



Dear reader,

Increasing attention towards energy from waste is changing the organic waste treatment market. For certain waste streams the CO₂ producing composting process is more and more replaced by anaerobic digestion, with which electricity and heat is generated in a Combined Heat and Power unit (CHP) from the produced biogas. Christiaens Group acknowledges this change and thinks both systems work complementary to each other. Digestate from the AD-process requires less composting due to the extracted energy. The final composting can be done by using (part of) the electricity and heat from the CHP. This combination significantly reduces the carbon footprint while keeping the (similar) compost output.

Although wet AD (using high calorific liquids from mainly food waste) is using quite well known technologies, the dry AD or High Solids digestion technology (producing energy from lower calorific green solid waste) is still premature. The different types of waste and the feed-in tariffs in the different countries clearly affect the amount and type of AD facilities and its process and thus its environmental and economical efficiency.

Therefore Christiaens Group and BAL Biogas-Anlage Langenau started a cooperation in 2009 to combine both expertises. BAL provides technology for High Solids digestion in air tight tunnel systems (see page 7). Furthermore Christiaens Group is testing other methods of digestion in general in its own testing facility.

However, since composting is far from being antique, Christiaens Group is still (successfully) tendering for designing and building different systems for all types of composting facilities around the world.

All our current facilities are in successful operation. Different types of legislation regarding compost quality and hygiene do not seem to stress the performance of the technology. Moreover, the energy use per tonne of waste is very competitive, even low. This makes waste composting more efficient.

In order to fulfill all these (ever more stringent) requirements, Christiaens Group is continuously designing and developing new solutions. Almost 30 years of experience in combination with the fact that the Group produces almost every supplied item in a composting facility, results in cost effective, high quality and successful designs each and every time.

Summurizing all said above, we could definitely say:

We make your waste (even more) valuable!

bulletin

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Ufton In-Vessel Composting Facility

[Ufton, Warwickshire, England]

After the good results that were achieved in the Biffa Etwell In-Vessel Composting facility, a second facility is realized for Biffa Waste Services Ltd. For this project Christiaens Group partnered up with G F Tomlinson Group, who were responsible for the civils. As already was the case for the Biffa Etwell IVC, the cooperation was very successful.

The input material for the Ufton IVC is collected in the Birmingham area and consists of mixed green and food waste. Depending on the season the ratio green/food waste is varying from 80/20 to 60/40.

Due to the content of food waste the material coming out of this facility has to meet the strict Animal By-Product Regulation. ABPR is legislation that became active after the devastating Foot & Mouth diseases that swept throughout Europe some years ago. The ABPR should limit the spreading of diseases, by demanding a pasteurization period. Currently this requires the waste to be above 60°C for 2 x 48 hours.

The design capacity of this two stage system is 40.000 tonne/year. The lay-out consists of a receiving/tipping hall which gives access to the 5 stage 1 tunnels. The stage 1 tunnels have double access doors to prevent cross contamination. After stage 1 the waste is put into one of the 3 stage 2 tunnels. After stage 2 the waste is stored outside to mature.

To minimize odour emissions the whole building is kept at negative pressure, preventing emission of odours. The exhaust of the tunnels is centrally collected after which it passes one of the water scrubbers and is then blown through the biofilter for final clean up.

The Ufton IVC facility received the first waste in September 2009. The facility was ABPR approved in March 2010. Currently (summer 2010) throughput is even more than the design capacity, without having any problems.

Although the facility is working very well Biffa Waste Services Ltd is always looking for further improvements. Currently they are looking towards changing the two-stage pasteurization protocol into a SINGLE PASS protocol, which should result in reduced handling and increased throughput. If this change will be successful, of which Biffa is very confident, the pasteurization protocol for the Etwell IVC facility will also be adapted.





City of Guelph OWPF *(under construction)*

[Guelph, ON, Canada]

Recently the re-construction of the Organic Waste Processing Facility for the Cith of Guelph was started. Due to the experience and their combined CV in Canada, Maple Reinders Group and Christiaens Group have been awarded the contract to built this state-of-the-art OWPF. Operations will be done by Aim Environmental and Van Kaathoven Group,

The facility will consist of 7 tunnels which will process about 36.000 tonne of SSO per year. The Source Separated Organics are mixed with overflow and/or amend-mend before being placed into the tunnels by loaders. After 3 weeks of sanitizing and composting in the tunnels, the compost is brought to the indoor maturation to reach the high quality requirements for compost as set out in the Interim Guidelines for the Production and Use of Aerobic Compost in Ontario (MOE, nov '04).

To ensure a proper working environment the facility is equipped with an energy efficient building ventilation system. This system requires no additional heating or cooling systems. By using the building's ventilation air for the process as well, the size (and energy use) of the air treatment is significantly reduced without affecting the performance. Commisioning is planned for the second half of 2011.



Fort McMurray Biosolids Composting Plant

[Fort McMurray, AB, Canada]

Due to population growth, significant upgrades to Fort McMurray's current lagoon-based treatment system became necessary and construction of a new Water Reclamation Facility was undertaken.

