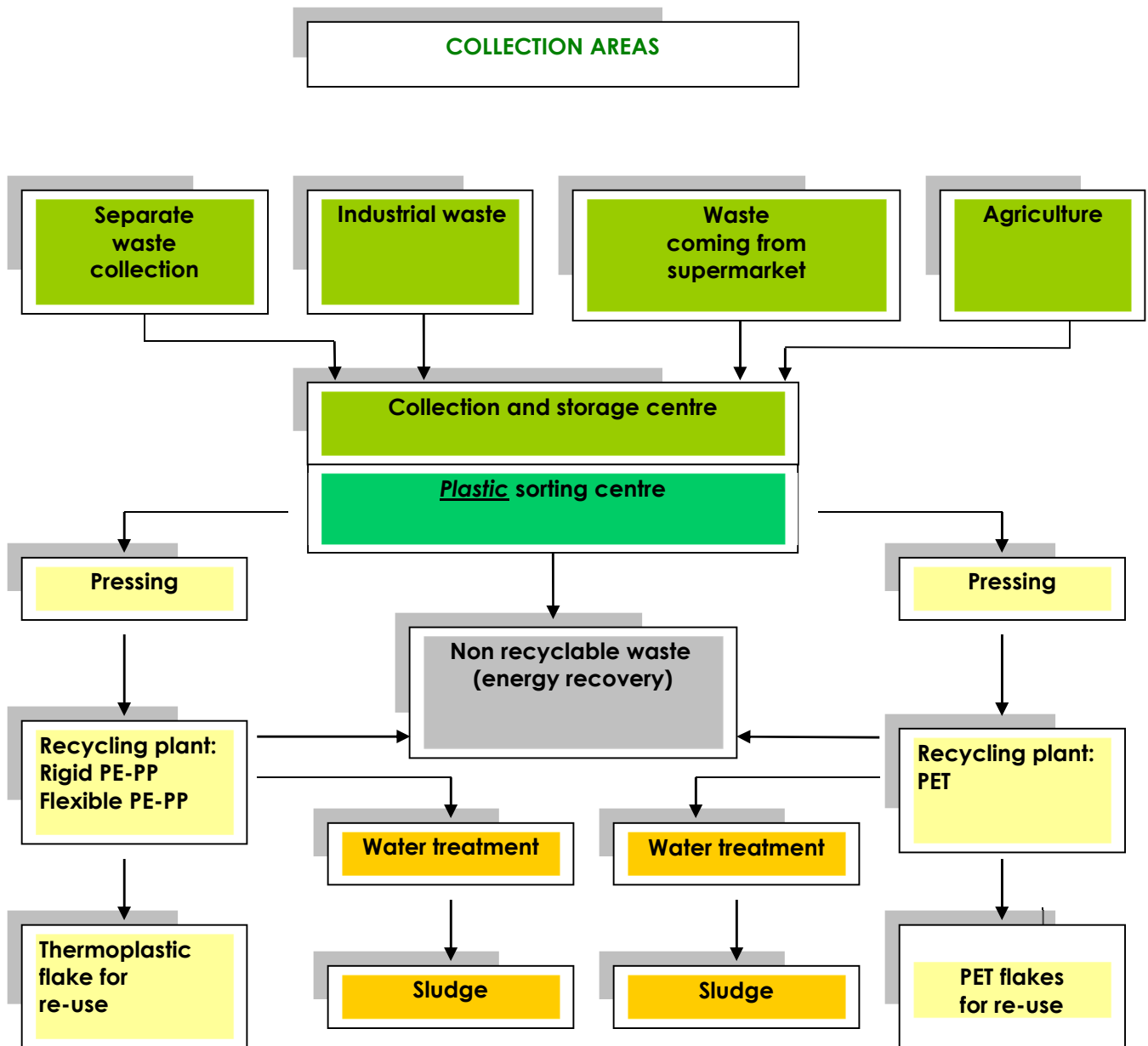
The sources of plastic waste supply therefore are different.

Plastic waste is initially treated in the sorting plant, where foreign bodies are removed manually and automatically and where plastics are separated according to their polymeric family and colour.

The plastic product once selected, pressed and baled immediately acquires an added value since it will be no longer classified as waste but as second raw material.

The sorted plastics after the following stages of washing and extrusion are ready to be released back into the production cycle.

