
GINEO
get energy
PRIME ITALIA


"The world is a
beautiful place and
for it worth fighting for."
A. Einstein
(Albert Einstein)


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www.getenergyprimeitalia.com

“LESS WASTE
MORE ENERGY”

INDICE / INDEX

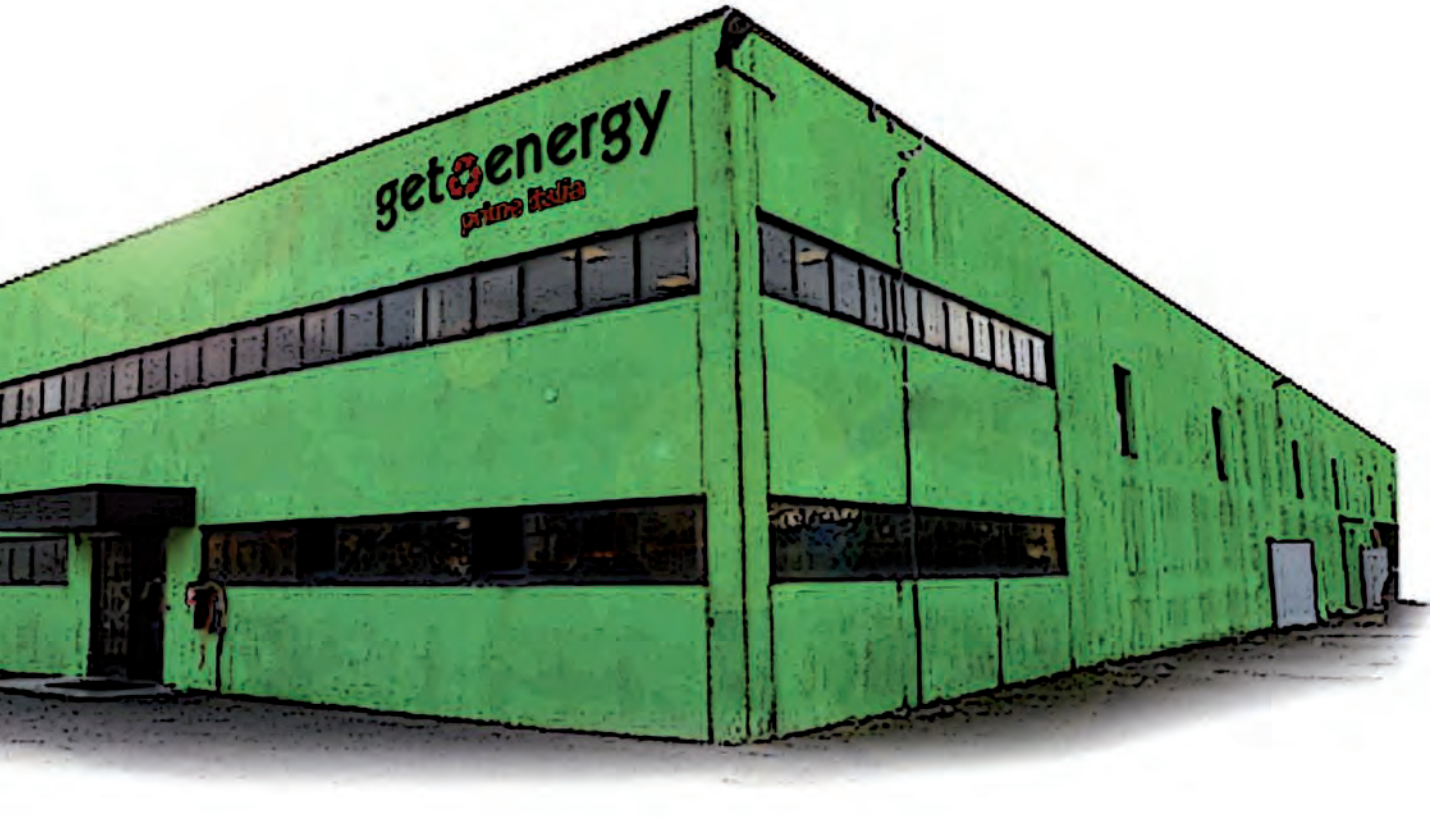
COMPANY PROFILE

THE PHILOSOPHY OF GET ENERGY PRIME ITALIA IS AND HAS ALWAYS BEEN, BEING A SAFE AND RELIABLE PARTNER FOR INDUSTRIAL AND ENTREPRENEURIAL REALITIES AND TO MEET ALL THEIR PROBLEMS IN THE ENERGY FIELD.

Get Energy Prime Italia is a company that operates in the field of research, development, design, construction and sale of plants to treat materials with high calorific value deriving from waste, generating electricity and thermal energy.
Get Energy Prime Italia was founded in 1996 as Get Energy Research (Research Center) and immediately focused on renewable energy sources.
In collaboration with the INSTM - NATIONAL INTERUNIVERSITY CONSORTIUM FOR SCIENCE AND TECHNOLOGY OF MATERIALS - (WITH THE UNIVERSITY OF PAVIA IN HEAD), GET ENERGY has thus created a network of consolidated collaborations, each based on their own skills suitable for the development of industrial plants whose technical and scientific validity is confirmed by the results obtained from the laboratory tests first and then from the tests of industrial plants.
The aim of this lot of work is to always identify the best energy result from the materials produced by the pyrolysis of waste.
Our mission in recent years has been to transform plastic materials and ELTs (recovering, in full respect of the environment, the precious components to reuse and achieve economics returns of interest.

AT PRESENT, GET ENERGY PRIME ITALIA HAS COMMERCIAL CONTACTS AND NEGOTIATIONS IN THE FOLLOWING COUNTRIES: :

1. ALBANIA
2. BRAZIL
3. CHILE
4. CINA
5. COLOMBIA
6. CROATIA
7. GREAT BRITAIN
8. INDIA
9. INDONESIA
10. ITALY
11. KOSOVO
12. MALAYSIA
13. POLAND
14. SENEGAL
15. SWITZERLAND
16. TURKEY



General Information and Social and Environmental Issues

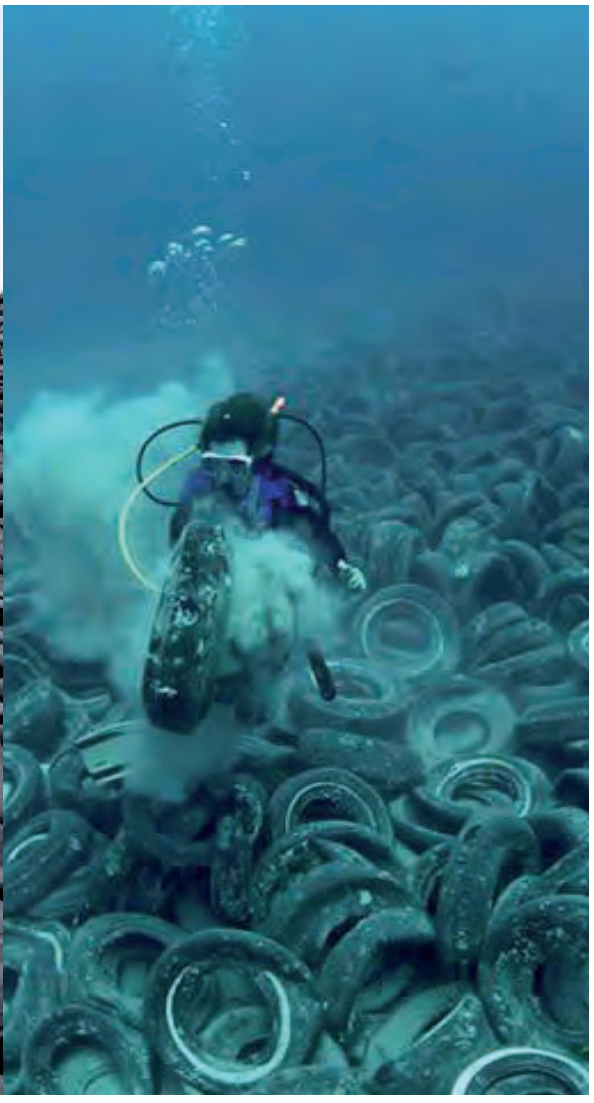
WORLDWIDE, ABOUT 4.5 MILLION TONS PER YEAR END UP IN LANDFILLS, SEAS AND OCEANS OR IS ILLEGALLY BURNED.

The report "L'Italia del riciclo 2010" (Italy Recycling 2010) by the Italian Ministry for the Environment and ISPRA is one of the many studies presenting waste management principles and addressing the issue of ELTs.

All reports indicate that the fi rst problem to be addressed is

- The inventory of ELTs
- their management as waste.

