Compost Systems

2026 Edition

INTERNATIONAL

COMPO news

Agriculture in transition

Biological waste treatment in Slovakia

The new TracTurn HD is here!

www.compost-systems.com

Dear readers

On some days, it is difficult to keep the faith. It seems that, once again, might is right. Truth is becoming something that some people bend to suit their own ends – especially those who can afford it. Even the history books are being rewritten – a trend very much in keeping with Pippi Longstocking's motto: "I make the world the way I like it!" The reality is that we are now in the fifth year of the war in Ukraine, and Europe is in the grip of a three-year recession. On the international stage, environmental issues have apparently receded to the "insignificant" category. And yet we must continue to find fresh motivation every day to carry on working for the environment. Because there is still a lot to do.

With that in mind, however, I would also like to offer some measure of reassurance. A few years ago, I had an interesting conversation with the manager of a very large US corporation. He made a statement that, to this day, I have never forgotten: "The fact is that Europe has had to reinvent itself time and time again over the past several thousand years." Europe has survived the Catholic Church, the Romans, two world wars and many other challenges. We have certainly had our share of madmen in positions of power – and, if I may say so, some are still there today. But Europe has always managed to overcome the crises of the time and to rise successfully to its challenges, even if sometimes more slowly than expected. The chances are very good, therefore, that Europe will not shirk its responsibility to take the problems facing our environment seriously.

And even if many no longer take climate change seriously, the responsibility Europe bears here is truly great. Climate change is very real, and it will leave its mark on our agriculture as we know it. We live in a society that could surpass the 10 billion mark within this century, and sooner or later we will have to accept that our resources are finite. Particularly where our food is produced, we should act with caution and foresight – no matter what childish minds, fanatics, denialists or people with "other" interests try to make us believe. Unfortunately, soil is a finite resource, and it is our duty as a society, as farmers and as industry to respect this fact and act accordingly. I am pleased to see that the vast majority of our friends and associates continue on their path undeterred. Success proves us right! With that in mind: Even if it is sometimes difficult to find the courage to go on, nobody ever said it would be easy. But it is genuinely important that we all do our part to make our environment, our soils and our livelihoods a little better each day.

Aurel Lübke
Managing Director Compost Systems GmbH

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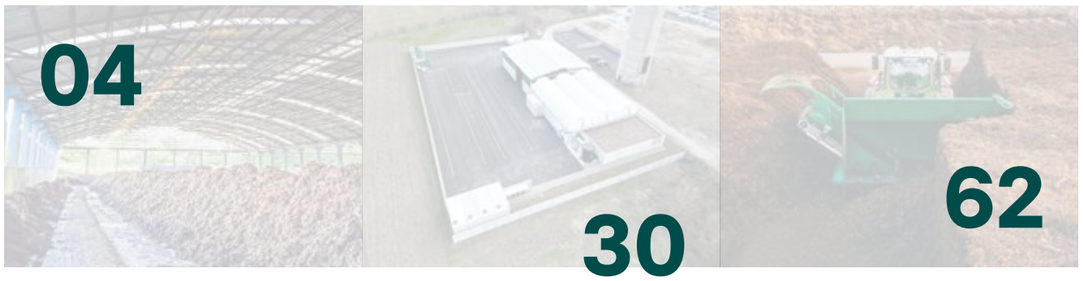

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To improve readability, we refrain from using the gender forms male, female and diverse at the same time. All references to people apply equally to all genders. Errors and omissions excepted. Subject to printing errors.

Where are you headed, farmer?

Agriculture in transition

Photo above © Mark Stebnicki / Pexels. Photo below © EnsearchofYou */ Pexels.

Agriculture has changed significantly in recent years. If we go back as far as the age of industrialisation, we can see that fundamental opportunities emerged, some of which were put to excellent use.

Whereas in the post-war years a tractor still had an output of 15 or 20 hp, today it is an intelligent, GPS-controlled machine capable of operating autonomously. Another example is robots that use AI to weed fields or milk cows. We have also achieved remarkable things in livestock farming: Animals that can move around freely, even on large farms, and no longer have to spend their lives confined in the smallest of spaces. Cows that can scratch themselves and produce twice as much milk as they did just a few decades ago. All of these achievements are the result of research, development and the evolution of agriculture. When it comes to the use of manure, however, there is still considerable scope for optimisation in agriculture. Facing the prospect of one day having to feed a world population of 10 billion, the focus for many for a long time was on production. But the fog is slowly beginning to lift, and as a society we are realising that unsustainable agriculture can very rapidly lead us to the brink of social collapse.

Technology, working methods, livestock farming and culture are changing worldwide, and with them the way we practise agriculture.

Photo left © Carol Highsmith's America / Unsplash.
Photo right © Polina Zimmerman / Pexels.

A different picture in Russia and the USA

A frequently cited example of a critical development is the shift in global politics as it affects fertilisers. The consequences for agriculture were already clearly being felt when Putin first attacked Ukraine in 2014. Nevertheless, the capacity of the fertiliser industry in Russia was expanded considerably between 2014 and 2022. When the EU finally imposed an embargo on Russia, the severe upheaval this caused was not limited to the oil, gas and ore sectors; Russia had become a major exporter supplying large parts of the world with urea, potash and other fertilisers. This gave rise to serious problems: Countries such as Brazil, or entire continents such as Africa, suddenly realised how dependent they were on a single supplier. Unfortunately, Europe is also dependent on imports for oil. And oil is, after all, the raw material from which nitrogen is obtained, albeit indirectly, using energy to bind nitrogen from the air.

Potash and phosphorus are likewise mining products that we largely have to import into the EU. The fact that an Austrian farmer must already invest an average of 30% of production costs in fertilisers is a clear sign of dependence on an industry that is itself almost entirely dependent on imports from outside the EU.

What we see, therefore, is that the global economy has become more vulnerable and, above all, more self-interested, and that Europeans, who make up just 1/16 of the world's population, are highly susceptible to pressure, whether through energy, rare earths, a handful of other raw materials, or fertilisers.

Only cow manure always stays the same.

Photo © Jörn Heller / Pixabay.

Interestingly, the EU continues to increase the recyclability of products and consumer goods, in some cases at exorbitant expense. One example is our beloved weekend pastime of reclaiming the 25-cent deposit on PET bottles, or the requirements imposed on the automotive industry to make cars recyclable, while cheap products from the Far East flood the markets. In agriculture, by contrast, we are still more or less at the level of 1850 when it comes to the recycling of fertilisers. Of course, slurry pits have been enlarged, and the rules governing the spreading of slurry and manure have been regulated according to the season. But by and large, the way in which we manage soil fertility within the cycle has changed only minimally.

Taking stock

In fact, the globalised world has taken different paths in different regions. While in Europe livestock breeding and agriculture have remained more or less inseparably linked, in other parts of the world livestock breeding has become completely detached from cultivation of the land. Whether that is good or bad is open to question, because in truth what matters is not the context in which land is used for production or food security or who owns it, but solely what is actually done with it.

In Austria, we proudly hark back to a tradition of hundreds, if not thousands, of years. On many, if not most, farms, a wall bears a family tree tracing the lineage back to a year before 1492.

Let us look at the USA: There, livestock farming became detached from agriculture many decades ago. Across the vast expanses of Illinois, hardly a single cow is to be found, while just one state further north, Wisconsin is home to 1.2 million cows – the highest density of cows anywhere in the world. This leads to unmistakable problems caused by the long-term over-fertilisation of land with farmyard manure, as well as major problems in Wisconsin's many lakes, extending even to drinking water contamination caused by nitrate leaching into the groundwater.

In other parts of the world, the situation is different, but not always better. With its rapid growth, Asia in particular has expanded the food sector considerably over the past few decades, and done so with great confidence. Here too, livestock breeding has become largely dissociated from agriculture.

Agriculture presents a somewhat different picture across large parts of Africa, as well as South America. As the example of Ethiopia shows, two thirds of the population in parts of Africa still struggle as smallholders with an average farm size of less than 2 ha for a future in agriculture. But they are poorly armed to hold their own against global industry that relies on technology, large-scale organisational structures and stock-market investors.

In fact, the Netherlands has been the only European country, at least for a time, to pursue a separation of arable and livestock farming. Favoured by its advantageous geographical location in the hinterland of Rotterdam, not only was soya shipped onwards eastwards into the EU, but fully reared pigs as well. Interestingly, it is once again manure, to a large extent, that has thrown a spanner in the works of this initiative. The Netherlands simply does not have enough land to "digest" all the animal excrement. So, exports continue to this day. The only arguable improvement is that, whereas in the past slurry as such was transported over 500 km to eastern Germany or even as far as Poland, today it is increasingly biogas digestates that are transported hundreds of kilometres into neighbouring countries.

The obvious conclusion is that the problem is not one of farm size, structure or the legal framework. Rather, we need to fundamentally rethink the way we deal with the most valuable asset on our planet – the fertility of our soils, their nutrient supply from the natural cycle, and their adaptation to a new era of unpredictable rainfall, extreme weather events caused by climate change, and political discord.

The problem

Although we now house many times more animals in a single barn, the way on-farm manure is managed has seen little change. Simply installing biogas plants in some places cannot solve the problem. On the contrary, it may even exacerbate the problem considerably. The fact is that the natural nutrients we collect in slurry tanks only deliver long-term value in the field if they are transformed accordingly. Let us simply call it humification. However, humus formation is impossible with anaerobic bacteria found in a biogas plant. In fact, after passing through a biogas plant, the majority of the nutrients are present in the form of water-soluble fertiliser. Ideally, we can then apply this fertiliser in much the same way as commercial fertiliser, feeding it "straight into the plant's mouth". But everyday practice shows that this does not always work quite so well. A case in point: Slurry storage capacity!

The soil needs a certain amount of carbon, firstly to feed the bacteria that live in the soil and do their work there, and secondly to build humus, around 70% of which consists of carbon.

In fact, the biogas sector has so far tended to overlook the issue of digestate. What really matters is gas yield. A great deal of attention has certainly been paid to optimisation. Incredible technologies have been developed that enable us to upgrade biogas to highly purified natural gas. At the other end of the process, however, is the digestate tank, the necessary evil that collects the residual material that, sooner or later, we "DISPOSE OF" on a field!

The challenge

This is where the problem already becomes apparent: The solutions are transferable only to a limited extent, if at all. While in Europe the broader structure of agriculture tends to call for decentralised solutions, the challenge looks quite different for larger farms with high livestock densities and little or no agricultural land.

Agriculture in Europe today is struggling with labour shortages. In many cases, the very idea of an efficient manure management programme is already doomed to failure because of the lack of available labour. If robots are already being used to collect the manure behind the cow, the operator will not necessarily be interested in labour-intensive downstream processing.

In industrial agriculture, by contrast, entirely different considerations come to the fore: standardised and reproducible products, transport routes, shelf life, emissions, certificates, the carbon footprint in general and, above all, the question of economic viability.

And yet the goal remains the same for all stakeholders: We are trying to close the nutrient and carbon cycle while minimising loss and to create a product that does not spread animal diseases or weed seeds. A product that does not first have to be "digested" in the field, but arrives in finished form – not water-soluble, but exclusively plant-available. A mixture of carbon and nutrients with bacteria that we refer to as humus or, more precisely, nutrient humus.

A uniform process

From a purely microbiological point of view, the process is in fact the same for everyone. We start with a more or less homogeneous mixture of undigested raw biomass – with or without the necessary additional structural material or an upstream biogas process. What we are looking for here is a mixture containing around 60 % water and plus/minus 40 % pore volume.

In the initial degradation phase, we establish an aerobic process, in other words an oxygen-driven process, in order to break down the raw organic materials. In the phase that follows, the nutrients are oxidised and stabilised. In technical terms, this process is described as binding the nutrients and combining organic and mineral substances to form a stable product called humus. All that remains then is to make it suitable for storage and wait for the optimum time for application.

However, from the user's perspective, the process actually involves two completely different objectives. For a product in which long-term fertilisation is the main priority, the objective is to bind as many nutrients as possible while ensuring particularly high plant compatibility. On the other hand, we are talking about nutrient-intensive top dressing that is immediately available to a crop and, much like intensive chemical fertilisation, can easily be leached out. Here, the focus is on the fertiliser's ability to retain nutrients well, so that as many nutrients as possible are supplied to the plant rather than the groundwater.

The role of Compost Systems

As an engineering company operating at the cutting edge between industry and research, our first task is always to identify problems and find the best solutions. That is why, with the newly revived trend in agriculture among operators large and small towards efficiently closing internal fertiliser cycles, we are right at the heart of current developments and actively seeking the most efficient solutions in order to make our contribution to sustainability.

Successes in practice

As a time-tested example, windrow composting is perhaps the first method worth mentioning here. It has proven effective for many years in both conventional and organic farming. Also known as the **CMC process**, it gives farmers a simple means to upgrade their fertiliser. However, we have further developed our technology in this area as well. One example is the **Earth Flow System** as a fully integrated solution. As an integrated part of the manure store behind the barn, **Earth Flow** can transform the manure produced directly into compost with minimal labour input – in effect automatically – and without the need for emission-intensive interim storage.

Naturally, the system is subject to physical limits. Roughly speaking, such a system is economically viable for 50 to 200 cattle or the equivalent quantities of horse, sheep, goat or chicken manure. If the volume is significantly greater, other solutions may also prove competitive.

In the palm oil industry, around 3 tonnes of liquid waste are generated for every tonne of solid waste. With optimised process control, the water can be evaporated within the process itself. What remains are the nutrients, carbon and minerals in the form of biofertiliser – or, as we call it, high-quality compost!

