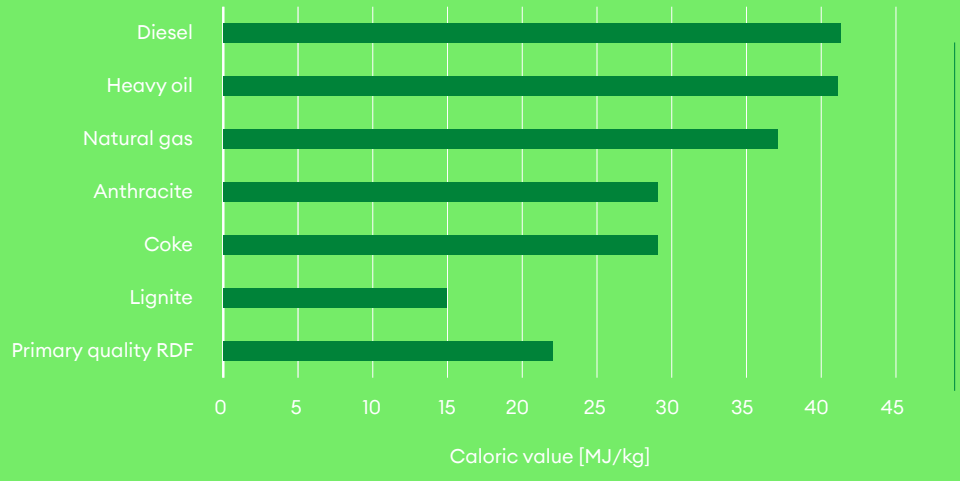
KOMPTECH

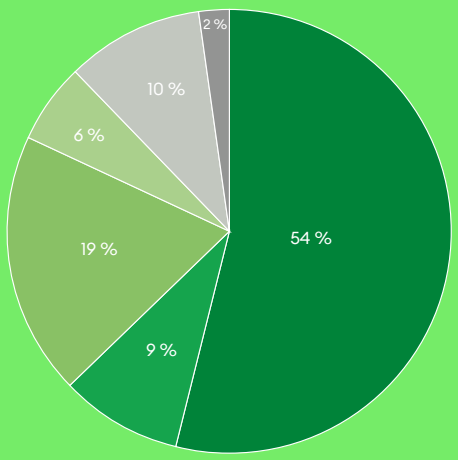
PRODUCTION OF RDF

Treatment of mixed waste

Caloric values of different fuels



Alternative fuels [1]



[1] Global cement and concrete association (GCCA)

Think green!

Komptech is a leading international manufacturer of machines and systems for the mechanical and biological treatment of solid waste. This includes the processing of woody biomass for use as a renewable fuel.

Refuse-derived fuel production

The production and use of refuse-derived fuels (RDF) is central to modern waste management. As legal requirements increasingly restrict the landfilling of untreated waste and at the same time call for higher recycling quotas, the use of fuel made from waste has become an important factor alongside recycling.

Processing plants to order

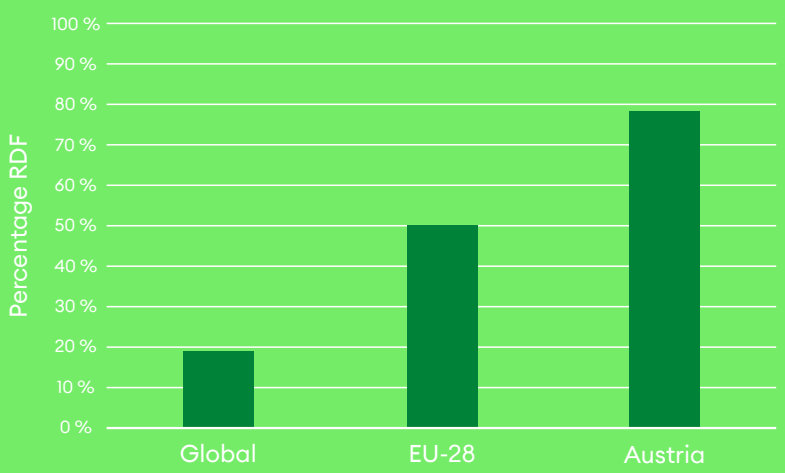
At Komptech we design and build refuse-derived fuel production plants that are adapted to the requirements of our customers. The feedstock composition and the sales opportunities for the resulting refuse-derived fuels are key parameters that we take into consideration.