RECYCLING FLOW CHART FOR IMPROVEMENT AND RE-USE OF PLASTIC WASTE





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TECNOFER SORTING PLANT

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- ◆ Short description
 - ◆ Photos machinery composing the plant
 - ◆ Line layout

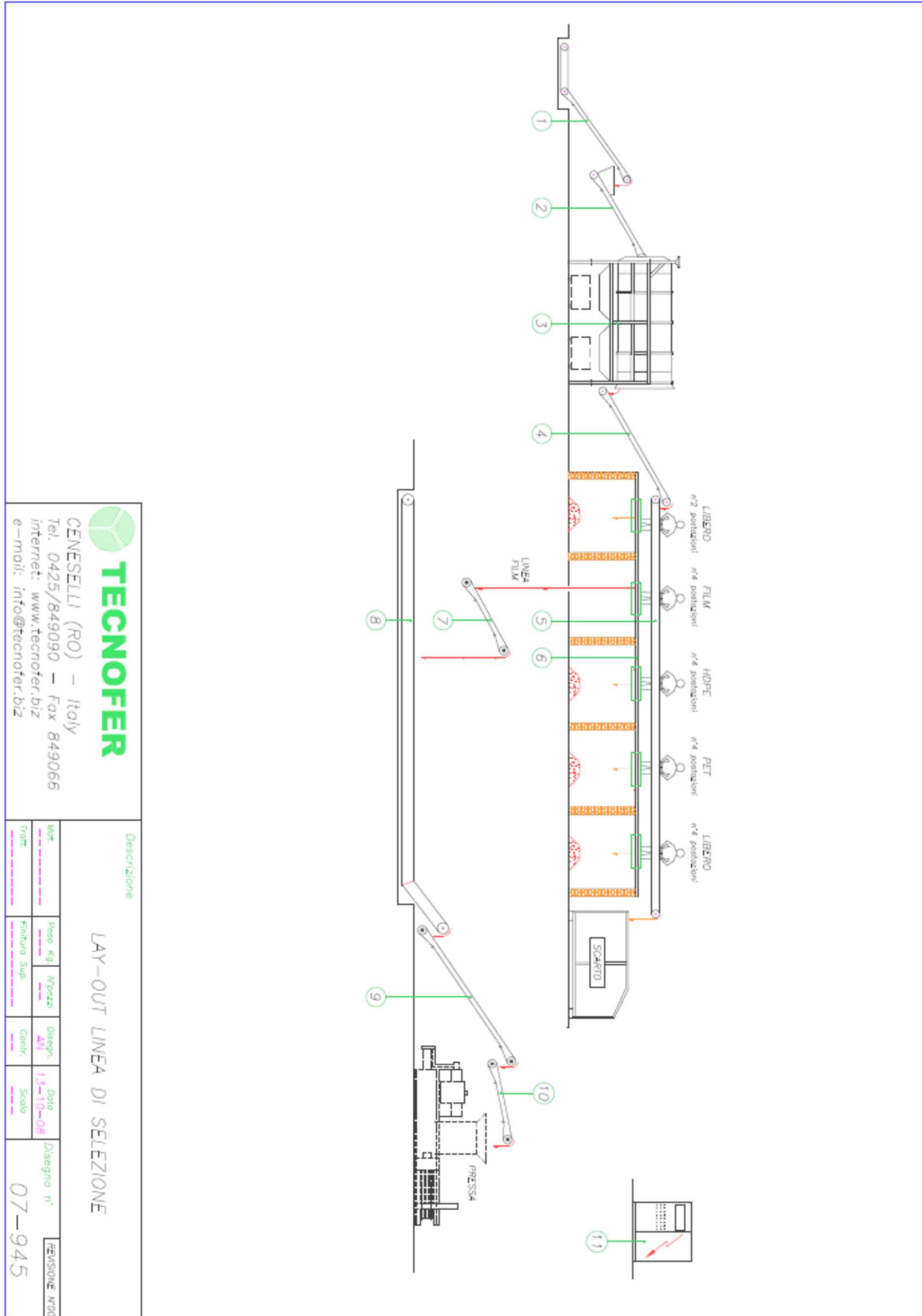
SORTING PLANT FOR PLASTIC WASTE

Input product: heterogeneous plastics coming from urban collection, industrial waste, packing from supermarkets and from agriculture.

Output product: pre-sorted plastics according to their polymeric family and colour, partially separated from foreign and contaminated bodies and then baled and ready to be sent to the process of recycling.