However, Compost Systems now also has more industrialised solutions for animal waste in its portfolio in the form of integrated system solutions. Here, considerations other than the actual challenges have come to the fore. Whereas in Europe some form of biogas plant is involved in most cases, outside Europe the focus tends to be more on the efficient utilisation of fertiliser or resources and on reducing transport weight by dewatering the product. One example here is the palm oil industry, for which we were already able to plan and build our first large-scale plants more than ten years ago. If mass is reduced by more than 90 %, transport costs are naturally reduced by more than 90 % as well – enough to put a smile on any business economist's face.

But the issue of water evaporation is not limited to the palm oil industry. Wherever we are dealing with digestate, the fight against water is on. One additional difficulty in the use of digestate is that we have little structure and, with it, little energy. Because the energy content of the raw product is directly linked to its potential drying performance, the key lies in making the best possible use of the available energy. The aim is to reduce the need to mix in energy-rich material, optimise evaporation performance and speed up the process so that a marketable product can be produced within a short time and with as little loss as possible.

In some cases, the moisture content even has to be reduced to below 30 % in order to enable further processing steps such as pelletising or granulation. Similar challenges arise in the processing of chicken manure. Manure from egg production in particular is typically very wet and needs a lot of "love" – or, more accurately, a lot of air – to get rid of the water.

Here, digestate is transformed together with other waste and straw into a high-quality compost fertiliser within 6–8 weeks.

In all these cases, from slurry drying through to the drying of digestate or chicken manure by means of a biological process, two conditions must be met: the conversion of water into water vapour and its removal. We can achieve both – with AIR. While our exhaust air acts as the transport medium by which the water leaves the material, the oxygen it contains activates the biological processes carried out by our bacteria. At the same time, additional hurdles may well arise, ranging from active wastewater or exhaust air treatment to the recovery of nitrogen from the exhaust air.

At present, Compost Systems is implementing treatment capacities for farmyard manure equivalent to around 70,000 LSU (livestock units) in Austria and abroad.

Here, pressed slurry, digestate and other agricultural waste are processed into a high-quality fertiliser.

As part of a production process, compost can also be further processed into standardised fertiliser granules or fertiliser pellets. The granulate is made from composted horse manure.

Conclusion

Agriculture is changing. Not only the pressure to become more sustainable, but also the potentially existential struggle to reduce dependence on third countries or fossil energy, together with continued consumer pressure in the direction of sustainability, make it imperative that the agricultural sector close fertiliser cycles efficiently and sustainably.

In some European countries, sustainable farm management has already become a criterion in banks' lending decisions. In the Netherlands, the issue of sustainability in fertiliser management is already forcing many farms to close down.

Any real change or solution to the problem involve upgrading "MANURE" as an organic fertiliser, with as little loss as possible, into a soil-compatible product that does not enter the groundwater, is available to the next crop and, if not needed, is stably stored in the soil as humus. Biological stabilisation in efficient facilities is an economical and goal-oriented solution. Successfully implemented projects testify to the possibilities available for closing nutrient cycles efficiently. Upstream biogas plants do not exactly make the job any easier, since what arrives downstream is not extra energy, but extra water; nevertheless, successful projects show that efficient planning and implementation can also lead to success in such cases.

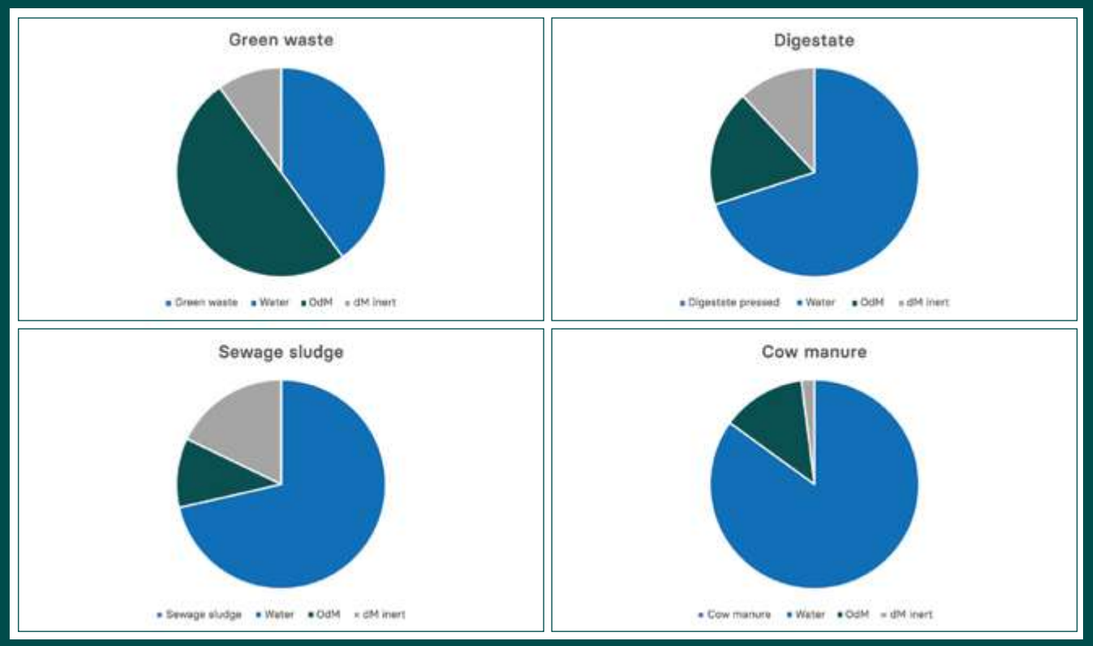
Water in the compost cycle

Too wet – what now?

There appears to be an international trend towards ever wetter raw materials. Biogas technology, for example, always operates under very wet conditions, but slurry, sewage sludge and other types of manure are also becoming increasingly wet. How can we understand and best deal with this new challenge?

Chicken manure from laying hens, digestate from anaerobic digestion, slurry from cattle or pigs, even sewage sludge or industrial sludge – they all have one thing in common: They are wet and have little structure. To make matters worse, the remaining pore volume is also filled with water. As a result, anaerobic conditions are difficult to prevent, and putrefaction is the consequence. As we know from biogas plants, the anaerobic process is only minimally exothermic and therefore produces very little heat. Instead, it produces CH_4, or methane, which is of no use to us whatsoever in aerobic treatment. But let us take a step back to the basics: To understand the problem better, we should take a closer look at the composition of the various raw materials.

It then becomes clear that the ratio between degradable organic matter and water content is drastically out of balance. This means that, particularly in the case of sewage sludge and/or digestate, but also cattle manure, it becomes impossible to mobilise sufficient energy from the proportion of available organic raw materials to achieve the necessary evaporation performance. It is therefore necessary to add structural material. This not only provides feed for the microorganisms, but also creates structure, allowing the microorganisms to be supplied with oxygen. Is screened oversize, for example, suitable as a structural material? Probably not, because screened oversize consists almost exclusively of lignin, so degradation proceeds with the brakes on, as it were. Straw or freshly shredded green waste are much more suitable choices here.



A key factor in biological drying is the ratio between organic dry matter and water. Only the organic matter can be broken down. Each tonne of degraded organic matter releases roughly enough energy to evaporate around 6 tonnes of water. If this energy is insufficient, the water remains in the product. Without enough structure, there is not enough oxygen. Without enough oxygen, energy cannot be mobilised – and the material remains wet!

As a rule of thumb, it can be said that from a density of 650 kg/m³ upwards, it becomes difficult, if not impossible, to achieve an adequate oxygen supply within the material.

Of course, climatic correction factors also apply. If, in summer, a plant can additionally use the sun's thermal energy, or if a dry Saharan breeze is blowing, this can indeed have a positive effect on evaporation. A cold winter, by contrast, will tend to have an adverse effect. Condensate returning to the process can certainly reduce winter performance levels. In unventilated windrows, the process can in some cases come to a complete standstill during the winter.

It should be noted here that, as an engineering company, we never work without active aeration in facilities where there is a high demand for water evaporation – if only for the simple reason that the dehumidification process depends greatly on the removal of water. This happens almost exclusively through water vapour, and the transport medium for that water vapour is, in turn, air. The controlled addition of air is indispensable for making the process controllable, reliable and manageable. This also shortens the composting time and, above all, makes it predictable.

Did you know, by the way, that every m³ of air escaping a compost heap at around 60 °C carries away approximately 150 g of water? If, by contrast, we are talking about saturated air at 25 °C, that figure is only around 20 g/m³ of air that we can remove. At 40 °C, the value increases to roughly 40 g of water per m³ of air.

At the Tripoli plant, digestate from residual waste is dried and stabilised. Only once the material is dry enough can it be screened and subjected to further treatment.

Can I accelerate evaporation by turning more frequently? The answer is quite simple: If you had a structurally rich raw product, frequent turning would do little or no harm. But if we are talking about structurally poor digestate, sewage sludge or cow manure (or straw as a structural material), excessive activity leading to the breakdown of structure should be avoided as far as possible. Otherwise, what you produce is not compost, but "mush". *So, when it comes to turning: as often as necessary, as little as possible!* In such cases, we recommend turning around 1–2 times per week; over the course of one complete process cycle, around 5–10 times.

Digestate is processed in combination with a small quantity of straw and other types of manure. In around 6 weeks, a large part of the water is evaporated, and the compost is stabilised and made saleable!

Conclusion

For a variety of reasons, we are increasingly having to deal with very wet raw materials in composting. The drying process is actually very similar to the composting process. The key difference is that, in the drying process, the focus is much more strongly on active and optimised process control.

The ratio between aeration and turning changes in order to promote the drying process and make the best possible use of the microorganisms' energy. Actively controlling the air supply is just as crucial as keeping turning to a minimum when it comes to preserving structure – and therefore oxygen supply – for as long and as efficiently as possible.

Plant expansion in Austria

Seiringer composting plant

Wieselburg, Austria

An aeration line at the composting plant.

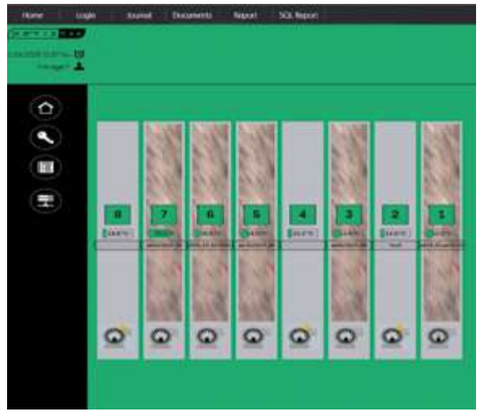
The composting plant operated by Seiringer was built in 1989 and, in 1996, was one of the first plants in Austria to be fitted with our aeration system for aerobic composting. In 2006, composting was expanded to include a second composting area. In addition, the plant was expanded to include a soil blending facility and biomass processing.

Direct link to
the online reference

The next phase of expansion is now scheduled for 2026. The retrofitting of three additional aeration lines, together with the changeover of the turning system to **TracTurn HD**, will allow a significant increase in annual intake capacity.

The control and visualisation system was introduced in 2006 and, as part of the expansion, is being replaced by the current version of MetizPro. This will make it possible in future to operate the plant not only from the control PC, but also via any mobile device (smartphone, tablet, etc.).

The user interface of the MetizPro control and visualisation system.



Note: Now 30 years old, the aeration pipes in the original plant show no signs of fatigue, and the area commissioned in 1996 remains an integral part of the composting plant. Since then, more than 50 million m³ of air have been pumped through each individual aeration line.

Operator:	Seiringer Umweltservice GmbH
Waste types:	Biowaste, Green waste, Sewage sludge
Capacity:	25,000 t/year

Scope of supply:
Engineering and Consulting, Aeration technology, ICA system, Exhaust air systems, TracTurn compost turner

Waste treatment in Bulgaria

Modernising composting facilities for the separate treatment of biowaste

Sofia, Bulgaria

Text: Dipl.-Ing. Veronika Markov, HTI BULGARIA EOOD

In Bulgaria, the path towards sustainable waste management continues in line with the ambitious targets set by the European Union. As part of this transition, a national programme was launched in 2024 to modernise and upgrade existing green waste composting facilities so that they can accommodate a new and rapidly growing waste stream: separately collected food waste from households.

This step represents a significant milestone in improving the country's capacity to divert biodegradable waste from landfill and to recover valuable organic resources. However, when dealing with municipal food waste – especially from large urban areas – one of the main challenges lies in its proper separate collection. Continuous efforts are required to inform and motivate citizens to participate correctly in source separation. Public awareness, behavioural habits, and collection logistics directly influence the quality and composition of incoming material.

Author Veronika Markov with Compost Systems' flagship turner, the TracTurn.

These factors also create new technical and operational challenges for composting facilities. Processing lines must be designed to handle contaminated input streams, including waste disposed of in non-biodegradable plastic bags and mixed with other unwanted materials. Addressing these challenges requires advanced technological solutions and extensive operational expertise.

This is where the experience of Compost Systems, in close cooperation with its local partner HTI Bulgaria, plays a key role. The companies are actively involved in developing the technological concepts for several ongoing projects, applying an individual approach tailored to each municipality. This includes analysing local waste generation patterns, existing infrastructure, and citizen participation in separate collection schemes.

The proposed solutions include **enclosed composting boxes (COMPOboxes)** for sanitization and controlled processing, advanced aeration systems, and specialised turning machines designed to ensure optimal biological conditions. In addition, efficient site logistics are supported by solutions such as the **TracTurn**, which enables flexible and efficient material handling within composting sites.