In system design the focus is either exclusively on refuse-derived fuel production, or also includes separation of certain recyclable fractions. There may be a requirement for the plant to be flexible enough to adapt to changing conditions.

For these complex tasks, Komptech offers capable and efficient solutions. They are based on our comprehensive line of key components for shredding, screening and separating, plus market-proven components by leading manufacturers.

- Fuel from solid waste
- Solvent
- Old tires
- Used oil
- Saw dust
- Other

RDF rates in the cement industry [2]



[2] VÖZ, 2021 (GCCA Specifications 2019)

APPLICATION

Materials for processing

Commercial, bulky, production, packaging and even some household waste (residual waste) can be processed to derive fuels of varying quality.

Waste processing makes two things possible:

1. Materials like metals, PPK, glass and selected plastics (like PET) can be sorted out and recycled.
2. Waste can be separated and post-shredded to targeted caloric values and particle sizes. This gives refuse-derived fuels for specific firing technologies.

01 Commercial waste

02 Bulky waste

03 Production waste

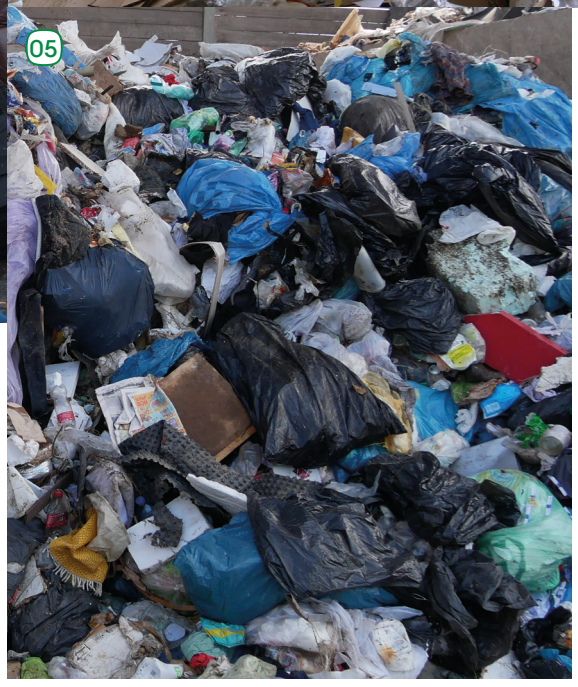
04 Packaging waste

05 Household waste


03


SMART


04


05

The task

In refuse-derived fuel production, the mechanical treatment of the input material is critical.

Different quality classes can be obtained depending on the type of waste, its composition and any pre-treatment (see fig. 1).

The quality of a refuse-derived fuel depends on its caloric value and particle size. For example, input material with high amounts of plastic, paper, cardboard or textiles can give an RDF with a high caloric value.

Depending on the quality, refuse-derived fuel can be used in industrial furnaces, cement plants and RDF power plants. It can substitute for fossil fuels like oil and gas.

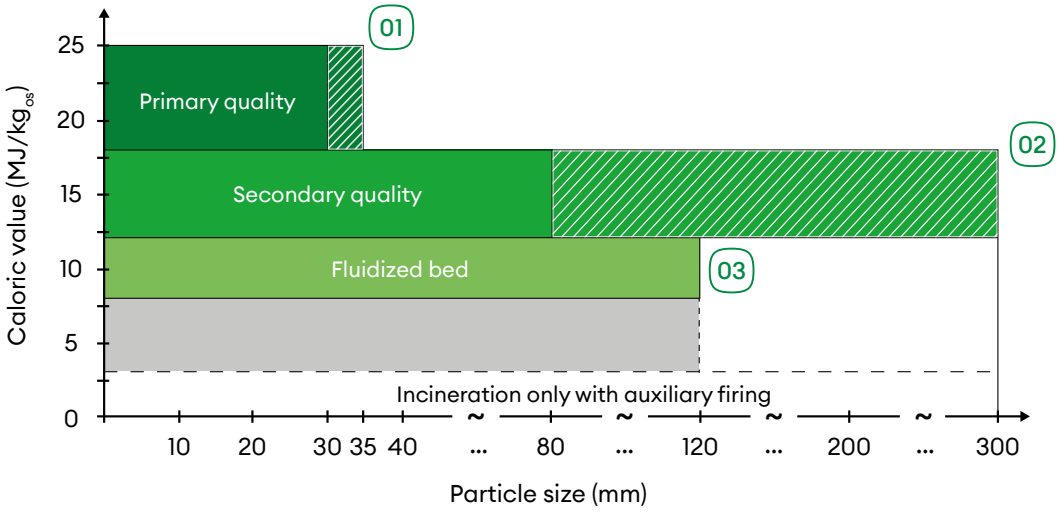


Fig. 1: Typical RDF qualities [3]

