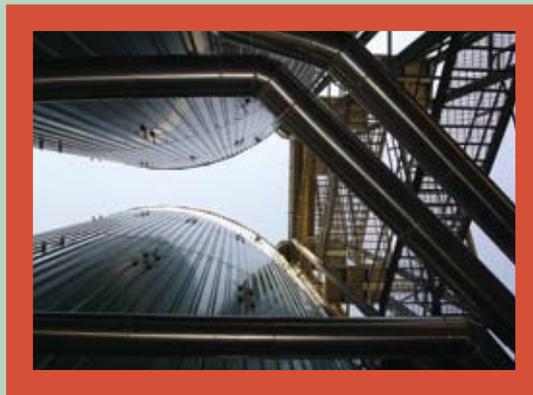


The IuT Group

Anaerobic Digestion of Organic Slurry ADOS System[®]



www.theiutgroup.com



ANAEROBIC DIGESTION PLANT

ORGANIC COMPONENTS REQUIRE SPECIFIC TREATMENT PROCESS

Landfilling of the organic fraction of municipal waste produces methane (a gas approx. 23 times more harmful to the climate than carbon dioxide), which is released to the atmosphere. In order to reduce the pollution potential of this waste, a variety of treatment options are available: thermal disintegration and biological treatment (this option is in any case more environmental friendly and economically efficient). Of the biological treatment options, the implementation of **anaerobic digestion**, followed by aerobic stabilization, is quite an interesting choice as it allows co-generation of electrical and thermal energy, as well as production of high quality natural fertilizer.

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THE ADOS SYSTEM® & ANAEROBIC DIGESTION - THE PRINCIPLE IS EASY TO UNDERSTAND

Anaerobic digestion is a natural process in which organic matter is decomposed by micro-organisms in the absence of oxygen. During hydrolysis, proteins, fat and carbohydrates are converted into amino acids, fatty acids and sugars; through acidogenesis and acetogenesis, these compounds are degraded further, mainly to acetate and hydrogen. In the methanogenic phase bacteria convert these two substances into CH_4 and CO_2 .

AEROBIC DIGESTION – COMPOSTING ANAEROBIC DIGESTION





The ADOS System® (Anaerobic Digestion of Organic Slurry)

is a **semi-dry process**, which means that the slurry has a solids content of approx. 15%. Organics from separately collected or source-sorted waste are a perfect feedstock for this technology. All that is needed is a simple pre-treatment process that removes ferrous metals and inerts. Even the organic fraction extracted from unsorted municipal solid waste by mechanical separation will yield excellent results with this system. In this case it is sufficient to design the sedimentation step accordingly and to recirculate enough digestate to get the slurry consistency right.

ADOS System® amplifies the advantages of the wet and dry techniques and minimizes the disadvantages by:

- reducing the complexity of the mechanical pre-treatment system,
- using small and efficient pumps,
- implementing thermophilic conditions to maximise the gas yield,
- avoiding big digester volumes, and
- ensuring homogeneous conditions inside the digester (optimal for bacteria activity)

These are some of the advantages that make the system one of the most efficient and convenient anaerobic treatment systems available in the market.



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THE **ADOS** PROCESS COMBINES
THE ADVANTAGES OF THE WET AND DRY
TECHNIQUES.

THE **ADOS** SYSTEM CAN BE USED
DOWNSTREAM OF A MUNICIPAL SOLID
WASTE TREATMENT PLANT.

EXPLOITING THE BENEFITS



ADOS SYSTEM® - NEW STANDARDS FOR DIGESTION SYSTEMS START HERE

Heart of the plant is a special designed “wet-mill”, the so called **ADOS mill**, which has been developed in order to:

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- reduce particle size so that bacteria can attack and degrade the feedstock,
- treat the input material to pumpable slurry,
- maximize the quality of the material going to the digesters as well as of the rejects.

The slurry leaving the ADOS mill is moved to the **sedimentation tank**. Here it is first homogenized and then sent through a calm zone, in which 3 layers are formed. The sedimentation tank is designed to remove heavy as well as floating particles and to ensure an optimal homogenisation of the substrate. The middle layer with the highest content of putrescible material is pumped to the **buffer tank**, which serves multiple purposes:



- to further separate sediments and floating particles from the main stream,
- to speed up the first biological processes (hydrolysis and acidification),
- to store part of the daily waste delivered in a closed atmosphere to contain odour emissions,
- to keep the digester operating 7 days a week on waste delivered only 5 days a week.

