COMPO news

INTERNATIONAL

Edition 2020

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Dear reader,

The quest for cheap alternative energy and solutions to global warming is often an endless cycle of pessimism and frustration. We forget the connections between environmental and economic principles, alternately revere and despise electric vehicles, and engage in heated debate over whether nuclear energy helps to prevent global warming. Some politicians are still in denial about climate change, and others see no reason why they should make the first move.
So I am committing our company to telling the truth.
The truth hurts sometimes, and sometimes it can be twisted to suit a particular agenda. It's often harder to accept than the easy option of lying. But because we are an international company, ours is a neutral position. We believe that preventing climate change is all about protecting the environment, and making efficient use of energy and other resources. So we need to analyse our business processes in detail, and develop an effective and sustainable solution.
We are doing this for you and as many of our fellow campaigners as possible. We urge you to be vociferous in sharing this uncomfortable message, remain true to yourselves, and join us in the fight against the reactionaries.
The compost and waste sectors have a much bigger head start than many might think. Small measures can achieve big results – good and bad. We are proud that there are so many of us, and our numbers are growing by the day. And we are proud to be working with you to ensure that organic waste is put to good use.

In this sense we fight against Covid 19 for our seniors and preserve our natural resources - for our children!

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Back to the soil!

As the world seeks to maximise its use of renewable energy, our relationship with carbon is often overlooked.
And yet the soil, and the carbon compounds it contains, are our lifeblood.

"Imagine there was a machine that sucked carbon dioxide out of the air and stored it." Well, there is: nature invented it millions of years ago, and it's called a tree. But humanity is not paying enough attention to its crucial role in CO_2 storage; we burn wood and call it CO_2 free. It's time to rethink our whole approach. Trees do not reduce CO_2 emissions by providing us with something other than oil to burn. They absorb it over their lifetimes, and it is released when we burn wood in a stove.

Likewise, the CO_2 in the soil often gets overlooked when it comes to evaluating the process of climate change. National and international statistics pay scant attention to this, and yet it is the carbon that we most urgently need.
For example, if you enrich a one-hectare field with one percent carbon, it will absorb 50 tonnes of CO_2. Its water retention capacity will also increase by 400 cubic metres, the equivalent of a 40-millimetre downpour. Leaching of nutrients into the groundwater is partly down to large-scale livestock farming and increased use of fertilizer, but much of it is the result of dwindling humus levels in the soil, leaving fields unable to store water and nutrients.

The End of Australia as We Know It: that was the headline in a recent issue of the New York Times.

But this is only the tip of the iceberg. Alongside China and the United States, Australia has been more active than any other country in opposing effective action on climate change. It supplies China with raw materials, and yet for a while it was on the verge of being consumed by fire. This is a wake-up call. As in other countries, Australia's population is divided. Young people skip school on Fridays to attend demonstrations, and have adopted Greta Thunberg as their figurehead.

Democracy is slow, but it works. Some countries are taking longer than others to drive oil and coal lobbyists out of the corridors of power. There is a long list of measures that must be taken, and the agriculture sector bears responsibility for many of these. They are the only way to begin taking CO_2 out of the atmosphere.

In this context, the level of organic matter in our fields has decreased drastically, almost frighteningly. Many farmers grow crops with less than one percent organic matter. In today's agriculture, with its sophisticated, computer-controlled irrigation systems, the soil's ability to hold water is of secondary importance until the next heavy rains. Erosion poses major challenges for agriculture, so for farmers without automatic irrigation, climate change presents an existential threat.

They have to contend with increasingly long droughts, followed by storms in which a year's worth of rain falls in three days.

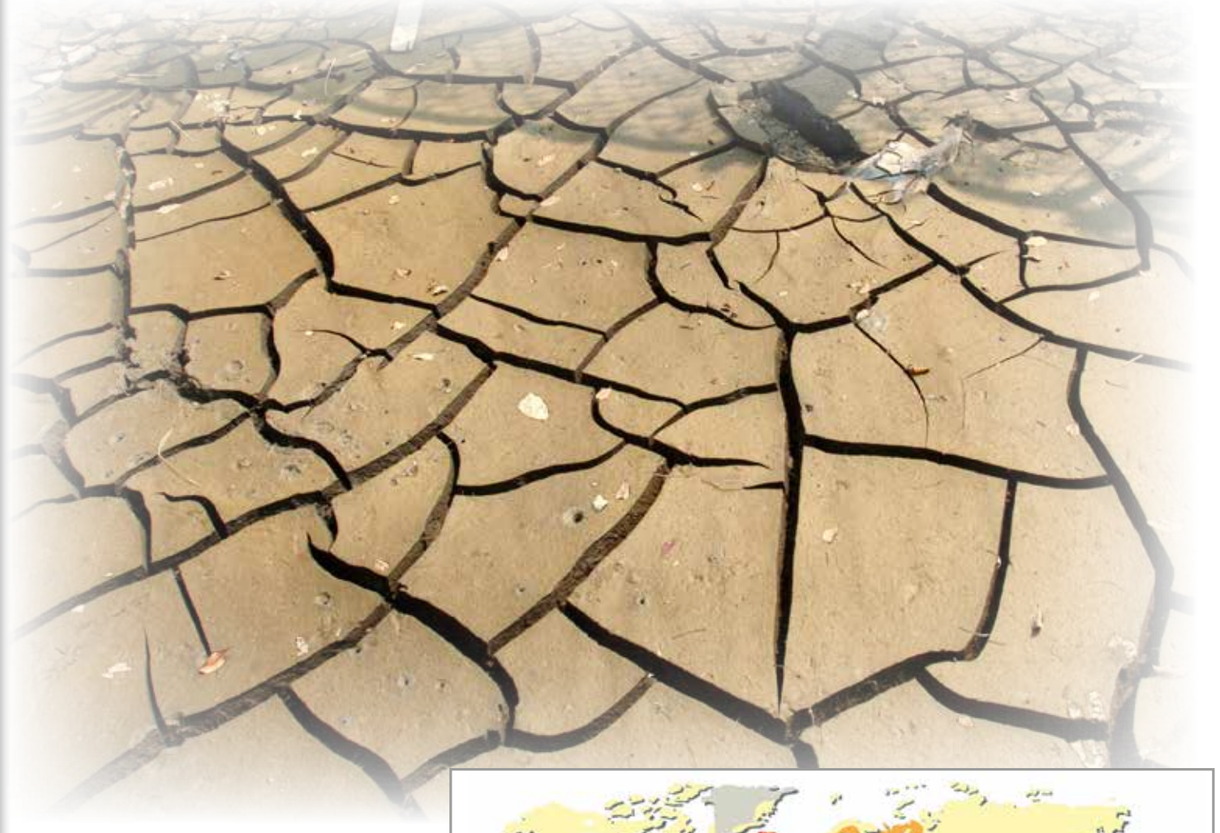
One of the most affected regions extends across North Africa and the Middle East, roughly from Morocco to Iran, and is home to more than 500 million people.