One of the most critical steps in processing separately collected food waste is the opening of plastic bags and homogenisation of the material. Bag-opening and mixing machines ensure that organic material is exposed to oxygen at the beginning of the process. This is essential because sealed plastic bags (whether biodegradable or not) create anaerobic conditions that negatively affect the composting process. Even biodegradable bags require time to break down, delaying access of microorganisms to the organic content.

The gentle rotor design of Compost Systems turning machines represents a major technological advantage. It prevents conventional plastic bags from being shredded into small fragments that are difficult or impossible to remove later. Instead, contaminants remain in larger pieces, allowing for efficient separation at later stages.

A decisive contribution to achieving high compost quality is made by advanced separation technologies such as the **AELUS air separator** *(read more from page 58)*. Using innovative air-based separation, this system effectively removes lightweight contaminants such as plastic film from the compost after the active phase, when moisture content has decreased. This ensures a clean, high-quality end product suitable for agricultural and landscaping applications.

Metal contaminants, another common impurity in municipal biowaste, can be efficiently removed through the integration of magnetic separators into the processing line. Together, these technological components form a comprehensive solution for managing even highly contaminated input streams while maintaining process stability and product quality.

Through these modernisation efforts and the implementation of advanced composting technologies, Bulgaria is strengthening its capacity to meet European environmental standards and to support the transition towards a circular economy.

Scan code to view our projects in Bulgaria

Thess Compost

Chalkidona, Greece

Thessaloniki Composting was founded in 2019 and is jointly owned by Compost Systems GmbH and the Greek climate technology company Mellon Labs EE.

Located roughly 40 km from the Thessaloniki city centre, the Thess Compost composting plant went into operation in 2024.

There, high-quality compost is produced on large triangular windrows that are regularly turned and actively aerated. The compost is made from pre-sorted municipal biowaste and plant-based agro-industrial waste from the Central Macedonia region. The prospect of expanding capacity to 20,000 t/year by converting the turning system from 3.5 m-wide tractor-pulled turners to the **lane-free TracTurn system** was already taken into account at the planning stage.

Operator:	Thessaloniki Compost
Waste types:	Biowaste, Green waste
Capacity:	7,000 t/year

Scope of supply:
Engineering and Consulting, ICA system,
Automated windrow temperature monitoring,
Screening station, CMC ST 350, Fleece roller and fleece

Belagreen composting plant

Scan for online reference

Verona, Italy

Much like livestock farming, agricultural biogas production also has to contend with the issue of high water content, and it is an economic challenge to return the digestate produced to the field as a nutrient source in a cost-effective way. For this reason, biogas slurry is also separated and centrifuged.

In biological terms, the degradation process in a biogas plant lends itself to comparison with the digestive tract of cattle. It therefore makes sense to work with the same Compost Systems concept as is used for the composting of cattle slurry.

The sophisticated **Compost Systems aeration system** guarantees a consistently aerobic composting process on the plants' 100 m-long windrows. This releases so much thermal energy that no external energy is required for this type of biological drying. In addition, the **TracTurn turner developed by Compost Systems** handles the material very gently. The limited structure present in the digestate is not destroyed and remains available as pore space. Up to 2/3 of the input mass is evaporated very rapidly and with minimal energy input.

In addition to the plant already built, two further plants are currently under construction and will be commissioned in the course of 2026.

Operator:	Belagreen
Waste types:	Digestate
Capacity:	30,000 t/year

Scope of supply:
Engineering and Consulting, Aeration technology,
ICA system, TracTurn compost turner,
Automated windrow temperature monitoring

Photo © Nguyễn Lê Thăng for TH Milk

Composting cow manure

Balancing cow welfare and environmental sustainability in Vietnam

Phú Yên and Thanh Hóa, Vietnam

TH Milk is one of Vietnam's flagship companies of the last 20 years. With ambition, drive, and great success, the company has developed into the leader in Vietnam's dairy industry in recent years.

Unlike our farmers in Europe, who produce specifically for export and thus largely ensure that they destroy not only their own livelihoods but also those of farmers in the destination country, TH Milk in Vietnam produces mostly for the domestic Vietnamese market. TH Milk also markets its products itself in the form of milk, butter, yogurt, and ice cream. And with great success.

The number of cows has grown to just under 90,000 in recent years. However, this always leaves one product behind: manure. TH Milk has been experimenting with this issue for a long time. In a relatively complicated and very sophisticated process, the manure is removed from the stables as slurry and, using a combination of various technologies, is processed into biogas, bedding, clean water, and compost. **And for the latter application, it is Compost Systems Engineering and Technology that transforms the manure into its new form.**

As befits a large corporation, environmental protection is naturally a top priority. Harmful emissions into the air or water are a no-go! This also applies in particular to methane emissions. While it is impossible to prevent emissions from cow flatulence, they are completely eliminated in a modern and professional composting process. The same applies to liquid emissions into the ground, of course.

Building and automated temperature monitoring of the first windrows at the plant in Phú Yên.

Due to the sometimes heavy rainfall that repeatedly hits Vietnamese land, all of the processing facilities have been covered.

Each production site also has its own composting facility to avoid unnecessary transport. Since TH Milk owns very little land on which to grow feed for its cows, it is necessary to make the end product as dry and user-friendly as possible so that it can be efficiently returned to agricultural land and reused as efficiently as possible.

Now all we need to do is duplicate the whole thing sufficiently and the problem is solved. Of course, it's not quite that simple. If you want to be a master of your craft, you will continue to optimize, experiment, and increase your efficiency. The next steps in the marketing plan are already in place, which will enable us to align even more closely with the needs and desires of the market. *This is yet another new challenge that allows us to put our knowledge as Compost Systems and our experience to good use in successful projects.* Under the motto: "Baking mixes sell better than flour," the end product should provide the user with a safe and successful product that is easy to use and perfect in its effect.

1 and 2 are already over, 3 and 4 are just around the corner. With a treatment capacity of 30 to 60,000 tons of input material per plant, most of which is very wet, the challenge lies not only in manufacturing the product, but also and especially in the ability to optimize the evaporation of the product, in other words, the loss of water. The combination of turning, naturally using the proven TracTurn concept, and active ventilation for process optimization is particularly well suited for this purpose. This not only optimizes the composting time and thus improves throughput, but also ensures a stable, marketable product with as many nutrients as possible in an optimized form, biologically activated.

Barns (in the background) and composting plant in Thanh Hóa. The composting hall (marked in red) measures 40 x 100 m.

With active aeration and turning using the proven TracTurn, compost is produced in the plant in a short time.

The composting plant in Phú Yên is covered, enabling compost to be produced all year round in any weather.

The first two plants are already fully operational, two more plants are scheduled to be completed and commissioned by summer 2026, and planning for the remaining plants is in full swing.

We congratulate TH Milk and its successful team for demonstrating sustainability in practice. We are pleased to confirm that not only are the cows at TH Milk thriving, but so are the microorganisms.

The plants in detail

Operator:	TH Milk
Waste types:	Agricultural residues, Separated and centrifuged cattle manure, Digestate
Capacity:	24,000 t/year (Phú Yên) and 27,000 t/year (Thanh Hóa)

Scope of supply:
Engineering and Consulting, Aeration technology,
ICA system, TracTurn compost turner,
Automated windrow temperature monitoring

Workers at both plants, shown here measuring windrow gases, are trained in all aspects of composting.

View our projects in Vietnam

Waste treatment in Croatia

Šibenik, Karlovac and Koprivnica, Croatia

Croatia is gradually implementing the European Union's requirements for the separate collection of waste. Biogenic waste and plastics are collected separately, while the remaining residual waste is processed in 11 regional waste treatment centres, known as *CGOs (Centar Gospodarenje Otpad)*, which are distributed across the country. Reusable recyclables are sorted out there, and the biological fraction is stabilised and landfilled in accordance with the requirements of the Croatian Landfill Ordinance.

Following the launch of the **CGO Bikarac** plant in 2022 near the tourist town of Šibenik, the next plant, **RCGO Babina Gora**, went into operation at the beginning of 2026.

Scan to view the online reference for CGO Bikarac

The CGO Bikarac composting plant has already been in full operation since 2022 and processes 43,000 tonnes of biowaste and household waste per year.

Aerial view of the Babina Gora composting plant.

Babina Gora is located in the heart of Croatia, close to the city of Karlovac. Its catchment area comprises a total of 20 towns and municipalities with roughly 135,000 inhabitants.

On an area of just under 30 hectares, a sorting plant, mechanical treatment facility, biological stabilisation stage and residual waste landfill are under construction.

Up to 30,000 t/year of mixed residual waste are processed in the MBT plant. After a four-week enclosed main composting phase with regularly turned, negatively aerated triangular windrows, the material undergoes a further eight weeks of post-composting on positively aerated triangular windrows until the landfill criteria are met. In addition, around 6,000 tonnes of separately collected biogenic waste can be processed into compost.

Biofilter, COMPOtainer and aeration line at the Babina Gora plant.

The planned RCGO Piškornica plant.

RCGO Piškornica belongs to the north-west Croatia region, whose two largest cities are Koprivnica and Varaždin. In future, waste generated by 110 towns and municipalities with around 530,000 inhabitants will be treated there.

On an area of just under 50 hectares, a sorting plant and a mechanical treatment facility are being built, along with a biological drying system with a downstream biological stabilisation stage, a residual waste landfill and an inert waste landfill. The total investment is about 100 million euros.

Plant expansion in Germany

AKG Agrar Kompost Gemeinschaft GmbH composting plant

Seckendorf, Germany

AKG Agrar Kompost Gemeinschaft GmbH operates several composting plants and one anaerobic digestion plant at four sites in the Fürth region. With the addition of an enclosed composting hall, the Seckendorf site will be able to process up to 27,500 tonnes of biowaste and green waste instead of 9,900 tonnes of biodegradable waste on an open site.

AKG was founded in 1992 by ten farmers and, drawing on many years of practical experience, values the compost quality achieved by regularly turned triangular windrows. For this reason, the **newEARTH process from Compost Systems** was deliberately chosen for the site expansion in order to combine the advantages of compost quality with the benefits of an enclosed system.

Ground-breaking ceremony in Seckendorf.

The odour-intensive first phase of the main composting process takes place in an exhaust-air-controlled composting hall. The second post-composting phase, triangular windrow composting, is carried out on the existing open area. This allowed the existing composting area to be integrated into the plant layout without further adaptation measures or additional costs.

It was also possible to incorporate the **TracTurn compost turner**, which had already been in use for many years, into the new plant concept.

There are eight windrows in the composting hall, each of which is negatively aerated individually by its own fan. In addition, the hall exhaust air is extracted at roof-ridge level. Separating these exhaust air streams largely removes the highly odorous windrow exhaust air (process air), thereby significantly reducing the load on the hall exhaust air. This makes the hall air significantly less aggressive and protects the structure. It also greatly reduces the energy consumption required for aeration.

An innovative solution from Hörmann is being used for the hall structure. The structure is protected on the inside by a membrane, while on the outside glass-glass photovoltaic modules with a capacity of around 1 MW form the roof skin. This concept provides the roof with a high level of light transmission, meaning that no lighting is required in the hall during the day. In combination with a battery storage system, it also allows a large proportion of the plant's energy demand to be generated on site.

In addition, the water concept included a solution for collecting the water volumes generated separately according to quality right at the point where they arise. This makes it possible to achieve a closed water cycle at the plant and reduce the discharge of leachate from the composting process to "zero".

After an extensive and highly detailed planning phase, the plant was completed in less than one year of construction time despite winter interruptions lasting several weeks, and it now makes an important contribution to a sustainable circular economy in the Fürth region.

How it works:
The newEARTH process!

The new composting hall with photovoltaic roof.

Thanks to the light-transmitting roof design, no lighting is required during the day.

Hall ventilation.

Ingea Recyklace s.r.o. composting plant

Ostrava, Czech Republic

Scan to view the reference online

Ingea Recyklace s.r.o. is one of the leading players in the field of biodegradable waste recycling, fertilizer production, and the manufacture of alternative fuels for the energy sector in the North Moravian region of the Czech Republic.

As part of expanding its production capacity and continuously improving the quality of its technological processes, the company decided to invest in the construction of a new, large-scale facility for the treatment of biodegradable waste.

Ingea has long relied on advanced waste recovery technologies, and therefore particular emphasis was placed on technological sophistication and operational sustainability in the new project. A key feature is a modern floor-based active aeration system installed in the *composting boxes (COMPObox)*, complemented by sophisticated monitoring and process control systems that ensure optimal composting performance.

Waste is composted in enclosed boxes.

The boxes are fitted with hydraulic, easy-to-operate doors.

The new plant has an annual capacity of 37,500 tonnes of input biodegradable materials. The material undergoes an intensive processing phase in enclosed composting boxes, followed by a maturation phase on open-air curing areas. Process air is directed to a biofilter, which significantly reduces odour emissions and contributes to the comfort of residents living near the facility.

The plant was constructed in a record time of less than five months. Such a demanding schedule required a high level of organizational and coordination readiness from all project partners, as well as strong supplier capabilities.

The project has also been designed with future development in mind. It allows for straightforward capacity expansion and the integration of additional technological functions, such as the stabilization of the organic fraction of mixed municipal waste.

Control container for monitoring the composting process.

