

# The Sustainable Future Of Sludge Destruction

John O'Regan, CEO of SCFI



The way we dispose of wet waste is under increasing social, political and environmental scrutiny. As the industry looks on to find a sustainable solution, John O'Regan, CEO of SCFI, explains a revolutionary new technology that not only fully destructs sludge safely and economically, it also generates renewable energy in the process.

## A Call For Change

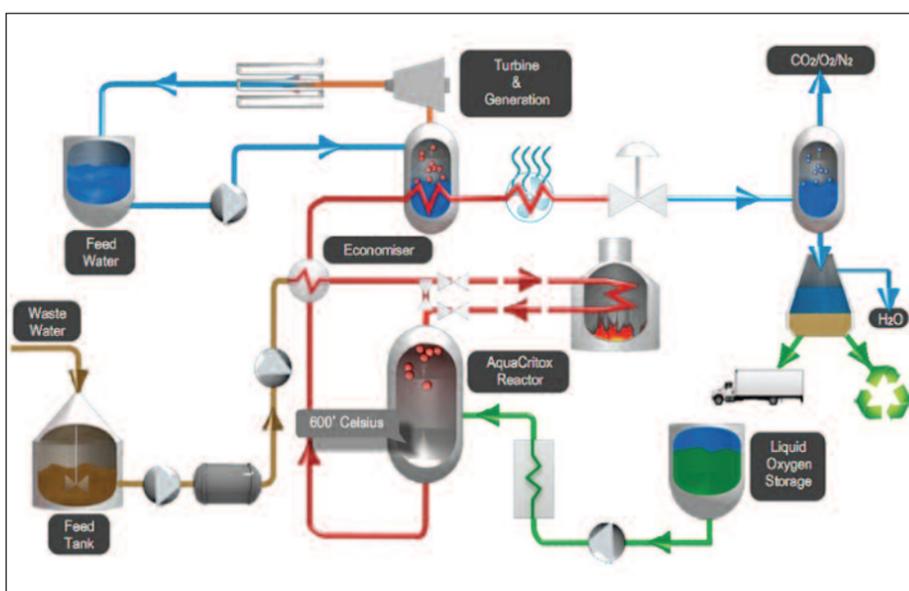
Current methods of disposal, for example land spreading and landfill, are prompting growing opposition from the public, who are voicing strong concern about the shortage of available land and the introduction of potentially harmful waste into the environment. This is reflected in political pressure, such as the enforcement of EU directives, and economic challenges like the raising of landfill taxes. Traditional destruction methods, such as waste incineration, have also been met with similar challenges.

These growing tensions contextualise the industry's need, now more than ever, for a safer, sustainable alternative. In response to this, after years of development and an investment in excess of \$40 million, we at SCFI have launched a world-first technology designed to meet this need effectively and economically. AquaCritox® uses Super Critical Water Oxidation (SCWO) to treat organic wet wastes and delivers complete destruction in a cost-effective, quick, safe and sustainable process. What's more, it simultaneously generates renewable energy – making it the first technology to have a positive energy balance from processing wet waste.

## A Super Critical Solution

AquaCritox® provides water treatment plants with a single-step solution to the treatment of wet wastes such as sewage, drinking water and industrial organic aqueous waste streams. The technology delivers 99.99+% destruction of organic waste – a far greater rate than other competing technologies. The process is also safe and odourless, and does not generate any hazardous emissions or by-products.

## AquaCritox® Process Diagram:



During the SCWO process, wet wastes are subjected to an elevated temperature and pressure (374°C and 221 bar) above the critical point. Under these conditions water enters a fourth 'super critical' phase, where it becomes neither a liquid nor a gas, but rather a universal solvent for gases and organic compounds – even those that are normally insoluble in water. At this stage, AquaCritox® adds an oxygen supply, creating a rapid and complete oxidation reaction that converts all organic materials in the sludge

into CO<sub>2</sub>, nitrogen and clean water. The nitrogen can be safely released into the atmosphere and the CO<sub>2</sub> (a short cycle carbon rather than greenhouse gas) may be sold on for industrial applications or dry ice production. All residual materials are non-hazardous, and inorganic materials are easily separated and treated in a separate step to recover phosphorus or, in the case of the treatment of drinking water sludge, valuable coagulants such as aluminium hydroxide, which can then be reconstituted into new coagulants for reuse.

## Energy Positive

At the start of the SCWO process, an external heat source is used to bring the sludge feed up to the desired temperature. However, once underway, this temperature is maintained by the significant levels of heat generated by the exothermic reaction, and the process becomes autothermal. Over and above this, there is an additional balance of heat, which can be converted into renewable electricity or steam and hot water.

The potential to produce renewable electricity matched with the significant reduction to a plant's carbon footprint are key benefits for those facing pressure to reduce their overall costs as well as environmental impact. As a one-step full destruction technology, AquaCritox® requires no trucking off site. In fact, it will reduce truck movements by 97%, lowering costs and emissions even further.

## Typical Results

For every dry tonne of organic wet waste processed, AquaCritox® can deliver up to:

- A volume reduction of 97%
- 3.6MWh of thermal energy / 1MWh of renewable electricity
- Totally inert byproducts

Therefore a plant designed to process 20,000 metric tons of dry solids per year can generate between 15,000 and 20,500MWh of electricity gross.

Sludge generators can quickly and easily find out just how much energy they are currently losing in their disposal process by visiting [www.scfi.eu](http://www.scfi.eu) and inputting three basic figures into our new interactive calculator. This will show the amount of thermal energy that could be converted into electricity (or steam/hot water) using AquaCritox®.

## A Cost-Effective And Efficient Alternative

With a typical payback period of approximately five years, AquaCritox® offers a significant cost saving compared to other disposal/destruction methods – potentially turning cost centres into profit centres. The need for any expensive dewatering equipment is eliminated, whilst better destruction rates than incineration or wet air oxidation are achieved. The technology will also work well alongside anaerobic digestors at the post-digestion stage, destructing the residual sludge and extracting the remaining energy left after the production of biogas.

AquaCritox® can also generate revenue from recovering valuable resources found in sludge, such as phosphorus and CO<sub>2</sub>. Similarly, for drinking water sludge applications the technology will recover used coagulants – not only negating the cost of their disposal and the replacement of the flocculant for each treatment cycle, but also avoiding the contentious sociopolitical issues that surround hazardous landfill.

The nature of the SCWO process as a rapid reaction means that AquaCritox® units are small in actual size: units are available in four sizes, with footprints between 300m<sup>2</sup> and 1750m<sup>2</sup>, and hydraulic loads ranging from 1 to 20 tonnes per hour. They are robust and designed to last for a minimum of twenty years.

For more information about the AquaCritox® process and its applications, visit [www.scfi.eu](http://www.scfi.eu).

## Eras Eco Installation

The global commercialisation of AquaCritox® has begun with a planned installation at Cork-based waste treatment and recycling company Eras Eco in Foxhole, Youghal. Following three years of testing at SCFI's operating facility in Ringaskiddy, where the technology has been successfully processing wet waste for a number of global leaders in the wastewater treatment, pharmaceutical, chemical, oil and gas industries, the system is planned for installation at the plant in autumn 2012.

The technology will process waste from pharmaceutical companies in the Cork region, which until now has been shipped abroad for thermal treatment.