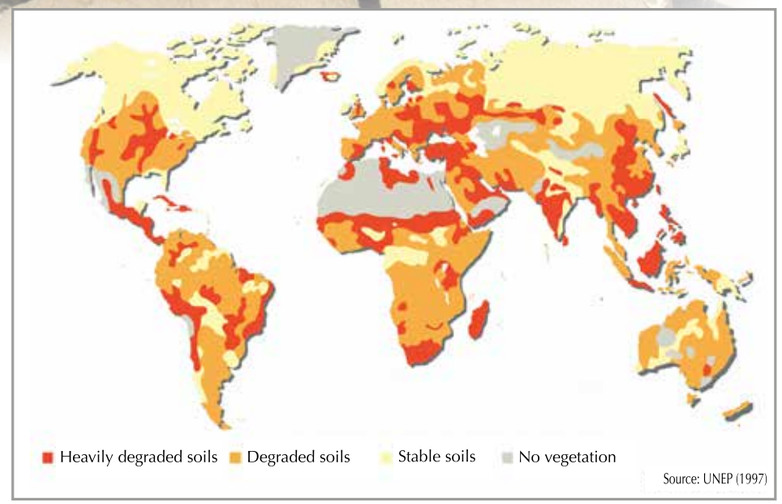
Based on current climate change forecasts, temperatures in this region will rise by up to four degrees, provided the average global warming remains below 2°C. Drastic measures will be needed to prevent the Sahara from spreading all the way to the Mediterranean sea. One of the most important ways of increasing the soil's absorbency is to enrich it with carbon and increase its humus content. Of course, this is not Europe's problem as such, but we can't just remain as passive onlookers. If we want Europe to take the lead on this issue, we must keep our eyes open. Fifty percent of the world's CO_2 emissions are created by just ten percent of its people. This is equally true of Asia, the most populous continent, and we cannot solve the problem of climate change simply by telling Asians to stop driving cars. Over several generations, we have imposed our lifestyle on a vast swathe of the planet's surface. Asians flock to our designer stores, snapping up what they regard as the coolest and most desirable aspects of our culture. They even have cosmetic surgery to bring them closer to western ideals of beauty. So it is not acceptable for Europeans to sit carping on the sidelines and claiming nothing will change as long as Asian emissions continue to increase: if we do not take action, nothing will change.
But let's get back to what we can do!

Agriculture is in the grip of the eternal dilemma: prices are controlled by the supermarkets, and overproduction by the world's farmers makes this a buyer's market. Cheap imports from Asia, Brazil, and Argentina push down prices in Europe, so Europe exports its produce to Africa, causing a collapse in prices there. This is bad news for our farmers, and they respond by overexploiting their land. For what it is worth, there is some light at the end of the tunnel here and there. The EU's plans to tie agricultural subsidies more closely to environmental measures are a step in the right direction. And the growing interest in CO_2 certificates, which farmers can earn by putting carbon into the soil, is a strong signal. In Austria, the sharp rise in compost prices over recent years suggests that healthy soil is suddenly higher on people's agendas.
But at the end of the day, who pays for all this? Sadly, CO_2 emissions have no direct effect on those who generate them, and it is often cheaper just to forget about them. For better or worse, communities need to set a price – and by communities, we mean states or groups of states. So where do we start? It can be little things, like replacing the mirrors on your electric SUV with aerodynamic cameras, saving 632 kilogrammes of carbon dioxide over its lifecycle.
Or you could invest €5,000 in fertilizing ten hectares of desert with compost, which would save 200 tonnes of CO_2 and secure its longterm future as farming land.

We can only hope that society continues to function, and politicians decide that the best way of reducing CO_2 emissions is to ensure that doing so has multiple benefits for the community.

Compost and soil improvement is one example.
Regardless of who or where!





Trivia

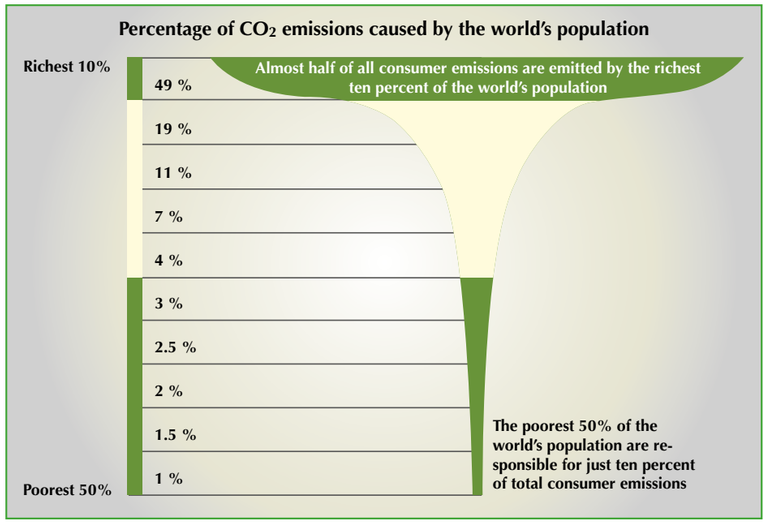
Did you know that...? Or...

Methane stinks! False! Methane does not smell at all, contrary to preconceptions. The truth is that methane is indeed emitted during an anaerobic process in compost, but it is the other organic compounds produced during the process that smell. These compound include hydrogen sulphide or other short-chain carboxylic acids.

Methane is produced when the compost process becomes anaerobic. **Incorrect!** Methane is not necessarily produced when an anaerobic process is taking place. The anaerobic process often stalls in the course of the hydrolysis stage during composting. This may be due to incorrect storage of raw materials, for example. This will cause the pH value to drop so greatly that the microorganisms breaking down matter are no longer able to do their job.
The process stops and the pH value does not rise above pH 7. This technique is used intentionally for silage or sauerkraut when lactobacilli acidify the product, thus stabilising it.

Did you know that if your compost process is anaerobic for just 2-3 days, environmentally harmful gas emissions may be doubled? This is due to the fact that methane has a 25 times more harmful effect on the climate than CO_2 (calculation based on 25% dry matter degradation over six weeks' decomposition time).

Did you know that 50% of all greenhouse gas emissions are produced by ten percent of the world's population? And 50% of the world's population are only responsible for ten percent of environmentally harmful emissions.



Did you know that the compost turner's rotor speed has a direct impact on the capacity to shred plastic?

A 40% increase in rotor speed will double the shredding energy. This may be something you should remember when the next analysis from the laboratory comes back and the plastic load per square metre or contamination with glass in the compost has been exceeding permitted values yet again.

Did you know that six tons of water are evaporated for every ton of dry matter decomposed in the compost? A little less in winter, a little more in summer.

If we take an example where composting breaks down just 100 kg of dry matter from 1,000 kg of raw material, this means there has been a water loss of 600 kg. This explains why many composters contain composts that are much too dry. On the other hand, heavy rainfall can introduce more water than the compost can handle. It is high time we think seriously about water management in compost in the era of climate change. Incidentally, poor moisture management in composting is one of the most frequent mistakes in common practice along with too little turning, an incorrect choice of material mix and excessively large compost piles.

To finish off, we have some salient facts about shoes!

Did you know that shoes that you buy from mail order produce the lowest CO2 emissions? Even if you pick up shoes from the store by bicycle, the CO_2 footprint is still about 1 kg higher than when the postal service delivers a parcel to your door (a return rate of 30% is included in calculations). The main culprit is the air-conditioned retail space in stores. Shoes perform worst if you go shopping by car since you usually produce more CO_2 when looking for a parking space than the postal service does delivering your parcel. Incidentally, you can save the most CO_2 if you don't actually buy any new shoes at all.

Biological drying

What do liquid manure, palm oil and biogas plants have in common?
A water problem.

It is probably a sign of the times that waste is readily available in liquid form. About 3 tons of liquid waste are produced for each ton of solid waste from a palm oil mill, for example

We can find similar situations with intensive animal farming in agriculture. Long gone are the days when manure was spread within the bounds of each farm using small manure barrels. Today, liquid manure is transported up to 500 km before being spread on agricultural land.
This is a situation that is also becoming increasingly difficult to solve in the biogas segment. As quantities increase, transport distances and, consequently, costs also rise. This is reason enough for us to turn our thoughts to the topic of biological drying and highlight the technology.
Biological drying refers to the mobilisation of biologically produced energy to dry biomass, based on the decomposition of organic matter. In other words, intensive composting without any irrigation.
At Compost Systems, we have gained a great deal of experience in the palm oil industry during our activities in this field. We can now also apply this expertise to manure management or fermentation residue drying.