Operator:	Ingea Recyklace s.r.o.
Waste types:	Household waste
Capacity:	37,500 t/year

Scope of supply:
Engineering and Consulting, Aeration technology, ICA system, Exhaust air systems, Box roofs, Door systems, Automated windrow temperature monitoring

Waste treatment in Greece

Composting plants on the Peloponnese in full operation

Tripoli, Kalamata and Sparta, Greece

A large proportion of the waste generated on the Peloponnese is treated at three sites near the towns of Tripoli, Kalamata and Sparta. The three plants have a combined capacity of over 200,000 tonnes of waste per year and not only produce *CLO (compost-like output)*, but also generate energy in the form of biogas.

Plant in Kalamata.

With the commissioning of the Kalamata plant, the last of the three plants has now entered full operation. As is to be expected in Greece, a number of ancient finds caused significant delays to the already tight construction schedule.

Direct link to the online reference

The Tripoli plant – the largest of the three – has been in full operation since spring 2023 and boasts a capacity of over 100,000 tonnes of household waste per year. An upstream anaerobic digestion stage is used to generate biogas from the fine fraction, which is converted into electricity in a 1.5 MW CHP plant (combined heat and power plant). Biological stabilisation begins with a three-week phase in aerated boxes, followed by a further six weeks on an aerated post-composting area.

The smallest of the three plants, Sparta, started operating at full capacity in spring 2024. With an annual capacity of around 40,000 tonnes, no upstream anaerobic digestion stage was installed here, and the waste is stabilised exclusively under aerobic conditions in four boxes and on an aerated, covered post-composting area.

In Kalamata, the construction work was delayed by numerous archaeological finds, with the result that full operation did not begin until 2025. Here, around 65,000 tonnes per year are aerobically treated and dried in boxes for three weeks after anaerobic digestion, after which the material is stabilised into CLO on the suction-aerated post-composting area.

With the completion of Kalamata, the Peloponnese trilogy has now been brought to a close for Compost Systems after more than five years of intensive work, during which we were once again able to apply our expertise in a place "where others go on holiday" – from the planning and detailed design of the aerobic treatment to the supply of aeration and exhaust air technology, control systems and turning technology.

Plant in Tripoli.

Plant in Sparta.

The Kalamata plant in detail

Operator:	Terna Energy
Waste types:	Household waste, Green waste, Digestate
Capacity:	65,000 t/year

Scope of supply:
Engineering and Consulting, Aeration technology, ICA system, Exhaust air systems, TracTurn compost turner, Membrane roller and membrane

Biological waste treatment in Slovakia

In recent years, there has been a great deal of construction activity in Slovakia to implement the European Union's legal requirements regarding the reduction of the biogenic fraction in residual waste. To keep transport distances short, small to medium-sized decentralised composting plants were built.

Different composting modules from Compost Systems were used depending on plant size.

At the smaller plants (200–3,000 t/year), the first enclosed sanitization phase takes place in a **CSC-Container**. The material is then fully composted on an open composting area. Exhaust air treatment in the container is carried out via a semipermeable membrane.

Filling the CSC-Container using a wheel loader.

Emptying the CSC-Container.

Maturation with fleece cover.

View all our projects in Slovakia online!

Biological waste treatment in Slovakia

Composting in the CSC-Container

Čadca

Capacity: 900 t/year
Number of containers: 2

Mepos SNV

Capacity: 250 t/year
Number of containers: 1

Tvrdošín

Capacity: 1,500 t/year
Number of containers: 3

Humenné

Capacity: 250 t/year
Number of containers: 1

Zlaté Moravce

Capacity: 1,480 t/year
Number of containers: 4

Trebišov

Capacity: 2,800 t/year
Number of containers: 3

Bošáca

Capacity: 900 t/year
Number of containers: 1

Nové Mesto

Capacity: 400 t/year
Number of containers: 1

Galanta

Capacity: 200 t/year
Number of containers: 1

Senica

Capacity: 550 t/year
Number of containers: 2

Biological waste treatment in Slovakia

Composting in the COMPObox

For larger plants, the logistics required to handle containers would become very complex. This is where the COMPObox system comes in.

Sanitization is carried out in a box closed by a hinged door. Once sanitization is complete, the material can remain in the boxes for longer in order to produce odour-stable material for further treatment on the open maturation area. As with the CSC-Container, exhaust air is treated either via a membrane or via a separate exhaust air treatment system with washbox and biofilter.

Brezno

Capacity: 3,500 t/year
Number of boxes: 3

Dolný Hričov

Capacity: 5,000 t/year
Number of boxes: 3

Kežmarok

Capacity: 3,000 t/year
Number of boxes: 3

Púchov

Capacity: 1,600 t/year
Number of boxes: 3

Partizánske

Capacity: 3,300 t/year
Number of boxes: 3

Envigeos

Capacity: 5,000 t/year
Number of boxes: 3

Biological waste treatment in Slovakia

Composting in bays

Trnava

Capacity: 4,990 t/year
Number of bays: 8

Levice

Capacity: 3,500 t/year
Number of bays: 6

In addition, the first phase can take place in bays covered with a membrane.
As with the CSC-Container, exhaust air is treated via a membrane.

Shown here is a semipermeable membrane wound onto the membrane roller, which serves not only as protection but also for odour filtration.

Osijek composting plant

View the reference online

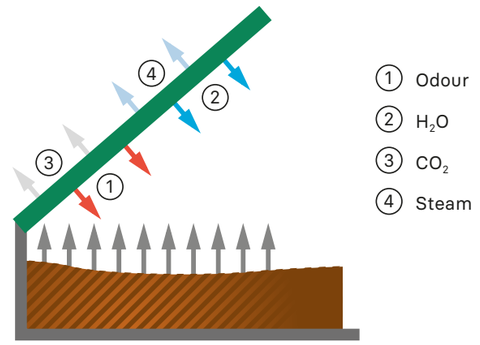
Osijek, Croatia

Osijek is the fourth-largest city in Croatia and is located in eastern Croatia near the borders with Hungary and Serbia. At the composting plant, which went into operation in 2024, sewage sludge from the municipal wastewater treatment plant and green waste generated in the surrounding area are composted and further processed into compost and substrate mixtures.

The first odour-intensive phase takes place in five enclosed boxes. The boxes are covered with a semipermeable membrane. Because of the warm air rising beneath the membrane, a layer of condensation forms in which odour molecules are dissolved and thus retained. Each box is closed by a hydraulic door so that material handling – filling, turning and emptying – can be carried out easily. The second phase takes place on the existing composting area.

Operator:	Unikom
Waste types:	Sewage sludge, Green waste
Capacity:	12,000 t/year

Scope of supply:
Engineering and Consulting, Aeration technology, ICA system, Boxes with hydraulic doors, Automated windrow temperature monitoring



The function of a membrane.

Box composting in Israel

Ein Shemer, Israel

Israel has a high wastewater treatment rate. A total of 99 % of the country's wastewater is treated in modern sewage treatment plants. At every sewage treatment plant, sewage sludge is generated regularly as part of the treatment process.

In Israel, around 95 % of sewage sludge is further treated and recycled as organic fertiliser for agricultural purposes. Most of this treatment takes the form of composting – usually as a mixture of sewage sludge and green waste. At most sewage treatment plants in Israel, it is standard practice to deliver sewage sludge to one of several central composting plants specialising in sewage sludge composting.

The *Iron sewage treatment plant* is a medium-sized sewage treatment plant in central Israel operated by the *Menashe Council Municipal Company*. More than a decade ago, the management of the Iron sewage treatment plant decided that on-site composting was the right solution for its sewage sludge, as it eliminates additional costs for transport and for commissioning an external treatment company.

For several years, the sewage treatment plant carried out on-site composting using a composting drum. However, this solution did not perform well. Operating and maintenance costs were high, and there were considerable odour problems. The original concept of treatment directly on site, however, proved its merits.

On the basis of this experience, the sewage treatment plant decided to build a new composting facility based on static composting units. In a tender published in 2022, bidders were restricted to offering static composting units with membrane covers as the odour treatment solution.

In 2023, the local company **Nativ Recycling, representative of Compost Systems GmbH**, was announced as the winner of the tender. The technology selected was the **COMPObox process**, in which sewage sludge is mixed with green waste.

The material enters a box closed by a hinged door for the first phase of composting, namely sanitization.

The plant was designed and built over the course of two difficult years marked by a challenging security situation. It consists of eight composting tunnels, each 45 m long and 6 m wide. The roofs are formed by a stainless-steel structure with a membrane cover.

Compost Systems supplied the plant structure, the active aeration system, the control system, the membrane covers and the hydraulic doors. The roof structure was fabricated on site.

The plant went into operation in January 2026 and treats 60 t/day of sewage sludge mixed with around 100 cubic metres of green waste. The process lasts 25 days, with intensive composting in the boxes. This is followed by several weeks of maturation on an open platform. The finished compost is screened and marketed to local farmers for agricultural use. Screen residues are reused in the compost mix.
The management of the sewage treatment plant plans to improve the efficiency of plant operation by replacing the current use of a loader to mix sewage sludge and green waste with an automatic mixing system. This plan is to be implemented over the course of 2026, with commissioning scheduled within the same year.

The Iron sewage treatment plant is the first in Israel to include complete on-site sewage sludge treatment. It is expected that other sewage treatment plants will follow Iron's example and opt for local composting as a practical, cost-effective and sustainable solution.

Operator:	Menashe Council Municipal Company
Waste types:	Green waste, Sewage sludge
Capacity:	18,000 t/year sewage sludge and 6,000 t/year green waste

Scope of supply:
Engineering and Consulting, Aeration technology, ICA system, Door systems, Membrane, Automated windrow temperature monitoring

Direct link to the online reference

Box composting in Poland

Wołomin / Stare Lipiny, Poland

Stare Lipiny is located in the Masovian Voivodeship in central Poland, close to the dynamically developing Warsaw metropolitan area. In recent years the region has experienced rapid development, which has also increased the demand for modern and efficient waste management solutions. Local authorities and municipal companies are increasingly investing in technologies that enable environmentally friendly treatment of biodegradable waste while meeting ambitious European Union targets for landfill reduction and recycling.

One of the key investments currently being implemented in the region is the expansion of the composting infrastructure at the **Waste Management Plant in Stare Lipiny**, operated by MZO.

The new installation has been designed to improve the treatment of selectively collected biodegradable and green waste from surrounding municipalities. The project focuses on efficient composting technology, reliable process control, low operation cost and minimisation of environmental impact.

The investment consists of two complementary technological stages. The first stage of the process is the intensive composting phase carried out in eight **composting boxes (COMPObox)** equipped with aeration and irrigation systems. These boxes provide controlled conditions for the biological process and material stabilization, ensuring high quality of the final product and operational flexibility of the installation.

The boxes have been designed with particular attention to operational safety and working comfort. They are covered with transparent membrane roofs that improve natural lighting inside the working area. Additionally, the boxes are equipped with hydraulic doors opening upwards, allowing safe and collision-free operation of heavy machinery. An adaptive ventilation system maintains constant negative pressure inside the boxes, ensuring hermetic conditions. This solution significantly reduces potential odour emissions and ensures environmentally friendly operation of the installation.

The second stage of the process is the sheltered compost maturation area, where the material is processed in eight aerated windrows. Each windrow is equipped with both negative and positive aeration systems, providing optimal oxygen supply and stable biological activity throughout the composting process. This solution increases operational flexibility and allows effective odour control.

Maintaining proper moisture content is one of the key factors influencing composting efficiency. For this reason, the installation is equipped with a rainwater irrigation system that allows collected rainwater to be reused in the technological process.

Leachate generated during the composting process is collected in dedicated tanks and recirculated to the initial phase of the process. This approach helps maintain the proper moisture level while inoculating fresh material with active microorganisms. To ensure environmental protection and the comfort of nearby residents, the facility is also equipped with a two-stage process air treatment system consisting of a water wash box and a biofilter. This solution effectively captures and treats process air generated during composting, significantly reducing potential odour emissions.

The entire composting process is supervised by a modern automation and monitoring system. Wireless temperature probes installed in the composting material enable continuous monitoring of process parameters and provide operators with real-time information on biological activity inside the windrows. Windrow turning and aeration are carried out using a **TracTurn compost turner**, ensuring efficient material handling and optimal logistics of the composting process.

Environmental impact

The expansion of the composting infrastructure in Stare Lipiny will significantly improve the management of biodegradable waste in the region. Instead of being landfilled, organic waste will be processed in a modern treatment facility. The result of the process is high-quality compost that can be used as an ecological alternative to chemical fertilizers in agriculture, landscaping and land reclamation. At the same time, the modern air treatment systems installed at the facility will significantly reduce the environmental impact of the composting process.

Conclusion

The new composting infrastructure at the Waste Management Plant in Stare Lipiny represents an important step toward modern and sustainable waste management in the region. The combination of advanced aeration systems, efficient process control and effective air treatment technologies provides optimal conditions for environmentally friendly processing of biodegradable waste. The investment demonstrates how modern composting technologies can support the development of a circular economy while contributing to the achievement of European environmental targets. The final product of the process will be high-quality compost meeting the requirements of Regulation (EU) 2019/1009.

Operator:	MZO – Municipal Wastewater Treatment Plant in Wołomin
Waste types:	Biowaste, Green Waste
Capacity:	32,000 t/year

Scope of supply:
Engineering and Consulting, Aeration technology, ICA system, Exhaust air systems, Box roofs, Door systems, Automated windrow temperature monitoring, TracTurn

Closed windrow composting

Sheltered windrow composting

Open windrow composting

Concrete roof vs. membrane

Because we care about your team.

