

Adaptable Thermal Decomposition Station

MADE IN
RUSSIA



Reduce waste disposal costs
with no harm to the environment



ASTRA

What is Astra

Adaptable
Thermal
Decomposition
Station

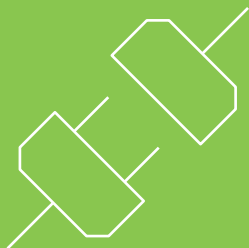
Astra is a unit that helps to save on waste disposal with no harm to the environment. Production waste or garbage from the landfill is loaded into the unit. As a result, environmentally friendly ash remains for secondary use, heat and electricity are generated.

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Astra's Features

Astra is installed at the landfill or connected to the technological line of the enterprise – no need to take garbage out anywhere.



It processes up to 5 tons of waste per hour without harmful air emissions.

Ash residue corresponds to the 4th–5th class of waste according to the Federal Classificatory Catalogue of Wastes (FCCW).

Exhaust gases correspond to SanPiN 2.1.3684-21 and GN 2.1.6.3492-17*.

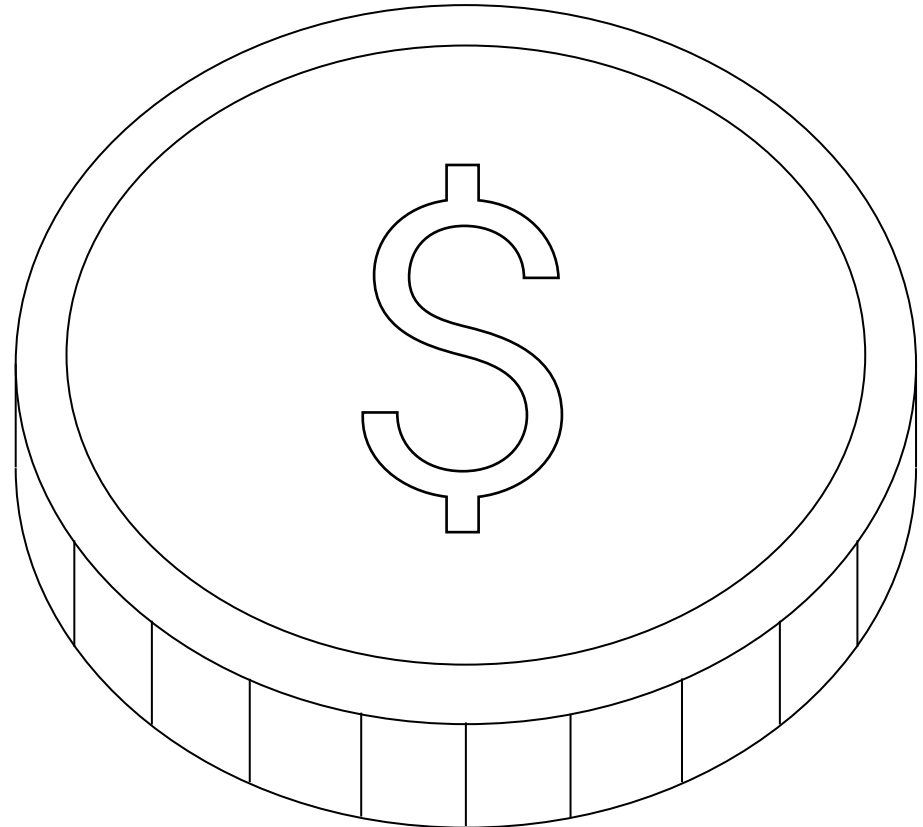


How Astra Helps to Save Money

Astra turns the problem of waste disposal into a great way to save up to RUB 9.6 million per month if purchased and 2.6 times if rented.

One ton of waste can be disposed of for an average of RUB 2,700 at St. Petersburg or Leningrad Region landfills including RUB 1,500 for waste collection and transfer to a landfill, and RUB 1,200 for burial.

There are indirect costs, for example, garbage trucks damage road surfaces, landfill waste pollutes groundwater adjacent to the landfill area in a large radius around the landfill body, makes the soil under landfills unusable for decades, and emits unpleasant odors.



Astra will pay off in less than a year

The unit processes up to 5 tons of garbage per hour. It can process 3,600 tons per month with round-the-clock mode.

$$\begin{array}{l} 24 \text{ hours} \\ \times 30 \text{ days} \\ \times 5 \text{ tons/hour} \\ \hline 3,600 \text{ tons/month} \end{array}$$

Astra reduces the amount of garbage by 100 times: the output is 36 tons of ash per month.

The remaining 3,564 tons of garbage do not need to be taken out and buried – they are completely recycled locally. Consequently, the savings on garbage disposal per month will be:

$$\begin{array}{l} \text{RUB } 2,700 \text{ /ton} \quad \leftarrow \text{rate*} \\ \times (3,600 - 36) \text{ tons} \\ \hline \text{RUB } 9,622,800 \end{array}$$

The unit can be rented

Instead of buying the unit, you can lease it, signing a service contract. You guarantee the loading of 5 tons of garbage per hour and pay for the processing of waste at a rate: for example, 1000 rubles per ton *. In a month, 3,600 tons of garbage are processed into 36 tons of ash. Even with standard landfill disposal, the cost of ash disposal will be:

$$\begin{array}{l} (3,600 \times 1,000) \\ + (2,700 \times 36) \\ \hline \text{RUB } 3,697,200 \end{array}$$

There will be a 2.6x reduction in disposal expenses.