For now, it is important that raw materials contain sufficient energy and that this energy can be mobilised. As an example, it is not very wise to restrict your formula to fermentation residue alone, because an efficient fermentation system has already removed all rapidly degradable substances from the medium. It is thus important to add more feed to the mixture for the microorganisms.
The situation is different, yet similar with liquid manure drying. Normal cattle manure contains about eight percent dry matter. Manure separation ensures it is perfectly possible to press out highly compostable material. However, it is still not possible to process the entire quantity of manure. An energy-rich bulking material also needs to be added to liquid manure. As a general rule, we can say that about four tons of liquid manure can be dried with one ton of straw, for example. The rule of thumb applies again in this case: "one ton of decomposed dry matter evaporates about 6 tons of water."

This produces a combination of various factors that help to accelerate and decelerate the process.
The amount of moisture to be discharged must be in proportion to the amount of bulking material. The carbon-to-nitrogen ratio should not be too low since this could lead to higher nitrogen losses. A lower total output is to be expected in winter, because some of the water vapour returns to the process due to condensation.
It is also important to note that biological drying is essentially ineffective if there is no active aeration.
We should also mention here that maximum aeration performance for optimising moisture discharge is only possible if temperature is measured in real time.

Incidentally, biological drying can also be used in waste management – to dry household waste, for example. It should be noted that drying alone cannot meet the stability criteria required for final disposal of waste in a landfill. However, it is possible to sort the waste in a dried state – to remove substitute fuel or other recyclable materials, for example. The residue fractions must then be dampened again and completely decomposed to prevent activation in the landfill and potential methane formation.


La Paz composting facility, processing residues from the palm oil industry


The palm fruit, from which the palm oil is extracted


Residues from palm oil production to be composted


Mixing in the manure


Adding liquid manure


Box composting – drying box with integrated energy recovery from CHP waste heat (biogas plant) in Epirus, Greece


Biological drying boxes

Protect compost!

Sometimes it only takes a single night of rainfall to ruin several months' work. Having said that, dried-out composts are not any use either.
That is why we canot say it enough: **compost must be protected!**

There are several ways of doing this. First and foremost, buildings guarantee protection regardless of the wind, sun and other weather conditions. However, there is also the option of a cover for those who cannot afford to build a structure or do not wish to spend money on one.

Two methods have proven their value in this respect: a fleece cover or covering with a membrane.
Membranes require active aeration, but a fleece can also be used without aeration.
You should never use non-permeable plastic covers.

Membrane winder in use in a French facility

Semi-permeable membrane

Compost protection fleece in use in an Austrian facility

One-sided fleece roller

	Compost protection fleece	Semi-permeable membrane
Rain protection	yes	yes
UV protection	yes	yes
Protection from drying out	yes	yes
Aeration required	no	yes
Protection against odour emission	to limited extent	yes
Weight	about 200 g/m²	about 500 g/m²
UV-resistant	> 5 years	> 5 years (in Central Europe)

Maintaining quality in finished compost – aeration for storage and maturation

During the main decomposition stage, it is plainly clear to everyone that regular turning is required to create aerobic conditions – this supplies oxygen and the respired carbon dioxide is expelled. The energy contained in the biogenic material is biologically stabilised. After about 2 months, the temperature should have fallen permanently below 40°C and the compost should be at the maturation stage or, subsequently, in storage.
Most decomposition processes are now completed, but it is still essential to maintain aerobic conditions. During the maturation stage, an excessively large pile is often built up for reasons of space or because the hired screening machine is not available at time. Likewise, turning is forgotten, which is still necessary, although not quite so often.
Mistakes are also repeatedly made when finished compost is placed in storage. Marketing mainly focuses on high-grade potting soils in spring. However, potting soil production needs to get through the winter period, difficult for composting. The product is sometimes screened too early or when it is too moist to ensure there is sufficient product for sale, meaning the finished compost starts to become biologically active again in the storage heap. Many facility operators are not even aware how far this damages compost quality. Nitrate is reduced to nitrite if oxygen is no longer present during storage. Nitrite is toxic to plants and causes root burns, which is the exact opposite of what is required for potting soil.
Installing an aeration system in the compost storage or post-decomposition area provides a permanent supply of oxygen and successfully prevents nitrate being reduced to nitrite. Excessively high moisture content can also be easily compensated.

The Earth Flow NEW! composting system

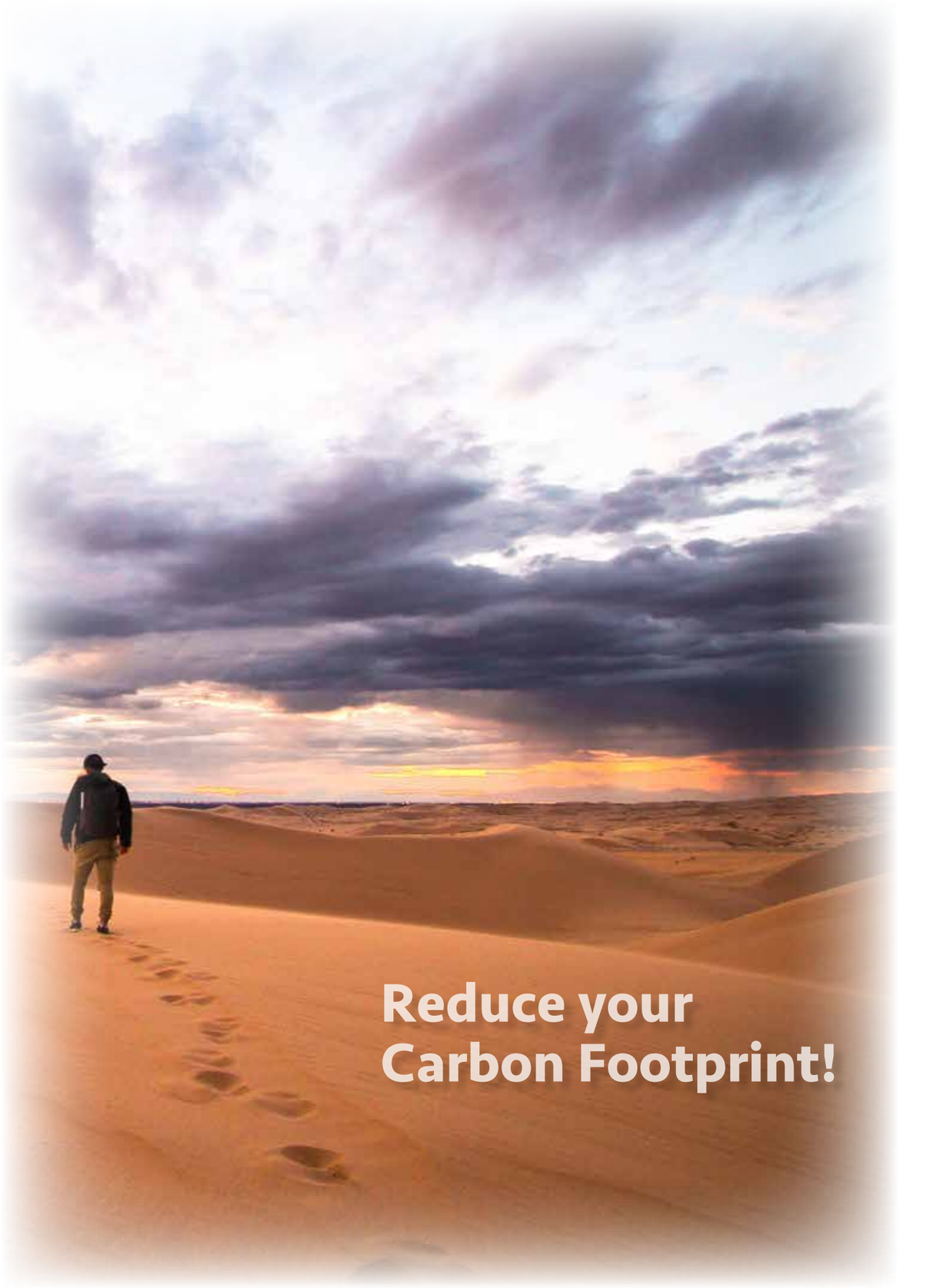
Compost Systems has taken over sales for the Earth Flow automatic composting system since early 2020.