Some pictures of the equipment of the sorting plant





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Descrizione	
LAY-OUT LINEA DI SELEZIONE	
Site	Issue n°
Tratt.	Finitura Sup.
Area	Area
Disegn.	Scale
Centr.	Disegno n°
Scale	07-945
Scale	VERSIONE N°00



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TECNOFER RECYCLING PLANTS FOR THE MAIN PLASTIC POLYMERS

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- ◆ Short description and flow chart
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❖ RECYCLING LINE FOR PET BOTTLES

- ◆ Short description and flow chart
 - ◆ Photos machinery composing the plant
 - ◆ Line layout

RECYCLING LINE FOR PE FILM and PP BIG-BAGS (sc. 4190-F)

Input product:

A) LDPE-LLDPE film coming from sorting systems of the municipal separate waste collection, agricultural mulching, fertilizer bags, irrigation flexible hoses, flexible packaging from supermarket waste.

B) LDPE-LLDPE film coming from post-consumer and from supermarket.

C) PP big-bags

Output product:

high quality thermoplastic granules suitable for the production of new plastic products

FILM LINE

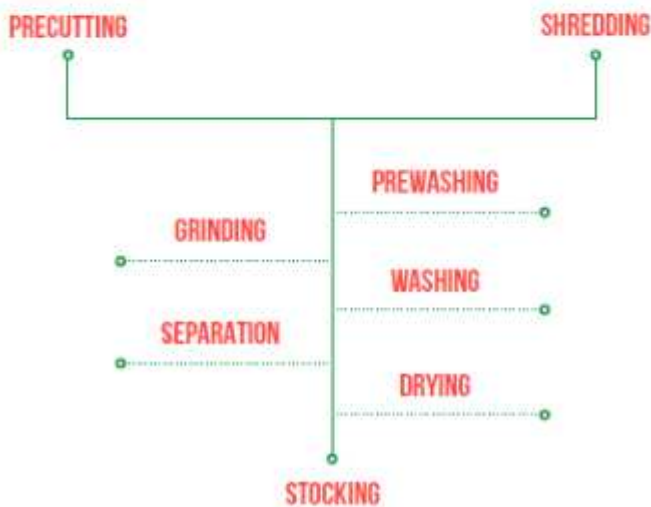
Complete washing lines
for LDPE-LLDPE-HDPE-PP film

