

Regulatory Barriers to the Utilization of Conversion Technologies in California

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Executive Summary

This paper focuses on the historical legislative and administrative policies that have inhibited the introduction of municipal solid waste (MSW) conversion technology projects in the state of California, and addresses the reforms that may be required to facilitate the use of gasification in the production of synthesis gas (syngas) and its derivatives, including biofuels, chemicals, upgraded pipeline natural gas and other biobased products. It does not address such other challenges facing the industry as siting, project finance, the need for long-term feedstock and off-take agreements, or establishing renewable natural gas (RNG) standards for pipeline transport.

California Assembly Bill AB 341, passed in 2011, requires CalRecycle, the state's integrated waste management agency, to adopt regulations for mandatory commercial recycling and to pursue a new statewide goal of 75% recycling, to be achieved by 2020, and 95% recycling by 2025, through source reduction, recycling, and composting. Neither this legislation nor any of CalRecycle's subsequent planning documents mention Conversion Technologies (CTs) as playing any role in achieving this goal. Further, in September 2014, Governor Brown signed AB 1594 mandating that, as of January 1, 2020, the use of green waste as alternative daily cover will no longer constitute diversion through recycling and will instead be considered disposal in terms of measuring a jurisdiction's 50% per capita disposal rate. More recently, AB 350, the Clean Energy and Pollution Reduction Act, mandated the State to obtain 50% of its power from Renewable Energy by 2030.

Local communities have challenges meeting these goals. Cities and counties throughout the state are now seeking strategies that will allow them to find alternative uses for these feedstocks, as well as other post-recycled organics, that will enable them to meet their landfill diversion mandates. However, the opposition to gasification and CT technologies remains entrenched. It is led those who believe that source reduction, re-use and traditional recycling are the only legitimate pathways to zero waste, and by those who benefit economically from current recycling practices, with support from members of the state's legislative bureaucracy.

Legislation authorizing diversion credit for the gasification of organic materials, otherwise headed for landfills, and recycling credit for the process would a) help public jurisdictions

to find alternatives to waste disposal, b) provide RNG for transportation, and c) enable the use of their materials in the production of biofuels and renewable power.

Additionally, the revenue base for biofuels and RNG involves renewable fuel incentives as RINs and Low Carbon Fuel Standards (LCFS) credits, making this one of the most practical and potentially profitable alternatives to the landfilling of organic wastes. Evolving state policy now requires that legislative and regulatory reform be addressed. The following table captures the major issues inhibiting the implementation of conversion technologies in California.

Problem	Issue	Proposed Solution
Definition of Recycling	CTs do not qualify under current statute. Over the past five years, CalRecycle policy has not taken into account their potential contribution to the recycling process.	Revise language in PRC 40180 to read that solid waste qualifies as (or meets the definition of) "recycling." Institute policies that comply with the definition of recycling in that section.
Definition of Gasification	The definition is scientifically inaccurate. It discourages CT developers from attempting to operate in California.	Amend or delete definition of gasification in PRC 40117. Acknowledge its rightful place in the waste management hierarchy.
Diversion Credits	Waste Gasification presently does not qualify as diversion from landfilling.	Revise the definitions in PRC 40121, 40192 (b) and elsewhere to remove the classification of waste conversion as disposal. Update and resubmit previous language from AB 222.
Statutory Roadblocks	CalRecycle does not acknowledge gasification as having a role in achieving its AB 341 goal of 75% recycling. For more than ten years, the state legislature, together with elements of the environmental movement, has resisted corrective legislation on behalf of conversion technologies. Policy should establish standards of performance, rather than regulating technologies by type.	Seek reconsideration of corrective legislation. Motivate CalRecycle to revise its treatment of conversion technologies, and ease the permitting for these projects, as has been done for composting and anaerobic digestion.

Background

In 2011, California’s legislature set new goals for solid waste management. AB 341 required CalRecycle to adopt regulations for mandatory commercial recycling and to pursue a new statewide goal of 75% recycling, to be achieved by 2020 through source reduction, recycling, and composting.