The system pre-treats the compost in enclosed or partially enclosed container units for about ten to twenty days. The compost is then matured and completed in static units.
The Earth Flow container solution thus provides the ideal basis for stand-alone facilities and offers the perfect solution for facility sizes with a capacity between 100 t and 1000 t per year.
The Earth Flow container can be equipped with a biofilter and an extraction system to eliminate residual odour emissions as options.
Compact and flexible, the container performs the critical stage of composting and ensures the aerobic decomposition process is performed correctly right from the outset. The container is thus ideal for private facilities, for own use, agriculture and smaller composting facilities in the municipal sector. The container is also particularly suitable for the aerobic stage for fermentation residues from biogas plants.

This is Igor, from London!

Igor is called "the food waste farmer".

Igor is collecting food waste from various restaurants in central London.
After collecting the food waste, the material is filled into a CSC container, where the material starts its process of composting and sanitization. Once the container is filled, a truck will bring the container with the material to a farm outside London in an exchange routine.
After a total composting time of approx. 20 days, the containers are emptied and the compost is finished at the farm.
However, this is only half the trick!
Igor uses the compost to fertilize his land. This well prepared and fertile land he now rents to several kitchen chefs from Central London, to grow their vegetable, spices and fruits. This is what you could call a full circle food management and demonstrates the possibility to act responsibly and sustainable. Well done Igor!



Australia: Camperdown Compost


Turning with bucket excavator


Retrofitting the decomposition surface


Supplied aeration pipes

Now that there is a facility in Camperdown, this means there is a composting plant equipped with Compost Systems composting technology on every "habitable" continent. Camperdown is located in the south of Australia, about 50 km from the Great Ocean Road and about an hour from the Twelve Apostles in the state of Victoria. The local composting facility operator, Camperdown Compost Company, has more than 30 years' experience in collecting and composting biogenic waste. The company had been creating unaerated static decomposition piles measuring over 5 m in height and turning them with bucket excavators in a time intensive process for years.


The typical Australian composter's multi-purpose vehicle: workhorse on working days, beach boy at weekends

After attending our CMC seminar and several reference plants, the company entrusted Compost Systems with the task of changing the complete plant layout. Thanks to smaller, actively aerated triangular windrows, the decomposition time will be significantly reduced in the future and compost quality will also improve. The strict Australian regulations on hygienisation were also taken into account during the planning phase. In future, the temperature will be recorded on a continuous basis at each windrow using wireless measuring lances. Optimisation of plant logistics and internal processes will deliver a significant increase in plant capacity.

Construction work is already fully underway. The existing plant's substructure is currently being upgraded.
Twelve containers with concrete aeration pipes have already been delivered and are waiting to be installed.

Soil-rich Krems –
composting facility and earthworks

The Brantner Group is one of the largest waste management companies in Austria. For over fifteen years, the group has operated composting facilities which use a Compost Systems TracTurn compost turner across Austria. One of the composting facilities, the Hollabrunn site, has also been equipped with a Compost Systems aeration system for almost ten years. We have been able to demonstrate our expertise for many years.

The favourable economic development and the increased connection rate have led to a significant increase in separated biodegradable and green waste, especially in eastern Austria.

The authorised plants exceed their capacity limits, so it was self-evident that the largest player on the market would take the initiative to fill the gap.
In addition to an established location in Krems an der Donau, a composting plant with a connected soil production plant is being built at a central location in Eastern Austria with good transport connections.
The enclosed design offers optimised temperature, aeration and humidity control for the process and the maximum technical standards in exhaust air collection and exhaust air purification. These characteristics make the facility the most innovative, most modern and largest enclosed biogenic recycling plant in Austria with an annual capacity for 35,000 t of biogenic waste and 10,000 t of excavated material.
Compost Systems was incorporated into the design team right from the initial phase, so that our expertise could be used from the very start of this showcase project for the recycling industry in eastern Austria.

Construction is scheduled to start in spring 2020 and the first windrows should be formed by the end of 2020.

From left to right: Compost Systems Director Bernhard Gamerith, Brantner Group's Managing Director Stefan Tollinger, Lower Austria Deputy Governor Dr Stephan Pernkopf, Brantner Group's Managing Director Josef Scheidl

Inaugural address by Brantner Group's Managing Director Josef Scheidl

Schabs composting facility – Eisacktal district

Construction period: approx. 3 months
Started operation: 2012, extended in 2014 and 2019
Input: 11,800 t of separated bio- and green waste
Technical equipment: Five aerated boxes and positive-aerated maturation
Turner: Wheel loader or triangular windrow turner

The upgrading of the Schabs composting facility was successfully completed with the installation of an aeration system in the existing post-treatment area. A box composting system was installed upstream of the existing composting area in 2012 and 2014 without interrupting facility operation while the composting area itself was converted into an aerated post-treatment zone in 2018.

Separated bio- and green waste from the Eisacktal district collection area can now be processed into high-quality compost for fruit growing and agriculture without producing odour.

HSY Finland composting facility

The northernmost composting facility equipped with the aeration system from Compost Systems is located in the Finnish city of Espoo, near Helsinki.

Operator HSY (Helsingin Seudun Ympäristöpalvelut – Helsinki Region Environmental Services) processes 10,000 tons of green waste from the Helsinki region into compost every year.

Two sections each feature a trapezoidal windrow with a fan system extracting air.
Five trapezoidal windrows 50 m in length each can be created in the plant.

Construction period: approx. 4 months
Started operation: 2018
Input: 10,000 tonnes/year of green waste
Technical equipment: negative-aerated trapezoidal windrows
Turner: wheel loader

Herbsleben composting facility

About 10,000 tons of biowaste from separate collection have been turned into compost for agriculture for more than 30 years in former agricultural silos at the Herbsleben composting facility in Germany.

Static decomposition is used to create compost. The decomposition heaps are covered with a membrane to reduce odour emissions. The aeration required for the membrane to function was provided through on-floor aeration pipes. Plastic pipes were placed on the decomposition area and then the material was set up on top. However, these pipes need to be pulled out whenever the material is handled. In most cases, this is not entirely without any destruction.

When the platform was being renewed, the decision was made to position Compost Systems concrete aeration pipes into the floor, so that material can be easily handled as required in the future.

Original on-floor ventilation with plastic pipes

Installing pipes in the existing facility

Reconditioned decomposition area with in-floor concrete aeration pipes

Construction period: approx. 2 months
Started operation: 2019
Input: 9,500 tonnes/year of separated biowaste and green waste
Technical equipment: Positive-aerated trapezoidal windrows
Turner: wheel loader

Natura GmbH & Co. KG

Natura GmbH & Co. KG has been producing biogas from biogenic waste and generating compost from green waste and organic waste as specified by the Bundesgütegemeinschaft Kompost e.V. RAL quality mark for more than 15 years.
In September 2019, the decision was made to switch over the existing composting system to aerated triangular windrow composting.
As winter was approaching, the required earth and installation work was quickly completed, so that the composting surface could be tarmacked by mid-November.
In the future, it will also be possible to use the composting temperatures, read by wireless measurement probes, to control aeration times as well as proof of hygienisation in line with the German Biodegradable Waste Ordinance (BioAbfV).
The plant was put into full operation when the tractor-driven TracTurn compost turner went into action in February 2020.