The design allowed for a new state-of-the-art indoor composting system to stabilize blended sludge from the fermentation and secondary treatment processes. The blended sludge is conveyed directly to a mixing tank via a series of augers. Wood chips are added to the tank and the two sources are thoroughly mixed, to produce a blended mix ready for composting. The mix is then composted in series of concrete tunnels for 21 days. There are 7 tunnels used on a rotating basis, with provisions to expand the system up to nine tunnels.





SESA SpA AD and IVC Facility

[Este, PD, Italy]

SESA SpA (Este Environmental Services Company) is a partly governmental partly private owned waste treatment plant. The plant consists of anaerobic digestion systems, 9 tunnels for green waste composting, 20 tunnels for composting of kerb-side collected waste and a water treatment plant.

The plant currently converts over 300.000 tonne of organic waste per year into electricity, heat and compost. Electricity is produced at a continuous rate of 4MW and fed into the grid. The heat is used for district heating of for example the local school and hospital. Furthermore a significant amount of compost is produced (totally indoors), to be used for agricultural soil improvement up to the highest quality for horticultural use. Currently the amount of Combined Heat and Power units is increased, so the produced heat and electricity will increase even more in the near future.

In 2006 Christiaens Group has extended SESA SpA composting facility. The extension comprised of the construction of 4 new tunnels and the modification of 10 bunkers. The newly built tunnels are 8 meters wide and 56 meters long. These tunnels are equipped with the same robust air handling system where Christiaens Group is well known for. The modified bunkers are converted into tunnels which make it possible to recirculate the process air, minimizing the amount of air to be exhausted. Hence, the amount of air treatment system and biofilter area required is less.

In 2009 the Christiaens Group has renovated the control system for 20 tunnels, involving plc's, servo's, frequency converters and sensors. This was required in order to meet the latest standards.

The challenge for this renovation was the requirement to keep the plant fully operational during the changes. There was no possibility of carrying out this work during a plant shutdown. After several weeks of intensive preparation the change to the new control and communication system successfully took place during a single day.

Besides air handling equipment and controls, SESA SpA is a respectable client of our machinery department. Demanding high quality machinery which works in harsh conditions 24/7 has resulted in delivering numerous hoppers and conveyors during the years.





Bioman SpA AD and IVC Facility

[Maniago, PN, Italy]

Lying half embedded in a former river bed, the Bioman SpA waste huge amounts of organic waste.

The initial building phase consisted of 18 tunnels of 8m wide and 52m long, of which part are biofilter tunnels. The design incorporated changing biofilter tunnels to composting tunnels and vice versa, keeping the plant flexible. Furthermore the design of the technical area is unique in the way it integrates the different functionalities and requirements. Again keeping future expansion in mind. This directly paid off when the facility was extended with another 18 tunnels of the same size.

For both operations Christiaens Group delivered the process equipment, tunnel spraying system, doors, doorframes, aerated floors, building ventilation and process controls. Moreover, during the second phase an overhead filling system for 24 tunnels was delivered and installed. Furthermore the sorting hall required extra ventilation for the wind zifter. Together with the building ventilation this air is used in the process and afterwards treated in the scrubber and biofilters. The design, engineering and planning of this project is carried out in close communication with Wilbert Smeets and Ing. Angelo Mandato from Bioman SpA. This project clearly shows the advantages of early involvement in new projects.

Besides composting, the facility is equipped with a wet digestion system. The produced biogas will be used in the CHP units to produce electricity and heat. The capacity of the digesters is approximately 80.000 tpa. Together with the estimated (totally indoors) composting capacity of 400.000 tpa, makes this facility unique in its size and its setup.

Screening line





Angers Loire Métropole *(under construction)* [Angers, Maine-et-Loire, France]

Christiaens Group, in cooperation with construction company Vinci Environnement, delivered and installed equipment for the waste treatment facility for the city of Angers. Angers is a averaged sized city in the west of France, about 300 km south west from Paris. The municipality has decided to build a new waste treatment facility called Biopôle.

This project consists of 7 tunnels with a capacity of approximately 200 tonne of mixed material for each tunnel. The tunnels will be filled with an overhead filling system and will be emptied by means of a front-end loader. The material to compost is a mixture of sorted domestic waste, amendments, pressed cake, sludges, effluents and spin-dried juices.

The system which Christiaens Group installed consists of a transverse crane, rails, overhead filling unit, conveyor system, lifting doors with door wagons and hatches.



Digestate Drying [Fos-sur-Mer, Bouches-du-Rhône, France]

Recently the waste treatment facility of Urbaser in Fos sur Mer (near Marseille) was finished and started up. This facility, consisting of a sorting plant, anaerobic digester and incinerator, can treat up to 410.000 tonne of municipal solid waste per year.

Christiaens Group supplied and mounted the equipment for drying the digestate coming from the digester. To dry the digestate in an efficient and fast way it is carefully mixed with structure materials. After the digestate is placed in one of the 4 tunnels where it is aerated by hot air to vaporize the water. The energy for evaporation of the water is excess heat of the facility.