[3] Sarc (2015), Herstellung, Qualität und Qualitätssicherung von Ersatzbrennstoffen zur Erreichung der 100%-igen thermischen Substitution in der Zementindustrie

High caloric refuse-derived fuels

Primary (premium) quality refuse-derived fuels are used as a co-fuel in cement works, more specifically for primary firing in a rotary furnace. These fuels have high caloric value and low, homogenous particle size. Other important quality criteria are the chlorine, water and ash content.

Detail requirements [3] *

Particle size $d_{95} \leq 30$ (to 35) [mm]
Caloric value 18 – 25 [MJ/kg]

Medium caloric refuse-derived fuels

Secondary (medium) quality refuse-derived fuels are typically used for secondary firing in cement plants. These fuels are also called the “calcinator fraction” since their energy is used for calcinating (de-acidifying) the raw cement powder. They have moderate caloric value and moderate particle size. Cement works with a hot disc process can also use larger particle sizes for calcinating.

Detail requirements [3] *

Particle size $d_{95} \leq 80$ (to 300**) [mm]
Caloric value 12 – 18 [MJ/kg]

Low-caloric refuse-derived fuels

Refuse-derived fuels with low caloric value are used in incineration and co-incineration plants, for example in industrial fluidized bed firing. Much lower demands are placed on these fuels in terms of energy output and particle size.

Detail requirements [3] *

Particle size $d_{95} \leq 120$ [mm]
Caloric value 8 – 12 [MJ/kg]

* ... The specific requirements can differ based on the detail configuration of the (co-)combustion plant.

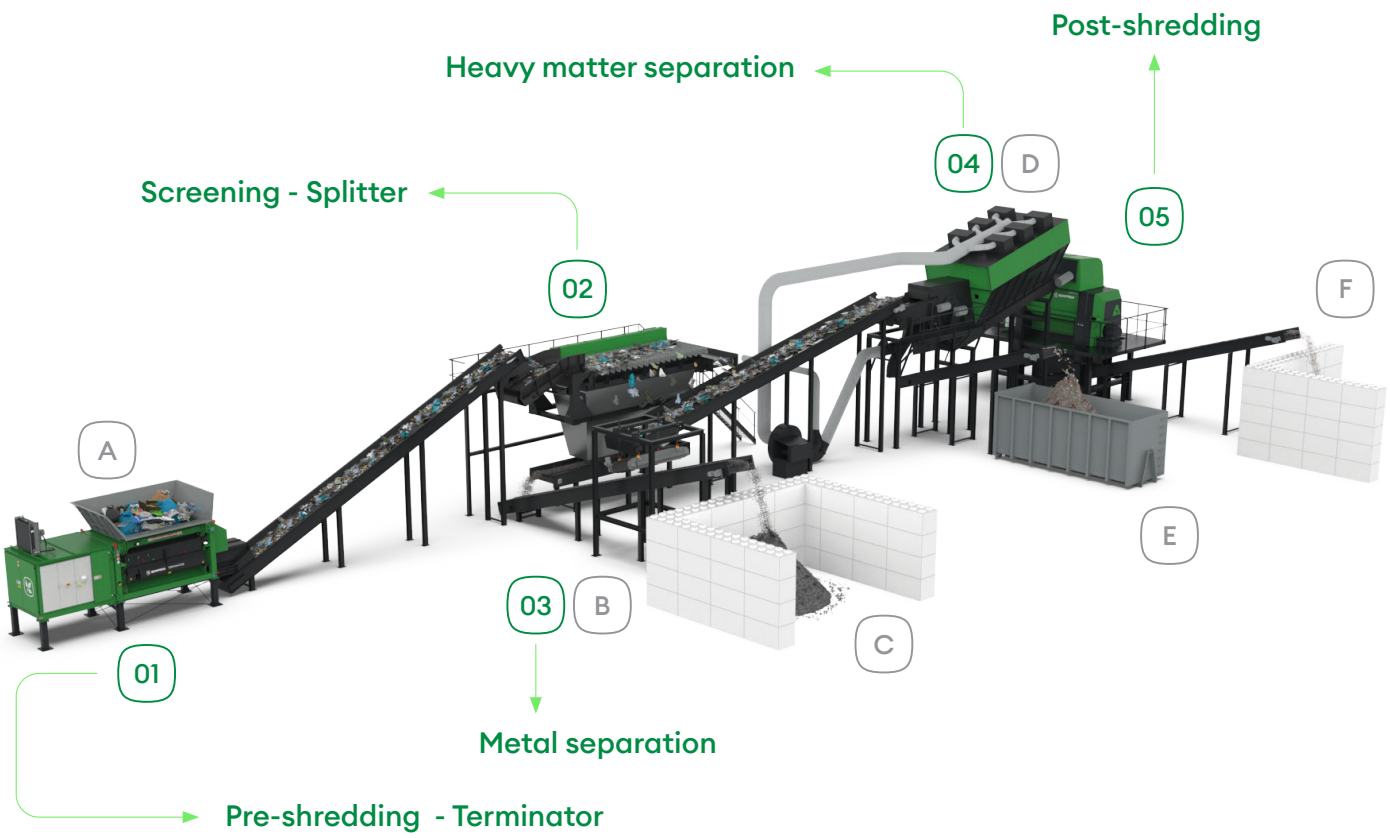
** ... Particle size range applies exclusively to hot disc applications.