This issue is particularly relevant in countries listed as emerging economies. For example, the current evolution of the Chinese economy has



dramatically contributed to the increase in generation of used tires. The United States have now been replaced by China as world leader in ELT generation, with over 200 million tires per year (approximately 5 million tons). Although until recently ELTs were sent to dedicated or mixed waste landfills, legislation was passed banning (with few exceptions) landfill disposal in the USA and, since July 2003, in Europe. Nevertheless, approximately one third of the 13.5 million tons of ELTs produced every year in the world are still either disposed of in uncontrolled or illegal landfills or burned.

General Information and Social and Environmental Issues

The more alarming illegal practice associated with ELT disposal is, however, 'open air combustion' of tires.
The smoke produced by uncontrolled burning contains serious pollutants like aromatic hydrocarbons, sulphur compounds, carbon monoxide and nitrogen oxides.

SMOKE COMPOSITION FROM UNCONTROLLED BURNING OF ELTs

COMPONENT	CONCENTRATION (g/kg of burnt ELTs)
CO^2	1.450
CO	35
N2O	0,9
NO	3,2
SO^2	15
HCN	4
HCl	-
UNBURNT HYDROCARBONS (Benzene, Toluene, ecc)	23
POWDERS	285
METALS (included Al and Zn)	31,9
IPA	0,0633
PCB	$2,66 \times 10^{-4}$
DIOXINS/FURANS	$6,44 \times 10^{-7}$

Fonte: SNCP 2007

The high temperatures reached during the fire cause also the decomposition of the rubber mix and the production of hydrocarbon oils of different molecular weight that facilitate the propagation of the fire.
The fire extinction can also be hazardous since chemical leaches can contain heavy metals in such a concentration as to pollute the underground layer.

This is the reason why landfi ll disposal has been progressively outlawed in Japan, North America and Europe.

As it was the case in the USA, the prohibition of landfi ll disposal of ELTs, introduced in Europe by EC Directive 1999/31 and adopted in Italy with Italian Legislative Decree No 36/2003 has revolutionized the entire ELTs chain, favouring the implementation of new recovery methods.Since 2006 landfi ll disposal of both whole and shredded tyres has been forbidden, except for tyres used as engineering material and those with an outside diameter above 1,400 mm.

At present the fi ght is against illegal ETLs dumping sites, that cannot be controlled and represent a further hazard for human health and the environment.

In Europe, as in the United States, until recently tyres have been channelled to landfi ll. With an annual growth of tyres' production of approximately 2.6%, the amount of waste to be managed has passed from 2.10 million tons in 1994 to 2.78 million tons in 2006 (EU 15); with the enlargement of the European Union to 27 member States, the total of ELTs can be estimated at 3.2 million tons/year.

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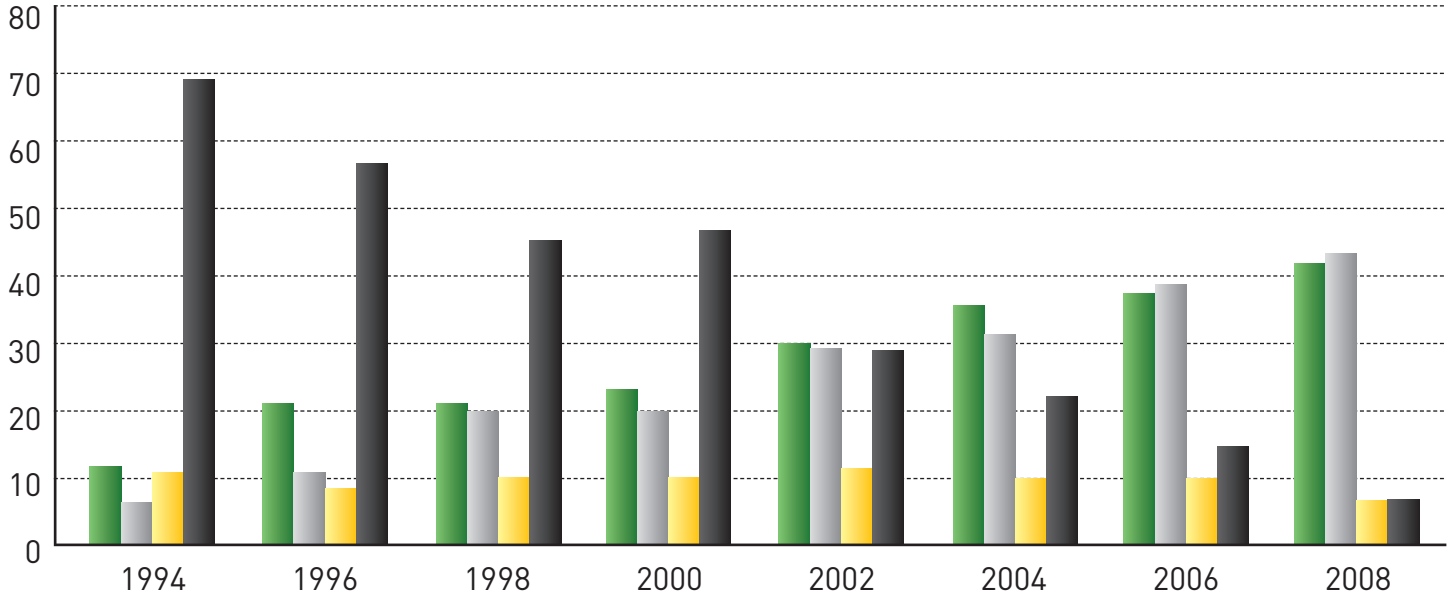
General Information and Social and Environmental Issues



ENERGY
MATERIAL
EXPORT
LANDFILL

Source: ETRMA, 2008

The Italian situation is different: even though approximately 48% of ELTs are used for energy recovery, the corresponding share of the real material recovery does not balance this ratio and there is still a high percentage (>25%) of material whose destination is uncertain.

In Italy every year 100 thousand tons of end of life tyres disappear unknown,

According to a Legambiente, report concerning the period 2005-2010.The study has identified, since 2005, more than 1.050 illegal dumping sites on a territory of over 6 millions of square meters. These illegal activities can be ascribed to Ecomafia but also to some operators that build small landfills in order to reduce the costs of disposal.
Puglia has 230 ELT illegal sites, that account for 22% of the national total, followed by Calabria with 159 sites, Sicily with 141 and Campania with 131.
Lazio has the negative record for the Centre, with 77 illegal dumping sites, whereas Piedmont is leader in the North with 37. For the State, the overall economic damage accounts for 2 billion Euros, including VAT evasion on disposal and reclamation costs and signaling the safety of illegal landfills.
Another bad blow for the environment, in terms of landscape and health.

MAIN APPLICATIONS FOR ELTs IN ITALY

RECOVERY	APPLICATION	QUANTITY (TON)*	NOTES
MATERIAL	SOCCER FIELDS AND OTHER SPORT SURFACES	30.000	Contrary to what happens in Italy, the reuse of tyre fragments represents the widest application at international level
	ANTISHOCK FLOORINGS	8.000	Including tile forms and in situ preparation
	SOUNDPROOFING AND ANTIVIBRANT SYSTEMS	5.000	Including anti-footstep mats, soundproofi ng, anti-vibrant panels for the railway sector, etc.
	ASPHALT	100	Not yet spread
	OTHER	8.000	Urban and road furniture, rubber mixes, etc
ENERGY IN ITALIAN PLANTS	CEMENT PLANTS	60.000	Including applications as single fl ow and RDF mix → 5 operating plants
	ELECTRIC POWER PRODUCTION	45.000	Both as single fl ow and RDF mix → 3 operating plants
	PYROLYSIS AND GASIFICATION	0	Plants under development but not in use yet

* Note: quantities reported are representative of both the material used in Italy and the exported material

Source: Ecopneus on operational data of the sector

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General Information and Social and Environmental Issues

The prohibition of landfi ll disposal of ELTs in the USA (introduced in Europe by the EC Directive 1999/31 and adopted in Italy with Legislative Decree No 36/2003) has changed the management practices and favoured the implementation of new recovery methods.
This legislative change is particularly important in Italy because the Italian situation is rather peculiar: even though approximately 48% of ELTs are claimed to be used for energy recovery, the corresponding share of material recovery does not match this value and a considerable percentage (>25%) of material cannot be accounted for. This fact results in 100 thousand tons per year of ELTs not accounted for in the period 2005/2010 (as per a Legambiente report). The study also indicates that by the year 2005 more than thousand illegal dumping sites had been identifi ed on the national territory.

CONSIDERING ELT AS A RESOURCE

The European Union (EU) considers “waste minimization” the most desirable approach to waste management while “re-use”, “recycling” and “component recovery” of waste material are all more desirable than ultimate “disposal”.