BAL Langenau Dry AD Facility

[Langenau, Baden-Württemberg, Germany]

In 2009 Christiaens Group and Biogas Anlagenbau Langenau (BAL) started a cooperation. BAL runs several dry anaerobic digestion facilities.

The Langenau Dry AD facility consists of 7 gas tight tunnels. The tunnels are filled by loader(1) after carefully mixing the different input materials and inoculum. Only 5-15% inoculum is required. After the doors are sealed, the waste is sprayed with percolate from the percolate tank.

The percolate, which is at approximately 40°C, distributes the gas producing micro organisms through the pile of waste. Besides biogas production in the tunnels there is also biogas production in the percolate tank. The produced biogas is analysed(2), cleaned and temporarily stored.

The biogas is combusted in one of the 3 180kW CHP's(3) to create electricity and heat. The electricity is fed into the grid and the heat is used for heating a swimming pool, drying wood chips and to keep the process at the right temperature. After 28-35 days the compost is taken from the tunnel and stored outside to mature. The mature compost is used as soil improvement for agricultural use(4). Moreover, the effluent can be used as high quality fertilizer for agriculture. This results in optimally using the potential of organic waste.



Hornillos-Obra UTE

[Valencia, Spain]

Hornillos-Obra UTE is a corporation of firms, acting on behalf of the organization Entidad Metropolitana para el Tratamiento de Residuos (EMTRE), that has been appointed to implement the construction of a waste treatment plant in Valencia. The aim is the recycling of the various products of municipal waste (glass, paper, cardboard, plastics, metals and others) and the composting of the organic material. Finally the plant will be processing 680,000 tonne of waste per year. Christiaens Group has been approached to provide an automatic loading and unloading system for the 25 composting tunnels. The loading system consists of filling conveyors with an overhead filling unit, while the unloading system utilises the patented Christy-floor (walking floor) system in conjunction with a Christiaens pulling winch and discharge conveyors. The composting in the tunnels commenced during early May 2009.





Christiaens Group

the power of combined experience

MUNICIPAL SOLID WASTE (MSW)

Austria	ASA Abfallservice Halbenrain GmbH & co Nfg KG ESG Stad Linz MBA St. Pölten	Halbenrain Linz Sankt Pölten
Finland	Kujalan Komposti Oy	Lahti
France	Chantier CVO Cap L'Orient	Lille Caudan
Germany	MEAB EGW RABA Erfurt –Ost MBA Cröbern	Berlin Borken Erfurt Leipzig
Luxemburg	Region Luxembourg	Fridhaff
Spain	Ecoparc 1 VAERSA Regio Valencia Hornillos-Obra UTE	Barcelona Villena Valencia Valencia

BIOWASTE

Belgium	DDS-Verko	Dendermonde
Canada	City of Hamilton Region of Peel Cape Breton Regional Municipality City of Guelph	Hamilton (ON) Brampton (ON) Sydney (NS) Guelph (ON)
France	Biopole	Anger
Germany	Schneider Emsland WGV WKG	Gießen Meppen Quarzbichl Würzburg
Italy	Sesa SpA Bioman SpA	Este (PD) Maniago (PN)
The Netherlands	Van Kaathoven Groep Van Kaathoven Groep Ogar RAZOB RAZOB	Bladel St. Oedenrode Oude Pekela Acht Deurne
UK	Viridor Waste Management Ltd. Enviros Biffa Waste Services Ltd. Biffa Waste Services Ltd	Beddington Deerdykes Etwell Ufton

ANAEROBIC DIGESTION RESIDUE

Germany	AHA Avea	Hannover Engelskirchen
France	Valorga International Urbaser	Calais Fos-sur-Mer

ANIMAL MANURE

Belgium	Op de Beeck La Vrijssen	Antwerp Bree
The Netherlands	Van Rens Nies Peelen Janssen Vaessen Meevis Van der Kruys-Pennings Classens Tewierik Philips Bongers Van Geneijgen	Hegelsom Kelpen Meerlo Meerlo Meerlo Nederweert Nederweert Oirlo Raalte Swartbroek Weert Weert
Portugal	Cooperativa Avicola do Centre S.A. Cavican	Santiago da Guarda Bidoeira de Sima
USA	GPRA Thoroughbed Training Centre Inc.	Boynton Beach

BioBox

France	Ramery	Harnes
Nigeria	Shaw Environmental & Infrastructures Ltd.	Lagos
The Netherlands	Van Kaathoven Groep	St. Oedenrode

SEWAGE SLUDGE

Canada	Banff WWTP City of Prince Albert Regional Municipality of Wood Buffalo	Banff (AB) Prince Albert (SK) Fort McMurray (AB)
Spain	GTR GTR	Barcelona Blanes
The Netherlands	GMB GMB	Tiel Zutphen
UK	Anglian Water	Ipswich
USA	BFI	Unity

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