



Thermal Hydrolysis Processes

- Reduce sludge volume
- Improve sludge quality
- Increase biogas production

WATER TECHNOLOGIES

Thermal Hydrolysis Processes

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

Exelys™ is an innovative and complete sludge reduction solution that works in continuous mode.

By coupling thermal hydrolysis with anaerobic digestion, BioThelys™ and Exelys™ offer enhanced performance over conventional digestion and optimize sludge treatment by producing:

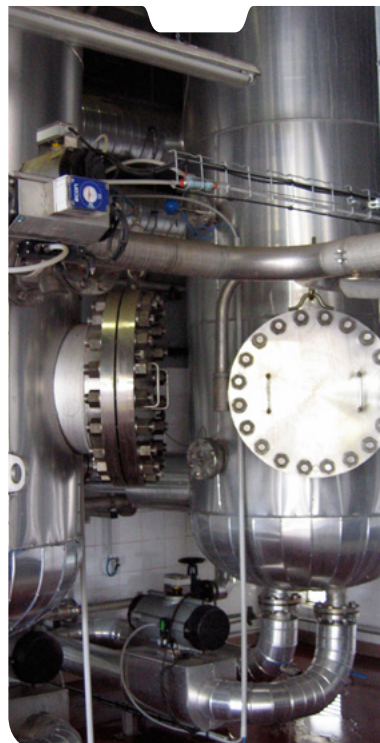
- 25 to 35% less dry solids
- 30 to 50% more biogas
- No odours
- A pasteurised digestate, for safe reuse

Both processes handle all kinds of organic, industrial or municipal sludges and can also handle grease.

Benefits

- Reduced digester related investment for new installations
- Reduced operating costs with less sludge to manage
- Income is generated from:
 - Excess energy generated with more biogas
 - Excess capacity to process organic imports

Higher revenue



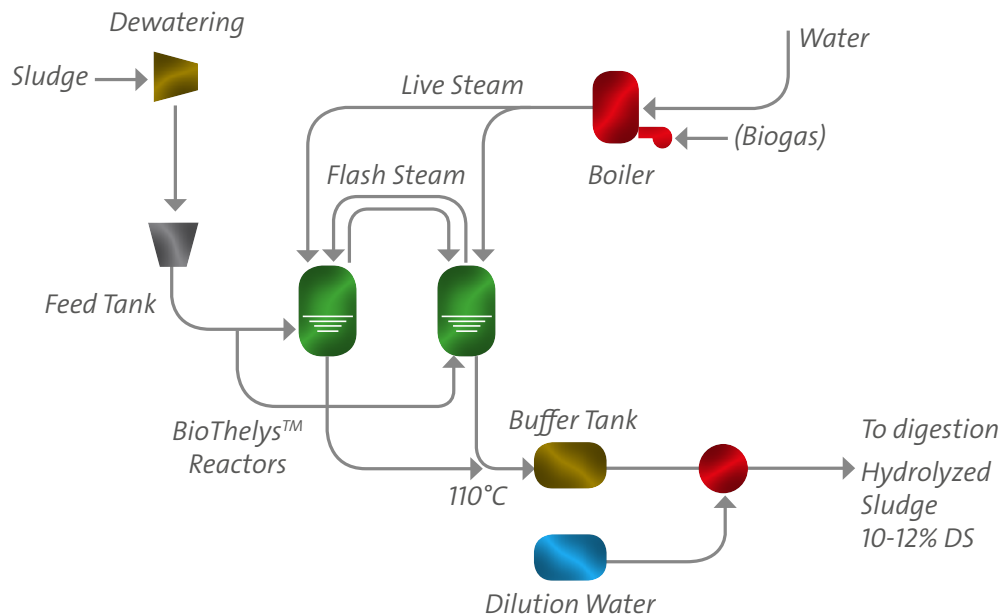
Lower expenditure



Operating Principle

Bio Thelys™

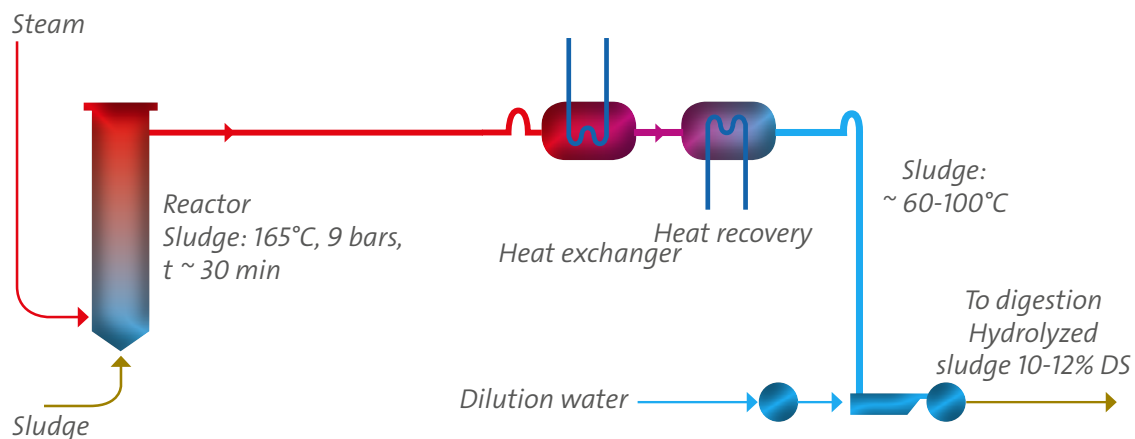
Dehydrated sludge first goes through a batch thermal hydrolysis phase during which steam is injected in reactors operating under specific pressure (9 bars) and temperature (165°C) conditions for approximately 30 minutes.