Although the reuse of ELT (in practice linked to the reconstruction of the tread), is defined as the "Best Praticable Environmental Option" (BPEO), the quantity of ELT not suitable for reuse grows continuously.
The cost-effectiveness of "recycling" management is complicated because the solution for reusing the materials making up the tire is also complicated: rubber, iron, fiber, has a limited feasibility.
In practice, as an alternative to the landfill for the remaining ELTs, only two solutions appear feasible:
- the recovery of the materials "ingredient"(residues carbonaceous and combustible oils);
- the recovery of the energy value of the aforementioned materials (transformation into thermal energy,
- power supply for electricity generation

To defi ne the scale of the issue posed by ELTs in Europe will suffi ce to quantify the yearly rate of generation of ELTs: 3.3M tons/year in Europe, of which ~450,000 tons/year in Italy [source: www.etrma.org].
As indicated above, the reuse of old "whole" tires (rethreading), or the recycling of the composition materials after physical dismantling (which creates rubber granules and metallic and fibrous residues), are management activities on ELTs with limited applicability.

A DIFFERENT METHOD OF TREATMENT OF THE ELT

Here we will present and discuss one of the different ELT treatment methods aimed at recovering the maximum energy content, while avoiding "combustion", a source of thermal energy (and therefore avoiding complex treatments of the exhaust fumes).
This is called "pyrolysis", a thermochemical process that induces the depolymerization of the organic rubber compound, in an inert environment (without oxygen). This process can be activated through from combustion heat sources, ultrasound equipment, microwave, or induction.

PYROLYSIS OF RUBBER ORGANIC COMPOUNDS IN A TEMPERATURE CONTROLLED ENVIRONMENT WILL “CRACK” THEM INTO A SOLID FRACTION (Char), AND A GASEOUS ONE
(Gaseous organic components at the discharge temperatures of the Pyrolysis Chamber).

The controlled cooling of organic gases involves the condensation of the organic component oils and the separation of a combustible gas fraction.
So the effect of ELT pyrolysis is the generation of:

- The “char”, solid granular carbon, which can be packaged for direct utilization or for further processing
- The liquid phase, a mixture of combustible oils, which can be drummed for commercial use or utilized “at source” to fuel diesel/generator groups that can provide electricity to the processing plant and to the national electric grid.
- an uncondensable organic gaseous fraction such as CH4, C2H4, C3H6H2 and H2S, CO, CO2 which will be used on site, in controlled way, as an additional energy source.

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General information and environmental and social issues

TECHNOLOGICAL PLANT FOR THE TREATMENT OF PLASTIC MATERIALS FOR ELECTRICAL AND THERMAL ENERGY PRODUCTION PLAST GINEO

The increase in electricity demand, the depletion of non-renewable energy sources, the growth of illegal waste landfills imply the need to use modern technologies in order to obtain electric and thermal energy at more advantageous costs.
Treat plastic to obtain new energy resources could be the way to make real speech on eco-sustainability. How? Using cogeneration.
Article. 2 paragraph 8 of Legislative Decree 79/99 defines
-"Cogeneration" the combined production of electricity and heat under the conditions defined by the Authority for Electricity and Gas.

Our experience is based on studies of specialized technicians who, after years of research, have created a technology for the treatment of plastic materials at modulated temperatures in low pressure, allowing the recovery of liquid products (synthetic oils), gaseous and solid.

The final result is a range of plants capable of:

- Dispose of plastic waste -
Produce electricity
- Produce thermal energy

PURPOSE OF THE STUDY AND FOUNDATION OF THE PLAST GINEO INVESTMENT

The study describes a thermoelectric plant, a plant that works on the basis of the recovery of plastic waste and their transformation into the so-called large fraction, used as an alternative source for heating or for the power supply of current generators. The instrument for the purposes described above is just the plant for plastics processing, essential and integral object of the study.

General information and environmental and social issues

European directives and current technology allow us to consider waste as a resource and therefore proceed with its recovery. Maximum attention is therefore paid to the entire process, called waste management, which concerns collection, transport, up to treatment (disposal) of the waste.

Traditional forms of waste disposal are controlled landfills, recycling and composting, incinerators and waste-to-energy plants.
The controlled landfill, although constituting the most used system in Italy for the contained plant and management costs, is a potentially dangerous technology if not implemented and managed correctly.
The goal is that to accumulate waste previously treated on smallest possible area, minimizing their volume.
Decisive element is the proper choice of the site, which must be subject to iron rules that protect ecosystems and inhabited areas.
During the deposition of the compacted landfill waste, drainage pipes capture the biogas developed following the maturation of the waste. These biogas can be assimilated to renewable sources; the problem is that, when not used to produce energy, they are mostly burned on site or even released into the atmosphere with serious consequences for the environment.
Composting is the natural method for converting waste, composed of organic materials into fertilizer, thanks to the action of bacteria which, in aerobic conditions, consume and transform organic substances. An essential element is that upstream of the method there is an accurate separate waste collection. While in Europe the valorisation of organic waste takes place through the composting guaranteed by the rule, in Italy, only after the entry into force of Legislative Decree 22/97 is a turning point marked for the growth of this sector, especially in the center.

The incinerator, feared by those who live nearby and chosen only in the presence of significant quantities of waste to be treated for costs and management difficulties, allows, through combustion, to minimize waste destined for landfills, to produce energy and to check the emissions to the chimney, the liquid discharges and the solid discards in order to check the parameters required by current legislation.
Alone cannot represent a solution to the waste problem, but it can eliminate some organic toxic components and allow a reduction in the volume of waste to be sent to landfills.

General information and environmental and social issues

Every year in Europe are produced 2 billion tons of waste, a figure still rising.The storage of these wastes cannot represent a sustainable solution and their destruction through incineration is not satisfactory due to the emissions produced and highly polluting residues. Noting that the average rate of recycling of domestic waste in the European Union touches only 26%, there will immediately realize that waste management at a European level is a complex topic, because the objective pursued is to protect the environment and the territory without distortions for the internal market. Given this premise, it should be noted that Directive 75/442 / EEC, as amended, established the following hierarchy of waste disposal systems: prevention, recycling, energy recovery, safe disposal in landfills with an exclusively residual method. Similarly, also in Italy the problem of waste plays an articulated role. The data are clear:each inhabitant produces more than 1.5 kg of waste daily, divided between organic waste, paper, iron, plastic, aluminum, glass, wood, dust...

ANNUAL QUANTITIES OF URBAN WASTE PRODUCED IN ITALY

Region	Inhabitants	Production 2 1 (t)	Per capita 2 1 (kg / inhab)	Production 2 2 (t)	Pro-capite 2002 (kg/ab)
Piedmont	4.213.294	2.081.942	4.941	2.133.155	506.3
Aosta Valley	119.546	69.427	580.8	70.667	591.1
Lombardy Trentino	9.033.602	4.538.400	502.4	4.579.831	507.0
Alto Adige Veneto	940.506	514.644	547.2	478.894	509.2
Friuli Venezia Giulia	4.529.823	2.163.297	477.6	2.177.344	480.7
Liguria	1.183.603	589.642	498.2	603.432	509.8
Emilia	1.570.004	928.297	591.3	939.000	598.1
Romagna	3.984.526	2.516.009	631.4	2.634.690	661.2
Tuscany	3.497.042	2.283.601	653.0	2.353.705	673.1
Umbria	826.196	453.563	549.0	467.969	566.4
Marche	1.471.123	782.502	531.9	800.514	544.2
Lazio	5.117.075	2.981.191	582.6	2.949.337	576.4
Abruzzo	1.263.379	598.716	474.3	567.428	465.3
Molise	320.467	116.427	363.3	117.269	365.9
Campania	5.701.389	2.762.878	484.6	2.659.996	466.6
Puglia	4.019.500	1.753.487	436.2	1.806.588	449.5
Basilicata	597.468	217.498	364.0	214.606	359.2
Calabria	2.009.623	811.320	403.7	859.193	427.5
Sicily	4.965.669	2.423.379	488.0	2.520.782	507.6
Sardinia	1.630.847	822.652	504.4	833.188	510.9
ITALY	56.993.742	29.408.873	516.0	29.787.587	522.6

General information and environmental and social issues

Waste-to-energy uses the same incineration process, but with the addition of electricity and thermal energy production. If from the refusal it is extracted through separate collection the portion that can be easily put back into the market for secondary raw materials (for example, paper, cardboard, aluminum, glass, plastic, iron, wood and organic fractions to be transformed into high quality compost) in a significant quantity, i.e. greater or equal at 35% by weight required by law, the residual fraction can be sent directly to the waste-to-energy plant or transformed into more suitable fuel for energy recovery. The energy recovery process takes place inside a waste-to-energy plant, a combustor where waste is burned under controlled conditions: from the heat exchange between the high temperature fumes and the water there is the production of steam which, made to expand inside of a turbine coupled to an alternator, produces electricity. The energy efficiency varies from 18% to 23% in cases of electricity production only, while it also reaches over 60% in the case of cogeneration.

This means that from a ton of waste, deducted the energy to produce the fuel and how much self-consumed by the system, about 6/7 kWh can be obtained. With environmental emissions that reach lower values than what is established by the relevant legislation. Nitrogen and sulfur oxides, dioxin, furans, heavy metals and fine powders, PM 10:
the reference emissions are those of the European directive (76/00), already more restrictive than the standards currently in force in Italy and the BAT standards envisaged in the most modern systems, allowing a halving of the emissions of the current legislation.
But the ecologically and economically sustainable solution on the subject waste management is to proceed with the recovery of the various components through a separate collection of the various waste, a process in which the separation can take place by citizens at the time of delivery from homes to public collections or in particular establishments, where some materials are separated from the rest of the waste by the waste management body.

