VEOLIA

Bio Thelys™
Batch thermal hydrolysis

- Reduces sludge volume
- Improves sludge quality
- Increases biogas production

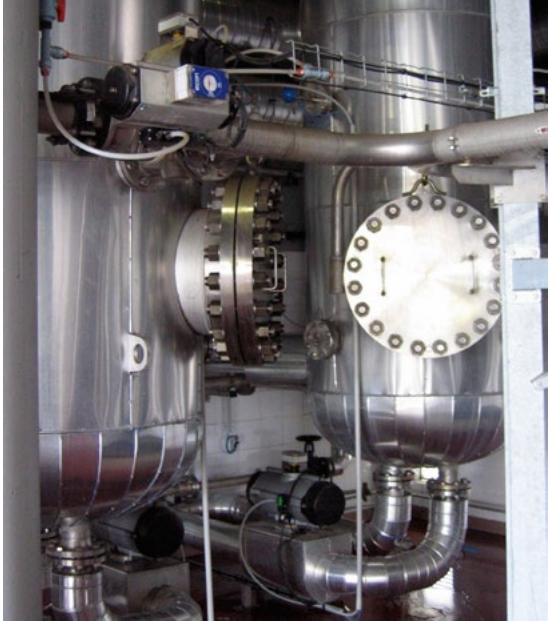
WATER TECHNOLOGIES

Bio Thelys™ is a complete sludge reduction solution that works in batch mode, combining thermal hydrolysis and anaerobic digestion.

By coupling thermal hydrolysis with anaerobic digestion, Bio Thelys offers better performance than conventional digestion and optimizes sludge treatment by producing:

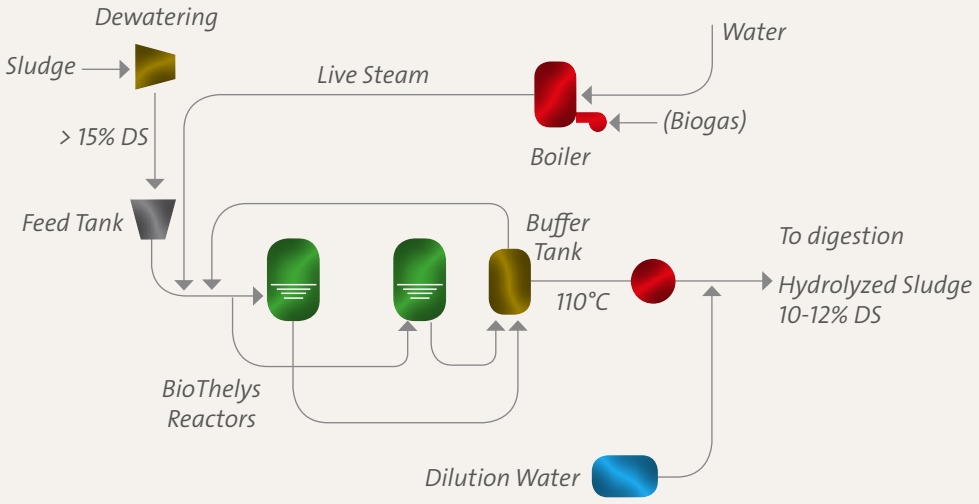
- 25 to 35% less dry solids
- 30 to 50% more biogas
- No odours
- A safe, high quality product for land application.

Bio Thelys is able to process a wide range of organic, industrial or municipal sludges, including those containings fats, oils and grease (FOG).



Operating Principle

Dewatered sludge first goes through a batch thermal hydrolysis phase during which steam is injected in reactors operating under specific pressure (6-8 bars) and temperature (165°C) conditions for approximately 30 minutes.