In 2015, California's statewide landfill disposal was 33.2 million tons and its population was 38.9 million. While California as a whole remained well above the 50 percent diversion mandate set for local jurisdictions, the statewide recycling rate 2015 dropped to 47 percent, not a very good indication that the state will be able to achieve 75 percent recycling by 2020. The state's recycling rate had remained essentially unchanged at approximately 50% since 2010. By 2020, it is estimated that California will be generating 80 million tons of solid waste annually. Therefore, to reach its goal of 75% recycling in a growing economy, the state will have to reduce by approximately nine million tons the amount of material it landfills each year.

This goal, which relies heavily on the imposition of a universal commercial recycling program and convincing the public to further reduce the volume of organics in the residual waste stream, is believed to be unrealistic. It will require increased composting and will shift the focus of renewable natural gas production from landfill biogas to anaerobic digestion, and under the appropriate statutory and legislative environment, to gasification, as well. However, the gasification of municipal solid waste (MSW) to produce syngas for power, liquid fuels or for the production of renewable natural gas (RNG) does not currently count as recycling.

Another driver for the conversion of MSW to RNG is SB 350, the Clean Energy and Pollution Reduction Act of 2015, signed into law by the Governor on October 7th 2015. Its provisions include a mandate for utilities to produce 50% percent of the state's power from renewable energy by 2030.

For Southern California Gas Company, 50% means 50 billion cubic feet of RNG per year. Its plan to achieve this level of production includes 14 gasification facilities capable of producing 42,000 SCFM of RNG from municipal solid waste.

A further incentive for the introduction of conversion technologies is SB 32, signed by the Governor in September 2016, which establishes a California greenhouse gas reduction target of 40% below 1990 levels by 2030. This is the most aggressive GHG reduction benchmark enacted by any government in North America.

It should be noted that, to date, the prior legislative campaigns on behalf of CTs, all of which have been unsuccessful, have focused on creating an acceptable regulatory environment for the production of power and/or biofuels, chemicals or biobased products. The state's current environmental mandates establish the need to use conversion technologies for the production of renewable natural gas, as well.

Legitimizing the use of gasification in the production of RNG will require modification of the current rules for RNG pipeline injection. In 2012, the renewable natural gas industry successfully sponsored AB 1900 and AB 2196, which established specific rules for qualifying biogas and biomethane under California's RPS, and mandated that standards be established for testing treated biogas so that it could be transported in the state's

natural gas pipelines. Although these bills enhanced the market for biogas captured from landfills and sewage treatment plants, and represented a major step forward in dealing with organic wastes after they have decomposed in landfills, they have not yet resulted in a regulatory environment that will enable the injection of RNG in the state's natural gas pipelines.

Ever since its first publication in 2006, California's BioEnergy Action Plan has included language directing CalRecycle "to work to promulgate changes to existing law to develop a regulatory framework for biomass waste conversion facilities, meeting environmental standards, that clearly distinguishes them from disposal, and provides clear permitting pathways for their development, as well as provides diversion credits to local jurisdictions for solid waste processed by these technologies."

Further, the state's Air Resources Board has long recognized that organic waste is one of the only feedstocks that, on a life-cycle basis, will meet the emissions reduction objectives of California's Low Carbon Fuel Standard. As early as 2010, its staff declared that 24 waste-to-biofuels facilities would be required in the state by 2020—18 plants that produce biofuels from waste products and six new biodiesel/renewable diesel plants—to assist in meeting the goals of this program. However, none of this has been acted upon.

California's Definition of Recycling

California law defines recycling, PRC 40180, as "the process of collecting, sorting, cleansing, treating, and reconstituting of materials that would otherwise become solid waste, and returning them to the economic mainstream *in the form of raw material for new*, reused, or reconstituted products, which meet the quality standards necessary to be used in the marketplace."

Current regulatory practice rarely adheres to this definition. However, it defines the pathway for the production of chemical, biofuels, RNG and other biobased products. The industry would be creating a raw material, synthesis gas, for use in the production of new products.