Exelys™

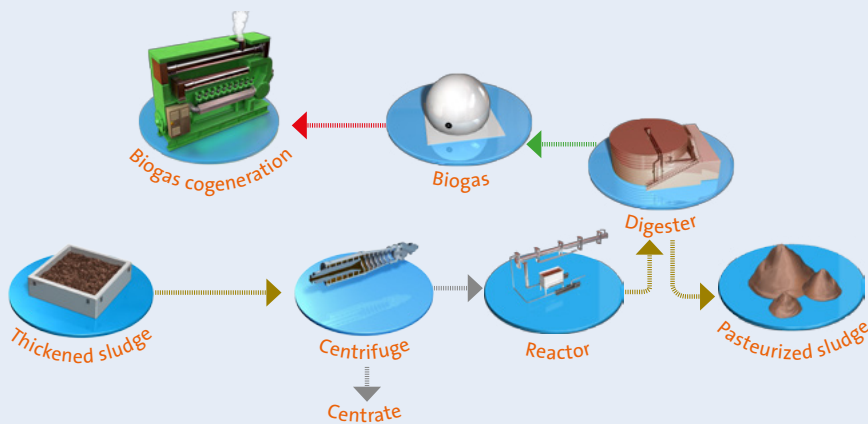
Continuous thermal hydrolysis operating 24 hours a day with feed and removal levels that are adjustable in real time, Exelys™ operates under controlled temperature (165°C), pressure (9 bars) and residence time (approximately 30 minutes) conditions.

The system is controlled by a PLC that modulates the steam flow rate in line with the amount of sludge injected.



3 configurations

Lysis/Digestion (LD) Configuration

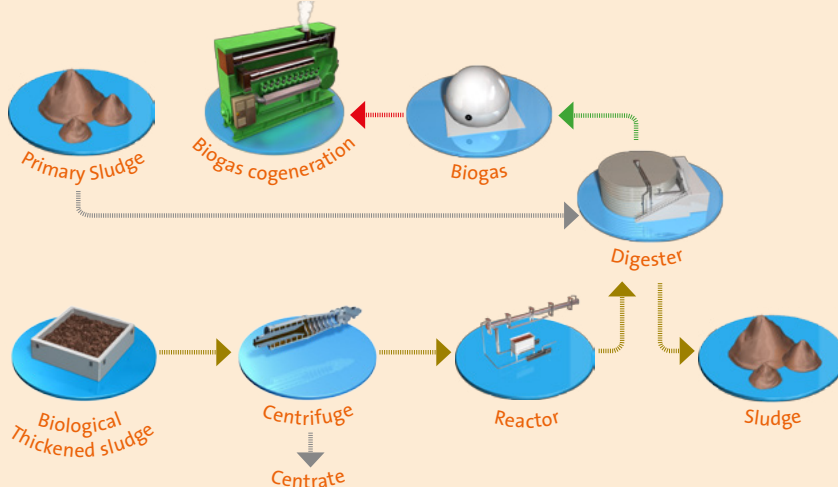


Thermal hydrolysis is performed on the whole or a part of the sludge stream prior to digestion.