Refuse-derived fuels: fluidized bed, secondary or primary quality

Standard refuse-derived fuel processing

A plant designed exclusively for refuse-derived fuel production generally consists of pre-shredding, screening or separation, and post-shredding steps. This setup enables the transformation of untreated input streams like commercial waste, bulky waste, production residue, packaging and household waste into refuse-derived fuels of various types. With the exception of Fe and non-Fe metals, recycling plays a subordinate role.

Process management enables ideal opening of the input material including the effective removal of FE/NF metals and the separation of inert fines and heavy materials. The remaining fractions – mostly light materials like foil – are post-shredded to a defined degree, in order to get the desired particle size for a refuse-derived fuel of secondary or primary quality.



A — Feeding of the input waste is done by front loader, mobile excavator or conveyor.

B — After pre-shredding and screening, ferrous, and if applicable non-ferrous, metals are separated out of the fine fraction for recycling.

C — The fines (usually < 100 mm) obtained from screening can be used as RDF for fluidized beds, or may need to undergo biological treatment, depending on their composition.

D — The remaining high-caloric coarse fraction (typically 100-300 mm) is cleared of heavy matter such as stones and glass.

E — Depending on the composition it might be possible to get further recyclables out of the heavy fraction.

F — The output at the end of the process is a finished RDF in secondary or primary quality.