This is what the State of New York defines as the "cessation of waste". It can only occur once the step of reconstituting takes place, and it results in a flexible regulatory framework based upon standards of performance. Its statute reads: "*When granting a beneficial use determination, the department shall determine, on a case-by-case basis, the precise point at which the solid waste under review ceases to be solid waste. Unless otherwise determined for the particular solid waste under review, that point occurs when it is used in a manufacturing process to make a product or used as an effective substitute for a commercial product or used as a fuel for energy recovery.*" [6NYCRR360-1.15 (d) (3)].

“Recycling” is not simply the act of segregation, or the business of collection, or the sorting that occurs at the Materials Recovery Facility (MRF), or even the brokerage of those materials. It is a process--a pathway that transforms materials from being waste into raw materials.

This involves changing the form or structure of something, whereas CalRecycle, in its AB 341 planning and other policy making, maintains that recycling constitutes only material segregation, collection, and sorting. Recycling programs that simply collect, sort, clean, and sell "recycled materials" are not performing recycling as defined in statute, but simply brokering goods as part of a larger, unregulated value chain.

California’s Gasification Definition

For the past decade, elements in the legislature have blocked all efforts to amend or remove from statute a definition of gasification that is universally acknowledged to be scientifically inaccurate, and which leaves developers vulnerable to spurious legal challenges and possible shutdown due to lack of compliance. Its key provisions read as follows:

40117. "Gasification" means a technology that uses a noncombustion thermal process to convert solid waste to a clean burning fuel for the purpose of generating electricity, and that, at minimum, meets all of the following criteria:

(a) The technology does not use air or oxygen in the conversion process, except ambient air to maintain temperature control.

(b) The technology produces no discharges of air contaminants or emissions, including greenhouse gases, as defined in subdivision (g) of Section 38505 of the Health and Safety Code.

(c) The technology produces no discharges to surface or groundwaters of the state.

(d) The technology produces no hazardous waste.

(e) To the maximum extent feasible, the technology removes all recyclable materials and marketable green waste compostable materials from the solid waste stream prior to the conversion process and the owner or operator of the facility certifies that those materials will be recycled or composted.

To summarize, the definition restricts the use of air or oxygen in the gasification process (a disqualifying element for most technologies), and requires zero emissions, not simply from the gasification step, but from the entire biorefining process. This is a physical impossibility and a standard that would shut down every power plant and petroleum refinery in the state, not to mention any gasification facilities.

It creates uncertainty as to whether individual conversion technologies, when processing MSW, will qualify for credit under the state’s Renewable Portfolio Standard.

Statutory Roadblocks

Since 2005, due to the statutory and regulatory roadblocks faced by conversion technologies in the state, California-based companies alone have located an estimated \$1 billion in gasification-related renewable energy projects elsewhere.

The following are the main statutory roadblocks to the use of gasification in California.

1. For more than a decade, the legislature has refused to amend or remove from statute a scientifically inaccurate definition of gasification (PRC 40117). During this time, four comprehensive packages of corrective legislation sponsored by the BioEnergy Producers Association and dealing with this issue have been rejected by the legislature.
2. Further, a number of other statutory provisions prevent MSW gasification facilities from receiving credit as landfill diversion. This discourages jurisdictions from entering into long-term feedstock contracts with project developers, as such contracts would raise the possibility that, at some point, these jurisdictions could incur financial penalties for failing to meet their landfill diversion mandates.

AB 1126, for example, establishes a definition for what it calls “engineered municipal solid waste conversion,” a definition that makes no distinction between combustion and thermal conversion. It places conversion technologies under feedstock volume and content limitations that had been drafted to regulate the incineration of MSW in cement kilns. For purposes of AB 939 and AB 341 compliance, it codifies that MSW residuals, when used to produce syngas or such derivatives as RNG or biofuels, count as disposal, rather than recycling. It denies RPS credit to facilities that generate power from MSW-derived biogas, which this feedstock would receive if it had been processed using anaerobic digestion.