General information and environmental and social issues

The use of recycled materials must therefore be considered as a resource and as a source of alternative energy.
But to use the energy contained in the waste materials it is necessary to subject them to a transformation process.
For plastics, only recyclable materials have been taken into account and not those sent to the waste to-energy plant, as not all plastics are recyclable both by type of polymers and for the economic convenience of their recycling.Those not recyclable, albeit for economic convenience, are transformed into excellent quality fuel to produce electricity and heat. An important solution also for the landscape and the health of the air, given that those deriving from plastics constitute a considerable group of waste that does not decompose quickly and therefore remains in the natural environment and that their direct incineration is not economic, nor eligible under the provisions on environmental protection. It must also be said that combustion by incineration has the sole purpose of eliminating waste by burning it, without producing anything "useful" and usable, while waste-to-energy uses the same incineration process but with energy production.
Plastic can therefore be transformed into an energy resource: just think that with a plastic bottle you can keep a 60 Watt bulb on for one hour and that by recycling 1 Kg (= 25 bottles) of plastic you save 30 Kwh = 300 100 Watt bulbs lit for 1 hour. Therefore, re-use, and then recycling, of plastics is fundamental for a country like ours, particularly poor of raw materials that must be mostly imported.

General information and environmental and social issues

By expanding the analysis worldwide, we can conclude that ours is a planet submerged by plastic waste: global production settles on 265 million tons per year, as reported by the statistics of the European Packaging and Films Association (Pafa). And the recycling of plastic does not come to the aid of this invasion: in Europe it barely touches 33%, in America 15%. Then there is to say that many of the plastic waste, being packaging, they cannot be recovered and are intended to be discarded after the first use. Furthermore, the recycling of plastic materials is really functional only if the collection is done by separating the different materials.
And the fact that there are at least 50 types of plastic, different in weight, resistance, flexibility, even if all obtained from raw materials such as oil, natural gas or coal, does not facilitate the division that must be made upstream of the recycling.

Where does the rest of the plastic waste end up? It is destined for the landfill ...

Highlighting that some plastic materials, being biodegradable only in the long term, can constitute a danger to the environment if disposed incorrectly and that the cycle plastic processing requires a fair amount of resources, the conclusion appears to be one and obvious: eliminate waste, convert to recycling and transform waste into energy.

Il residuo carbonioso

Properties of Worn Tyres

RUBBER COMPOSITION OF CAR TYRES

SUBSTANCE	CAR TYRES	TRUCK TYRES
NATURAL RUBBER	41-43%	34-35%
COAL	38-32%	36-32%
HYDROGEN	6–7%	5–6%
SULPHUR	1–1,5%	1–1,5%
IRON	10–12%	20–22%
FILLERS	3–4%	3–4%
TYRE WEIGHT	5–10 kg	< 70 kg

THE VALUE OF ELT

COMPONENTS	TIRE FOR PASSENGER CAR, WT %	TIRE FOR TRUCK, WT %
NATURAL RUBBER	22	30
SYNTHETIC RUBBER	23	15
SOOT	21,5	22
METAL	16,5	25
FIBRE	5,5	-
ZINC OXIDE	1	2
SULPHUR	1	1
FILLERS	7,5	5
JOINT CARBON MATERIALS	74	67
AVERAGE WEIGHT OF NEW TIRE	8,5 KG	65 KG
AVERAGE WEIGHT OF OLD TIRE	7 KG	56 KG
NET CALORIFIC VALUE	30,2 MJ/KG	26,4 MJ/KG
CARBON (C)	69 %	61 %
SULPHUR	1,3%	1,4 %

Source: Scientifi c Journal of Riga Technical University Environmental and Climate Technologies 2010 Volume 4.

Properties of Worn Tyres


Frazioni di olio di pirolisi

The tire key elements are “natural rubber”, a natural polymeric material that obtained from latex sap of trees, and “synthetic rubber”, a rubber made by copolymerization of isobutylene (2-methylpropene (CH3)2C=CH2 with a small amount of isoprene. The Carbon fraction refers to “Carbon black”, a common tire manufacture additive; it is virtually pure elemental carbon in the form of colloidal particles (produced by incomplete combustion or thermal decomposition of gaseous or liquid hydrocarbons under controlled conditions).

THE OVERAL COMPOSITION OF TIRES RESULTS IN A PRODUCT THAT, IN GENERAL, HAS MORE HEAT ENERGY BY WEIGHT THAN COAL (UP TO 37 MJ/KG VS. 27 MJ/KG)

These data indicate that the ELT should not be considered a waste, but an economic resource in the energy field and therefore as such must be managed.

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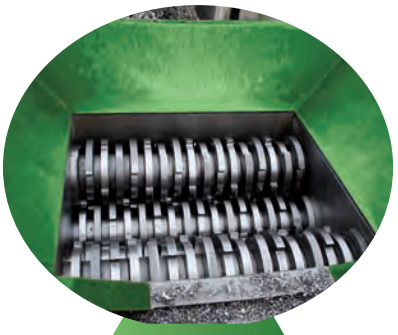
Description and operation of the Plant PNEUS-GINEO

WORN TIRES (LIFE TIRES LT)



SHREDDER

LT SHREDDED

DEPOLYME-RIZER

PYROLITHIC OIL (FUEL)