Even more benefits

In addition to reducing disposal costs, Astra allows you to additionally save: It produces 2 Gcal of heat energy, sufficient to heat an area of 42.000 m2 for a month. It generates 700 kWh of electricity – one household consumes an average of 220 kWh per month. It lessens environmental pollution – the process has no harmful air emissions and the produced ash can be used to produce fertilizers or construction materials. The roadbed is not damaged.

What is Required to Operate

The unit works autonomously using some of the produced heat and electricity to maintain its operation, for example, for the rotation of electric motors, heating of garbage and functioning of the automation system.

Astra can be compared with a car.

The car is moving and its sensors, lights, and air conditioning system continue to function as long as there is fuel in its tank. Similarly, the thermal decomposition unit works as long as you feed a particular amount of garbage into it.

However, there are some restrictions, as with a car.




Start-up process requires electricity and gas bottles. In order to go into operation, the unit needs 50 m³ of bottled domestic gas, as well as 12 kW of electricity.

Like a car, you need a starter and a battery to get started. Bottles can be purchased from appropriate suppliers, and a diesel generator of the required capacity or the company's network can be used for power supply.



Garbage must be served continuously – at least 2 tons per hour. For the installation to function, it is necessary to recycle a minimum amount of waste. Like a car may stall if its fuel supply is cut off or drastically decreased.

A large, dark-colored industrial machine with a perforated metal front panel. The machine has the word "astra" written in white on its side, along with a circular logo. The machine is set against a dark background with a grid pattern.

**Astra is a completely
eco-friendly unit.
It uses a unique
technology of thermal
decomposition of garbage,
which has no analogues
in the world**

Our technology is
patented.
Patent of the
Russian Federation,
reg. No. 2459144

Our technology outperforms every existing method of disposal.

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Landfilling

The most widespread approach to waste management is also the least rational as it requires large territories for garbage storage, while hazardous substances penetrate into the soil and pollute groundwater.

Recycling

A method that turns waste into goods or houseware through reprocessing. The issue is that up to 50% of waste still remain unprocessed and needs to be disposed of in the same landfills.

Incineration

This method involves using open-burning furnaces, or incinerators. They solve the problem of landfills, but dangerous dioxins are released into the atmosphere during combustion. This pollutes the environment and is banned by many countries.

How Processing is Done

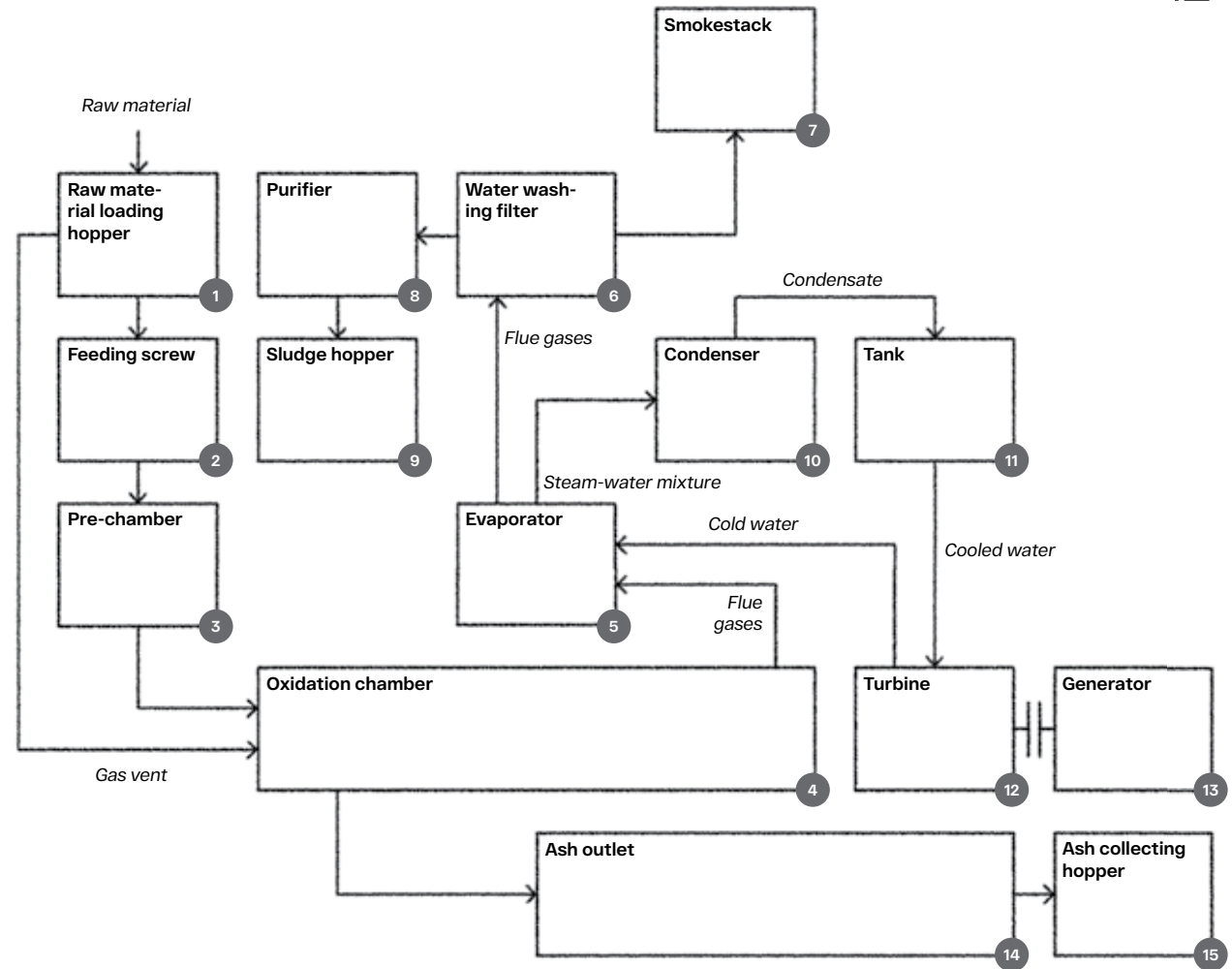
While processing carbon-containing waste decomposes (rather than being incinerated) under high temperature into safe components such as ash residue*, dioxin-free exhaust gases** and chemically pure water.