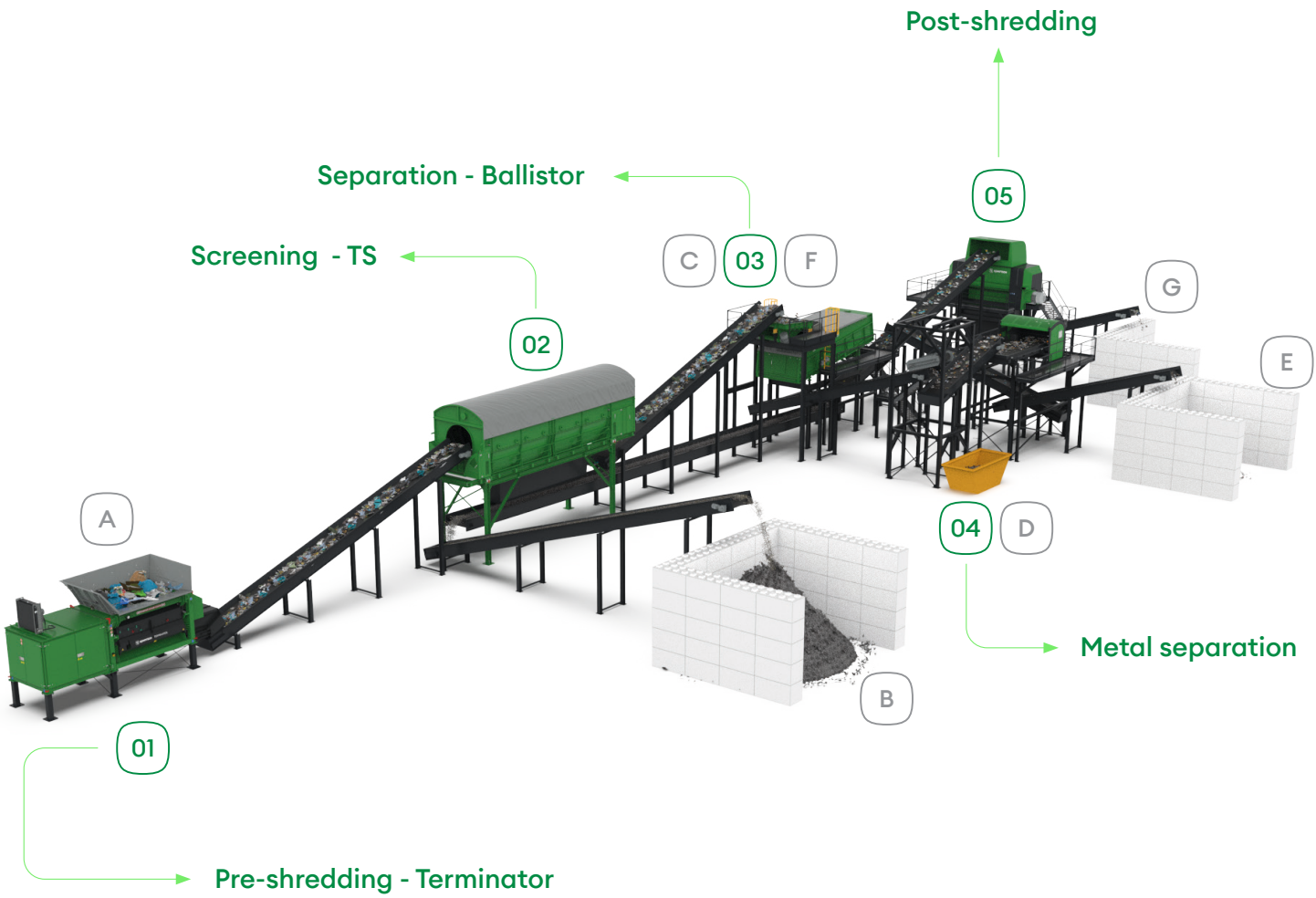
Depending on requirements, contaminants like material containing chlorine (such as PVC) can be removed in a post-treatment step.

Refuse-derived fuels: fluidized bed, secondary or primary quality

Refuse-derived fuel production and recyclables recovery

Plants that combine recyclable reclamation and refuse-derived fuel production are becoming more and more important. With them, operators can react flexibly to changing legal requirements for higher recycling quotas, and at the same time process a wide range of untreated waste, like commercial, bulky, production, packaging or household waste.

The necessary process steps comprise pre-shredding, screening or separation, sorting and post-shredding. Depending on the input material, the focus is on reclaiming recyclables like plastics, paper and cardboard or on the production of refuse-derived fuel. The two can also be prioritized equally.



A — Feeding of the waste is done by front loader, mobile excavator or conveyor.

B — The pre-shredded material is screened. The fines (typically < 80 mm) are either subjected to biological treatment or used as RDF (fluidized bed), depending on their organic component.

C — The 3D fraction from ballistic separation is cleared of metals and sent on to sorting.

D

E — With manual or sensor-based sorting, target recyclables (such as plastic) can be reclaimed from the waste stream.

F — The high-caloric 2D fraction from ballistic separation is ideal for making primary quality refuse-derived fuels.

G — Depending on the intended application of the RDF (secondary or primary quality), the final post-shredding can use different screen basket configurations.