COOLING SYSTEM

FUEL TANK

ELECTRIC POWER GENERATOR

ELECTRIC POWER

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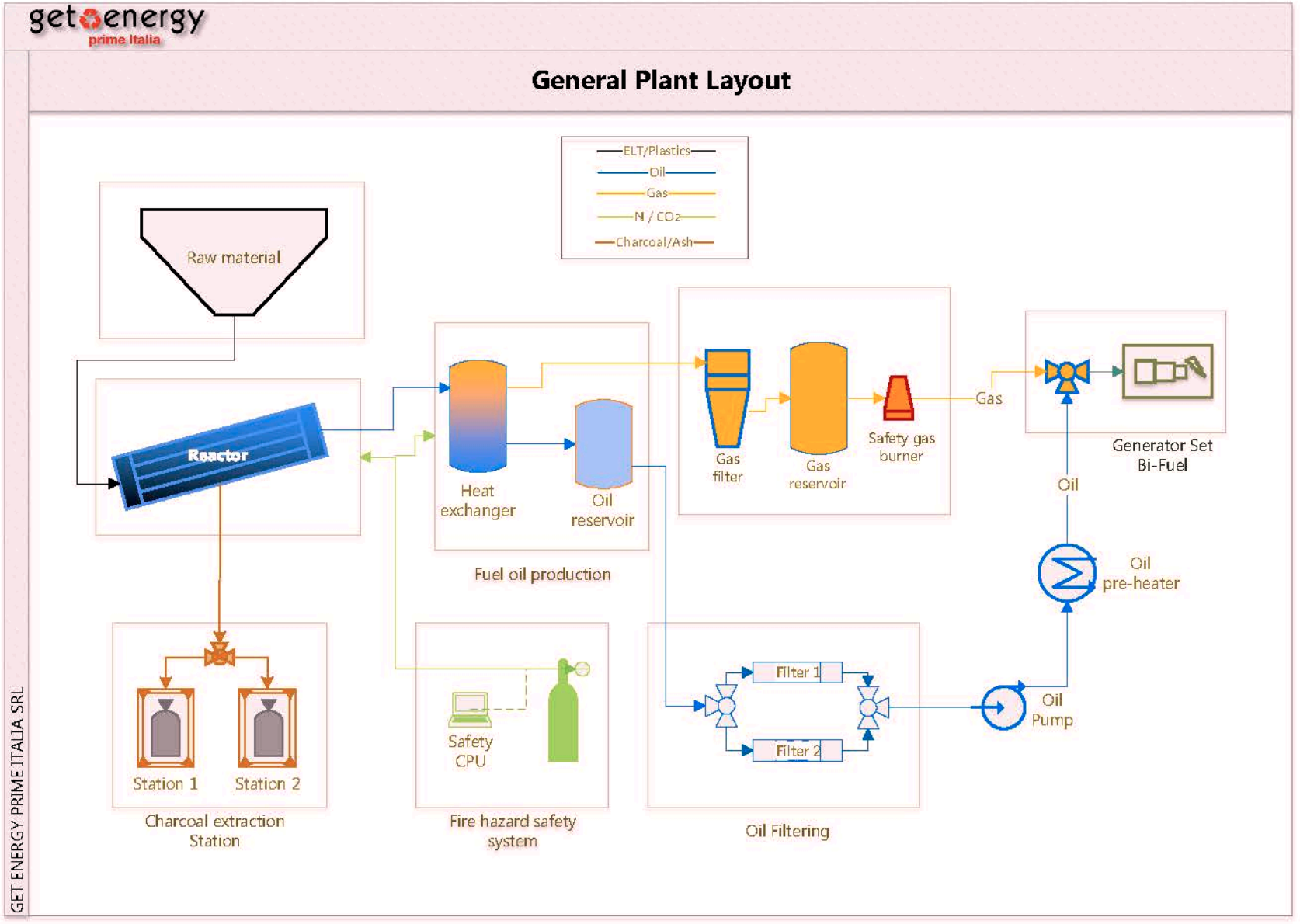
PNEUS GINEO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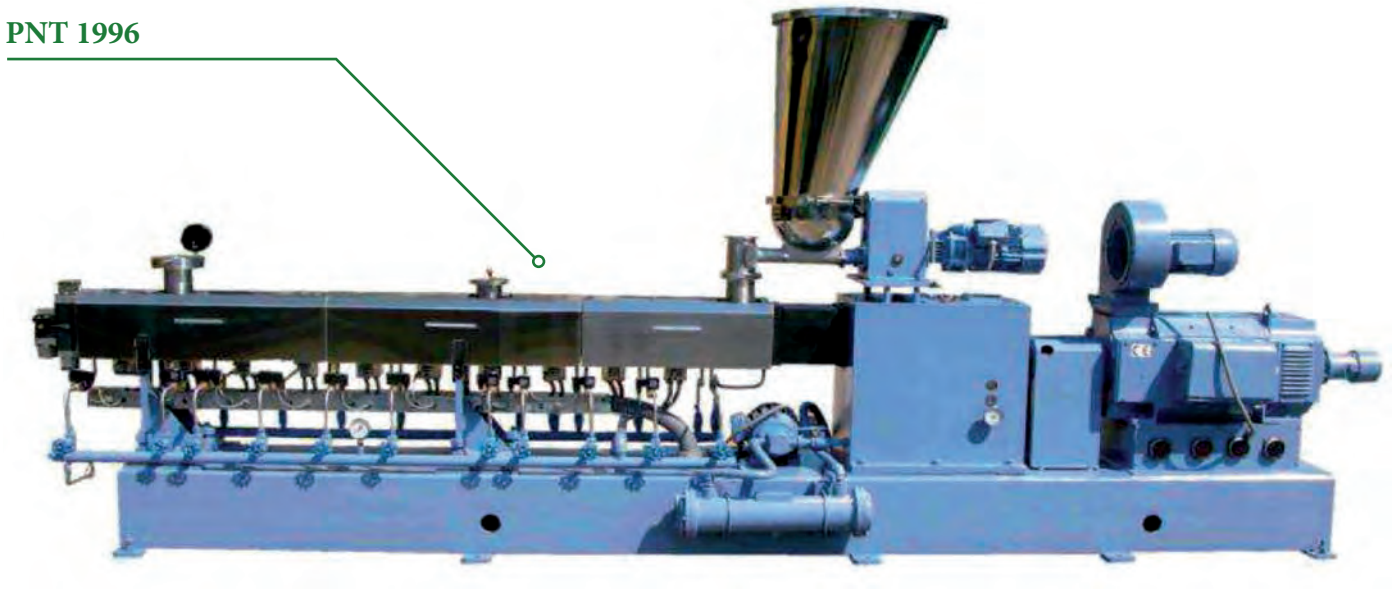
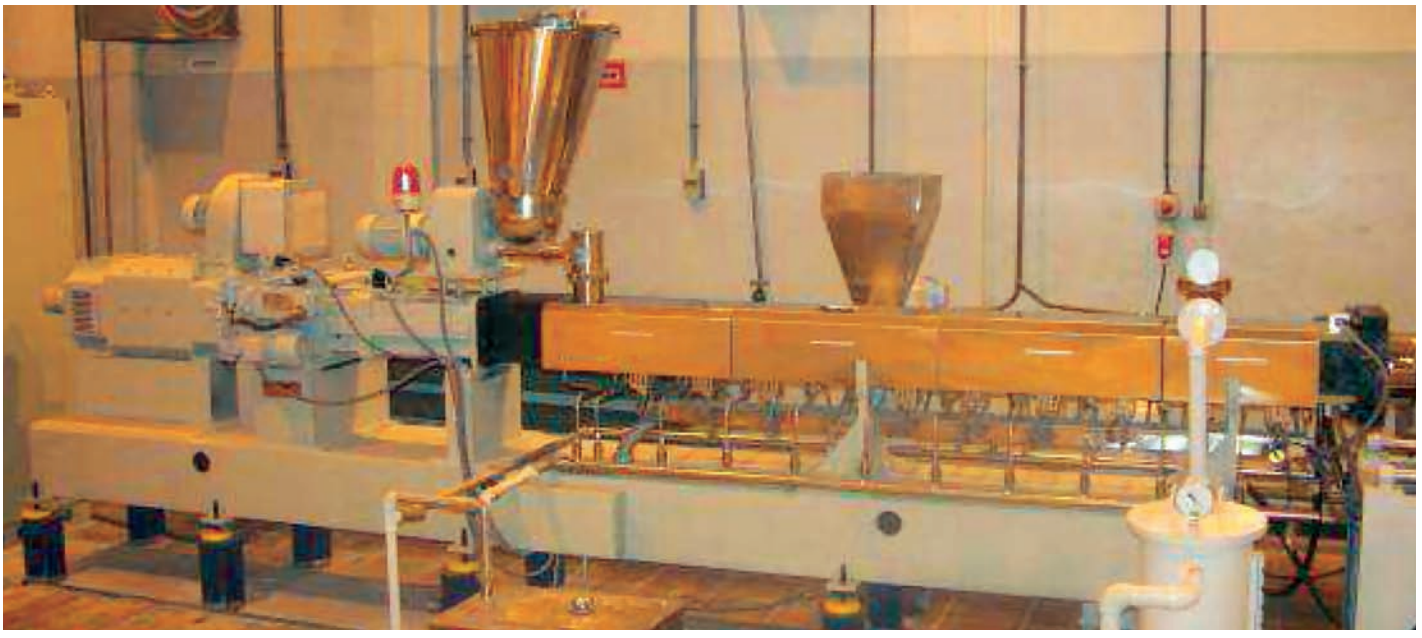
General Plant Layout
ELT/Plastics
Oil
Gas
N / CO2
Charcoal/Ash
Raw material
Reactor
Heat exchanger
Oil reservoir
Fuel oil production
Gas filter
Gas reservoir
Safety gas burner
Gas
Generator Set Bi-Fuel
Oil
Oil pre-heater
Oil Pump
Station 1
Station 2
Charcoal extraction Station
Safety CPU
Fire hazard safety system
Filter 1
Filter 2
Oil Filtering
GET ENERGY PRIME ITALIA SRL

Description and operation of the Plant PNEUS-GINEO

PNT 1996





PLANT 2004

PLANT 2015

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FIG.1

FIG.2

FIG.3

FIG.4

THE "PNEUS GINEO" IS A PLANT BASED ON A PROJECT WITH PATENTS DEPOSITATED TO TREAT GRANULATE OF PFU WITH A PROCESS OF PIROLYSIS. THE TECHNOLOGY, DEVELOPED BY GET ENERGY PRIME ITALIA INTRODUCE NEW TECHNOLOGIES OF HEAT TREATMENT AND THE USE AS DIESEL FUEL OF AS POLYROLIC LIQUIDS.

The rubber granulate (from 1 to 4 mm in diameter) is introduced continuously into the pyrolysis reactor where the heating of the product is obtained by electronically controlled electric inductors. The rubber immersed in an inert atmosphere therefore generates pyrolysis gas and carbon residues.
The solid residue is continuously discharged from a reactor hatch and transferred, under forced cooling, from an auger to collection devices. **(FIG.1)**

The pyrolysis gases are transferred into air heat exchangers, where they progressively cool down, depositing the condensed liquid fractions.

Liquid gravity condensed fractions are collected in sedimentation tanks. **(FIG.2-3)**

(FIG.4) The remaining gaseous fraction is filtered through a water scrubber before being sent to the generator.
The liquid fractions are mechanically filtered for the removal of non-combustible solid particles and sent together with the gaseous fraction to the energy generators. The process is automated and completely controlled by a PC.