* Ash residue corresponds to the 4th-5th class of waste according to the Federal Classificatory Catalogue of Wastes (FCCW).

** Exhaust gases correspond to SanPiN 2.1.3684-21 and GN 2.1.6.3492-17. SanPin (sanitary rules and regulations) and GN (hygienic standards) – Russian state regulatory legal acts with descriptions and requirements of safe and harmless parameters for human health and its environment.

- The waste loaded into a hopper ①, gets into a feeding screw ②, where it is compressed and heated to 600 to 700 °C.
- The heated raw material enters the oxidation chamber ④, where the main chemical reaction of partial oxidation takes place. Oxygen is supplied into the chamber with simultaneous heating to 1,500 °C and rarefaction. This is done in portions: so that the raw materials do not burn, releasing harmful substances, but decompose into components.
- Carbon dioxide mixed with flue gases passes through a filter ⑥, where it is purified from impurities and finely-dispersed particles. As a result, the concentration of carbon dioxide released into the atmosphere corresponds to the Euro-6 class.
- Ash resulted from decomposition is moved by the screw and gathered into a separate container ⑮.
- The hot water from the partial oxidation process enters the evaporator ⑤ and is converted into vapor, which is then used to generate heat and electricity.
- The vapor is split into two streams. One stream is condensed and pumped through a heat exchanger, thus producing 2 Gcal of heat per hour. Another stream is treated and fed to a turbine, ⑫ which drives a generator, with a minimum electricity output of 700 kWh.
- The process repeats: the exhaust vapor flows back into the evaporator ⑤.

1. The loading hopper is designed for loading the raw material.
2. The feeding screw is used to move the raw material into the pre-chamber.
3. The pre-chamber is intended for preheating of the raw material.
4. The oxidation chamber is designed for high-temperature decomposition of the raw material.
5. The evaporator is designed for vapor formation.
6. The water washing filter is designed for purification of flue gases.
7. The smokestack is designed for discharging flue gases.
8. The purifier is designed for filtration and discharge of finely-dispersed soot particles into the sludge hopper.
9. The sludge hopper is designed for collecting finely-dispersed particles.
10. The condenser is designed for converting vapor into liquid.
11. The tank is designed for collecting condensate and its subsequent supply to the high-pressure zone of the turbine for generator rotation.
12. The turbine is designed for transferring torque to the generator.
13. The generator is designed for generating electricity.
14. The ash outlet is designed for removal of ash residue.
15. The ash collecting hopper is designed for collecting ash residue.



Technical Characteristics of the Installation

The cost depends on the configuration. Contact us for a calculation.

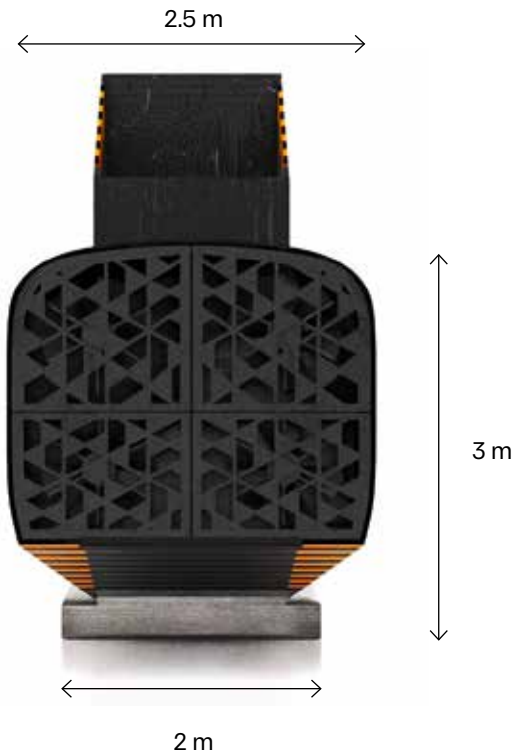
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12.5 m