From the buffer tank the substrate flows the **digesters**, dedicated tanks without any movable parts inside. Four external recirculation lines ensure the necessary heat supply and recirculate the complete digester volume in the course of one day. After approx. 21 days the slurry is pumped out, dewatered via a decanter/centrifuges, mixed with bulking agent and then sent to the final step (**composting process**).



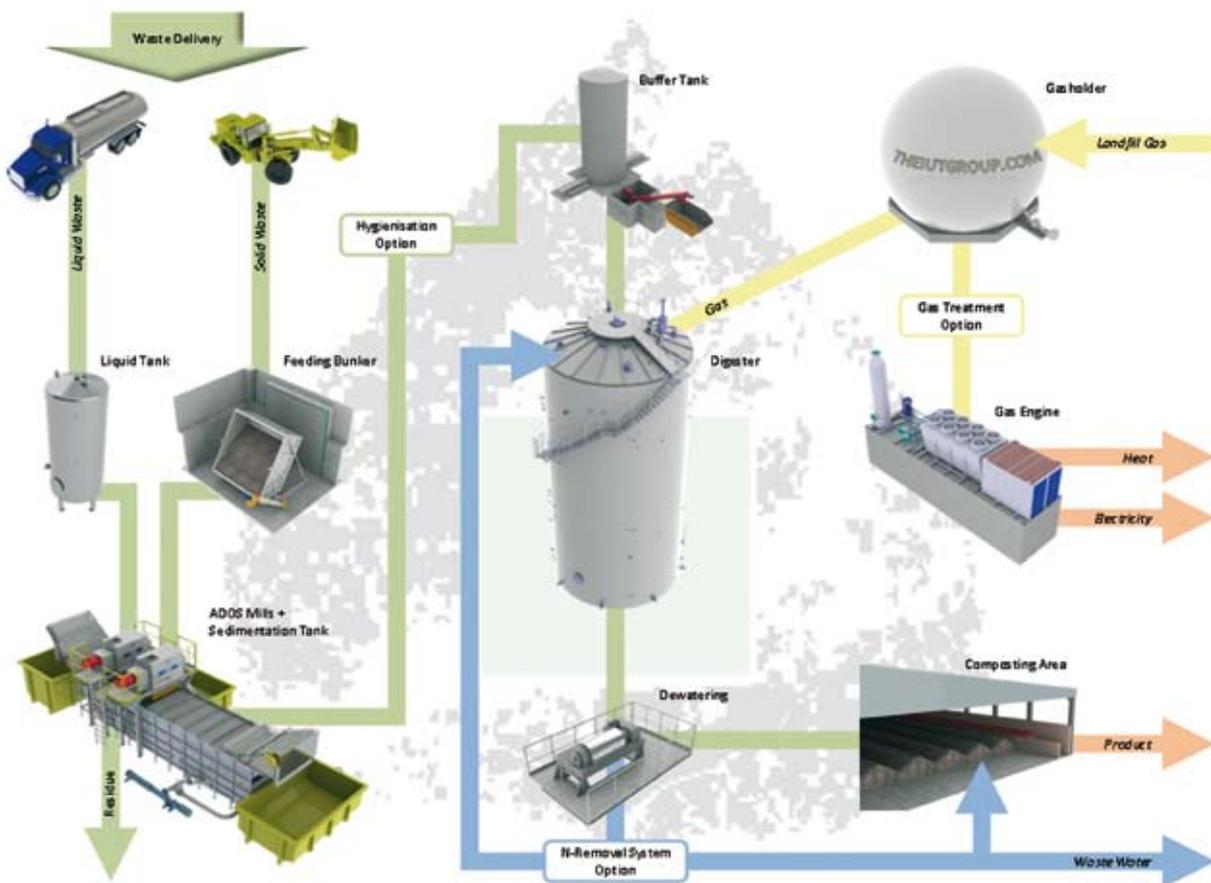


The biogas obtained undergoes treatment (customised to meet actual needs) before being stored in a double-membrane **gas holder**, including homogenisation by equalising production and composition fluctuations. **Co-generation units** transform biogas into easily marketable electrical and thermal energy. If needed, biogas can be also flared to uncontrolled emissions into the atmosphere.