post consumer
post industrial
agricultural
woven bags
ropes



RECYCLING TECHNOLOGY
by

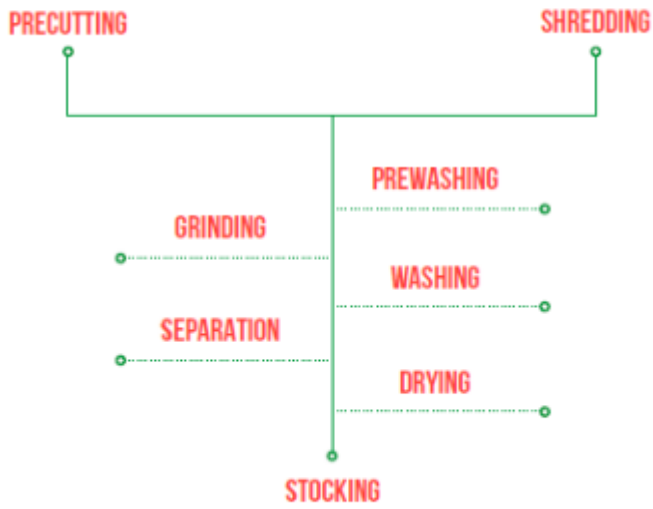
TECNOFER®



PP LINE

Complete washing lines
for PP big-bags

woven bags



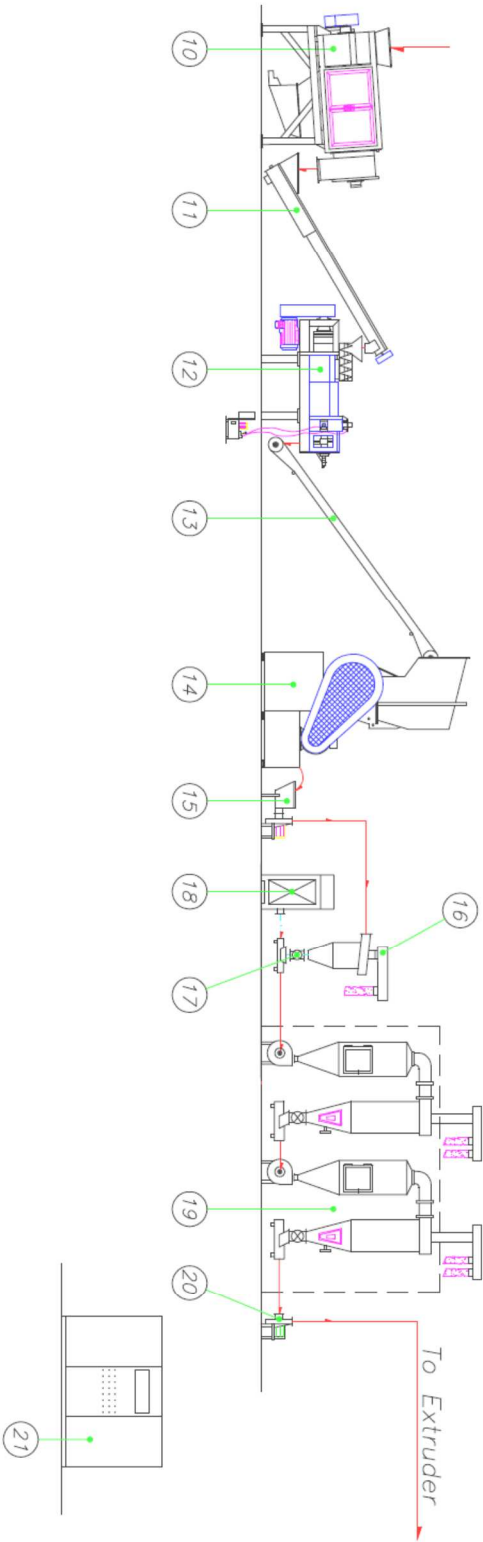
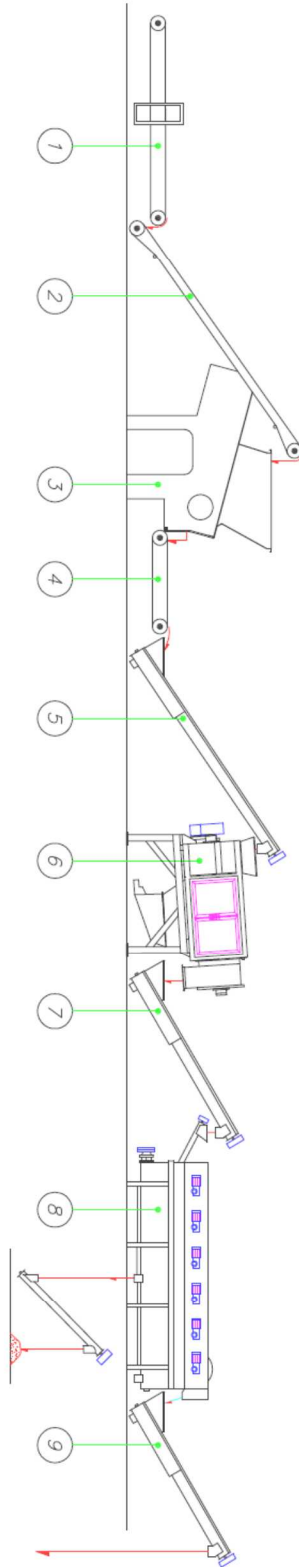
RECYCLING TECHNOLOGY

by



Some pictures of the equipment of the plant





RECYCLING LINE FOR PP-HDPE RIGID PLASTICS (sc. 4673/BM-W)

Input product:

Rigid HDPE-PP plastics, like drums, crates, bottles, pipes, car bumpers, batteries.

Output product:

high quality thermoplastic granules suitable for the production of new plastic products.