9.5 m

Curb weight without raw material loaded is 12 tons

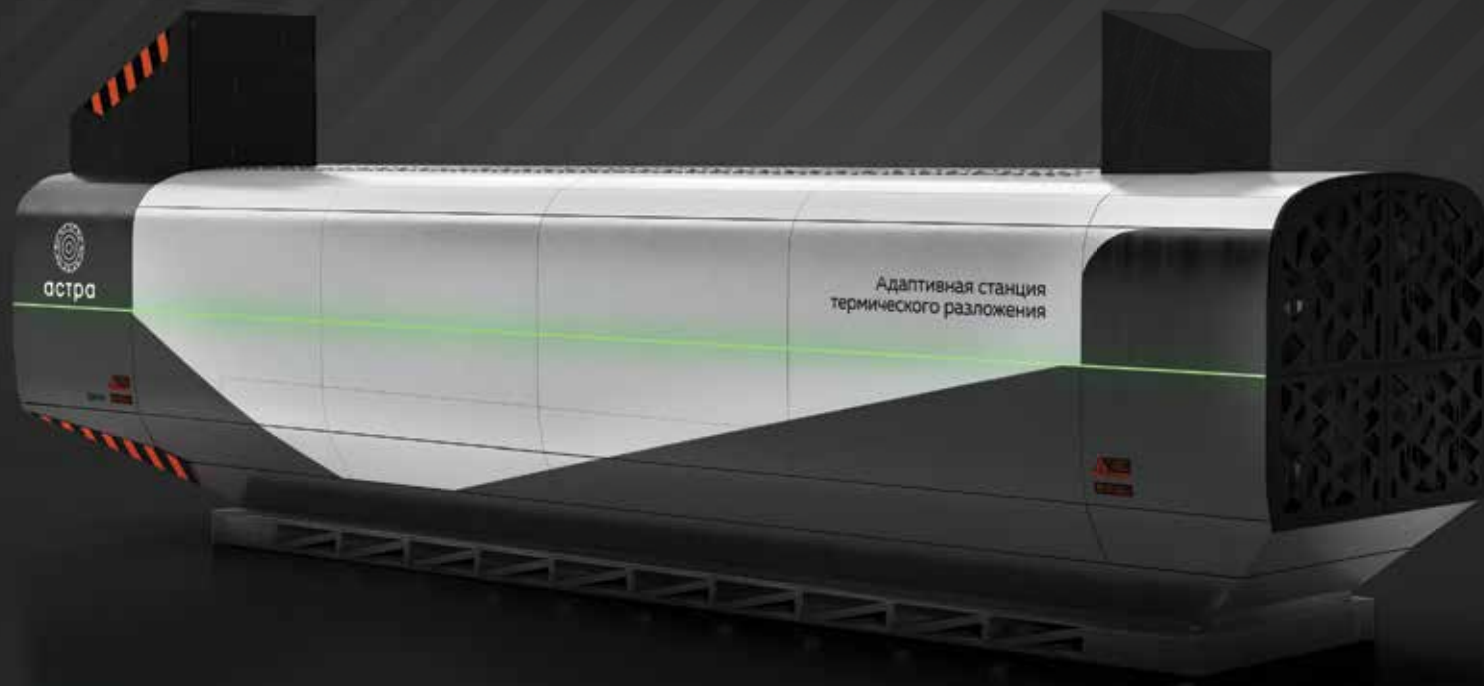


Nominal volume of loaded raw materials	5 tons/hour
Minimum volume of loaded raw materials	2 tons/hour
Electricity consumption	5–15 kW
The volume of waste produced* in proportion to the volume of processed raw materials	From 1:50 to 1:100
Service life	10 years
Duty cycle	Continuous
Number of start/stop cycles during the design service life, maximum	
Vertical (B):	50
Horizontal (Y):	40
Operating temperature conditions	-50 to +50 °C
Generated heat energy	2 Gcal and more
Electricity generated by processing 5 tons of raw material per hour	700 kWh and more
Personnel required	2 operators per shift
After-sales service	Once in 340 days with complete shutdown and start-up

*4- and 5-class ashes according to FCCW.