Construction period: approx. 2 months
Started operation: 2020
Input: 9,000 tonnes/year of green waste and digestate
Technical equipment: Positive-aerated triangular windrows
Turner: TracTurn

News from India

Started operation: 2017
Input: 1,000 tonnes/day of household waste
Technical equipment: four open newEARTH sheds with eight negative-aerated, triangular windrows each, cable-free temperature monitoring and seven irrigation lines each, four roofed, positive-aerated curing halls for eight windrows with cable-free temperature monitoring
Turner: TracTurn

The compost produced from household waste at the Mumbai composting facility meets A+ class requirements specified in European standards and is sold in pellets or as loose compost in packaging units between 3 kg and 25 kg.

After starting operations in 2017, the city of Mumbai's composting facility for residual waste has since gone into full operation. It should be duly noted that the facility has achieved a remarkable compost quality despite critics predicting otherwise.
According to European standards, the compost from the facility would qualify for a class A+ rating based on its heavy metal and pollutant levels. This means it meets an optimum quality standard and would be suitable for use in organic farming. The operator currently markets compost locally as loose compost or in pellets under the City Compo brand.

Methane emissions can be prevented thanks to the guaranteed aerobic process when raw material is extracted. If the materials still went to an uncontrolled landfill, this would mean uncontrolled emission of more than 360,000 tons of CO_2 equivalent per year of environmentally harmful gases. The facility thus makes a significant contribution to climate protection!

Mitterbach composting facility

Construction period: approx. 3 months
Started operation: 2019
Input: 8,500 tonnes/year of separated biowaste, green waste and sewage sludge
Technical equipment: positive- and negative-aerated triangular windrows
Turner: tunnel turner

Naturgut und Landschaftsbau GmbH's Mitterbach composting facility is one of the pioneering facilities in Austrian composting. Organic waste has been composted there since the mid-nineties. The facility has been extended on several occasions over time. The site is established but the possibilities to expand its surface area were limited. Nevertheless, the company managed to double capacity thanks to the installation of an aeration system in its existing decomposition area.
The exhaust air is also purified in a biofilter.

It also managed to significantly reduce the turning intervals for maintaining aerobic conditions in the compost windrow.

Since the facility was already in use, conversion needed to be completed quickly to ensure operations were interrupted for as little time as possible. The existing facility's supporting structure was in good shape. Only the top sealing asphalt layer needed to be replaced. Once the top asphalt layer was removed and levelled, a work trench about 70–80 cm wide was excavated. Just two men with excavator lifting equipment were required to lay the aeration pipe. The remaining space between the work trench and the aeration pipe was filled with lean concrete. Once the connecting pipes were installed to the fans and siphon pots, reconstruction was quickly completed with new asphalt. The plant was put back into full operation after just a few weeks.

Installation team – two men plus lifting tool lay the pipes in a work trench 80 cm wide

Connecting pipes to fans and siphon pot

Composting platform – fully asphalted in a few days

Facility in full operation again

Composting facility in Sevlievo

In 2014, an EU-funded pilot project was launched to introduce separate collection of biogenic waste and production of compost in the Sevlievo region of Bulgaria. In addition to the purchase of collection equipment (collection vehicles and bins), authorities also invited tenders for the planning of a composting facility and the supply of suitable composting technology. After the usual problems of finding a plot of land due to zoning issues, the planning stage was completed in 2015 followed by delivery of the complete aeration and turning technology. However, delays in the subsidy application process and construction postponed initial operation for over four years, meaning the construction stage and cold testing of the facility were not completed until autumn 2019.
Since early 2020, up to 3,000 tons of separated organic and green waste per year can be handled at the composting facility in Sevlievo and then returned to the environment as compost.

Started operation: 2019
Input: 3,000 tonnes/year of green waste
Technical equipment: Negative-aerated windrows with cable-free temperature monitoring
Turner: tractor-towed compost turner ST 350

Typical mass balance of a MBT plant

Compost SYSTEMS

Compost Systems MBT-Technology

Delivered waste

100 %
(100,000 t)
Solid waste

8–10 % *(8,000–10,000 t)* → CO_2

18–22 % *(18,000–22,000 t)* → H_2O Vapor

10–15 % *(10,000–15,000 t)* → Compost (CLO)

20–35 % *(20,000–35,000 t)* → RDF *wet* → Biological drying → RDF *dry* 15–20 % *(15,000–20,000 t)*

2–4 % *(2,000–4,000 t)* → Metals (Fe, Ne)

5–10 % *(5,000–10,000 t)* → Recyclables (PET, Glass, ...)

0–10 % *(0–10,000 t)* → Inert (Stones, Glass, ...)

$CO_{2\ equiv.}$ Reduction
- 80,000–100,000 t/a
(prevention of
1,400–1,700 t CH_4)

10–30 % *(10,000–30,000 t)* → Landfill inert
(Respiration rate
$AT_4 < 10$ mg O_2/g dM)

Seiringer, Austria

Open windrow composting
with turner TracTurn

Ryman, Poland

Box composting and
open maturation

A Greek statement of art

Located in the north-western part of Greece, close to the city of Ioannina and the ancient city of Dodoni, the MBT plant is managing the municipal solid waste of the Epirus prefecture.

The project was implemented as a Private Public Partnership between the Epirus Region and "Aeiforiki of Epirus", subsidiary of TERNA ENERGY Group, with the vital contribution of the Public & Private Partnerships (PPP) Special Secretariat, and constitutes a model project, as it was completed within an unprecedented licensing and construction timeframe. It has also been awarded as "the project of year 2018" at the 3rd Infrastructure and Transport Conference in Greece.

Construction period: approx. one year
Started operation: 2018
Input: 105,000 tonnes/year of MSW
Technical equipment: 9 active aerated COMPOboxes, one positive aerated drying box
Scope of delivery: engineering, aeration technology, EI&C,exhaust systems, box systems, irrigation, mixer

Mechanical separation line provided by Stadler

Anaerobic treatment plant supplied by Kompogas/Hitachi Zosen

Aristoteles Frantzis, Director of Operations of the Waste Management facility, is providing the project's specifics.

Compost Systems: *Aristoteles, please give us a glance of the facility.*
Aristoteles: The facility is processing 105.000 tons of waste on an annual basis. It receives the mixed municipal solid waste from 18 Municipalities from the region of Epirus, with a total population of about 350,000 people. The total investment amounted to EUR 52.6 million.
Compost Systems: *What is the impact you are expecting to bring to the Region of Epirus?*
Aristoteles: The positive environmental impact of the facility is the fact that significant amounts of materials are now being recovered from the municipal waste of the Region and diverted from landfilling enhancing the circular economy. In addition the plant produces renewable energy from the organic waste via anaerobic digestion and feeds to the local grid with enough electrical energy to provide 1,000 homes with energy all year long.
The plant has one of the lowest tipping fees in Greece at just below 40 €/t providing top quality environmental services that do not burden the local communities.
The operation of the plant has both direct and indirect effect on employment in the wider area.The plant employs 70 people, while it is estimated that at least 120 jobs in businesses relevant to the plant have been created.

Getting into the heart of the facility, we will have the opportunity to be guided through by George Roibas, the Operations Manager.