A flexible and safe solution

- Produces a pasteurised digestate that is compliant with international standards e.g.
  - EPA Class A (USA)
  - ADAS Safe Sludge Matrix (UK)

Other benefits

- Reduced digester-related investment for new installations
- Increased digestion capacity allows for greater sludge through put even at existing facilities
- Reduced Operating costs:
  - Improved sludge dewaterability saves on chemical costs.
  - Reduced sludge volume provide savings on the transport
- Income is generated from:
  - Ability to process imported organic materials for co-digestion.
  - Selling the energy produced from co-generation or bio-methane

Higher revenue, Lower expenditure

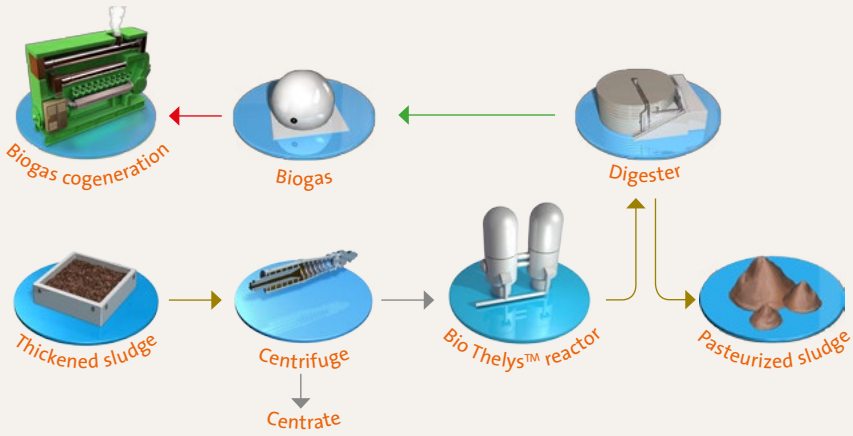
3 configurations

Lysis/Digestion (LD) Configuration

Thermal hydrolysis is performed on the whole or a part of the sludge stream prior to digestion.

This configuration reduces digester volume by a factor of 2 to 3, reduces the amount of sludge and guarantees that it is sanitized while increasing biogas production.

Using the LD configuration, the throughput of an overloaded digestion plant can be doubled, thus avoiding the need to build additional digestion capacity.

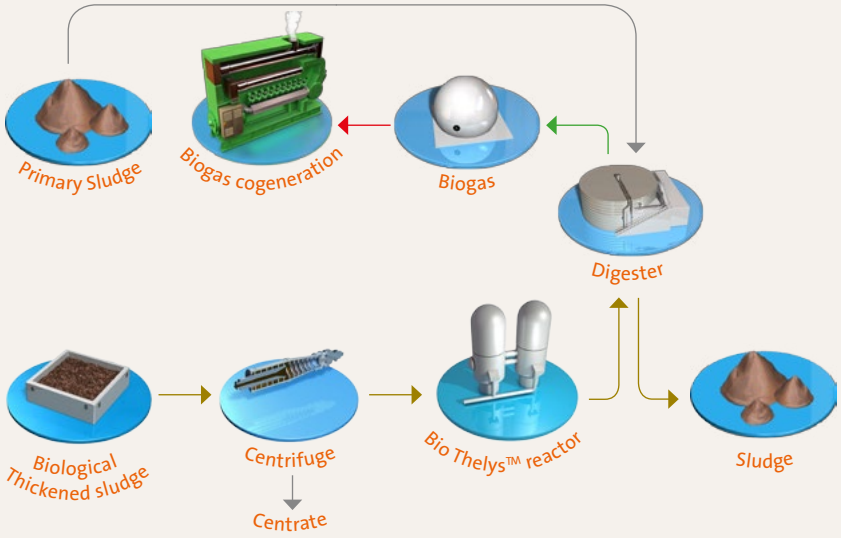


Partial Lysis / Digestion (Partial LD) Configuration

The Hydrolysis reactor may process only the biological (secondary) sludge with corresponding enhancement on biogas production.

This configuration gives the client the greatest savings in regards to reactor capacity and steam consumption.

Using the partial LD configuration, digestion capacity of an existing installation can be increased by a factor of 2.