The pyrolysis reactor is a cylinder of the required length to the amount of waste to be treated, and is designed in accordance with the CE standars and criteria.
The reactor is equipped with a special motorized mixer which ensures an accurate heating of the granulate in the predetermined time.
The heat exchangers for the pyrolysis gases are finned to allow an air-cooled, the same are segmented to allow the control of the liquid fractions and thus optimize the condensation process.
The auger is designed to transfer and cool the solid residue in tanks prepared at room temperature. (Figure 5)
The diesel generator set is modified to accept the complete liquid fraction generated as fuel and is equipped with a special catalyst that allows compliance with environmental discharge standards. (Figure 6)


FIG.5

FIG.6

TYPES OF GENERATORS SETS AVAILABLE

PRODUCTION KW IN WORK CONTINUOUS	MODEL	CONSUMPTION L/H
230 KW	CUMMINS NTA 855G4	~ 60 L
445 KW	CUMMINS VTA 28G5	~ 120 L
675 KW	CUMMINS NTA 855G4 + VTA 28G5	~ 180 L
820 KW	CUMMINS KTA 50G3	~ 215 L
1050 KW	CUMMINS NTA 855G4 + KTA 50G3	~ 275 L
1265 KW	CUMMINS VTA 28G5 + KTA 50G3	~ 335 L
1640 KW	CUMMINS KTA 50G3 X 2	~ 430 L

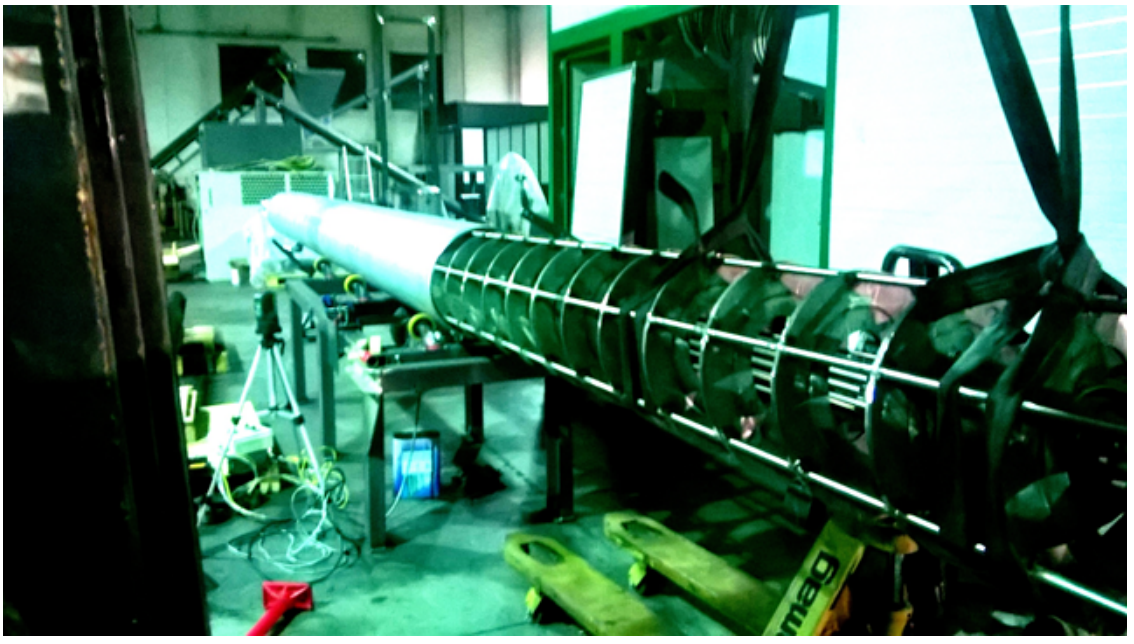
All the components in contact with solid, liquids and gases generated, are manufactured in special steels and stainless steels

Description and operation of the Plant *Plast-Gineo*

DISTILLER GROUP

The plant in question is constituted by a power generator, reactor and accompanying devices.

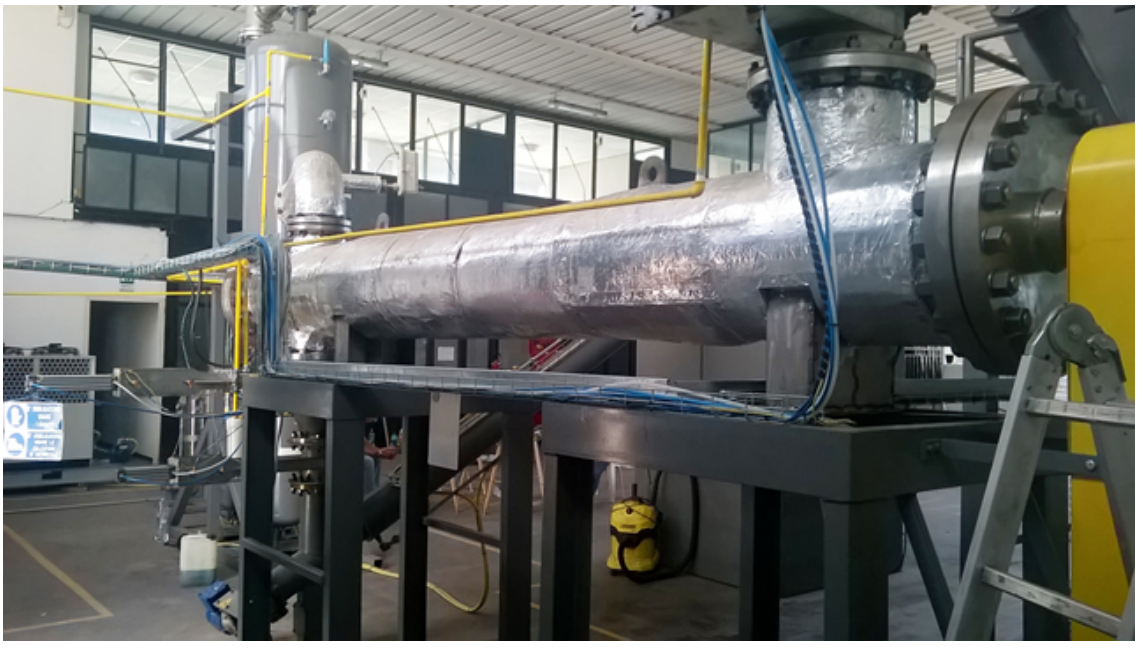
The raw materials that feed the plant are plastic waste. The raw materials destined for recovery must be loosened and enlarged in order to be placed in the belt loader; they are then directed into the hopper and transferred to the pressure vessel. Polyolefin (i.e. polyethylene, polypropylene, etc., plastic bags, cover sheets, rigid buckets, jars of yogurt ...). PP PE (6) HDPP HDPE (2). The same arrives in the form of bales or in big bags.



In the reaction chamber there is a preheating (plastification) of the plastic materials through a modular temperature between 170 and 330 ° C.
The raw materials thus treated are pushed into the reactor where, with the action of modular temperatures between 380 and 600 ° C, they are transformed into synthetic hydrocarbons in the paraffin structure. The components obtained do not contain dioxins, sulfur compounds and other polluting elements. For this reason, this procedure is counted among the "ecological" (zero-emission) products.

The paraffins, in such conditions and temperatures, can also be present in the form of vapors.
The vapors, thanks to their overpressure, leave the reactor and reach the condensation radiator.
The condensation process, inside the latter, creates three fractions of products: oil, paraffin and light paraffin (gas). The gaseous part is highly combustible and has a high energetic power.

It can be inserted, after a filtering process, directly into the power generator through the intake manifolds or it can be used as thermal energy with other technological systems.
The paraffin oil fraction is introduced by gravity into temporary receivers and then pumped into the storage tank. Adjacent to the tank there is a technological recovery system. A three-way pump is placed between the paraffin tank and the technological recovery system, which mixes the paraffin.
The paraffin thus treated is conducted through the fuel pipe to the engine of the power generator.
All this entails a considerable saving of liquid fuel during the production phase of electric and thermal energy. Furthermore, this process also generates water vapor, the presence of which in fuels reduces the concentration of residues which makes the process more ecological.



GENERATORS GROUP

When using the engine with pyrolytic oil and / or combustion paraffins, the emissions are as follows:

a. Nitrogen oxides - NOx <4000 mg / Nm3
b. Carbon monoxide - CO <650 mg / Nm3
c. Fixed particles PM (summarily) <80 mg/Nm3

The plant includes the cogeneration module of 2 generators in a container.
The standard set of 900 kWe baseload power has a noise level of less than 69 dB at 7 m. The overall efficiency (electricity + heat) is around 80%.
The set includes:

1. Two 450 kWe generator sets
2. Heat recovery module dedicated to the 2 groups mentioned above
3. Special wide container (3 m) soundproofed (common for 2 groups)

Ad. 1
Generator set HE-M450-PP
The open version for the container.
The unit for operation in continuous power mode according to PN-ISO8528 (fixed power over time, without time limits, ing. Continuous power,).
Gross active power [1]: 450 [kWe]
Rated current: 810 [A]
Voltage: 230/400 [V]
Frequency: 50 [Hz]
Fuel tank: 500 [l]
Fuel consumption: 117.2 [l / h] × 2 (+/- 8%)
Engine: IVECO FPT CURSOR 16
cylinder system: 6
displacement: 16 [l]
power supply: turbo intercooler
Dynamo: self-excitation, brushless, by the Marelli company
Protection // insulation class: IP23 // H
[1] - power on the terminals of the dynamo. The generator in use consumes about 15-20 kW of electricity. This energy can come from the generator or from the external network.