**We designed Astra
to be convenient to
transport and use**

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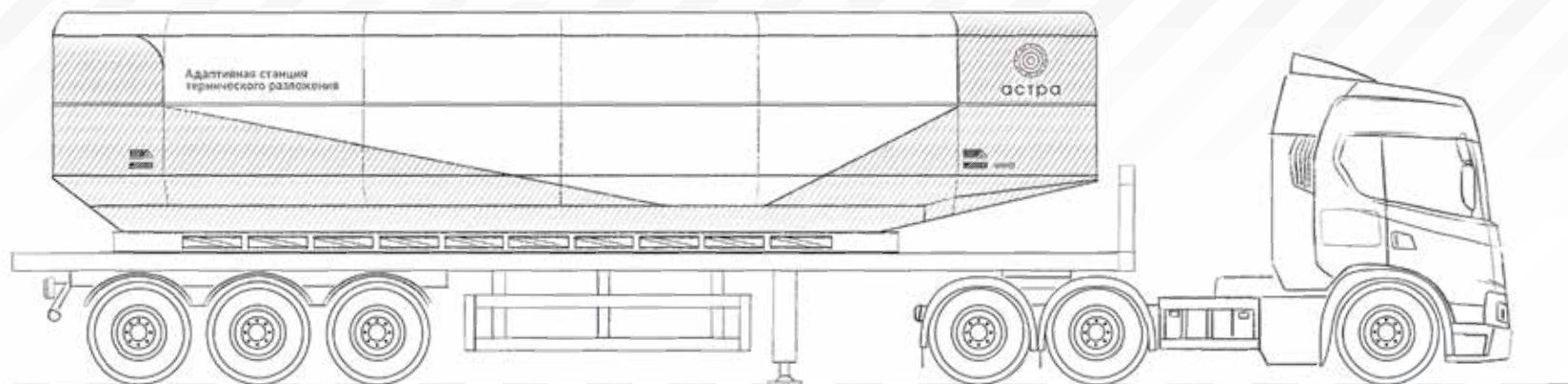
Transportation

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Astra is easy to transport.

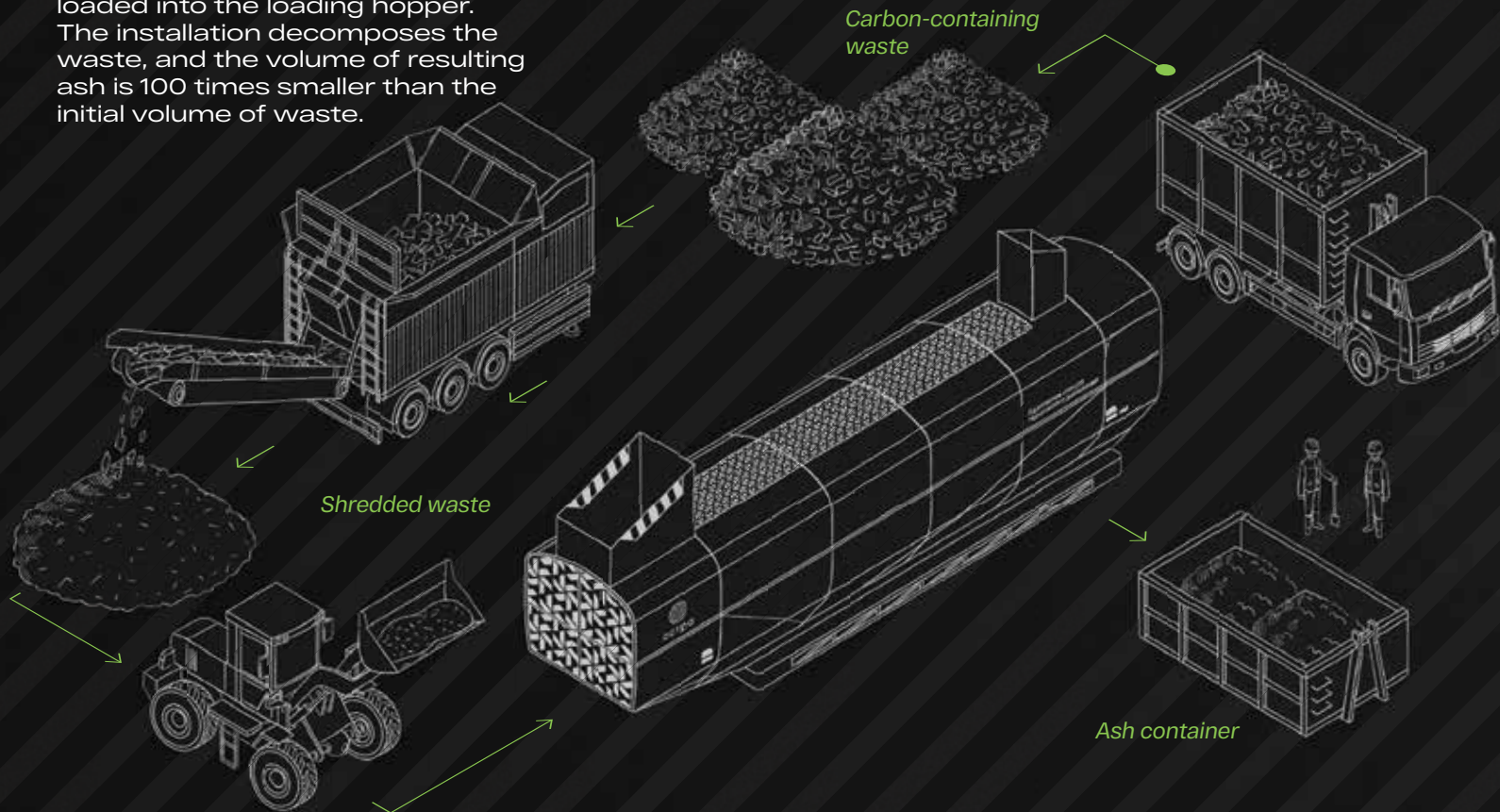
Its dimensions correspond to the dimensions of a standard 40-foot container, so a regular truck is suitable for transportation and special permits are not needed.