We are often asked:
Which is better – a concrete roof or an arched roof?

Sometimes the choice is dictated by the circumstances, but if the matter is viewed soberly, the following picture emerges: A COMPObox or a composting tunnel can easily hold a volume of 1,000 m^3 of compost. A wheel loader can handle around 3–4 m^3 in a single bucket.

That means a wheel loader drives into a box around 300 times in order to fill or empty it just once.

Daylight is indispensable for creating a pleasant and well-lit working environment. You can get the job done without it, of course, but then you should not be too hard on wheel-loader operators when they repeatedly end up causing all kinds of damage. The difference is as great as that between open-cast mining and underground mining!

The comparison

Compost Systems and Green Mountain Technologies

The transatlantic compost axis

Green Mountain Technologies is one of the leading engineering and technology companies in the USA. As our partner, Green Mountain represents Compost Systems with its product and design solutions on the US market, while Compost Systems presents Green Mountain Technologies' composting technology on the European market.

One of these products is the **automatic composting system Earth Flow**, which Green Mountain has developed over decades into a tried-and-tested product. We invite you to take a look at some successful reference projects carried out by our partner in the USA.

Waste types:
Food waste, Green waste

Capacity: 800 t/year

Scope of supply:
2x Earth Flow IM 40, Biofilter

Compost Colorado

Denver, USA

Compost Colorado (CoCo) is a non-profit, employee-led company. With support from the *Colorado Department of Public Health and Environment* and in close cooperation with the *City of Denver's Office of Climate Action, Sustainability and Resiliency*, CoCo operates the first official composting plant in Denver.

The company selected two Earth Flow systems as the centrepiece of its new composting operation. The Earth Flow containers are known for their ability to process organics and biodegradable plastics in less than four weeks. They are compact (less than 50 m²) and feature integrated irrigation systems that are perfectly suited to Denver's dry climate.

Blu Sky Farms

Ocala, USA

Ocala, Florida, known as the "Horse Capital of the World", has a rich equestrian heritage and is home to the renowned *World Equestrian Center*. *Steve Talbott*, owner of **Blu Sky Farms**, was looking for a sustainable solution for disposing of horse manure and bedding from his riding stable.

Steve was particularly taken with the Earth Flow solution because it offers automatic mixing and aeration. This not only ensures the production of high-quality finished compost, but also requires only minimal additional labour after the compost leaves the Earth Flow system.

Waste types:	Agricultural waste
Capacity:	900 t/year
Scope of supply:	Earth Flow CV 4012

Grupo Puntacana

Dominican Republic

Puntacana Resort is a holiday complex with more than 2,000 homes, three hotels, the largest international airport in the Dominican Republic, as well as the associated kitchens and restaurants. The resort was looking for a reliable and efficient on-site solution for composting food waste.

Waste types:	Food waste, Green waste
Capacity:	1,400 t/year
Scope of supply:	Earth Flow Site Built 7012, Biofilter

Now, the Earth Flow system processes up to 1,400 t/year of food and garden waste from Puntacana Resort. For this customer, the particular value of Earth Flow lies in its ability to compost food waste quickly and effectively on site, preventing it from ending up in landfill.

Lafayette College

Easton, USA

Sustainability is one of **Lafayette College**'s core values, so its decision in autumn 2023 to launch a campus-wide food waste composting programme came as no surprise. Among other things, the initiative is intended to help produce compost that will improve the soils of the college's local farm.

Waste types:	Food waste, Wood chips
Capacity:	180 t/year
Scope of supply:	Earth Flow IM 20, Biofilter

Traverse City

Traverse City, USA

In 2023 and 2024, **Traverse City** launched a pilot project for the composting and reduction of food waste. Its aim is to provide residents and businesses in the city with easy access to organic waste collection and processing, especially food waste.

The Earth Flow is housed in a shipping container and can process up to 180 t of organic waste per year. The system is fully enclosed, relatively tamper-resistant and processes waste very quickly while remaining largely odour-neutral.

Waste types:	Food waste, Green waste
Capacity:	180 t/year
Scope of supply:	Earth Flow IM 20, Biofilter

With a capacity of 180 t/year, the Earth Flow system is at the heart of the college's efforts to prevent food waste. The process begins with the collection of food scraps from the campus canteen, which are then loaded into the Earth Flow. In around three weeks, these scraps are transformed into nutrient-rich compost.

Ron LeFore Apple Farm

Milton-Freewater, USA

To meet the specific requirements of the 210 ha apple farm, a 40' x 8' Earth Flow with automatic temperature monitoring was designed to ensure the high-quality composting of apples, paper shreds and cardboard packaging material.

Waste types:	Food waste, Green waste, Agricultural waste
Capacity:	360 t/year
Scope of supply:	Earth Flow Site Built 4008

Managing Director Aurel Lübke in conversation with **Jayne Merner** on **The Composter Podcast**

One of the industry's true veterans, *Jayne Merner* has been an established name in American composting for many years. Roughly two years ago, she launched her own platform on which she interviews leading figures from the international composting industry.

In January 2026, Jayne Merner spoke with Aurel Lübke about developments in the global composting industry, innovative composting systems from Austria and the story behind Arnold Schwarzenegger's compost pilot project.

Scan to listen to the episode!

CSC-Container in France

Food waste sanitization using CSC-Container technology

View all our
CSC-Containers in France

Between the Alpine mountains of the Savoie and Hautes-Alpes regions, the spectacular panoramas of the volcanic island of Réunion in the Indian Ocean, and the large-scale farming of the Oise region northwest of Paris, what do these three French territories with contrasting and demanding climates have in common?

Quite simply, they have an exemplary food waste management system with efficient collection methods that provide a constant supply to CSC sanitization units located on platforms dedicated to composting organic waste.

France is now one of Compost Systems' main markets for the sale of its CSC-Containers to public authorities and private operators seeking scalable, regulatory-compliant treatment methods for composting food waste from separate collection.

Emptying the CSC-Container at the composting site.

Open CSC-Container at a plant.

Filling the CSC-Container using a telescopic handler.

SAVOIE DECHETS, Savoie and Hautes-Alpes

Chambéry, France

Since 2022, the **SAVOIE DECHETS** waste management syndicate has chosen to gradually equip itself with eight CSC-Containers spread across 3 sites in its mountainous territory. The CSC-Container solution ensures that household food waste mixed with green waste is thoroughly sanitized in order to produce a high quality biowaste compost that complies with French standard NFU 44051.

Green Tropical Circle, La Réunion

Saint-Joseph (La Réunion), France

The first CSC-Containers in the Indian Ocean are in service at the **Green Tropical Circle (HCE Group)** biowaste composting site on the island of Réunion. The CSC-Container solution is ideal for ensuring the perfect sanitization of household food waste in order to produce high quality biowaste compost in island territories.

A new application for CSC-Containers

Sustainable protein and animal feed production

Insect farming is becoming increasingly important as a sustainable source of protein and animal feed. It is also extremely efficient in the utilisation of organic materials. **REPLOID Group AG** uses black soldier fly (BSF) larvae to convert food residues into high-quality protein and fat. The insects' natural potential is harnessed to turn low-value residual materials into high-value raw materials. As a smart, environmentally friendly alternative to conventional disposal, this means less waste and greater efficiency in a genuine circular economy. Essential ingredients are preserved and returned to the nutrient cycle.

REPLOID puts this concept into industrial practice. In this way, organic residues can be used not only as a source of energy, but also as raw materials. However, their industrial application also entails making the best possible use of the residues originating from the rearing of black soldier flies. REPLOID is therefore working to ensure that these biodegradable residual materials, known as insect frass, can be safely returned to the cycle.

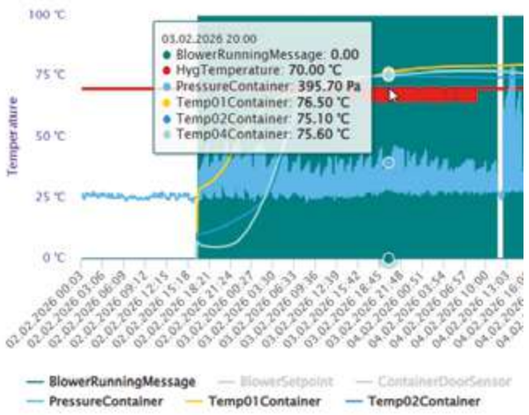
This is where the expertise and technology of Compost Systems come into play. As part of a trial set-up at REPLOID, our CSC-Container, which has already been used on a trial or production basis for many other biodegradable fractions (biowaste from municipal collection, manure from poultry, pig and cattle farming, various sewage sludges, pressed slurry and digestates, human excreta from dry toilets, residues from the production of medical cannabis products, etc.), is now being used to sanitize the insect frass remaining at the end of the rearing process in accordance with Regulation (EU) No. 2023/1605.

Sensors for controlled aeration and sanitization verification.

As a closed unit with integrated sensors, the CSC-Container provides the perfect environment for insect frass to be sanitized in a controlled and verifiable manner. The key advantage here is that the energy input required for sanitization can be optimised. The insect frass itself still contains enough energy to reach the required time-temperature regime through controlled aeration and the resulting biological process.

In addition, the CSC offers options for supplying external energy in cases where stricter requirements apply or batches with a lower energy content are to be processed. This becomes particularly clear when the temperature curves for the outdoor temperature (in winter) and the material temperature profile in the CSC-Container are compared directly.

Outdoor temperature and dew point:



The adaptations identified as helpful during the trials were implemented at short notice and represent useful additions to the CSC product options. These additions include both the simultaneous connection of up to four temperature probes and the option of connecting a powerful 230 V aeration fan via quick coupling. Moreover, the CSC offers the possibility of supplying external energy in cases where stricter requirements apply or batches with a lower energy content are to be processed.

All in all, the CSC is an ideal addition for ensuring that, in the sustainable production of proteins and animal feed, the residual materials can be returned to the nutrient cycle in a controlled and sanitized manner and with the lowest possible energy input.

230 V aeration fan connected via quick coupling.

Four temperature probes connected simultaneously.

Emptying the sanitized insect frass.

Allow us to introduce:

The Hispanic team!

There are more than 500 million native speakers of Spanish worldwide, as well as a further 225 million people in Portugal and Brazil who are supported by our team. Geographically, this covers the Iberian Peninsula and South America. Compost Systems has been active in these countries for more than 15 years and is proud to have built up some impressive references on both sides of the Atlantic.

Today, we would like to introduce three exceptional colleagues who will help make the advanced technology of Compost Systems available to many more users.

Cristián Mulcahy

Environmental engineer

Before joining Compost Systems, Cristián gained relevant industry experience as plant manager at a composting plant in Uruguay.

Cristián has been responsible for sales coordination in Iberia and Latin America for four years. Based in Madrid, Spain, he stands for excellent customer service and professionalism. He has a keen understanding of customer requirements and works together with the engineers at Compost Systems to develop tailored solutions – efficient, economical and, above all, feasible solutions. His own experience as an operator, his quick grasp of things and his insight form the basis for putting expertise to effective use in the market.

From top left:
Cristián Mulcahy, Raúl Chacón and David Díaz

Raúl Chacón

Economist, Master in Business Administration

Raúl spends most of his time in his native country Chile. A familiar face in the industry, he has been supporting customers in Chile and Brazil in the field of waste management for many years.

Raúl has been part of the Compost Systems team for three years and ensures that customers receive efficient support whenever they need it – both in Chile and in Brazil. South America remains a developing market, and it is safe to say that Raúl still has plenty of work ahead of him. Although many products from the composting industry are available in South America, Raúl has the honourable task of communicating the advantages of a well-designed plant.

David Díaz

Forestry engineer

David comes to Compost Systems straight from practical experience. Many years ago, he started out as a user. Today, many users come to him to learn from him.

That is why David supports the Compost Systems team – or rather, Compost Systems supports David in his efforts to make the technology of a modern composting plant and high-quality compost accessible to his fellow Colombians and to the composting industry in Peru. David not only operates his own Compost Systems plant, but also supports other users in developing their successful projects in the field of professional composting.

Huesca composting plant

Huesca, Spain

The **Consorcio Agrupación Nº 1 Huesca (GRHUSA)** has officially ushered in a new era of biological waste treatment in Aragon, Spain. Operational since 2024, the upgraded Huesca Composting Plant represents a significant leap forward, tripling its annual capacity from 2,000 to 6,600 tonnes of source separated household biowaste.

The heart of this transformation lies in the integration of Compost Systems' technology, designed to turn the challenges of organic waste into a high-quality resource for the soil. By transitioning to a sheltered windrow composting system equipped with active aeration technology, the facility now achieves great precision in process control.

Controlled via the ICA system, automated aeration ensures optimal oxygen levels and temperature management throughout the eight-week rotting cycle. This not only accelerates stabilization and guarantees full sanitization but also effectively minimizes odor emissions, a crucial factor for modern environmental standards.

The addition of the TracTurn compost turner has been a game-changer for site efficiency. This high-performance machine allows GRHUSA to compost a much higher volume of material within the same existing surface footprint, maximizing space while ensuring uniform mixing and homogenization. The synergy between active aeration and the TracTurn's mechanical precision creates the ideal environment for microorganisms to thrive.

Through this project, GRHUSA demonstrates how engineering expertise and biological insight can close the nutrient loop. We are proud to support Huesca in producing premium compost that returns vital carbon to the Spanish soil, proving that sustainable resource management is not just a goal, but a reality.