The parameters have been defined for the standard reference conditions:
temperature: + 25 ° C, pressure: 100 kPa,
relative humidity: 60%.

The group is composed by:
- compression ignition engine of the IVECO company, duly adapted, industrial type;
- automatic, electronic regulator of the motor rotation speed;
- engine block heating system which optimizes the conditions for group start-up;
- synchronous, self-excited, brushless dynamo of the Marelli company;
- automatic control and surveillance microprocessor panel with measurement module that allows synchronous work with the energy network. The panel also serves the heat recovery module;
- exhaust muffler (simple steel) with the compressor (stainless steel);
- main switch with electric controldule;
- special fuel filtering system for plastic materials;
- switching system of the plastic fuel feeder;
- operational surveillance systems of the engine properly selected to ensure the high level of control and automatic regulation required for non-standard fuels
- special low temperature heating system for the selected elements of the combustion system

Description and operation of the Plant Plast-Gineo

GENERATORS GROUP

Ad. 2
Heat recovery module dedicated to the 2-group system HE-M450-PP
The complete heat recovery system from the engine frame and from the combustion gases, with exchangers, pumps, pipes, sensors, valves and necessary equipment.
Thermal power 2 x 450 kWt (+/- 8%)
Heat support temperatures 70/90 ° C
Diameter of Connection / type: DN65 / a collar.
Manageable excess pressure on the connections of about 50 kPa - to be established.
The heat recovery system offered is composed of:
- 2 circuit external radiator, with thermostatically controlled electric fans, which performs the function of the spare radiator if heat is not received by the User devices;
- combustion gas type heat exchanger;
- water to recover heat from the combustion gases;
- by-pass of the combustion gas exchanger;
- plate heat exchanger type water - water;
- group of manageable three-way pumps and valves;
- necessary pipes inside the container;
- temperature, pressure and flow control system.

The control of the module is carried out through the group control system.

Ad. 3.
Special container, wide (3 m) soundproofed (common for 2 groups)
Noise <69 dB from 7 m.
Container size (m):
length x width x transport height / total
12.8 x 3.0 x 2.9 / ~ 4.2 (*)
(*) - there are other technical solution possibilities depending on the place of installation.

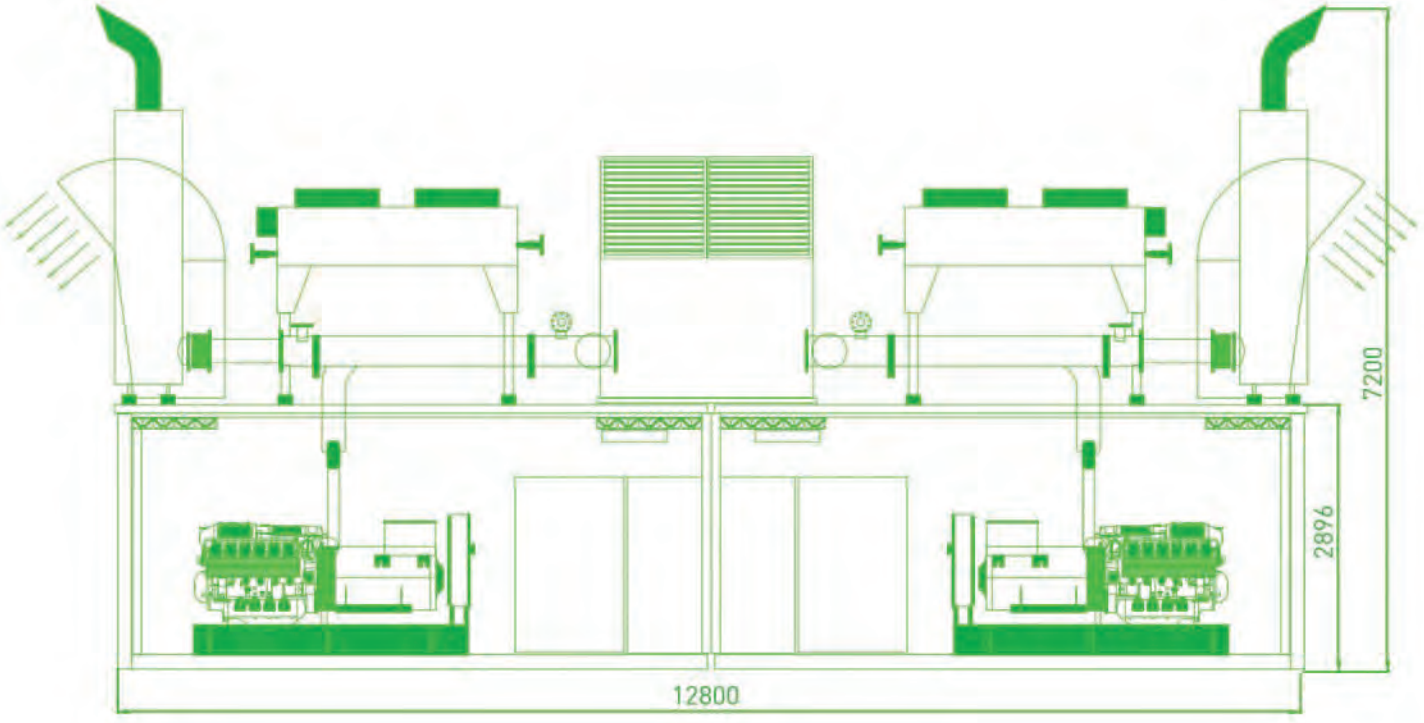
The container will be equipped with:
- soundproofing of walls, floor, ceiling, intake structure and launching device;
- internal ventilation system that works with the efficiency automatically adapted to the temperature inside the container;
- gripping and launching device equipped with silencers;
- connections for fuel supply and return of the plastic fuel;
- connections of the radiator, of the external thermal circulation;
- internal electrical system (for your needs);
- lighting system;
- aerosol extinguishing device;
- access door that allows easy access to technical assistance;
- "STOP" emergency switch;
- ecological tank that protects against spills with the monitoring of any leaks.

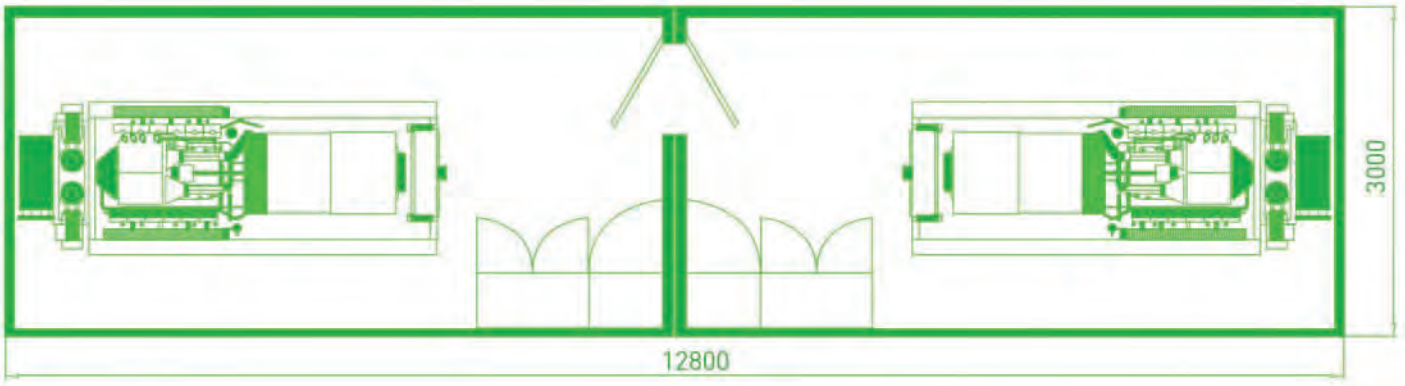
The container structure has been designed so as to guarantee free access to technical assistance to various elements of the system without the need to dismantle any part.
The engine spare radiator, the combustion gas exchanger, the intake work and the air launch device will be mounted on the roof of the container. Container weight 29 tons.

Warranty conditions:
The warranty period for the devices offered is: 12 months from the commissioning date.
The conditions and methods of technical assistance - to be determined.
Technical assistance operates 24 hours a day throughout the year.
Technical assistance is supported by the online monitoring system through internet connections.
After the warranty expires we offer a post-warranty technical support contract.