HDPE-PP LINE

Complete washing lines
for rigid HDPE-PP

bottles
crates
drums
pipes
car bumpers, batteries



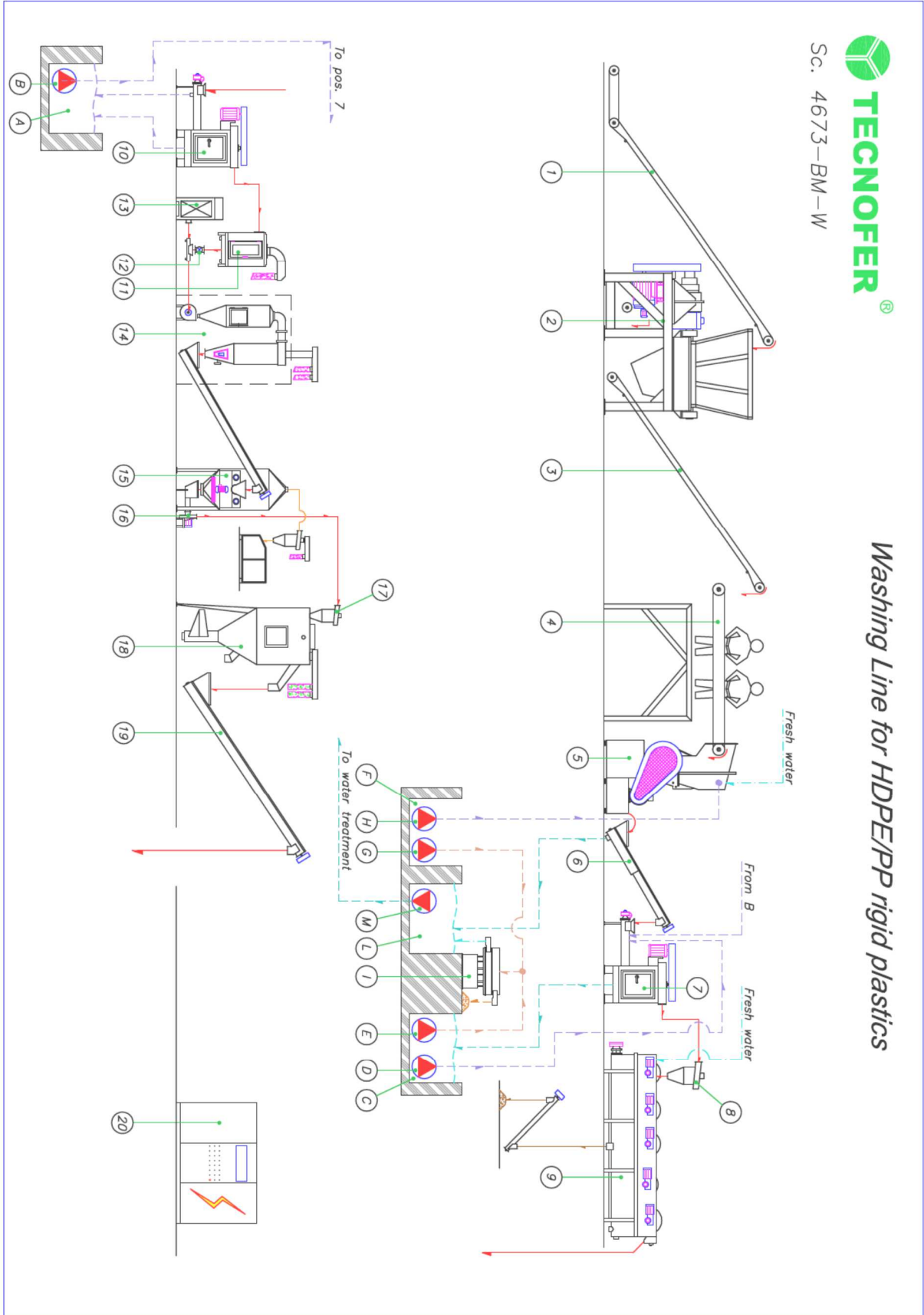
RECYCLING TECHNOLOGY
by



Some pictures of the equipment of the plant



Washing Line for HDPE/PP rigid plastics



RECYCLING LINE FOR PET BOTTLES (sc.4698-P)

Input product:

PET bottles in bales coming from the sorting plant.

Output product:

flakes with regular size from 12 to 14mm with a high quality degree suitable for bottle to bottle process, for the production of fiber and sheet.

