

EXCERPT

COMMENTS BY CAMBRIAN ENERGY IN RESPONSE TO THE PANEL QUESTIONS FOR THE 2017 INTEGRATED ENERGY POLICY REPORT JOINT AGENCY WORKSHOP ON RENEWABLE GAS

Submitted by:
EVAN G. WILLIAMS
President
Cambrian Energy Development LLC

How much growth of energy development and use from renewable gas, biogas and biomethane do you expect for each submarket (e.g., dairy and livestock, food waste and organic diversion, waste water treatment, landfill gas and agricultural/forestry and urban woody biomass residue)?

*The processing of dairy and livestock waste, food waste and organic diversion, biosolids from wastewater treatment plants, agricultural waste and urban woody biomass into a refuse derived fuel (“**RDF**”) suitable for gasification will allow for remote processing of such feedstocks for delivery to a central gasification facility located near a natural gas pipeline. If such gasification facility were located at a landfill, which is already zoned for truck traffic and the handling of solid waste, this location would facilitate adding gas processing equipment to a gasification facility that is producing RNG so as to convert the additional collected landfill gas into RNG. With California’s laws requiring diversion of organics (which are anaerobically converted within a landfill into landfill gas) from landfills, this will cause a diminishing production of landfill gas from the many millions of tons of organic material already buried in California’s landfills. That diminishing production of landfill gas represents a diminishing feedstock required for RNG gas processing facilities. It will be an impediment, particularly as time passes and landfill gas production further decreases, to the development of standalone RNG gas processing projects at California landfills. The co-location of a gasification-to-RNG project at a landfill cures the economic deficiency of a diminishing single fuel source. The ongoing production of RNG from continually supplied and gasified organic materials will allow for shared operational costs and capital expenditures (such as RNG gas monitoring and interconnection costs) that would help both technologies used to produce RNG.*

What key factors (i.e., incentives, technology advances, and business maturity) are required to be in place to achieve 2030 SLCP targets in California?

In the view of Cambrian Energy the key technology advance that must occur for California to achieve the 2030 SLCP targets is the demonstration at commercial

scale gasification of organics to RNG technology. Cambrian Energy is investing its own money to conduct such a demonstration of that technology at commercial scale. Due to the natural gas pipeline access and definitional impediments that now exist in California with respect to the development of gasification projects, the demonstration project is being done outside of California. Major technology providers have joined with Cambrian Energy in this demonstration. The key aspect requiring demonstration will be the gasifier. All other components of the process have already been commercially demonstrated throughout the world and can be procured with the requisite guarantees of performance to support project financing.

If the demonstration by Cambrian Energy in 2017 of the gasifier at its commercial scale project is successful, such facility will be available to be visited by California legislators and regulators to witness its effectiveness. Such facility will operate using very high heat that is generated electrically and not through any combustion event. The process of organics through gasification is not incineration. The syngas produced by the gasification will be collected, cleaned of contaminants and then converted by means of a commercial methanation process into natural gas pipeline quality RNG.

The methanation process is a catalytic one, so constituents about which natural gas pipelines have expressed concern during the PUC AB 1900 proceedings, such as siloxanes and sulfur, will be removed before being introduced to the catalytic methanation process.

How do you see a market growth sequence or progress of steps evolving for each submarket and what government actions are needed at each step?

We expect a rapid growth in the development in California of gasification projects for separated MSW, including food waste and yard trimmings, for animal waste, and for biosolids from wastewater treatment plants. For this to occur, however, some anachronisms in current regulation regarding gasification projects will have to be corrected. Those restrictions on the development of gasification include the definition of the gasification process, the limitation of project sizes to 500 tons per day and the exclusion from receipt of organic diversion credit to cities and counties that deliver the organic waste stream for gasification as opposed to composting or anaerobic digestion.

These limitations were adopted at a time when gasification technology was incorrectly understood to be the same as incineration. Unlike the incineration of waste process, no combustion of organics occurs using gasification technology.

The limitations on the use of gasification technology also occurred at a time when the major solid waste management companies wanted all waste streams

to be directed to the landfills that they owned and operated and not to any alternative method of disposal of that waste. With the adoption of AB 1826 and AB 341, disposal of all organics in California landfills is no longer an option.

How soon would you expect substantial market growth for each submarket?

Cambrian Energy expects to see rapid development of gasification projects for most of the categories of organic waste listed by the CEC as soon as the regulatory impediments to the development of gasification projects is removed.

Gasification projects represent a total waste disposal solution. There would be no residual environmental exposure to address as there is with landfill gas. Owners of landfills are required to maintain gas collection systems and are responsible for the control of landfill gas emissions for 30 years after the closure of a landfill. This is because only approximately 1/3 of the energy content in the organics deposited in landfills is projected to be converted by anaerobic digestion to landfill gas over a 25 to 30-year period. By contrast, approximately 85% to 90% of the energy content of organics that are gasified to syngas are captured and converted. This happens in a matter of seconds and not over a 25-year timeframe. The remaining material is an inert ash or slag that can be easily disposed of for roadbed material. It could even be disposed of in a landfill, since it is now an inert material and no longer an organic. However, disposal in a landfill would add a cost. The better solution is to sell the ground slag as roadbed material.

Gasification of organics will yield the highest recovery of the energy content in such organics. It represents a total disposal solution for such organics. It eliminates the large cost and lengthy environmental exposure that now exists for the large fraction of organics deposited in landfills that will continue to produce landfill gas over many years.