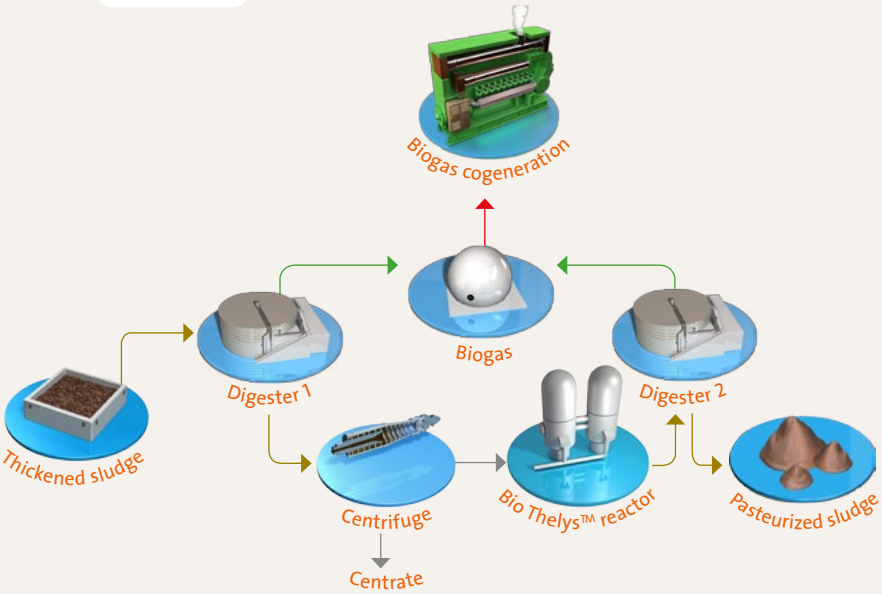


Digestion/Lysis/Digestion (DLD) Configuration Veolia Patent

Thermal hydrolysis is applied to all of the digested sludge from digester 1. Then the sludge is cooled and diluted before breakdown continues in digester 2.

This is the optimum formula in energy terms as it uses less steam while producing more biogas and electricity.

It also means that the quantity of sludge to be disposed of is reduced.



Our Bio Thelys References

2013

Oxford, United Kingdom
- 1,400,000 PE[1]
- 26,000 tDS/year[2]
- LD configuration

2013

Esholt, United Kingdom
- 2,100,000 PE
- 32,800 tDS/year[2]
- LD configuration

2011

Tergnier, France
- 70,000 PE
- 1,600 tDS/year[2]
- LD configuration

2010

Monza, Italy
- 750,000 PE
- 10,200 tDS/year (TH[4])
- 15,800 tDS/year (AD[3])
- LD configuration

2008

Le Pertuiset SIVO, France
- 80,000 PE
- 2,000 tDS/year
- LD configuration

2007

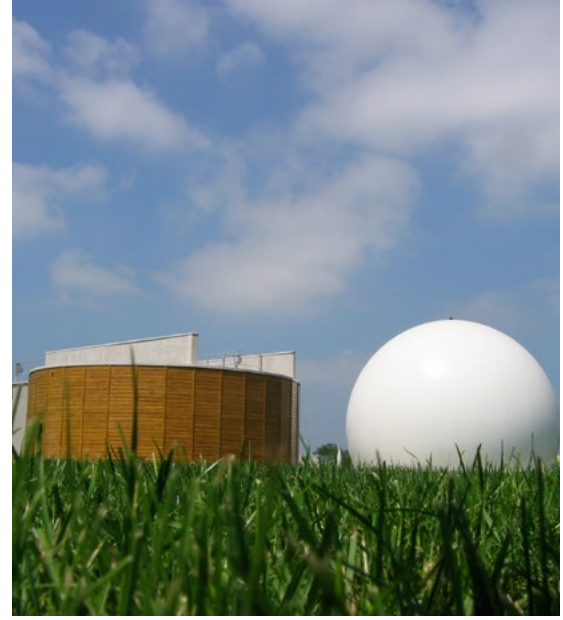
Château-Gonthier, France
- 38,000 PE
- 1,000 tDS/year
- LD configuration

2006

Saumur, France
- 60,000 PE
- 1,600 tDS/year
- LD configuration

[1]PE: Population Equivalent adjusted to inlet sludge capacity
[2]including imported sludge
[3]AD: Anaerobic Digestion capacity
[4]TH: Thermal Hydrolysis capacity

A solution that guarantees energy and environmental performance



Many possibilities for using biogas:

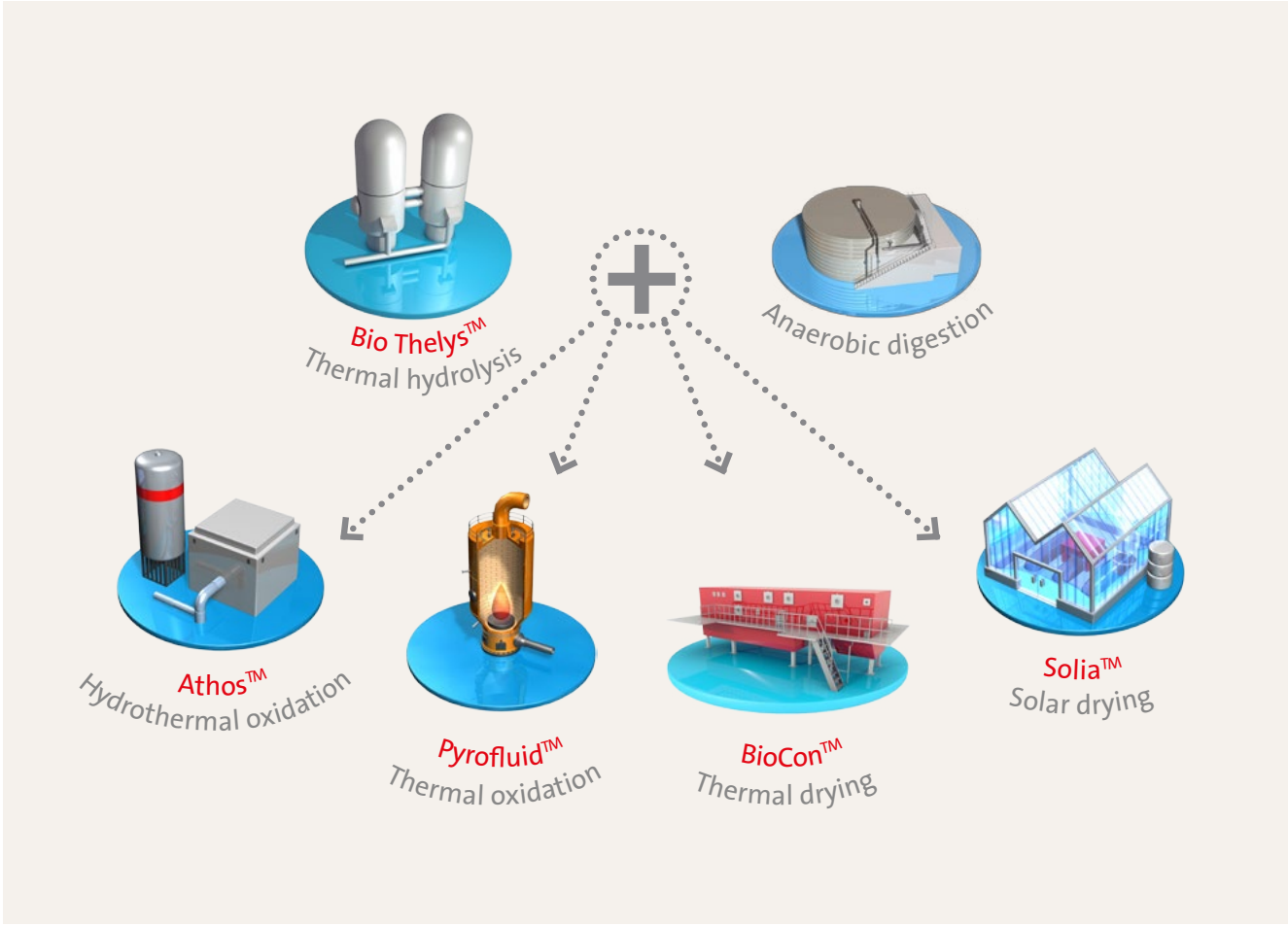
> Conversion into 'green' electricity via co-generation

> Biogas cleaning for bio-methane injection, bio fuel production, CO_2 and products recovery.

With external input (co-digestion), energy self-sufficiency or even a positive energy footprint may be achieved by the plant.

Bio Thelys, combined with other Veolia sludge treatment processes, offers even more sustainable solutions.

"Reduced carbon footprint of the facilities"



"Complete sludge pasteurization"

Resourcing the world

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