PET LINE

Complete washing lines for PET bottles

food grade applications "Bottle-to-Bottle"

fiber

strapping

sheet



RECYCLING TECHNOLOGY
by

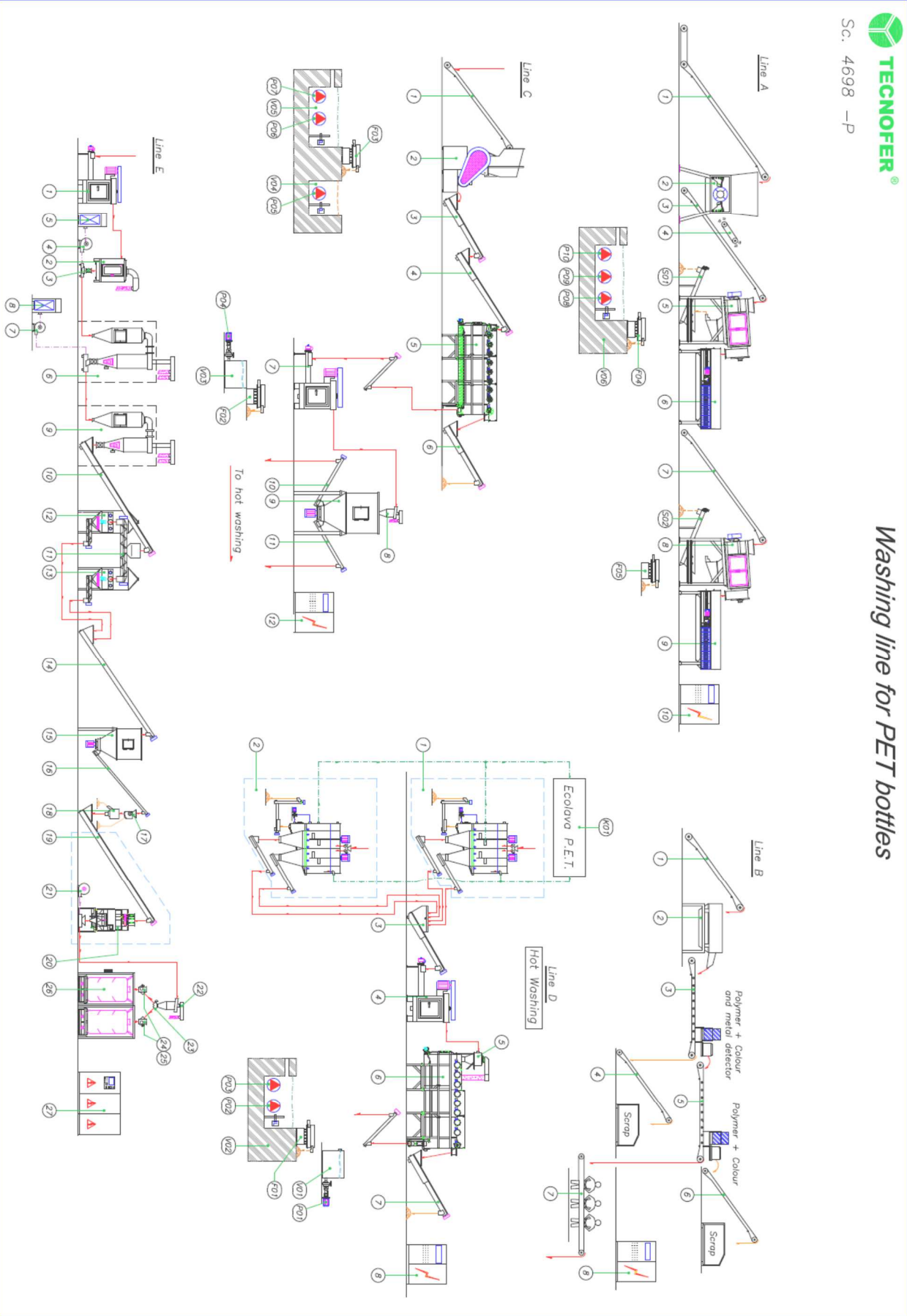
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Some pictures of the equipment of the plant



Washing line for PET bottles





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SPECIAL APPLICATIONS

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❖ **RECOVERY OF ABSORBENT PRODUCTS (AHPs)**

- ◆ Short description and flow chart

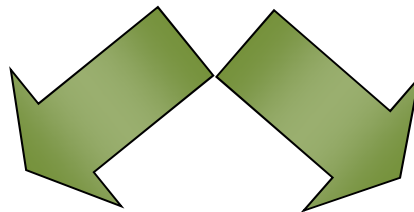
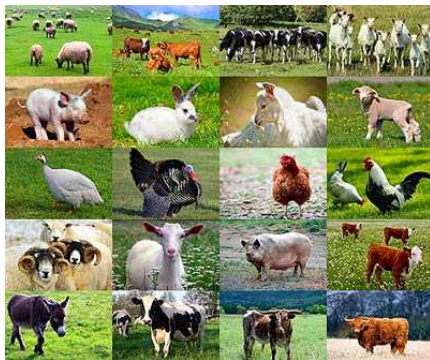
RECOVERY OF FOOD WASTE-PACKAGING

The disposal of packaged and spoiled food represents a big issue due to the fact that its packaging, which is highly protective, prevents a common fermentation process in landfills with a consequent volumetric increase of the landfills and a negative environmental impact.