One truck carries the unit itself, the second – pipes, other attachments, fans, electrics and sensors. The third truck transports the headquarters – the block unit to control Astra.



Astra on a landfill

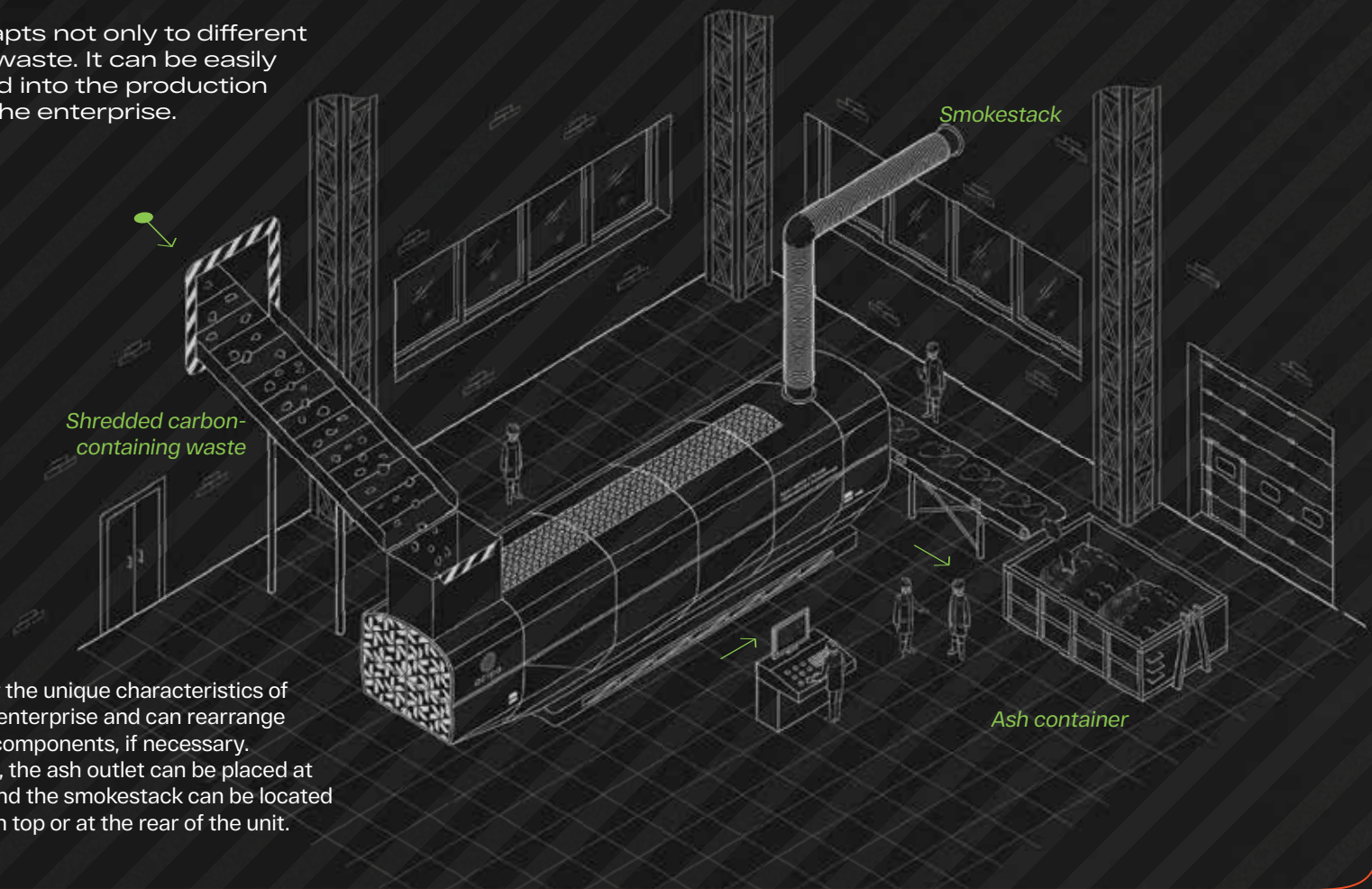
The carbon-containing waste is shredded with a shredder and loaded into the loading hopper. The installation decomposes the waste, and the volume of resulting ash is 100 times smaller than the initial volume of waste.



Astra at the enterprise

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Astra adapts not only to different types of waste. It can be easily integrated into the production chain of the enterprise.