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

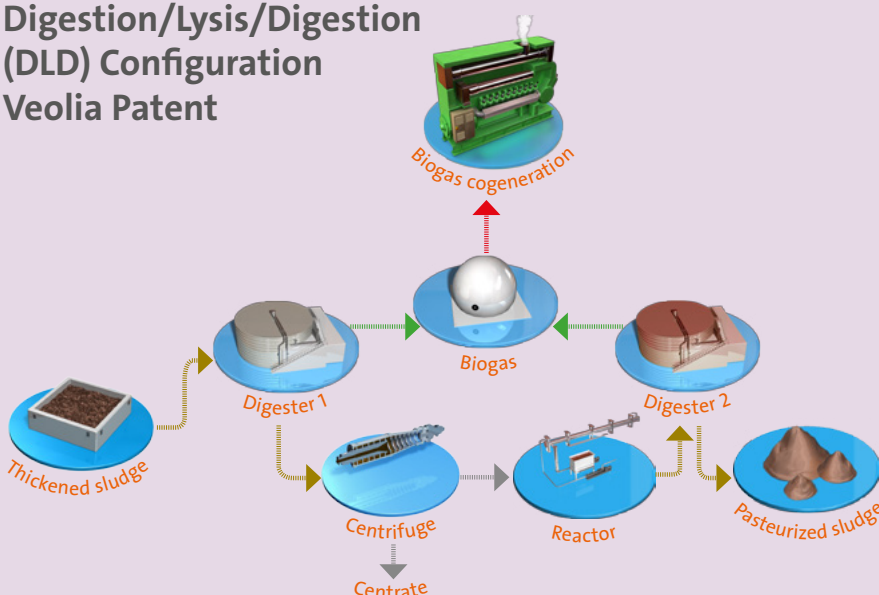


The Hydrolysis reactor may process only the biological (secondary) sludge with corresponding enhancement on biogas production.

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 enables the greatest reduction in the amount of sludge to be produced.

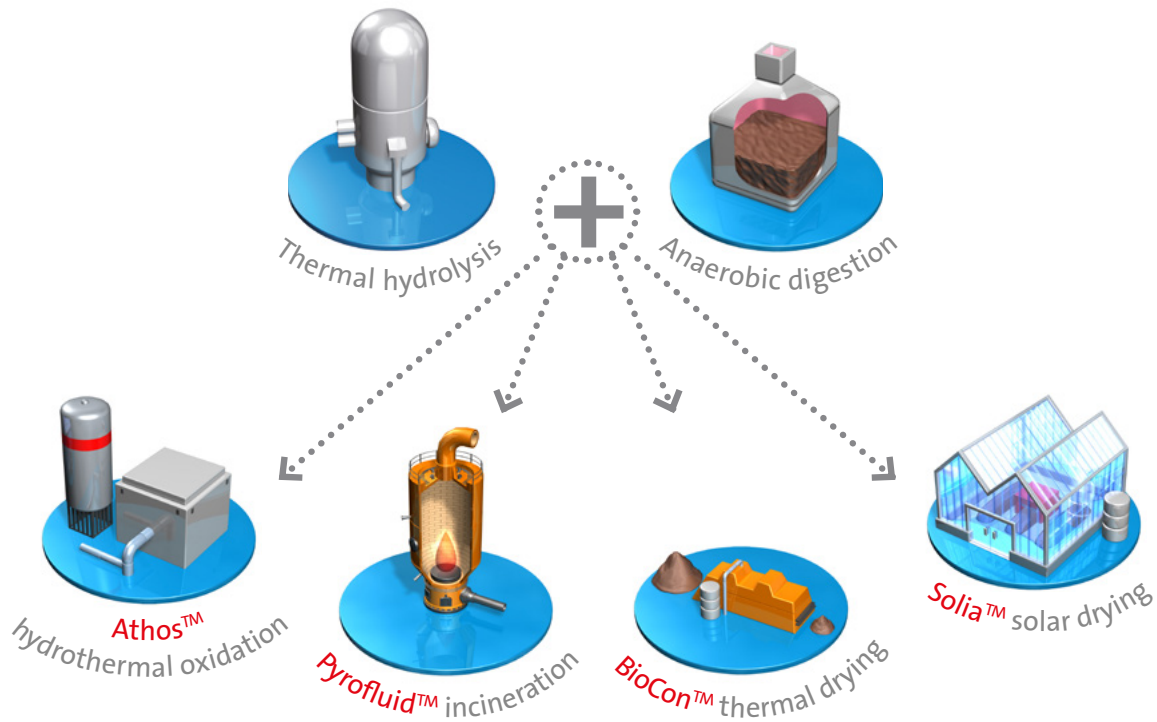
A solution that guarantees energy and environmental performance

Many possibilities for using biogas:

- > Conversion into 'green' electricity via co-generation
- > Bio-methane production (for injection into the network or as fuel)

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

Thermal Hydrolysis combines with other Veolia sludge treatment processes and completes them to offer even more sustainable solutions.



Reduced carbon footprint
of the facilities

Complete sludge
pasteurization

Our Bio Thelys™ References

Oxford, United Kingdom	2013	1,400,000 PE*	26,000 t DS/year**
Esholt, United Kingdom	2013	2,100,000 PE	32,800 t DS/year**
Tergnier, France	2011	30,000 PE	1,600 t DS/year**
Monza, Italy	2010	750,000 PE	15,800 t DS/year
Le Pertuiset SIVO, France	2008	80,000 PE	2,000 t DS/year
Château-Gonthier, France	2007	38,000 PE	1,000 t DS/year
Saumur, France	2006	60,000 PE	1,600 t DS/year

* PE: Population Equivalent.

** including sludge external input.



Our Exelys™ References

Marquette-Lez-Lille, France	2015	620,000 PE	22,000 t DS/year
Versailles, France	2015	330,000 PE	8,300 t DS/year
Bonneuil-en-France, France	2012	Industrial prototype	400 kg DS/day

* PE : Population Equivalent