Compost Systems: *George, please tell us a few words about the processes you follow here from the time you receive the waste.*
George: The waste trucks offload in the reception bunker. Then the mixed waste enters the Mechanical Sorting where we retrieve all the recyclable materials and forward them to regeneration factories in Greece and the EU. The organic fraction is diverted and part of it goes through the Anaerobic Digestion process where methane is produced and used to fuel a Cogeneration of Heat and Power unit with an electric capacity of 1,56 MW. At the same time, part of the heat is recovered and used to thermally dry the waste in a later stage, as well as cover the heating needs of the plant during winter.
While the fine fraction of the organics goes through the anaerobic digesters, the coarse fraction goes directly to the aerobic treatment facility where it is mixed with the digestate (fine organic fraction) that comes out of the digesters. The aerobic treatment unit receives and processes more than half of the total incoming waste.
Finally, after about 5 weeks of aerobic treatment (composting, biodrying and thermal drying) the facility is producing about 15000 tpa CLO, which is used as soil amendment media in the restoration of spent quarries of the Region.
Compost Systems: *What are the working conditions in a modern waste facility?*
George: Regarding health and safety, it is worth noting that the company is certified according to OHSAS 18001 and all personnel uses the appropriate personal protective equipment depending on their job requirements. Moreover, the plant has implemented and utilizes cutting edge technologies. The hand picking cabins are fully air conditioned with an automated fresh air ventilation system. All production premises such as the Mechanical Treatment Unit, the Composting boxes and the compost Refinery are equipped with a complete odor and dust control system. The dust is removed by bag filters while the odor abatement is achieved by using a two stage bio-trickling tower, a chemical scrubber and a biofilter. The technologies implemented keep the emissions of dust, odor and ammonia to a very low level, way below the limits of national legislation.

The Epele and Bizkaia facilities in Spain

Organic waste collection is being introduced across Spain in compliance with the EU Directive on separate collection of biodegradable waste. Besides separate collection, this waste also requires treatment under optimum conditions using the best available technology. With its three provinces of Gipuzkoa, Bizkaia and Araba, the Basque Country is a pioneer in this respect. Separate collection was first introduced as a door-to-door collection service in the province of Gipuzkoa. However, it was not only necessary to collect the waste but also process it further. As a result, the composting facility was built in Epele to produce quality compost in 2015.

To ensure long-term production of quality compost, management at GHK (Gipuzkoa Province Waste Management Service) not only required supply of an efficient, time-tested technology, but also support from the technology supplier over 12 months once the facility was put into service.

This enabled GHK to define operating and quality standards in cooperation with Compost Systems, as the supplier, which would form a binding basis for the current private operator of the facility.

Thanks to this wise approach, the composting facility in Epele has already been elected Spain's best composting facility for separated biodegradable waste two times.

Separate collection was then introduced in the province of Bizkaia. However, the equipment in the existing composting facility was not suitable for producing high-grade composts. After the positive experience in Epele, it was thus decided to adapt the existing composting facility based on the systems in the Epele facility. Alongside potential future quality control and emission recording, the facility upgrade also increased processing capacity. The new composting facility in Bizkaia was designed to handle a volume of 20,000 t per year.

The collected organic waste is mixed and homogenised with bulking material and green waste and then poured into one of the eight new composting tunnels.

Epele

Construction period: approx. 8 months
Started operation: Summer 2015
Input: 22,000 t of bio- and green waste
Technical equipment: 8 rotting boxes for the first treatment; 8 aerated maturation windrows
4 pressure-aerated storage bays
Turner: TracTurn

After four weeks, the raw compost is processed further in the aerated post-composting zone. Once post-treatment is complete, the compost is screened and can continue to mature longer in the aerated storage boxes until it is sold.

In addition to a bio-filter, exhaust air treatment also consists of an acid scrubber to minimise odour emissions as far as technically possible.

Due to the heavy rainfall in the region, the whole composting facility is roofed, including the biofilter and handling sections.

Amaia Moreno Gonzalez
Environmental engineer at GHK

"Our composting facility has been a success, exemplary for many in Spain and worldwide.
The chosen procedure ensured successful operation and end product quality assurance. The twelve-month runtime after initial operation with active assistance from Compost Systems technology experts and engineers made it possible to create operational and quality standards, which became basis for the operator.
The consistent implementation of these strict standards ensures quality even if the staff change."

Bizkaia

Construction period: approx. 8 months
Started operation: Spring 2020
Input: 20,000 t of biowaste including bulking material
Technical equipment: 8 rotting boxes for the first rotting treatment stage; 8 aerated post-composting sections, 3 pressure-ventilated compost maturing storerooms
Turner: tunnel turner

Composting in Andalusia

Climate change has become a reality in Spain. Storm Gloria unleashed its destructive force along Spain's Mediterranean coast, causing irreparable damage. Facilities located directly on the coast have become virtually worthless, are not insured and are unsellable.

You could say it was nature's response to the fiasco that was COP25 in Madrid in 2019.
Southern Spain not only makes a living from tourism, but also from agriculture. Divided into the three production areas of Nijar, Almeria and El Ejido, the Almeria region features the world's largest concentration of intensive vegetable production in greenhouses.
This region alone produces 2 million tons of biodegradable waste per year according to unconfirmed statistics and estimates. However, only a small proportion of this waste is processed into fertiliser and fed back into the soil. We might ask ourselves why. How is this possible?

The history of intensive agriculture in Almeria province has its roots in the Franco era. Of purely volcanic and marine origin, the soil in Almeria is infinitely rich in micro- and macro-elements like no other soil in Europe. Unfortunately, it is highly lacking organic content with average levels between 0.2 and 2%.
It was the Arabs who discovered enormous reserves of fresh water in the depths of this barren earth during their rule. Systematic colonization of the semi-desert around Almeria became the regime's most far-reaching initiative. Even back then, people realised that combining mineral soil with organic matter and water from the depths of the earth delivered exceptionally good harvests. Manure was used as a biomass at that time as it is now. Huge quantities of manure are imported to Almeria from other parts of Andalusia and regions further afield such as Castile and Murcia, instead of composting their own waste and using it as fertilizer.

But for an outsider, the reason is quite clear. The problem is the plastic. In the greenhouses, all climbing plants are guided along plastic twine – first upwards, then often criss-cross horizontally. There are kilometres of twine in each greenhouse. When production is finished, the fully grown plants are taken out of the greenhouses. They are still mixed together with this twine and dried in the sunlight, brought together as unusable waste on large spaces and in landfills and piled up in huge mountains. Composting using conventional machines is impossible since shredding causes the torn twine to become inseparable from the biomass and permanently contaminates the product.
Composting with wheel loaders in huge spaces is very expensive and not efficient. The gassing mass often ignites spontaneously and the process takes an extremely long time, producing inferior quality compost in the end.
There have been attempts to get farmers to separate the twine from plants, but calculations were made without farmers. Why should farmers take on extra work to separate the twine on their farms to help other people's businesses? Things continued in this way until climate change appeared, casting a long, threatening shadow over the Iberian Peninsula with weather phenomena such as the Gota Fria and Storm Gloria.
One day, however, an Andalusian came up with an idea. He asked himself what needed to be done to make farmers benefit and take an interest in separating the plastic from the plants or even stop using it.
The growing trend towards organic production also helped to develop a new idea, the idea of own consumption.
A cooperative was founded for the self-employed to put this idea into action after four years of development.
Compost Systems could almost be considered a member of this cooperative as one of our freelance collaborators joined as a co-founder. This is how the Ecogestiona SCA was created.
The basic concept and basis of this model is to build small or mini-composting facilities. These then completely transform the waste from each finca into quality compost and quality fertilizer in both solid and liquid form in any quantities that meet most requirements for biomass and soil organisms such as bacteria and mycorrhizae.
However, each of these facilities should have all the features of an industrial plant when it comes to process control. Nothing should be left to chance. The facilities should not only guarantee control of pests, but also prevent the spread of diseases.
Since a mini-facility is not able to produce at a reasonable price and farmers themselves do not necessarily need to be a composting expert, these structures require an external professional operator. This is where Ecogestiona comes in. The cooperative thus provides the staff, the necessary machines and control devices and operates the facilities.