Scan to view the reference online

Operator:	GRHUSA
Waste types:	Household waste
Capacity:	6,600 t/year

Scope of supply:
Engineering and Consulting, Aeration technology, ICA system, TracTurn compost turner, Automated windrow temperature monitoring

Control Ambiental Colombia

Facatativá, Colombia

Composting windrows under controlled conditions using forced aeration technology supplied by Compost Systems.

A long-standing partnership that has transformed composting in the tropics.

Control Ambiental Colombia has established itself as a leading company in the treatment and recovery of organic waste in Colombia. Throughout its trajectory, the company has maintained a clear purpose: to transform waste into valuable resources while delivering reliable, efficient, and environmentally sustainable technical solutions.

From the beginning, the organization recognized that large-scale composting is not only an operational challenge but also an environmental and social responsibility. Continuous investment in process optimization, technical expertise, and advanced international technologies has been fundamental to its growth.

Aeration technology by Compost Systems

The implementation of forced aeration systems supplied by Compost Systems marked a major technological milestone for Control Ambiental. By introducing controlled airflow through engineered piping networks and high-efficiency blowers, the company achieved uniform oxygen distribution within composting windrows.

This transition from predominantly mechanical turning to a biologically controlled aeration system allowed greater process stability, improved temperature control, and optimized microbial activity:

Process stability: Improved process control, traceability and operational stability.

Efficiency: Shorter composting cycle times due to optimised oxygen supply and lower operating costs due to reduced turning frequency.

Environmental compatibility: Significant reduction in odours and leachate through the prevention of anaerobic conditions.

Quality: Consistent, high-quality compost production.

In addition to the aeration system, the TracTurn compost turner from Compost Systems is also employed at the Control Ambiental plant – here for the composting of flowers.

Carbon footprint, climate performance and circular economy

Forced aeration plays a critical role in reducing the carbon footprint of composting systems. In conventional composting systems without controlled aeration, insufficient oxygen supply can create anaerobic zones within the windrows. These anaerobic conditions promote the formation of methane (CH_4), a greenhouse gas with a global warming potential significantly higher than carbon dioxide (CO_2).

By ensuring continuous and uniform oxygen distribution, forced aeration systems maintain fully aerobic conditions throughout the composting mass. This minimizes methane generation and significantly reduces greenhouse gas emissions compared to passive or poorly aerated systems.

Although forced aeration systems require electrical energy to operate blowers, the resulting reduction in methane emissions and shorter composting cycles leads to a net positive climate impact. Additionally, the production of stable, high-quality compost contributes to long-term carbon sequestration in soils, further improving the overall environmental performance of the system.

When comparing composting systems with and without controlled aeration, the forced aeration approach provides superior greenhouse gas mitigation, better process efficiency, and improved environmental reliability – making it a key strategy for advancing low-carbon waste management solutions.

The adoption of Compost Systems' forced aeration technology represents not only an operational improvement but also a strategic step toward strengthening Colombia's circular economy. Optimized composting operations reduce landfill disposal, mitigate greenhouse gas emissions associated with anaerobic decomposition, and produce high-quality organic amendments that enhance soil health.

Control Ambiental's experience demonstrates that technological innovation is essential to elevating composting standards across Latin America. The partnership with Compost Systems exemplifies how international cooperation can generate measurable impacts in efficiency, sustainability, climate performance, and product quality.

Screening, sorting and processing

As European rules governing maximum contamination in compost, such as the reduction of the maximum permissible amount of film plastic in finished products, become increasingly stringent, existing technologies often no longer suffice to ensure a marketable end product. For this reason, here are a few possible solutions to help ensure that a clean product can still be delivered to the customer in the future.

What goes into it?

In practice, it is not all that easy for processors to choose their raw material. And yet it is still possible, directly or indirectly, to influence what kind of material finds its way onto one's own site. A few encouraging words here and there, or active involvement in a sorting campaign in the municipality, can certainly have a positive effect on the cleanliness of the raw material. But we have to accept the fact that, as composters, we have only limited influence over the cleanliness of our raw material.

Basic principles

It is important to bear in mind that the relatively affordable technology of screening can only be used for contaminant removal if the contaminants have not first been aggressively shredded. **The practice of shredding the contents of organic waste bins, for example, must be strictly avoided. But operating turning equipment at high speeds is also a major mistake in the fight against foreign matter.** The principle of success is simple: The larger the foreign matter, the easier it is to remove. We should therefore try to avoid every single step that leads to the breakdown of foreign matter.

Another basic principle is the rule of thumb: The earlier, the better!

Of course, it would be ideal to remove the foreign matter directly from the organic waste bin. But how!? Technologies for removing contaminants from the raw product are actually expensive and, at times, inefficient. That is why the product must first be homogenised and, most importantly, dried sufficiently for efficient screening technology to work at all.

As a rule of thumb, the moisture content should be below 40 % and ideally closer to 35 % before contaminant removal technology really becomes efficient. This is naturally easier to achieve with active aeration, because moisture can then be adjusted more actively and more precisely. But not everyone enjoys that luxury, so some patience is required. With active aeration, treatment is possible after just four weeks, whereas without aeration it generally takes closer to eight weeks.

What technologies are available?

Of course, there are many other technologies that could be used, but in day-to-day practice, the combination of screening and air separation has become the state of the art. If this technology is not sufficient, a sorting table is the only remaining option – a slow and relatively expensive one.

The perfect preparation

As already mentioned at the outset, achieving the right moisture level is a decisive factor. The product should not smear, nor should it be dusty at that point. The rule of thumb is a moisture content of between 35 % and 40 %. The material should also be homogeneous, so it is worth turning it once or twice before screening.

It should be noted here that "turning" does not mean using a wheel loader, but actively mixing the product with a machine intended for that purpose. Under no circumstances should machines be used that shred foreign matter at high speeds. We recommend low rotational speeds, as with the TracTurn, which mixes the product extremely gently at only approx. 120 rpm.

The right screen

Quite apart from screen capacity, various screening technologies are available. While the trommel screen is among the most widely used technologies, other solutions have also proved effective. One example is the flip-flow screen, which can perform very well. This technology yields better results because plastic parts float up during the screening process. As a result, smaller plastic particles cannot be pulled through the screen as they can with a star screen, or pushed through by wood splinters as they can with a trommel screen.

Another advantage of flip-flow screens or star screens is that they can still screen somewhat wetter material efficiently at a stage when a trommel screen may already begin to produce "lumps".

How do you get the plastic out of the compost?

It is important to note that plastic can only be removed from the oversize fraction. Once the plastic has become so small that it ends up in the fine compost, the game is over. The point, therefore, is simply to make the screen oversize usable again so that it can be added to a further batch. This also means that there is no need for a technology that works 100 % perfectly – an impossibility, after all. BUT: It is important that the plastic content in the screen residue does not accumulate; otherwise, when the material is reused, it will end up in the saleable product in the form of small plastic particles.

Any alternatives? Yes, BUT: You can either find a way of putting the screen residue to some other use (thermal recovery, for example), or sooner or later you will have to screen your finished compost – which is not cheap and anything but easy!

Compost Systems also offers products for this stage of the process. In keeping with our well-known philosophy, we only develop products when we need them ourselves and the market does not yet offer them. That is how the **AELUS air separator** was developed as a solution for contaminant removal, available either in various configurations or as a stand-alone system. Our AELUS air separator can remove plastic, stones and ferrous metals from screen residue.

However, there are some fundamental facts to bear in mind here – imposed on us by Mother Nature in the form of physical laws:

1. **If the feed layer becomes too thick, it simply no longer works!** Put simply: If we throw too much screen residue too thickly onto the discharge belt, even the best air flow will not find the plastic. The result: poor efficiency.
2. **Uniformity!** It is important not to feed the air separator with too much material one moment and too little the next. Shock loads and idle running of the plant should therefore be avoided wherever possible.
3. **The right moisture level!** Screening machines prefer to keep things dry, but air separators like it a bit more moist. Because wood, for example, is lighter when it is dry, it can also be picked up more easily by the air separator, ultimately landing in the plastic container. But it is still important to ensure that no "lumps" form in the screening machine.

The right feed

Since, as described above, the right feed plays an important role, here are a few additional remarks: **Less is better! Uniformity is essential!**

For this reason, we have also equipped the stand-alone AELUS air separator with a hopper. However, if the air separator is fed from a screen, the question arises as to how the screen itself is fed. For smaller plants and mobile applications, a small feed hopper of 3–4 m^3 is typically state of the art. Particularly in the case of larger and above all stationary plants, we now tend towards large feed hoppers in the 15–25 m^3 range. This creates a certain buffer, easing the burden on the wheel-loader operator while fully ensuring a 100 % continuous and even feed to the screen and, in turn, to the air separator.

It also leaves enough time to transport screen residue or finished compost to the next processing location at the facility without the screening machine immediately running empty.

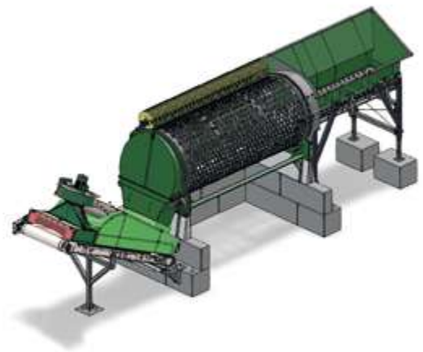
AELUS air separator

Possible configurations

The AELUS air separator in action!

01

02



03

04

05

01 Mobile air separator
02 Air separator with screen and small hopper (3.5 m^3)
03 Stationary screen with air separator and large hopper
04 Air separator with wheel-loader feed
05 Air separator fed by a mobile screening unit

Bigger, better, faster and more efficient

The new TracTurn HD is here!

Thanks to a combination of good ideas and skillful engineering, the new TracTurn HD has finally made it into series production after a lengthy development period.

For several years now, we have been observing the trend towards ever smaller machines – or, one could also say, ever larger tractors. When we began making the first TracTurn ready for series production over 15 years ago, tractors with a lifting capacity in excess of 10 tonnes were still few and far between. Today, the portfolio has advanced to a much higher level, and what we called top class then is now, at best, middle class. This made the evolutionary step of adapting the new TracTurn generation to the new reality unavoidable.

In fact, the development of the TracTurn HD moved in a very specific direction: How much material can I process over how many square metres of composting area? All of this had to be embedded in the requirements of today's industry – starting with foreign matter contamination, mixing effect, capacity and operating costs. The result speaks for itself. But let's start with the downside: With less than 300 hp and a lifting capacity of > 11 t at the 3-point hitch, it simply won't do the job. BUT: If you can call a suitable tractor your own, things really take off.

More power

First of all, the hard facts: Its performance compared with the standard TracTurn is + 50 %, or 3,000 m³/h. A tunnel turner with 3,000 m³ is nothing unusual in itself – but here we are talking about lateral shifting and 3,000 m³/h. Which immediately raises the question: What exactly is meant by lateral shifting? To quote Henry Ford, it is the modern industrial version of compost production on an assembly line. We mix the batch from the raw-material side, and by the time it "comes out" again at the back, it is already on the composting area or in front of the screening unit. That saves many wheel-loader hours otherwise needed to move material from A to B to C.

More volume

But there is more: Unlike what people are used to, the TracTurn and the TracTurn HD do not perform just one mixing operation in the rotor area. No, the TracTurn HD mixes the product three times: first in the rotor area, though extremely gently, at only around 120 rpm. Second, the material is mixed again on the conveyor belt, and third, it is once more thoroughly mixed as it is deposited onto the windrow.

What really needs to be borne in mind, however, is this: The oxygen supply is never provided by the mixing process itself, but by the subsequent air supply through the pores in the material. So, one could say: The looser the material is deposited, the better! And this is precisely where the TracTurn and the TracTurn HD once again score highly in terms of pore volume and loosening. According to precise measurements, the TracTurn achieved an additional 15 % pore volume.

The measurement was based on a 5 m-wide windrow, with the volume recorded before and after turning. A gold-medal result for the TracTurn HD! Now, 15 % more pore volume may not sound like very much. But one has to bear in mind that, in a compost windrow as we know it, around 40 % pore volume is required under optimum conditions to maintain even a reasonably aerobic state. In many "difficult" materials, where pore volume is already severely reduced due to a lack of structural material, 15 % can make all the difference. This means, for example: If you previously had only 30 % air space left in your compost heap and now have 15 % more pore volume, then you have risen to 45 % pore volume – from INADEQUATE to OPTIMAL – with little effort!

But that is far from all we can expect from the TracTurn HD.

Less wear, greater capacity and larger windrows

Alongside the optimisation of operating costs (reduced wear, increased capacity), it has become not only heavier, but also larger – fully grown, you might say. And not only has the overall height increased; more importantly, it can now truly handle any windrow shape, whether triangular or trapezoidal, up to a height of 3 m.

Small windrow, large windrow, table piles, curing windrow, storage windrow! Thanks to the sophisticated interplay between a lateral vertical rotor and the horizontal mixing rotor, turning the widest variety of windrow shapes has become child's play. This is where one of the most important new features of the TracTurn HD lies. The ability to process larger windrows also significantly increases the capacity of a composting plant – by as much as 30 % to 50 %. In this case, however, the commercial impact is far more noticeable.

And just to say this up front: Not everything the authorities allow is good, and not everything we consider good is permitted. Just because you now have the option of increasing capacity on your plant by 50 % does not automatically mean that your officially approved intake quantity will also be increased. But as the old saying goes: "Better to have it than to need it!"