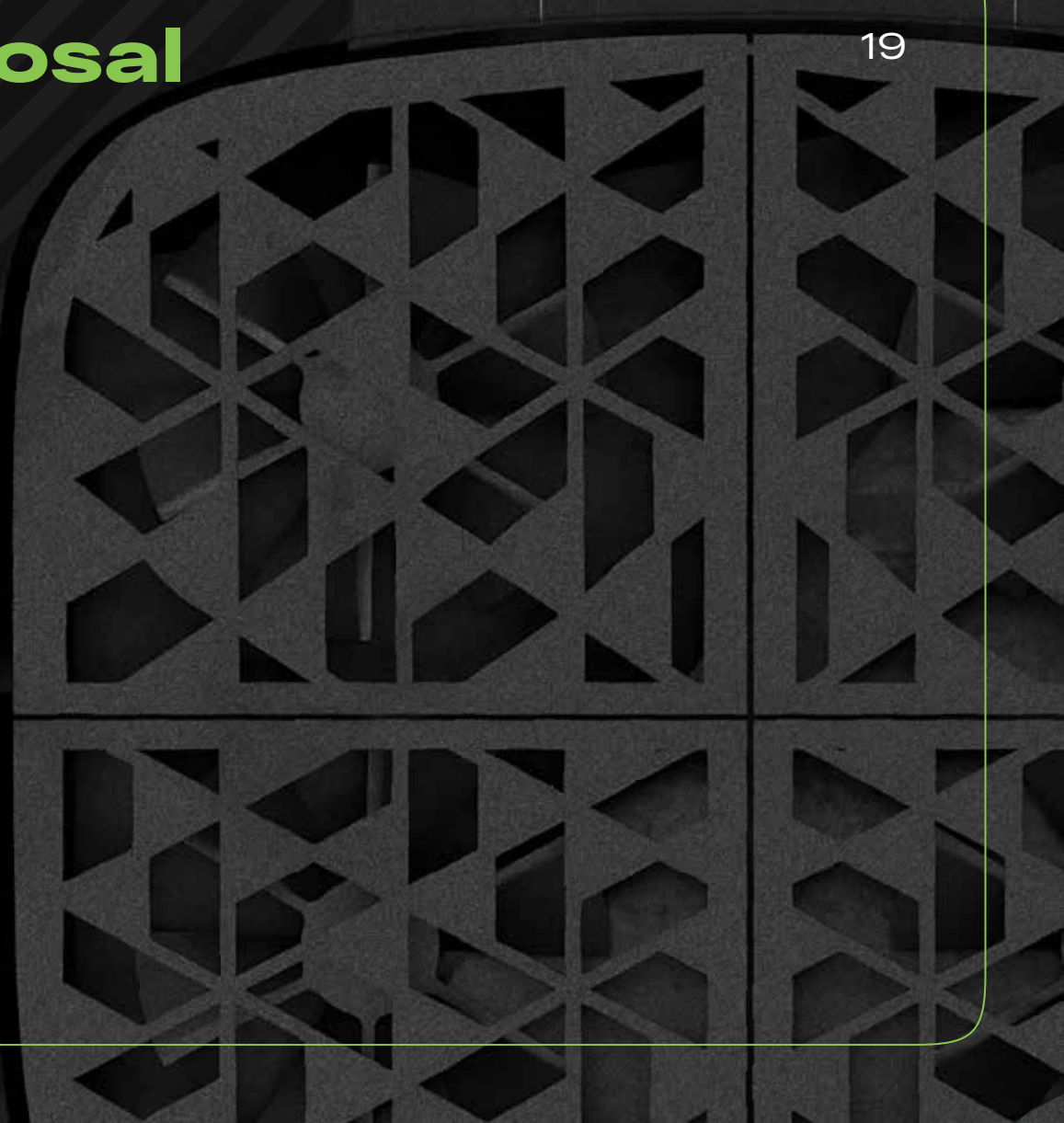
We consider the unique characteristics of a particular enterprise and can rearrange installation components, if necessary. For example, the ash outlet can be placed at either end and the smokestack can be located anywhere on top or at the rear of the unit.

Waste Disposal with Astra

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Astra reduces the environmental impact and costs associated with waste disposal several times over.

After processing, the resulting ash can be used, for example, as a mineral soil fertilizer or in construction mixtures. The heat generated in the process can be used to heat your own premises.



The installation will be useful to the owners of landfills, as well as waste processing and incineration plants.

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To landfill owners

The more garbage is at a landfill, the higher the environmental pollution and fines are.

If the volume of waste exceeds regulatory requirements, the landfill will have to be closed.

Astra processes not only all incoming garbage, but also already stored – the size of the landfill body will decrease, since the volume of ash remaining after processing is 100 times less.

At the same time the issue of garbage harmful impact is being solved.

For instance, plastic, which is among the most environmentally damaging materials, can be recycled completely.

To waste processing plants

Rejects are an unavoidable part of garbage processing – up to 50% of waste has to be dumped in a landfill.

This incurs an additional cost to the business.

Astra can be installed on the territory of the plant. This will reduce the cost of transporting garbage – the rejects will be processed on site.

To waste incineration plants

Waste incineration process requires continuous consumption of fuel oil, diesel, or natural gas.

Harmful substances like dioxins are consequently emitted into the atmosphere. As an autonomous unit, Astra needs no external power source.

Exhaust gases that are released during processing contain no dangerous pollutants and comply with environmental emission regulations (SanPiN 2.1.3684-21 and GN 2.1.6.3492-17)*.