In Almeria, all the customers are near to one another, so transporting machines from facility to facility is simple and cost-efficient. Five to seven facilities that can be operated in this way over a week produce a waste volume equal to that of a medium-sized composting plant. Farmers are also not forced to buy machines that they cannot use to full capacity. The operator ensures the quality compounds and concentrates of the selected micro-organisms. Their mixture is adapted to the crop being fertilised, creating what is known as a "smart compost".
This idea, a problem-solving initiative, caught the interest of those in charge at the Andalusian Department of Agriculture. Ecogestiona was commissioned as an advisory partner to design a pilot facility and build and operate it on the IFAPA premises (Instituto de Investigación y Formación Agraria y Pescera) in La Mojonera, Almeria. At the same time, all types of trials with quality fertilizers such as BFS (solid organic fertilizer) and BFL (liquid organic fertilizer) and trials with compostable, completely degradable twine are being planned and performed in adjacent greenhouses by the rope manufacturer Bezalin based in the Polish town of Bielsko-Bia a. All vegetables, fruit and green waste exclusively from all IFAPA experimental greenhouses and green areas are used as biowaste.
If this trial demonstrates that such facilities are truly suitable for full consumption of own waste for agricultural use, the government will support this approach in such a way that it will soon become compulsory in the region. An environmental and climate problem that has not been solved for decades could become another success story in Andalusia.
Ecogestiona's first own pilot plant has certainly already made a great impact on nearby regions and other industries. Ecogestiona is currently working on the design of a solution for composting sewage sludge. Tourist areas in Andalusia such as the coast have substantial differences in material flow, a situation which Compost Systems is not unfamiliar with.
The Compost Systems solutions such as those at the Polish reference plants in eba and Swarzewo serve as a model for Andalusia. A revolution is slowly emerging and climate protection, organic agriculture or even CO_2 farming are becoming a reality with an impact worldwide. IFAPA La Mojonera has received more than 100 visits by interested professionals from all over the world every year with visits becoming increasingly more frequent.
Ecogestiona is continuing with its work and is planning to expand its activities to cover all of Spain. It is working together with IFAPA Jaén, a centre for the olive industry, and NEIKER, an institution similar to IFAPA in the Basque Country on developing a quality composting solution for regional biodegradable farming waste such as alpeorujo (olive waste) and cow manure.

Reduction of plastic impurities in composts

Plastic contamination in municipal composts is a long-standing problem and attempts are being made to achieve a significant reduction by banning disposable plastics or using biodegradable plastics as collection aids. A standard (EN 13432) for these biodegradable plastics with regard to degradability was announced by the EU, and it has also been proven in many practical test series that these plastics are almost completely degraded to carbon dioxide and water.

In agriculture, plastics also carry great risk of soil contamination. Examples are cover films in the asparagus industry, growth covers for trees or growth strings in the vegetable industry. In cooperation with a fiber processing company, Lenzing AG has developed a special string made of Lenzing Lyocell cellulose fiber, which on the one hand fulfills the same technical parameters as a plastic string (tensile strength), but on the other hand is degraded without residue according to EN 13432. In a field test under realistic conditions at a technical composting plant under the supervision of Compost Systems, a 12-week composting trial was conducted to provide practical proof of degradation.

In agricultural production in greenhouses, strings are used to help the plants grow upwards. They must do so maintaining the weight of the plant over the entire growing period (up to 10 months) without breaking. At the end of the vegetation period the strings are shredded together with the plant.

Plastic fibres distributed throughout the material

At present, mainly plastic strings are used, which leads to the problem that the fine plastic parts cannot be removed from the shredded plant material or can only be removed with great effort.
Likewise, separating mechanically the plant from the growth string is very difficult to accomplish.
In practice, the proportion of string in relation to the plant material is about 1 %. As no shredded plant material was available in sufficient quantity at the time of the test, it was decided to produce a comparable initial mixture of green waste and biogenic household waste ("bio bin") with added pieces of string. A 15 m long "section" of a compost heap was made available, which was completely separated from the remaining heaps in order to avoid possible mixing/dilution. 600 kg string pieces were added to approx. 56.4 t of decomposition material – 1.06 % string portion.

The duration of the test was determined according to the state of the art with 8 weeks of aerated main rotting and 3–4 weeks of post-decomposition.
The pieces of string were applied to the top of the windrow and then mixed in with the turner.

Application and mixing of the string pieces

After mixing with the turner, a good ratio of mixing was already recognisable.

Optimum distribution after mixing

To ensure aerobic conditions, an aeration system installed in the decomposition surface is used on the test facility. The necessary gas exchange and the supply of fresh air are thus no longer dependent on the mechanical processing of the turning, but take place independently. This allows a continuous oxygen supply. In addition, a water content of 40-60 %, which is important for composting, was maintained. The homogeneous distribution of the moisture over the entire rotting body is important, which makes turning absolutely necessary in order to enable an even mixing.
During the main composting process, the windrow air composition and temperature were measured twice a week at 3 points of the experimental windrows. The temperature was also measured continuously with a wireless measuring lance at 3 points. Additionally, water content (regarding possible addition of water) and pH-value were determined.

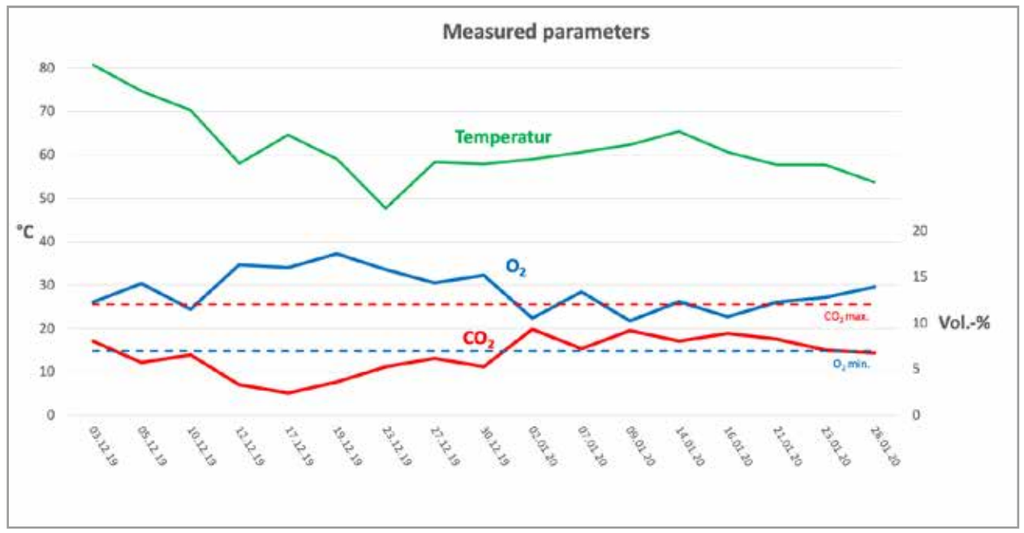
According to the above mentioned measurements, the decomposition process ran under optimal conditions. The windrow gas values were always in the aerobic range, the pH value was in the expected range of pH 7.4 rising to pH 8-8.5. Likewise, the water content was kept within the optimal range of 50 % by the appropriate addition of irrigation water or natural irrigation (rainfalls).
As expected, the temperature was reduced according to the rotting progress of the initial process.
According to ÖNORM S2205, the normal values for the oxygen content in the pore air are between 7 % and 12 % by volume during the main rotting process. The CO_2 content should not exceed 12 vol.% and the CH4 content 1 vol.%.
Due to the aeration system used, the oxygen content was always well above 10 % during the entire duration of the test, the CO_2 content never exceeded the 10 % mark. Likewise, no methane was detected, so the process always took place in an aerobic environment.
Methane was always at 0 %, therefore no separate curve is shown.