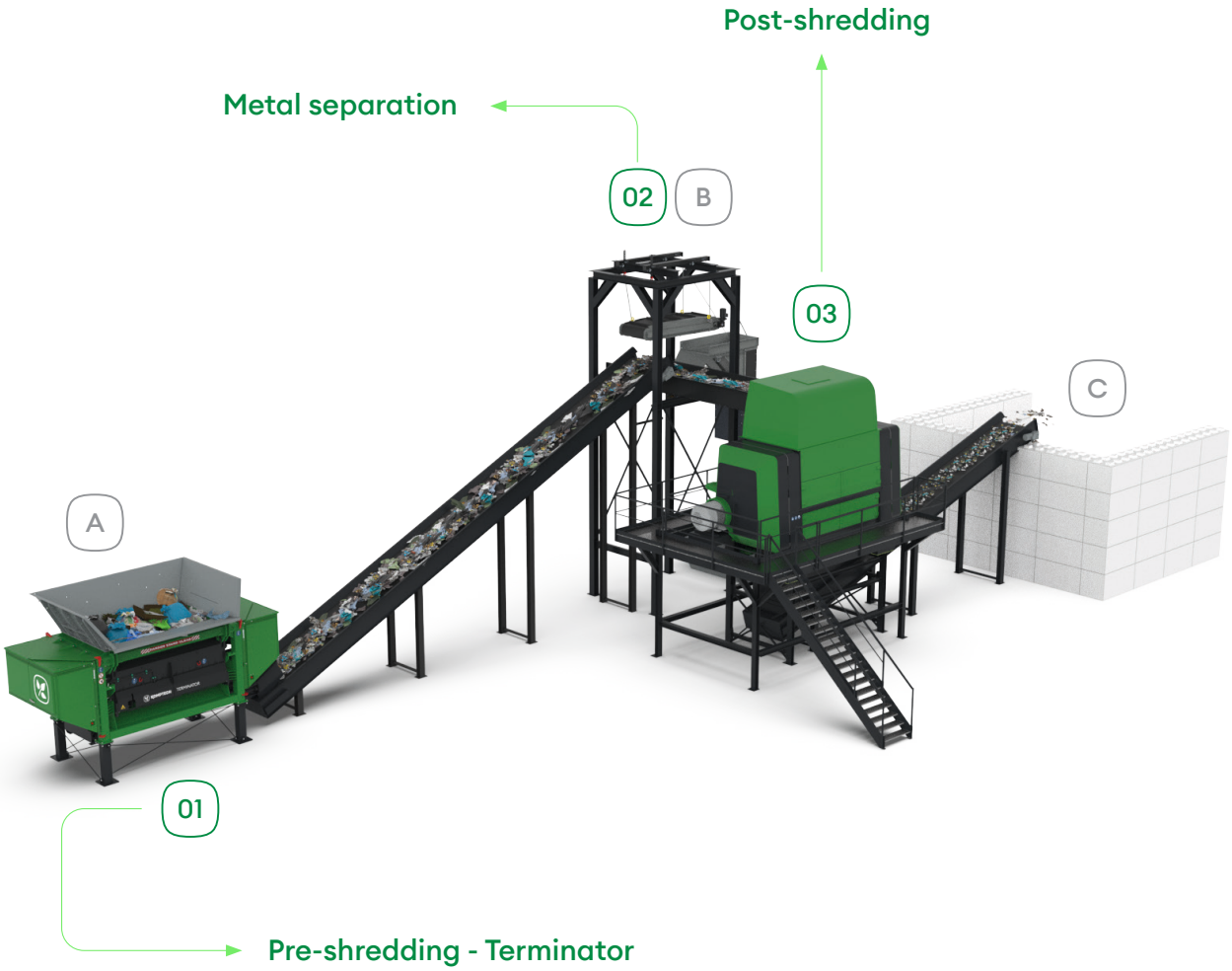
If needed, contaminants like items containing chlorine (such as PVC) can be separated out in a post-treatment step.

Refuse-derived fuels: primary quality

Making high quality substitute fuels

Waste streams that have already undergone processing, including the high-caloric fraction from mechanical-biological processing or appropriately preconditioned commercial and production waste, can be used to make high-quality substitute fuels. These fuel classes have high caloric values and low particle sizes.

As a rule, the processing described here consists only of pre- and post-shredding. If necessary, metal separation can be integrated into the process. This type of system can produce primary RDF for the cement industry.



A Pre-treated waste is loaded into the pre-shredder by front loader, mobile excavator or conveyor.

B After pre-shredding, metal separation removes ferrous recyclables while protecting downstream machinery from damage and wear.

C A post-shredder reduces the input material to the required particle size (typically 0-30 mm). The result is a primary quality substitute fuel.

SERVICE

The Komptech plus

Top advice

We'll show you how to optimize your processes, based on our experience and extensive data analyses.

All-in solutions

From individual mobile machines to complex stationary systems, with us you get the right process solution.

Service near you

Expert technicians are on-site quickly to make sure your machines keep running.

Productivity in view

Apps and integrated monitoring let you keep an eye on operating data and economy.

Spare parts always available

Intelligent stocking for the fast, economical provision of high-quality spare parts.

Need-based service

Our maintenance and service agreements, as well as extended warranties, are aligned with your needs.

KOMPTECH

Never waste an opportunity.

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We create value for you

Waste-stream expertise

Because you need a setup that is tailored to your waste stream.

Innovative technology

Because you need to adapt your output to your market needs.

Flexible sales models

Because you have the choice between new, rental and used machines.

Service excellence

Because you always need to keep your system running.