The ADOS System® is the most efficient system for the treatment of organic waste from:

- mechanical separation (fraction <60mm) of unsorted municipal solid waste
 - households
 - restaurants*
 - commercial kitchen waste*
 - agriculture
 - slaughterhouse waste*
 - markets* and
 - industries*
- * If animal by-product waste materials are intended to be used in a biogas plant, a hygienisation treatment for the reduction of germ numbers is prescribed by EU regulations*

ADOS System® - typical configuration



HIGH EFFICIENCY THROUGH AN ENERGY-SAVING PROCESS



THE ADOS SYSTEM®: AN ENVIRONMENT FOR THE FUTURE – A FUTURE FOR THE ENVIRONMENT

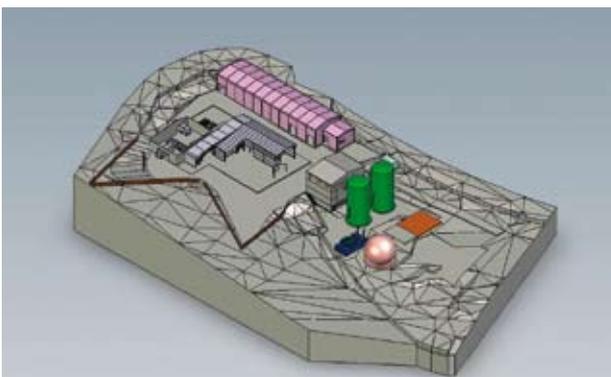
The advantages for the client:

- competent and highly qualified support across all project phases,
- extensive experience in anaerobic treatment design and operation,
- very well-known state-of-the-art technology,
- excellent energy balance (low consumption versus high green energy generation),
- robust process and operating flexibility,
- modular concept (extensions possible),
- insensitivity to feedstock fluctuations,
- simple digester configuration,
- easy access to each single part of the plant,
- good cost-effectiveness even of small industrial plant sizes (from 60-70 tons per day upwards),
- safe working conditions,
- access to “The LuT Group” network to share experiences with similar plant operators around the globe,
- active contribution to greening our environment.

25.000 tons per year of food waste could generate up to:

- 200m³ biogas per ton of feedstock,
- 5 million m³ biogas per year,
- 11.5 Gwh of green energy per year,
- 11.3 Gwh of thermal energy per year,
- 5,000 t of high-quality compost per year.

EACH PLANT IS INDIVIDUALLY DESIGNED IN 3D.





PROPRIETARY TECHNOLOGIES ARE THE FOUNDATION FOR SUCCESS

The ADOS process is one of the technologies covered by global patent protection that form the basis of the success of The IuT Group. These technologies are the product of research work undertaken by Ing. Reinhard Göschl, founder and owner of IUT GmbH, which is part of The IuT Group.

The IuT Group is a combination of international companies working on the solution of waste management problems.

THE IUT GROUP IS A PARTNER FOR construction and operation of:

- sorting and treatment plants for all types of solid waste
- digestion plants for organic waste or extracted organic waste fractions
- state-of-the-art controlled landfills
- degasification systems for existing landfills

reclamation of:

- disused landfills and contaminated sites, in cleaning up and recovering such areas for residential use, and in creating new landfill space.

Drawing on the engineering and organizational skills of its staff as well as on its profound understanding of the clients' local environment, The IuT Group is able to offer the best ecological and economical solutions to solve waste problems.

In pursuing their business on a global scale, the companies are guided by the objectives of controlled growth and a focus on proprietary technologies.



NATIONAL ENERGY GLOBE AWARD FOR THE ADOS PRINCIPLE

FOR THE REALIZATION OF THE ADOS PRINCIPLE IN SINGAPORE THE IUT GROUP WAS AWARDED THE NATIONAL ENERGY GLOBE – WORLD AWARD 2007 FOR SUSTAINABILITY. THIS PRIZE IS THE MOST SIGNIFICANT AND PRESTIGIOUS ENVIRONMENTAL AWARD WORLD-WIDE.



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