Relatively little degradation took place in the first weeks of the test. But that was certainly also due to the fact that new fibres (without 8 months of UV exposure in the greenhouse) and production-related very long pieces of string with a length of 20-25 cm (compared to the shredded plant material with 2-3 cm long pieces of string) were intentionally used in the experiment.

However, as the test progressed, it was noticed that the strings spliced open and the tensile strength also decreased significantly from about the 6th rotting week. With the transition from the main rotting phase to the maturation phase (8th rotting week), the tensile strength of the pieces of string still detectable was practically non-existent, and at the end of the experiment (11th rotting week), the tensile strength of the string pieces had decreased. At the end of the experiment (11th rotting week) some small pieces of fibre were found (diameter < 1 mm, length < 1 cm), but it could not be clearly determined whether these were the remains of plants (root hairs, plant fibres, etc.) or the remains of growth strings.

Conclusion:
In summary, it could be stated that under aerobic conditions with appropriate moisture management, as should always be the case on a properly managed composting plant according to the state of the art, composting the strings/fibres doesn't present a problem. The use of these types of strings is an important contribution to be able to return agricultural production residues from greenhouses as valuable compost/fertiliser into the own environment without contaminating the soil with plastics.

The experience from previous experiments in New Zealand (heap composting) and Germany (fermentation with drying boxes), where the degradation of cellulose has practically not taken place, has shown that for a properly managed composting process there is absolutely no problem in creating the appropriate degradation and conversion of cellulose.



Ethiopia – the emerging nation in East Africa

We first supplied equipment for a communal composting facility in Ethiopia back in 2014. Since then, a great deal has happened in the country, which is now among the fastest developing countries in Africa. The country's prime minister brokered peace in the country, for which he received the Nobel Peace Prize in 2019. Since then, Ethiopia has pursued economic and social development at a surprising rate. This is a country where 80% of the population still depends directly or indirectly on agriculture and which is particularly affected by climate change. This is a country which is building its infrastructure in record time. Migration from the land poses a huge problem, even though the countryside features spectacular landscapes, presenting cities with major challenges.

In spring 2019, we were allowed to present our Austrian waste management during an official visit by the Ethiopian Environment Minister. We are therefore all the more pleased that we have now been able to equip several facilities with Austrian compost technology. Six new plants have been built in various parts of Ethiopia with funding from the UN. Equipped with Austrian expertise and technology, they serve as showcase models for modern waste management in Ethiopia.

It is important to note that compost makes a huge difference, especially in a country with such a hot climate which is always afflicted by the consequences of long drought periods. Soils and crops become more resistant to withering, pests and diseases. We have been told that yield increases by 100% in the case of onions, for example.

We would like to pay tribute to the UN and the Ministry of the Environment in Ethiopia. It is precisely such projects which help a country and its people to progress.

Environment Minister visit to Austria

A quick note ...

... the CMC ST 200 is also available as an assembly kit!

We supply a complete kit with comprehensive instructions on how to assemble a compost turner 2 m wide. You will receive all the components you require in a compact shipment package which will allow you to assemble your own compost turner just like you would furniture from a Swedish furniture retailer. Knowledge of welding and paint finishing are a vital prerequisite for successful assembly.

You will find more information on our website at www.compost-systems.com

VIDEO

See how it´s done!

State-of-the-art for a flexible start: CMC SF 200

The small and micro facility segment is also undergoing continuous development. Years of experience on the part of the manufacturer and extensive practical experience on the part of customers have made it possible to continue developing the self-propelling, electrically operated CMC SF 200. The end result impresses with minimum space requirements, optimum mixing capability, low-noise electric drives and simple operation using the manual control unit or optional radio controls.

NEW!

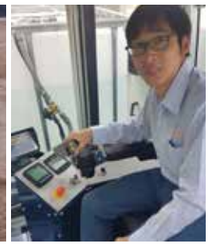
Sustainable vegetable production with the CMC ST 350

Some 2,000 tons of crop residues from tomato, cucumber and pepper production are processed into high-grade compost every year at the Kirchweidach organic farm in Bavaria.
This compost is used to provide sustainable, organic crop soils in greenhouses spread over six hectares.
It all started with a visit to Compost Systems' International Compost Seminar back in 2017 to learn about the basic principles of composting. The farm then began producing their compost after acquiring a CMC ST 350 in 2018. They worked with Compost Systems to set up a composting site and produced their first compost. This was then applied to the soils in the nine greenhouses. Quality compost provides a sound basis for sustainable organic vegetable production, including and especially in greenhouses.
Fertilisation in organic farming is subject to strict rules. Mineral fertiliser cannot be used and organic fertiliser must come from an organic source. The Kirchweidach organic farm managed to complete the organic cycle by using its own organic residue materials as a base material for the compost.
A highly promising crop year in organic vegetable production served as a reaffirmation of the Steiner family's approach in 2019 and they will continue to use their own compost in the future.
We at Compost Systems are proud of our contribution to this success.

VIDEO

CMC SF 300 goes Taiwan

After successful export of two tractor-towed CMC ST 300s in 2018, our self-propeller, the CMC SF 300, embarked on the 9,300 km voyage to the Port of Kaohsiung in Taiwan. Residues from sugar production are being processed at the Tainan Sugar Corporation in Tainan, the oldest and sixth largest city in Taiwan with some 1.9 million inhabitants. You could see the operators' enthusiasm with the new mechanical composting tool as it was put into operation.



Compost testing technology

Testing is knowing! Without the continuous monitoring of a composting process, the operator is moving in a blind flight.
Even or especially the most experienced operators of composting facilities control their rotting process. Here it is IMPORTANT that the devices will easily and quickly lead to reliable results.

Our measuring program has been successful for many years. The devices can be operated easily and in a practice-oriented way. The range of our measuring equipment focuses on fast measuring technology for on-site analysis at the composting facility to quickly and accurately make the necessary decisions for the operation.

Temperature

Digital thermometer
With our digital thermometer you quickly receive the temperature profile in your compost.

Compost analysis

CMC soil and compost laboratory
The CMC testkit stands out on account of its ease of sample preparation, simple test methods and fast, meaningful results for nitrogen, pH and sulphide.

Windrow gases

Carbon dioxide measuring device
The analogue carbon dioxide measuring device is widely used in practice on account of its ease of use. Pump, shake – and read off the gas content straight away.

Oxygen measuring device
The analogue oxygen measuring device, like the carbon dioxide measuring device, is low-maintenance and simple to use.

Windrow gas measuring device
The digital measuring device simultaneously measures the three most important windrow gases (methane CH_4, carbon dioxide CO_2 and oxygen O_2), which are used to describe the process conditions.

Find more information on our measuring technology here:

CMC compost seminar

... Shared knowledge about compost and organic waste treatment.

Our experienced trainers share knowledge about compost, soil, plants and the environment, natural laws and their correlations from their own experience and daily application.
The training program also covers important topics such as material flow management, quality assurance, system design, water, mass and air balances or the application of compost, soil substrates or compost tea.

For us, it is important to demonstrate the link between theory and practice. Accordingly, hands-on work takes place directly on-site, where participants can learn about process control, turning interval, water balance and measuring equipment.

The training course is targeted at plant operators as well as consultants, plant designers, compost users, lab assistants and anyone interested in compost and its effect.

You will find more information on the course programme as well as registration for the next CMC intensive course here:

We look forward to welcoming you on one of our courses. Please register early as places are limited.

CURRENT DATES YOU CAN FIND ON OUR HOMEPAGE!

CMC ST 200

CMC ST 230

CMC ST 300

CMC ST 350

CMC SF 200

Please refer to our website for further details:

CMC SF 300

TracTurn 3.7

Hopper/Mixer

Screening station

Fleece/Membran-roller and covers

CSC- Container

Earth Flow

CMC-Testkit

Measurement technology for compost

Welcome to one of over 100 working facilities!

We are happy to take care of your concerns:

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