



Zero Waste Energy's facility in San Jose, California with green fuel pumps in front. ZWE's process yields compost and clean biofuel.

California Dreaming

Zero Waste Energy and a new approach to organics

I recently travelled to the Netherlands for a waste management trade mission. One post-travel jet lagged morning a couple of images forced themselves into my consciousness. In Germany an HSBC ad stated, "In the future there will be no difference between waste and energy." In the Netherlands, while approaching Schiphol from the air, rows of wind turbines dotted the Dutch countryside in telephone-like grids.

Energy, as it turns out, is everywhere and available for the taking. In North America there are a few hubs where activity is brisk. From afar the State of California is a place of sunbaked liberalism, great wine and the permeating macrocosm that is the twitter-encased and TMZ-oiled Hollywood.

Say what you will though, Californians take their environment seriously. A quick troll through California's Department of Resources

RECs (Renewable Energy Credits)

A Renewable Energy Credit (REC) represents the environmental and renewable attributes of renewable electricity. RECs can be sold to utilities and other energy purchasers. California utilities are required to buy 33 percent of their electricity from renewable sources by 2020 via the state's "Renewable Portfolio Standard", which helps create demand for RECs.

by Paul van der Werf

"The renewable biogas provides 1.6 MW of on-site power with excess power for sale to local users of green energy."



Recycling and Recovery website (calrecycle.ca.gov) shows they aren't afraid to plan, set targets and regulate.

As of 2012, the state's diversion rate was 65 per cent. At that time California set a diversion goal of 75 per cent by 2020. Part of this goal envisions reducing the amount of organic waste landfilled by 50 per cent.

This has led to the development of a robust organics industry that currently diverts about eight million tonnes/year (tpy) of organics. (Due to various regulations this has stagnated and indeed dropped by 500,000 tpy in recent years so all is not rosy.)

Californians are on the same cusp as Canadians when it comes to choosing between aerobic and anaerobic processing of organic waste, but for far different reasons. There is a clear shift towards the latter but with a lag time as the industry changes its tack.

Nonetheless the state envisions the development another nine million tonnes of organics waste processing capacity to meet its waste diversion targets.

The clear regulatory (even if in some cases burdensome) climate provides the kind of certainty to the organics processing industry about which Canadians can only dream.

The shift towards anaerobic digestion (AD) has been spurred by renewable energy and clean fuel incentives available for these types



Aerial view of ZWE's San Jose, California facility.

of projects. This includes renewable energy credits (REC) as well as renewable identification numbers (RIN) and low carbon fuel standard (LCFS). This creates demand and ultimately a viable revenue stream for energy outputs.

Zero Waste Energy

Companies such as Zero Waste Energy (ZWE), incorporated in 2010, have sprung up to take advantage of the certainty that at least another nine million tonnes of organics need to work their way out of California landfills. (Never mind everywhere else.)

ZWE uses a European dry (i.e., solids content between 25-40 per cent) anaerobic digestion technology called SMARTFERM. This technology uses a non-continuous batch process and can be operated thermophilically. A key difference between it and other dry AD technologies is that it uses a sub-grade percolate tank. This reduces the amount of percolate and biogas piping as well as the motors and fans to move them.

The process itself lasts about 21 days and results in about 90-95m3 of biogas per tonne of organic waste, with a methane content of about 58-62 per cent.

The system comes either as shop-fabricated steel containers (3,000-40,000 tpy) or cast-in-place concrete digester for larger applications (up to 100,000 tpy).

The steel container design option is best suited for small scale dry AD systems and can be used to treat organic wastes on-site or as a centralized facility. Each digester provides a gas-tight seal to ensure anaerobic conditions are properly maintained during processing. It also includes a percolate tank (either below or above ground), containerized combined heat and power system, bio-filter, external biogas storage bladder and environmental controls.

OWMA 31st Fall Classic Golf Tournament



Brian Dermody, Conestoga Rovers (left), John DeYoe, RWDI (centre), Peter Kemp, Conestoga Rovers (right). Photo taken by Brad O'Brien, Publisher of this magazine.

The Ontario Waste Management Association's 31st Fall Classic Golf Tournament, was held September 11, 2014 at the Glen Eagle Golf Club, and was a huge success. Over 200 registered waste industry professionals enjoyed the golf and networking event.



Equipment detail from ZWE's San Jose, California facility.



The Marina (Monterey, California) facility.

Dry Anaerobic Digestion

Dry AD basically speeds up the composting process and results in the production and capture of methane which can then be converted to electricity or compressed natural gas (CNG). The process takes about three weeks and starts producing energy in about two days. Thermophilic systems have temperatures that will kill any pathogens. The outputs of the process are energy and compost.

The cast-in-place concrete digester system uses the same principals and much of the same equipment as the steel container design, but is scaled up by building larger in-place digesters.

ZWE have been deploying this technology to develop small and larger facilities in California (and beyond).

In Monterey, a 4,500 tpy facility handling commercial source-separated organics (SSO) from local restaurants generates about 100kw

electricity and 2,000 tpy finished agriculture quality compost. The electricity is sold to the neighbouring regional wastewater treatment plant to help it achieve its strategic goal of getting off the utility grid. The compost is sold locally. The Monterey Regional Waste Management District (MRWMD) was the 2014 winner of a leadership in organics award from the California Resource Recovery Association (CRRA).

On the other side of the scale is a 80,000 tpy facility built in St José and commencing operation in late 2013. The facility includes 16 concrete AD digesters plus four in-vessel composting (IVC) tunnels. The renewable biogas provides 1.6 MW of on-site power with excess power for sale to local users of green energy. In addition, about 30,000 tonnes/year of compost is produced.

California's waste diversion targets, combined with renewable energy incentives, provide industry with the certainty it needs to make the necessary investments to develop organic waste processing capacity. Zero Waste Energy is a great example of a company making that kind of investment.



Paul van der Werf is President of 2cg Inc. in London, Ontario. Contact Paul at 2cg@sympatico.ca



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