The bill places Material Recovery Facilities (MRFs), when processing MSW feedstocks for use in CTs, under burdensome volume, content and reporting restrictions. It limits EMSW facilities to no more than 500 tons per day of feedstock (whereas landfills are allowed to accept up to 10,000 tons per day), restricting economies of scale, and limits feedstocks to no more than 25% moisture content and 25% noncombustible waste, when many CTs can handle 50% moisture content and higher.

3. As mentioned previously, SB 498, passed in late 2014, established a new definition for “Biomass Conversion”. Although a token first step in dealing with the regulatory roadblocks facing conversion technologies, the bill specifically precludes municipal solid waste as a qualifying feedstock under this definition, instead addressing such single stream wastes as agricultural crop residues, green

waste and non-recyclable paper. A summary and the complete text of legislation impacting CTs may be found in Appendix “B”.

Policy Roadblocks

Since 2010, CalRecycle has pursued a policy of solid waste management that is narrowly focused on source reduction, reuse and traditional recycling as its primary alternatives to landfilling, while collaborating with the legislature to pass such bills as AB 341, AB 1126 and SB 498, which have provisions that are either adverse to, or ignore to the use of, CTs in processing municipal solid waste.

Operational certainty for CTs depends upon the state creating clear permitting and regulatory pathways based upon standards of performance, subject to environmental standards consistent with its other solid waste processing or refinery operations, rather than attempting to define, categorize and regulate these technologies by type.

Lacking such a practical statutory and regulatory foothold, CT providers have been unwilling to risk time and capital in an attempt to permit these projects in the state.

California-based Fulcrum BioEnergy is constructing its first CT facility east of Reno, Nevada. Benefiting from commitments for a \$105 million USDA loan guarantee and a \$70 million grant from the Advanced Drop-in Biofuels Production Project of the Department of Defense, the plant will annually produce 10.5 million gallons of “drop-in” jet fuel or diesel and 16 megawatts of renewable electricity from 147,000 tons of post-recycled municipal solid waste.

In part, the facility will use feedstocks supplied by Waste Connections, Inc., trucked from El Dorado County through the Lake Tahoe region to Nevada. This is of note because the electricity it produces, if sold back into California, will qualify as renewable under the California’s RPS, and by shipping its waste for gasification in Nevada, El Dorado County will obtain credit for landfill diversion in California and increase the County’s recycling rate. Fulcrum completed its initial permitting in Nevada in a matter of six months.

Meanwhile, state government continues to focus its efforts on improving the regulatory environment for other organic waste treatment processes that, in total, cannot address the state’s entire carbon-based waste stream.

For example, through regulatory decision-making alone, the state classified anaerobic digestion as composting, and as recycling rather than disposal, exempting these technologies from having to follow the same uncertain and time-consuming permitting pathways required of other CTs, enabling them to receive landfill diversion credit, and to qualify the power they produce for the Renewable Portfolio Standard (“RPS”).

AB 341, enacted in 2011, established a policy goal requiring the state to source reduce, recycle or compost 75% of its solid waste by 2020. The legislation does not so much as mention that CTs could play a role in this effort, nor has this alternative been addressed in any of CalRecycle's subsequent planning documents. In fact, since the passage of AB 341, the agency has collaborated with the legislature to enact four bills that favor anaerobic digestion (AD) and composting.

Composting facilities involve both emissions and odors, creating major challenges in facility siting. Two communities in Southern California have succeeded in shutting down these facilities due to odor problems. It is interesting to note that the state is currently landfilling more than 15 million tons of compostable organics each year.

Further, Los Angeles County does not currently have a single anaerobic digestion facility operating on a commercial basis. Preliminary estimates indicate that the County's jurisdictions would need 36 facilities, each with a processing capability of 250 tons-per-day, to meet the state's goals for anaerobic digestion.

In addition to setting an increased recycling goal, AB 341 creates other challenges for the state's cities and counties. For example, green waste will no longer qualify for diversion credit when used as alternate daily cover. Sacramento City and County landfill 80,000 tons of green waste each year, for which they have received diversion credit. Like cities and counties throughout the state, they are now seeking strategies that will allow them to dispose of that tonnage while meeting their landfill diversion mandates. Legislation authorizing diversion credit for the gasification of these materials would address this problem.