And if you are still not convinced, seeing it in action may change your mind. In any case, we are enormously proud of this important new step towards greater efficiency on composting plants. We are pleased to be making a contribution to the industry – one that helps counter the constant pressure on costs without compromising compost quality.

Scan and experience the TracTurn HD in action!

The new TracTurn HD put to the test

The TracTurn HD in action: Watch the performance test video now!

Measuring the performance and quality data of a turning machine under laboratory conditions doesn't really tell you much. What really counts is how it performs in real applications under harsh and often demanding conditions.

That is exactly what we did – at the Seiringer family's composting plant in beautiful Lower Austria. Around 20,000 tonnes of biowaste are processed there each year into high-quality compost. By the time we carried out the test, the new TracTurn HD had already been in operation there for around six months. Both the plant team and the machine operators were therefore already well attuned to it. At that site, the TracTurn HD is powered by a Fendt 936 – delivering around 265 kW.

What was tested?

We wanted to express the turning performance of the TracTurn HD under real conditions in concrete figures relevant to cost and quality. To do this, we turned the entire main composting area twice and documented everything in detail. Windrow volume, CO_2, CH_4 and O_2 were measured before and after each turning operation. We also precisely recorded the rotor hours of the TracTurn HD as well as the tractor's operating hours and diesel consumption.

Despite wet material: 80 % of maximum performance, 2,370 m³/h throughput and 75.3 litres of diesel – that's the TracTurn HD in action under real conditions, not just in the laboratory.

Volume

Before turning, the windrows had a cumulative volume of 4,510 m³. After turning with the TracTurn HD, the volume rose to 5,040 m³ – an average increase of 12 %. If one looks only at the three freshly formed windrows, the figure even reaches 18 %. This is particularly important in the case of fresh windrows: That is where the oxygen demand is highest, and the high moisture content of the fresh input materials impairs gas permeability.

Windrow gases

The gas measurements also turned out very well. CO_2 concentration was more than halved by turning, falling from around 4 to < 2 vol.%. CH_4 (methane) was already at < 1 vol.% both before and after turning, or even below the detection limit. The O_2 content increased by only around 4 % (which may not sound like much at first), but all windrows are equipped with the COMPOair aeration system, meaning that the O_2 level was already at 17 % before turning. Since air generally contains only just under 21 % O_2, there is hardly any room for improvement here anyway. What remains crucial, however, is pore volume, as this is what allows respiration to continue between turning operations.

Performance

For the full 4,500 m³, the TracTurn HD required 1.9 hours of rotor running time and consumed 75.3 litres of diesel. This corresponds to a throughput of 2,370 m³/h and around 16.7 litres of diesel per 1,000 m³. That is quite impressive when you consider that the material was very wet due to snow and rain. This increases the weight per cubic metre, and even so we still reached 80 % of maximum performance.

Also interesting is the following: Although the plant team knew the ropes, the Fendt 936 clocked up a total of 3.8 operating hours – in other words, only half that time was actually spent turning, while the rest was manoeuvring time. This shows that it is not only throughput that counts, but also how quickly the turner can get around the plant. The faster it can move on from the windrow it has just turned, the sooner it can start on the next one. If it moves slowly, it will take forever!

Tractor-pulled compost turners

CMC ST 230 - 300 - 350

The classic tractor-pulled compost turner is to Compost Systems what the Golf is to Volkswagen. With over 30 years of experience in building turners for agriculture, combined with the practical experience of countless customers worldwide, we have a solid foundation for continuous further development that we consistently incorporate into our models.

The results speak for themselves: robust, durable machines that more than meet the tough demands of practical composting.

The feedback from our customers makes us proud and drives us to make our good products even better. Customers tell us that the newly revised rotor not only delivers 20 % more performance, but also requires 20 % less power to do so. According to operators, the combined result is a 36 % saving in diesel! So, the new rotor design from Compost Systems really is a resounding success.

It's hardly surprising that Compost Systems turners hold their value particularly well on the second-hand market and continue to do their job reliably even at an advanced age.

Watch our CMC ST models in action here

Truth or wishful thinking?

24-hour compost

There is an international trend towards simplified methods of producing compost: super-high-speed composting, dehydration, flash composting, fermentation, and whatever other miraculous names are meant to suggest a miracle. Now we need to make one thing clear right from the start: There are no miracles in composting – unless, of course, one chooses to describe the work of microorganisms as a small miracle of nature in itself.

But the fact is that the various cultures of bacteria and fungi, some of which cannot even develop alongside one another, won't be told what to do – neither in terms of the quality nor the speed of their work. And that is final! Of course, that did not stop us from putting it to the test.

The 24-hour composting trial begins with food waste at the Compost Systems office in Gars am Kamp.

So, on a well-known online platform, we opted for the best-rated model and wasted no time in investing € 400–500 in a high-speed composter from the "kitchen appliance" category. Actually, we had to return the unit right after the first attempt because it was defective, but the replacement we were sent did allow us to carry out a proper practical trial. So, we put the usual kitchen biowaste into the unit and got to work.

First of all: This involved an input weight of exactly 545 g of biowaste. After a 24-hour treatment cycle, the weight on reweighing was 326 g – a weight reduction of no less than 42 %! In the process, we consumed almost exactly 1 kWh of energy.

With that in mind, let's take a look at the energy balance. Assuming that the amount of CO_2 or other substances lost during the process is negligible, the loss in weight must be due to water being driven off. To be precise, that means 229 g of water evaporated during the test.

Let's do the maths: Purely in energy terms, 144 Wh would have been needed to evaporate 229 g of water, but our meter showed electricity consumption of almost exactly 1,000 Wh. Our express composter therefore has an efficiency of just 14.4 %! Next, let's look at the electricity bill. Now let us imagine a proud homeowner deciding to switch a four-person household over to this wonderful new express system. Assuming 150 kg of biowaste per person per year (children somewhat less, as they are not so keen on vegetables), that would mean dealing with around 500 kg of biowaste annually. Of that amount, as established in the above test, 42 % – in other words 210 kg of water – would be evaporated. Scaled up to household level, that would correspond to a total additional energy consumption of 1,458 kWh. Incidentally, that is roughly equivalent to the electricity consumption of 15 to 20 sauna evenings with friends.

In hard cash, at today's electricity prices of 25 cents/kWh including grid charges, that would amount to € 364 per year. Of course, we can also convert that to a per-tonne figure, which would yield treatment costs of € 729 per tonne of biowaste.

If we were to apply this system across the whole of Austria and process the country's roughly 1.5 million tonnes of biowaste in this way – biowaste that is currently upgraded at professional composting plants – this would result in electricity consumption of around 4.4 terawatt-hours. That is roughly the same as the Austrian Federal Railways' electricity consumption for all rail traffic over a period of 18 months. If every household drove a Tesla, the 24-hour composter would consume roughly as much electricity as driving 8,000 km in a Model 3.

After 24 hours, the biowaste had indeed been transformed into a peat-like product. In the process, around 42 % of the weight was lost in the form of water. At an electrical efficiency of 14 %, however, that water loss came at quite a price. Treating one tonne of biowaste in the machine costs more than € 700.

Unfortunately, after 24 hours of composting, the product was not stable and began to heat up again after being remoistened.

During the 28-day maturation period, the material developed heavy fungal growth and began to smell musty.

These figures would not be a real source of concern if the electricity came from the household's own solar system and the compost itself was sound. So we took another look at the product itself.

What was immediately noticeable was this: It had lost its original appearance and gave the impression of coarse, dry peat. To find out whether the product had in fact undergone biological stabilisation, our test batch was watered again. The microscope images then showed heavy fungal growth in the product and a slight temperature increase of around 5 °C above ambient temperature. The smell was rather musty – not exactly the favourite smell of the modern homemaker.

After an observation period of 28 days of "curing", we took a closer look at the product once again and unfortunately had to stop the trial abruptly at that point. A heavy culture of black mould had developed in the vessel and, thanks to an ample food supply, was clearly doing a magnificent job of producing spores. That brought the ordeal of our biowaste trial to an abrupt end, and due to serious sanitary concerns, it ultimately ended up back in the biowaste bin.

Anyone who would like to have some fun working with 24-hour composting processes is very welcome to do so. Perhaps others will have more success with it. We were obviously not clever enough to get the system running properly.

One final point worth noting is that the 24-hour composter is equipped with an activated carbon filter intended to prevent unpleasant odours in the kitchen. Incidentally, the effect is genuinely noticeable during the first few runs. Unfortunately, the filter became saturated after only a few cycles, and the smell then hit the surrounding area in full. Apart from the little flies we normally associate with the biowaste bin in summer, hardly anyone found the smell attractive. And in the end, the cost of replacement filters completely wiped out any remaining motivation for 24-hour compost production.

In the end, the material turned into one large mouldy clump.

Conclusion

Unfortunately, our original suspicions had been confirmed. There is no such thing as 24-hour compost – at least not in the sense in which we understand compost. The costs from electricity consumption alone are absurdly high and far beyond anything that could be considered an acceptable energy balance. If anything, this practice is actually more harmful to the environment than it is "eco". The electrical efficiency was just 14 %. Based on one year and a four-person household, the cost of treating one tonne of biowaste comes to € 729 in electricity alone. After 24 hours of treatment, the biowaste looked relatively fine – but only in appearance. As soon as it was remoistened, the product immediately started working (again). At the same time, however, black mould developed in the substrate, which can be highly problematic for both humans and animals. In summary: A CLEAR FAIL.

The development of black mould, regarded by hygiene experts as highly concerning, marked the beginning of the end of the trial.

The 24-hour composting trial met its abrupt end in the final resting place of the biowaste bin.

Testing means knowing!

And now we know a little more again.

At Compost Systems, we not only preach the vital importance of measurements at composting plants, but also pursue the knowledge they can bring. In this spirit, we have recently carried out a number of very exciting measurements.

Over the past five years, we have conducted detailed investigations into the odour emission behaviour of nearly 20 composting plants. Probably the most comprehensive monitoring in Austria of two compost windrows over their entire life cycle was carried out in 2024 and 2025 on behalf of **KBVÖ (Austrian Compost Association)** in cooperation with the **University of Applied Sciences Upper Austria** as part of a master's thesis.

A brief explanation of the trial setup: In autumn 2024, two triangular windrows typical of Austrian composting (height approx. 1.5 m, width approx. 3 m), both made from the same input material, were set up in parallel at one plant. The aim was to document the influence of regular turning on the odour behaviour of small, non-aerated compost windrows. During the trial, therefore, one of the windrows was turned once a week (the minimum standard in Austria), while the other was treated "better" and turned every working day (five times a week).

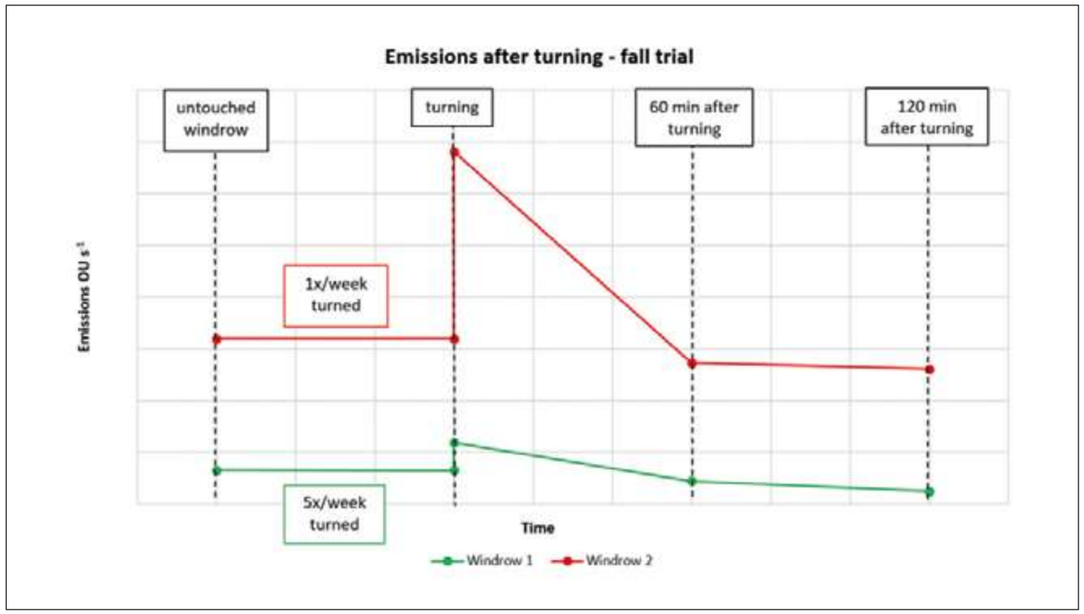
Both windrows were sampled several times a week for their odour emissions, the windrow gases produced (O_2, CO_2 and CH_4), temperature, moisture content, pH value and other parameters. Unlike other trials, this made it possible for the first time to carry out detailed, close monitoring of the key composting parameters.

To validate the results, the trial was repeated in spring 2025 with an energy-rich mixture typical of the season. In addition to the effect of the input mixture, this trial also examined the influence of "pre-storage" before the windrows were formed.

This close monitoring confirmed our previous measurement results, but it also produced new findings: For both windrows, it became clear that, with proper treatment*, the odour-intensive phase is completely over after around 2–3 weeks. In the more frequently turned windrow, odour emissions had already reached a very low level at an earlier stage. This earlier decline was also reflected in the faster breakdown of the short-chain carboxylic acids (substances responsible for unpleasant odours).