A possible solution for these products' end of life can pass through their recycling.

Re-usable materials can be made separating the packaging to the contained product and for this reason, the necessity of their collocation in landfills can go to an end.

Spoiled food, according to its appearance which can be solid, pasty or liquid can find a destination, maybe partial, for animal feeding but above all for energetic production industries through biogas generation.



Once it has been emptied and cleaned, plastic, cardboard or metal packaging becomes materials which can be processed into recycling plants.

The unpacking, separation and re-use process of spoiled food represents a big social and environmental importance due to the fact that packaging recycling and the energetic production involve negative cost apart from subtracting hundreds of ton of products to landfills.

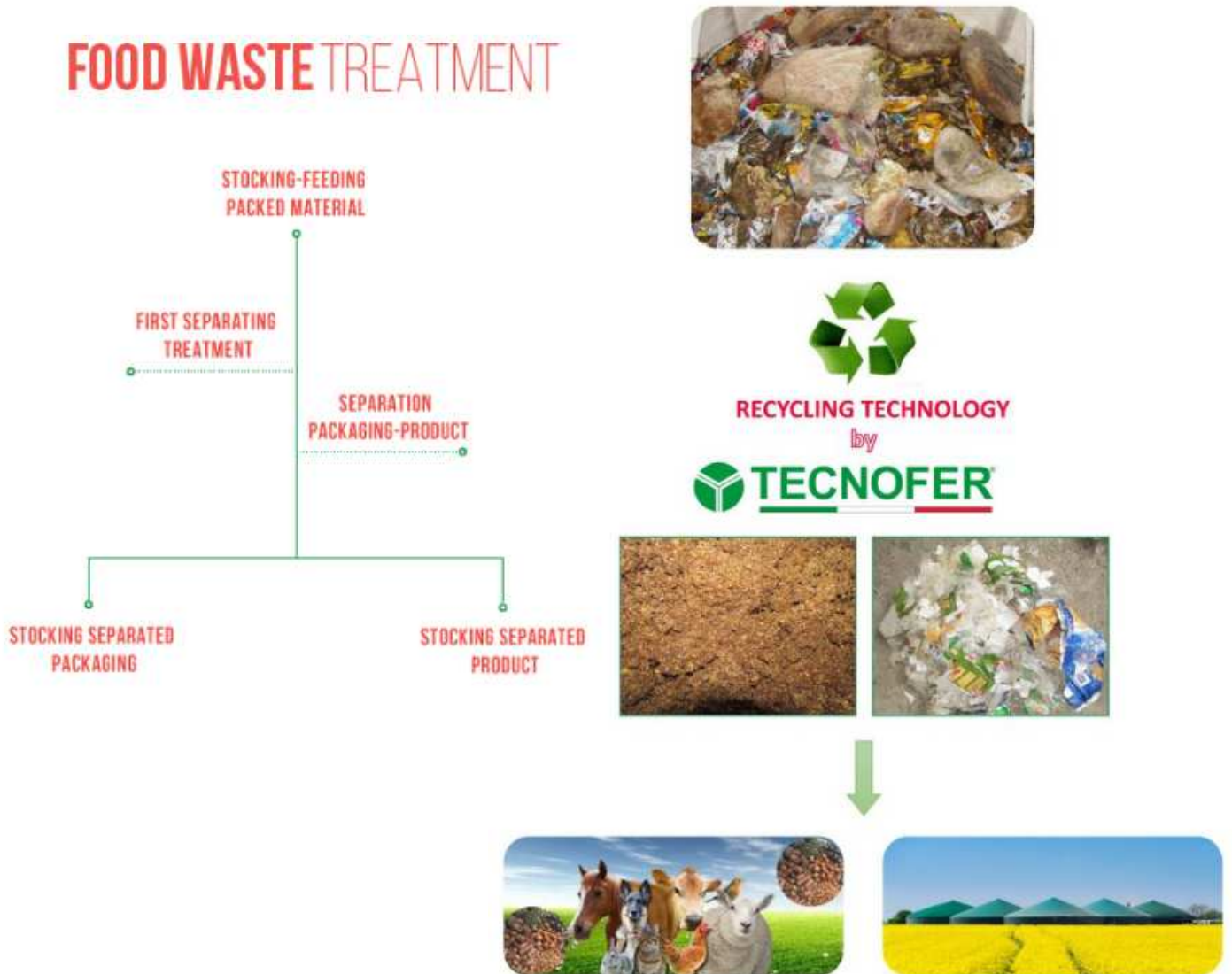
In order to gain operatively important results in product unpacking treatment process, industrial and automatic plants are needed which are safe, highly productive and reliable.