It is important to note that, without meaningful regulatory oversight, the state annually exports a significant quantity of its recyclables to nations like China, Taiwan and South Korea. In 2013, 18.6 million tons of recyclable material valued at \$7.5 billion passed through its ports, 60% to 80% of which are estimated to have originated in California. According to CalRecycle, "Some recyclables are actually processed into recycled content feedstock or new products after they are shipped overseas, but other materials are not, and it is difficult to track the final handling of materials. The lack of information on end-uses, adherence to environmental health standards, and regulatory compliance are potential concerns with the exportation of recyclable materials." Yet they receive credit as recycling in California the moment they leave the docks.

All of these facts confirm the magnitude of the potential for creating renewable natural gas from organics before they are placed in landfills. In short, the renewable natural gas industry needs a reliable business environment that will support the permitting and operation of innovative new science-based waste recovery technologies in a free market economy.

CT Supportive Legislative History

AB 222, the most comprehensive CT initiative and the one to advance the farthest during the past decade, was a two-year bill sponsored by the BioEnergy Producers Association in 2009-2010. Its goals included the following:

- It would have removed from statute scientifically inaccurate definitions and repressive permitting pathways that have driven biobased technology providers and investment capital out of California.
- In particular, for regulatory purposes, it deleted from statute the scientifically inaccurate definition of gasification.
- In its place, it inserted the following definition of a biorefinery:

"Biorefinery" means a facility that uses a non-incineration thermal, chemical, biological, or mechanical conversion process, or a combination of those processes, to produce a clean burning fuel for the purposes of generating electricity or a renewable fuel from either a solid waste feedstock or carbonaceous material not derived from fossil fuels. Carbonaceous materials include, but are not limited to, any of the following:

- (A) Dedicated energy crops.*
- (B) Agricultural crop residues.*
- (C) Bark, lawn, yard, and garden clippings.*
- (D) Leaves, silvicultural residue, and tree and brush pruning.*
- (E) Wood, wood chips, and wood waste.*
- (F) Nonrecyclable pulp or nonrecyclable paper materials.*
- (G) Waste fats, oils, and greases."*

- The legislation also would have qualified the biogenic portion of solid waste as a feedstock under the RPS, and would have enabled jurisdictions to count solid waste diverted for processing by these technologies as landfill diversion.
- It stated that biorefineries could only handle solid waste materials that constituted residuals of recycling.
- AB 222 received letters of support from approximately 100 stakeholders statewide and was jointly endorsed in a letter signed by either the Chair or Acting Director the California Energy Commission, the Air Resources Board and CalRecycle, an unusual honor for California legislation.
- Despite intense opposition, the bill passed the Assembly Utilities & Commerce Committee (11-0), the Assembly itself (54-13) and the Senate Energy, Utilities

and Communications Committee (6-1). It was ready for Senate floor passage and final signature by Governor Schwarzenegger when the Senate Environmental Quality Committee demanded to hear the bill, in connection with which its staff stripped the legislation of its RPS and landfill reduction provisions, and inserted amendments that would have created even more restrictive pathways for the implementation of conversion technologies in the state. The sponsors ultimately found themselves in the position of having to oppose their own legislation, and it was withdrawn from consideration.

Conclusion

During the past ten years, California has placed in landfills approximately 340 million tons of post-recycled solid waste, one of the state's most readily available and environmentally appropriate renewable feedstocks.

Organic waste feedstocks could support the production of 2.6 billion gallons of biofuels in California, or 243.6 billion cubic feet of gas per year, more than 10% of California's total use of natural gas.

The passage of SB 32 and other legislative and regulatory initiatives over the past several years have reinforced the need for legislation that would enable the use of gasification in the production of RNG, biofuels and other biobased products.

Existing federal and state incentives make possible a practical and potentially profitable alternative to the landfilling of organic wastes.

In summary, there is a new form of recycling emerging that supersedes California's approach – the pursuit of energy independence and a cleaner environment through the recycling of carbon. The process, also known as molecular recycling, is going to change the face of the waste industry, and how we think about recycling. It is a regulatory concept worth fighting for.