The clear difference in material composition between the two trial periods (more green-waste-heavy in autumn, and in spring a deliberately energy-rich mixture dominated by biowaste-bin material) was reflected, as expected, in a significant difference in the maximum odour load during the first odour-intensive degradation phase of around two to three weeks.

* Proper treatment: In Austria, the state of the art in composting requires turning at least once a week. For smaller windrows (windrow height < 1.5 m), it can be assumed that, due to the natural chimney effect, sufficient convective airflow is present to achieve a minimum air exchange for aerobic conditions. For larger windrows, turning several times a week or the installation of an aeration system is recommended in order to maintain aerobic conditions.



The marked differences at the start of composting between spring and autumn can be explained not only by the difference in material composition, but above all by the deliberately chosen pre-storage of the biowaste bin contents collected weekly in this case for up to 3 (!) weeks. As a general rule, pre-storage of biowaste bins at the composting plant itself is not state of the art in Austria and should be avoided. This trial setup was intended to demonstrate the expected effect of a four-week collection interval, which does occur in practice.

Odour emissions were measured before turning, directly after turning, and again 1 and 2 hours afterwards. This made it possible to describe the decay curve with a high degree of precision. In both cases, it was found that the peak immediately after turning subsides very rapidly within one hour and, as a rule, reaches a level in the range of the initial value before turning after 1 to 2 hours.

The chosen trial setup therefore allowed us to demonstrate that the emission peak caused by regular turning subsides much faster than stated in older literature. There, the decay phase is specified as lasting for "days". This provided clear proof that (regular) turning has a clearly positive effect on a plant's odour emissions.

If the daily turned windrows are compared with the weekly turned windrows of the autumn mixture (low-energy) after one week of the trial period, it can be seen that the baseline odour emissions differ by approximately a factor of 5 (!). In the decay phase after turning, which was also monitored in parallel and lasted around 1 hour, there is a difference of approximately a factor of 6 between the windrow turned every working day and the one turned only weekly.

In the energy-rich spring mixture, no clear difference in odour emissions between the windrow turned every working day and the one turned weekly was observed after one week of the overall monitoring period. Windrow gas measurements showed anaerobic degradation conditions in both windrows. This can be attributed to the fact that, because of the energy-rich and already pre-composted (anaerobic) input mixture, the brief oxygen input provided by turning is no longer sufficient to establish aerobic conditions. Even with turning every working day, the number of turning operations was too low to establish aerobic conditions.

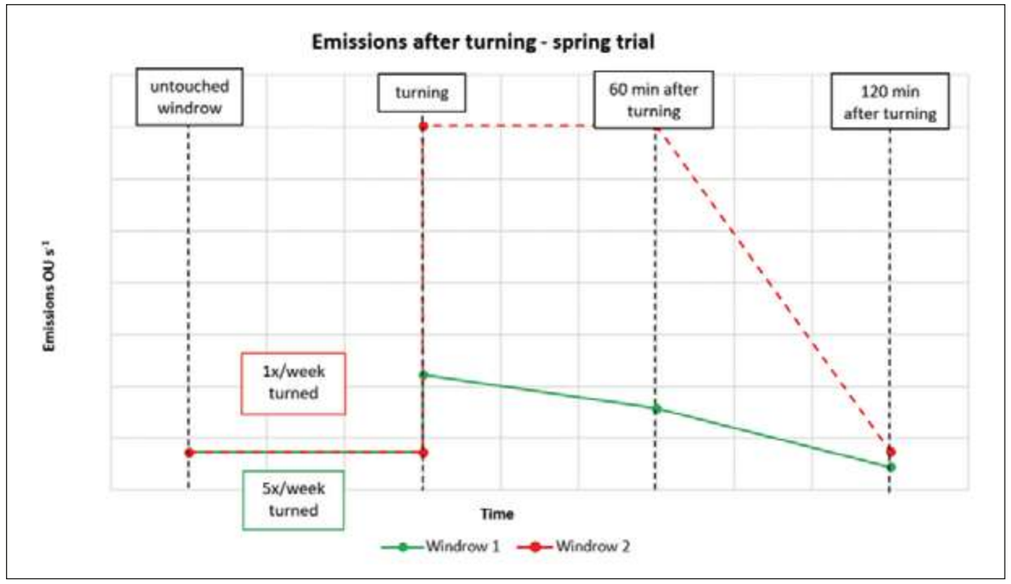
Download your SMART MONITORING SHEET here

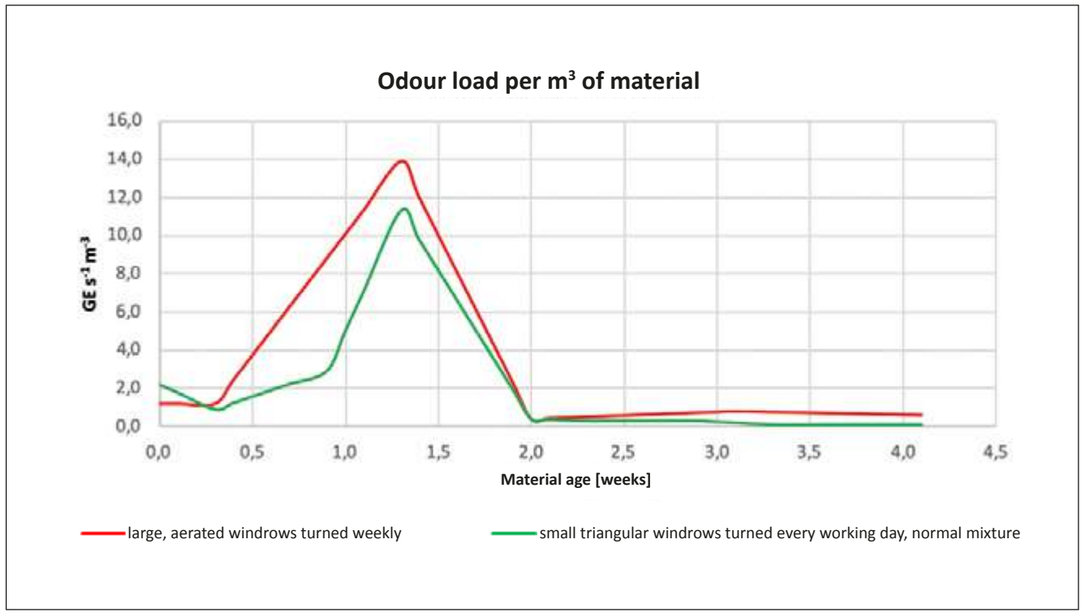
In a subsequent plant monitoring study, the same measurement programme as for the small triangular windrows was used in spring 2025 for one large, aerated triangular windrow. Thanks to the active aeration system, an aerobic composting body is guaranteed regardless of the turning rhythm.

In order to compare the odour emissions of the small triangular windrows in the autumn and spring mixtures with those of the large triangular windrow despite the different windrow dimensions, the measured odour values were expressed relative to the respective windrow volume formed. This showed that the large, aerated triangular windrow, when turned once a week, displayed emission behaviour comparable to that of the small triangular windrow in autumn turned every working day.

Further measurements showed the odour-reducing effect of a compost fleece. However, this effect is only achieved if it is sufficiently moistened. The odour-reducing effect is achieved by the film of water that forms between the fleece and the material. With a membrane or membrane fleece, this effect is inherent in the technology; with ordinary compost fleece, by contrast, this effect depends on factors such as sufficiently moist material, rainfall or morning dew *(a detailed report on these measurements can already be found in COMPOnews 2024).*

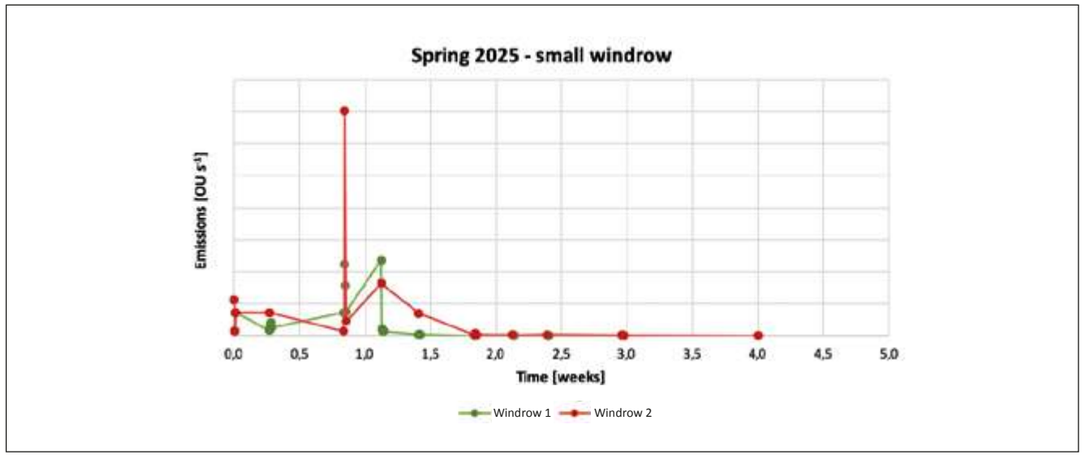
All of the results already described are based on aerobic composting. Under anaerobic conditions, which should not really occur in proper composting, odour loads higher by factors of 10 (!) are detectable due to the undegraded, odour-intensive short-chain organic acids.





The following conclusions can be drawn for properly operated plants:

- Maintaining aerobic conditions (frequent turning, active aeration) is essential and, alongside the input mixture, the most important factor influencing a plant's odour behaviour.
- With proper (aerobic) plant operation, the first odour-intensive phase of composting is complete after 2–3 weeks.
- Turning is important and affects the plant's odour behaviour only for a short period (1–2 hours). After that, emissions are generally below the level recorded before turning.
- The oxygen input provided by the time-restricted turning process is limited. Where the input mixtures are too energy-rich, turning alone is no longer enough. In such cases, a controlled, aerobic composting body can only be achieved by means of an active aeration system.
- Even with large windrow heights (2–2.5 m), an aerobic composting body can only be achieved by means of an active aeration system. Odour behaviour remains at the same (low) level as with small triangular windrows.



Temperature, windrow gases and composting parameters

Measurement technology

Without continuous monitoring of the composting process, a composter is effectively flying blind. That makes it all the more important that the equipment delivers reliable results quickly and easily.

Our measurement programme has been tried and tested for many years. The devices are easy to use and designed for practical day-to-day operation. Our range of instruments focuses on rapid measurement technology for on-site analysis at the composting plant, enabling operators to make the necessary decisions quickly and with confidence.

More information on Compost Systems measurement technology on our website

01

01 CMC soil and compost laboratory

The CMC practical kit offers easy sample preparation, simple test methods and fast, meaningful results for nitrogen, pH value and sulphide.

02 Windrow gas instrument

The digital measuring device simultaneously measures the three most important windrow gases (methane CH_4, carbon dioxide CO_2 and oxygen O_2), allowing composting conditions to be clearly described.

03 Digital thermometer

With our digital thermometer, you can obtain the temperature profile of your compost in seconds.

04 Digital CO_2 measuring device with temperature measuring

The compact combined measuring device uses 2 independent probes to measure the carbon dioxide concentration and the temperature of your compost.

02

03

04

Meeting of the Compost Systems elite!

Austria

In September 2025, we at Compost Systems had the pleasure of inviting our dealers and partners from all over the world to join us in Austria.

It was tremendous fun to spend this week with our partners. We were able to generate many new ideas and refine existing ones further. After a brief introduction to some Austrian must-see attractions, we reached our hub of creativity in Texing, Lower Austria. Affectionately nicknamed the COMPOST CASTLE by all the participants, we made plans in the nearly 1,000-year-old halls of Plankenstein Castle.

We hope all our customers will appreciate the effort our entire team put into racking their brains to make the compost industry just that little bit more effective, efficient, economical and, above all, more attractive for our customers.

The meeting opened with a sightseeing tour of Vienna.

In these venerable surroundings, we talked exclusively about compost, compost production, compost application and compost quality. Good humour, good food and alcohol were strictly permitted!

World premiere of the TracTurn HD

The crowning finale was the premiere of the new TracTurn HD at the Practitioners' Day in Hartberg. Under the motto "Bigger, faster, better", we presented the TracTurn HD in Hartberg not only to our international partners, but also to all the other visitors to the Austrian Compost Association's International Practitioners' Day.

Drawing a large number of visitors, the Austrian Compost Association's Practitioners' Day is the largest live machinery demonstration in Central Europe and takes place every two years. With more than 50 machines operating under real conditions, visitors can gain a genuine impression of how they perform in practice. The TracTurn HD, which sets new standards with a capacity of up to 3,000 m^3/h and a maximum windrow height of up to 3 m, made a fitting debut at the Practitioners' Day.

Want to find out more about compost?

CMC Compost Seminar

Composting is a biological process in which microorganisms, when supplied with bacterial feed, water and oxygen, produce a product that we largely refer to as humus. So, essentially, the subject can be explained in just four seconds. How we manage to talk about it for five days in a compost seminar is, in itself, an interesting first question.

As a matter of fact, the topic involves a host of highly complex, closely interwoven relationships, creating a field of activity so vast that even five days can only begin to reveal the tip of the iceberg.

Starting with the selection of raw materials, mixing ratios, process management and process control, and extending through plant planning and quality assurance to the somewhat more complex topics such as emissions management and mass, water and energy balances, we also aim to bring the subject to life for participants through practical experience at a composting plant.

Next date:

October 5 - 9, 2026

We kindly ask you to register in good time, as the number of participants is limited.

View the programme here

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