TECNOFER has designed and realized an extremely efficient system for the separation of the packaging from the contained product.

The unpacking system is designed and customized according to the requests and the productive necessity of the Customer.

Several important Food Companies chose **TECNOFER** technology and obtained an efficient separation of food from different types of packaging: TetraPak, aluminium, plastics...

FOOD WASTE TREATMENT



TETRA-PAK TREATMENT



RECYCLING TECHNOLOGY

by



**Example of separation
 of packaging from the contained product**



**Example of separation
 of food from its packaging**



The result of the process is to increase:

- ❖ the value of food, which can be destined to animal fodder productions or sent to biomass centers
- ❖ the value of packaging which is supplied to recycling Companies

RECOVERY OF ABSORBENT PRODUCTS (AHPs)

Input product:

absorbent hygiene products (AHPs) — dirty diapers, adult incontinence products, and feminine hygiene products

Output products:

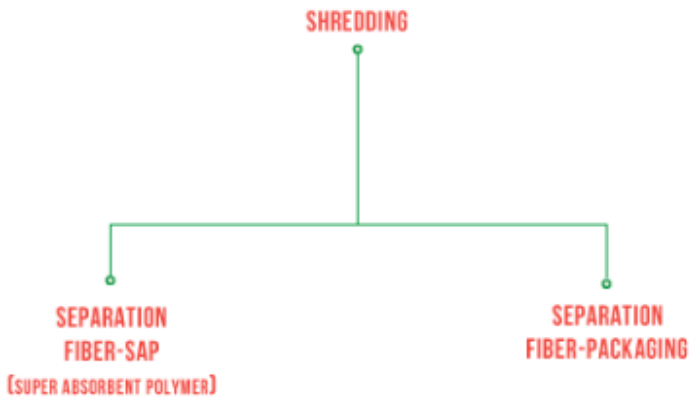
Fiber from recycled (AHPs) can make such products as insulation, cardboard, or cat litter. It is also suitable as an additive to concrete or asphalt.

Plastic can become siding, decking, signs, and especially the bins in which households, day care centers, and nursing homes collect the AHPs.

The waste is first processed into an autoclave and then sterilized. Then it is shredded, sorted to remove contaminants, and separated into its plastic and fiber components. The plastic undergoes final steps of being washed and converted to pellets. Then both materials are bagged and sold to companies that transform them into useful products.



ABSORBENT PRODUCT TREATMENT



RECYCLING TECHNOLOGY

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TECNOFER IN THE WORLD

**Over 1000 Companies
in more than 60 countries
chose TECNOFER technology**





TECNOFER RECYCLING TECHNOLOGY IN THE WORLD

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TECNOFER

EXHIBITIONS 2016



*Our next
exhibitions year 2016*



18-21 January
RIYADH - SAUDI ARABIA



1-3 February
NEW ORLEANS - USA



8-11 March
MEXICO CITY
MEXICO



22-23
March
BRUSSELS - BELGIUM



20-22 April
CREMONA - ITALY



25-27 April
ORLANDO - USA



17-20 May
KIELCE - POLAND



13-14
September
KIEV
UKRAINE



19-26
October
DÜSSELDORF
GERMANY



29 November
2 December
LYONE
FRANCE

“Facing environmental challenges – polluting emissions and climate changes, scarce availability of water, other non-renewable resources and exponential increase of pro-capita wastes, it is necessary and strategic to focus any activity on the Environment Protection, safeguarding and conserving resources for future generations.”