Types of plastic polymers that can be treated

№ 1 PET o PETE	**Polyethylene terephthalate or arnite: water bottles, soft drink bottles, shampoo bottles ...**
№ 2 PE-HD o HDPE	High density polyethylene: bottles, bags ...
№ 3 PVC o V	Polyvinyl chloride: **NO**
№ 4 LDPE o PE-LD	Low density polyethylene: frozen food bags, food film ...
№ 5 PP	Polypropylene or Moplen: ketchup bottles, pasta bags ...
№ 6 PS	Polystyrene or Polystyrene: disposable plates, glasses and cutlery, clothes hangers, trays and packaging of household appliances ...
№ 7 OTHER o O	All other plastic materials
№ 8	Other plastic materials
№ 9 ABS	Acrylonitrile butadiene styrene.
№ 10÷19	Other plastic materials





get energy
PRIME ITALIA

Production capacity

Plastic waste

* ≈ 1000 Kg / h - Plastics treated in pyrolysis becomes:
* The plastic waste called Plastmix is not homogeneous, therefore the% are subject to variables
* ≈ 10% - Fuel oil
* ≈ 62% - Singas
* ≈ 28% - Ash

Waste from ELT

* ≈ 1000 Kg / h - Deferred granulated rubber becomes:
* ≈ 45% - Fuel oil
* ≈ 15% - Singas
* ≈ 40% - Carbon black

Technical characteristics of the system

- The systems produced by Get Energy are all made of stainless steel and steels treated with particular internal anti-corrosion procedures
- The systems are supplied by probes that reveal in real time the% of oxygen inside the reactor. If necessary, they control the fire-fighting system installed inside
- The type of heating used is guaranteed by a magnetic induction system which allows not to produce further emissions compared to a traditional fuel heating system
- The whole operating, automation, control and safety system is controlled by a computer program owned by Get Energy
- The generators supplied by Get Energy are all bi-fuel (oil + syngas) and supplied

  according to the power requested by the customer. They are supplied in soundproofed containers respecting 65/70 dB at 7m

Noise emission:	75 dB at 23 ft away
Noise emission:	65 dB at 3,28 ft away
Equipment or location	Noise level, dB
Threshold of hearing, unaudible	0
Quiet bedroom	35
Windmill farm 380 yards away	35-45
Noisy office, fully operational	60
Truck running at 30mph, 110 yards away	70
Jackhammer at 23 ft away	95
Wind turbine, at 33 ft away	95-105
Pain threshold, hearing damage	140

Source: Cubasolar, Energéticas Renovables (CETER). Cuba.

Management of the Plant

- The sytem is 24 h monitored with on line data transmission through Internet and GPS to the main assistance centre (data collected in real time allow to go on with production and operation);

- Small size (Low environmental impact);
- Small noise level;
- No environmental impact;
- Mobile plant;
- Full plant cogeneration;
- Very simple and rapid structure for maintenance and damage;
- The plant can be insured;
- Average lifecycle of the plant: 18 years (with a regular maintenance);
- The plant is certified according to European standards (EEC);
- Generator certified according to European standards (EEC);
- The cleaning of the plant does not require the use of water ad thus is not polluting for ground and underground water.

Technical data

The standard 1MW Plant	
Plast / Pneus Gineo 1265 Nominal power kWe	1265
Self power estimated consumption kWe	265
Power supplied Kwe	1000*
Required material Kg / h	500 plastic waste 650 ELT granulated
Annual working hours	8000
Maintenance Periodicity	Stop plant every 360 working hours

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PRIME ITALIA

Our cutting edge technology

GET ENERGY PRIME ITALIA every year dedicates a portion of its turnover in the feasibility study of new technologies to create increasingly efficient and automated systems.
The two particular systems that characterize all GET ENERGY systems and that distinguish them from other systems are:

* a thermal heating system without using fuels or fuels necessary for the pyrolytic process and

at the same time avoiding large quantities of CO2 emissions into the atmosphere;

* a sophisticated "continuous" unloading system of the inert solid residue of the process allows

the plants to work 24 hours a day, with a significant increase in annual production and significant energy savings. This increase has been estimated at around 40% compared to other existing plants manufactured with traditional systems, now obsolete.
All systems manufactured by GET ENERGY PRIME ITALIA are CE compliant and comply with all the more restrictive ATEX conditions with the addition of fire protection devices included to guarantee greater safety for operators and the system itself.
The activity of the operator on the machine is truly reduced to a minimum thanks to the most complete automation system patented by GET ENERGY, which allows the operator to be engaged only in a control activity.

Environmental impact CO 2

According to ENEL data, each kw of electricity produced in Italy generates on average emissions for 0.700 kg of CO2

According to some statistical data, 1,650 kg of CO2 are emitted for each kg of fuel used in the generators.

Get Energy Prime Italia plants produce a bifuel that on average has a mass to energy ratio of 1 to 3.3, i.e. 1 kg of fuel can develop 3.3 kw

So 1.650 kg of co2: 3.3 kw = 0.500 kg of co2 / kw

This quantity is further reduced by 35-40% with a catalytic system at the generators outlet.
So, Kg 0,500 co2 - 35% = KG 0,325 CO2 / KW

We can declare that the difference in% of co2 compared to the national average is: 0.325 kg / kw: 0.700 kg / kw = 46.4%

Get Energy plant certifications

All the plants produced by Get Energy Prime Italia are supplied with the following documentation:

- CE certification
- ATEX certifications
- Steel type certifications
- Emissions certifications
- Security procedures document
- User manual

EEC Directives

Directive 85/374 / EEC
Liability for damage from defective products.
The directive defines the liability of the subjects for the placing on the market of goods. The document defines the producer as the person who produces the goods, who places the goods on the market by representing the product and, finally, who sells the product. The manufacturer and other subjects who participate in placing the product on the market are fully responsible for product defects and, towards consumers, suffer all consequences and are liable for their work. The consumer has the right to claim compensation for damages suffered, damage to health and other damages, against the subjects who place the product on the market.

Directive 90/396 / EEC
Gas appliances.
The directive defines the methods and requirements in the field of authorizations for placing gas appliances on the market. It establishes in particular the type and number of tests required for a device and the CE marking standards, so that the product obtains the authorization for distribution.

Directive 94/42 / EEC
Efficiency for new water boilers.
The directive defines the methods and requirements for the issue of authorizations for placing boilers on the market. In particular, it establishes the type and number of tests required for a boiler and CE conformity, the CE marking standards, so that the product obtains the authorization for distribution and energy efficiency.

Directive 2006/42/ EEC
Machinery.
The directive defines a series of rules and controls relating to the harmonization of exams and the CE marking, which must be satisfied before placing the product on the market, in order to protect the health of users.

Directive 2000/14/ EEC
Noise.
The directive defines the noise standards required for the devices specified therein. It defines the safety standards, the type and standards of the examinations and markings for normal use that the devices must satisfy.

Directive 2001/95/ EEC
General product safety.
The directive defines the obligations and methods of control towards producers, distributors and subjects responsible for placing the product on the market, in the context of full communication and marking of products regarding possible risks.

Directive 2004/22/ EEC
Measurement tools.
The directive prescribed in the requirements placed towards the manufacturers of measuring instruments, the methods of surveillance, examinations, markings and checks, taking into account the climatic zone, before placing the product on the market.

Directive 2004/108/ EEC
Electromagnetic compatibility.
The directive defines the requirements toward manufacturers for carrying out the examinations and for the application of the standards and marking which serves to market electromagnetic devices which, during their operation, will not disturb other electromagnetic devices connected to each other.

Directive 2005/32/ EEC
Eco-friendly design of products that consume energy.
The directive establishes the requirements relating to examinations, standards, marking and achievement of the CE declaration for devices that regulate energy, in order to make the best use of energy efficiency with minimal pollution of the environment.

Directive 2006/95/ EEC
Low voltage electrical equipment (LVD).
The directive defines which voltage standards the manufacturer must satisfy before placing the product on the market.

Conclusions

In an era in which the continuous increase in waste can no longer be contrasted with landfill storage or incineration, responsible for highly polluting emissions and residues, the only solution that can be envisaged is to look for a valid ally in the waste components .
The search for new energy sources implemented by Get Energy Prime Italia in these years has identified high- power energy waste as a solution that allows the production of electricity and thermal energy using alternative recycling methods.
The composition of the ELT makes its use appreciable in the most varied industrial sectors: electricity, thermal energy, Carbon Black, metal.
The company's experience teaches us that the higher the number of application sectors, the more it guarantees a compensatory effect when one of the areas in crisis.
Furthermore, the social problem on a global scale provides us with one and only perspective: recycling.

Get Energy Prime Italia is ready to create a strong and dynamic recovery system with its partners, which includes the market for the production of alternative energy sources.
At the center of this goal is PNEUS GINEO, characterized by innovative applied solutions and, at the same time, by a structural simplicity that makes the system easy to manage.
Choosing to recover tires by now at the peak of the life process and converting them is equivalent to solving two critical issues: eliminating a polluting material destined for destruction and producing energy thanks to alternative methods, respecting eco-sustainable principles and objectives.Now that the password is "recovering", transforming the tires into a resource means optimizing the two processes. But it also means facing the phenomenon of the spread of illegal landfills and taking sides alongside a planet in trouble. A choice in favor of the environment.
A valid choice also from the point of view of costs and revenues.

GET ENERGY PRIME ITALIA IS READY TO CREATE TOGETHER WITH PARTNERS A STRONG AND DYNAMIC ELTS RECOVERY SYSTEM, INCLUDING THE PRODUCTION MARKET OF ALTERNATIVE ENERGY SOURCES.

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