* SanPiN (sanitary rules and regulations) and GN (hygienic standards) – Russian state regulatory legal acts with descriptions and requirements of safe and harmless parameters for human health and its environment.

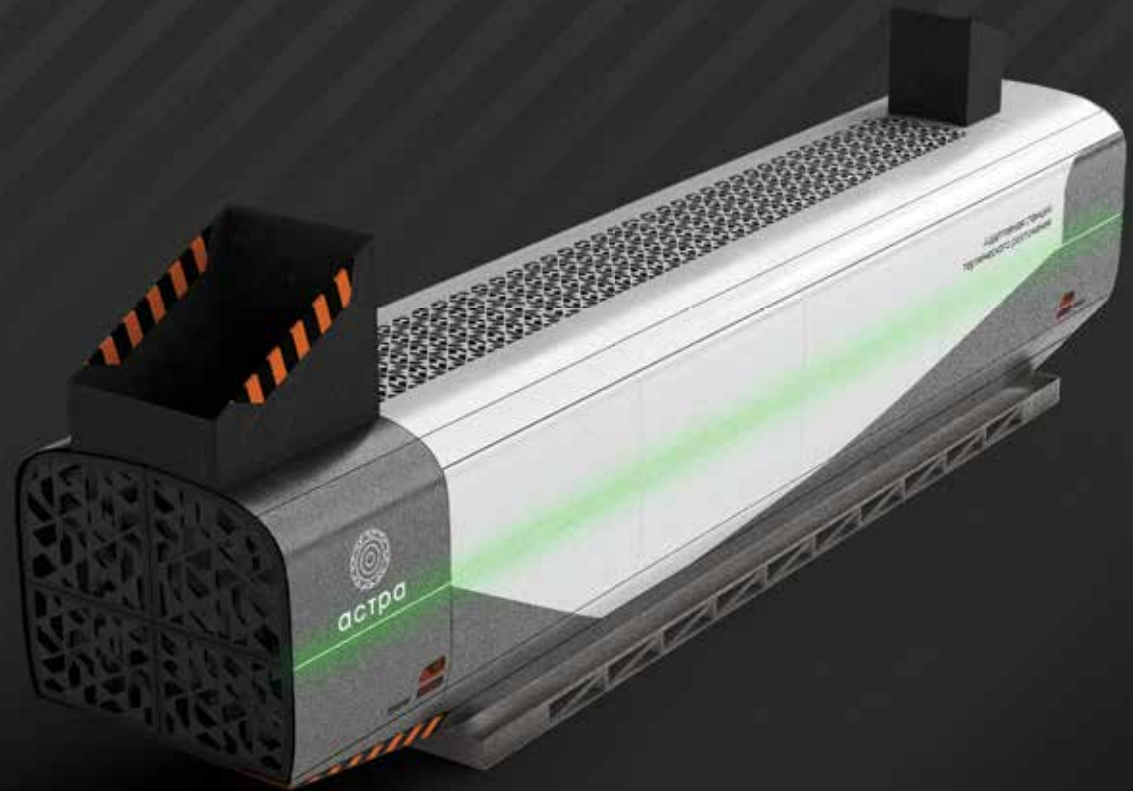
Remediation of Landfills with Astra

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Using Astra for remediation purposes looks as follows: the unit processes the loaded raw materials on a 24-hour basis and the output is environmentally friendly ash and thermal energy that can be used.

All the waste will eventually be recycled, and the entire area will begin to adhere to environmental standards.

We will take care of all stages of remediation – from transportation of the installation to the landfill to maintenance and environmental impact assessment



Astra can assist in transforming a packed landfill into a desirable location for investment

Profit rather than expenses

Instead of landfill maintaining expenses the region will receive a cleared area, attractive to investment, which will help to create additional jobs.

Region attractiveness

Absence of waste deposits adds to the attractiveness of the region. People prefer to reside in areas free of the offensive smell of an overloaded landfill.

Healthy environment

Any landfill is a source of pollution. Decomposing waste releases toxic compounds into the atmosphere and seeps into the soil, poisoning groundwater. These damages are considerably lessened by remediation.

About us

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We have been in the waste disposal business since 1991. Having started with waste disposal, today we are developing innovative solutions in the field of environmental engineering. In the first few months of our work, we noticed how ineffective and unsustainable waste disposal practices in Russia are. This revelation has influenced further development of our company.

We started raising the skill levels of our employees and invited experts from other sectors of the business. We have optimized the current logistics processes and developed new ones.

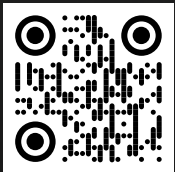
The key decision was to rely on an innovative approach to the problem and involve scientists in cooperation. In the last ten years, we have not only developed commercial areas, but also engaged in survey work and research activities.

Together with scientific and technical institutes and advanced design bureaus, we have been working on effective solutions in the field of sorting, neutralization and disposal of waste. Astra, a cutting-edge unit for thermal decomposition of waste, is the product of this effort.

With business and science working together, it combines brand new technologies and infrastructure approaches in environmental engineering to reclaim, maintain and preserve the environment.



ASTRA



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