

## California Biomass Collaborative, 8<sup>th</sup> Annual Forum

Questions for 6 April panel titled –**REVISED 31 March, 2011**:

URBAN ORGANIC RESIDUALS' PLACE IN CALIFORNIA'S LOW CARBON FUEL & RENEWABLE ENERGY STANDARDS

*Panelists will respond to questions presented in advance about Conversion Technologies' environmental performance, "renewability of energy product", and effects on the existing recycling infrastructure.*

1. Are thermal conversion technologies compatible with current environmental regulations, and if not, where do they exceed compliance and what research and development initiatives are critical for the future to allow them to achieve compliance?
2. Compared to the current practice of landfilling post-MRF or post-recycled material in California, do conversion technologies (biochemical or thermochemical ) offer improved greenhouse gas (GHG) life-cycle performance? Do CTs have other environmental impacts or benefits compared to landfills? Compared to landfilling, how does combustion with energy recovery perform with respect to GHG and other environmental parameters?
3. In California, combustion of MSW (or post MRF residues) with energy recovery is classified as "transformation" and has limited landfill diversion credit (it is essentially considered disposal). Electricity from transformation facilities does not qualify as renewable for purposes of California RPS (except for the Covanta Stanislaus facility). However, electricity generated from gasification of MSW/post MRF residues **does appear to** qualify for California RPS (regardless of feedstock composition) and gasified material would be considered diverted from landfill.<sup>1</sup>

It therefore appears that California policy favors gasification over incineration with energy recovery.

What is the basis for this policy result? What environmental, efficiency, or other performance advantage, if any, does gasification have over modern solid or mass-burn combustion processes? Are technology-independent environmental performance standards insufficient for the purposes of regulating fuels and electricity from wastes?

4. What actions are needed for California to achieve a zero waste future? What does zero waste mean- - no landfill disposal? Does energy recovery (heat, power, fuels) from the post- recycled / post-MRF stream support a zero waste vision?

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<sup>1</sup> See Appendix A for Public Resources Code definition of gasification, a portion of the Energy Commission RPS Guidebook describing RPS eligible MSW conversion technology, and a letter from CalRecycle commenting on technology classification for the "Liberty Energy Center Biofuels Gasification Project" draft EIR [proposed, Kern County].

## APPENDIX A

California PRC, Portion of SECTION 40100-40201

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.

(f) The facility where the technology is used is in compliance with all applicable laws, regulations, and ordinances.

(g) The facility certifies to the board that any local agency sending solid waste to the facility is in compliance with this division and has reduced, recycled, or composted solid waste to the maximum extent feasible, and the board makes a finding that the local agency has diverted at least 30 percent of all solid waste through source reduction, recycling, and composting.

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Renewables Portfolio Standard Eligibility,  
(Commission Guidebook, January, 2011)<sup>2</sup>  
Pg.28

Solid Waste Conversion Facilities: A facility is eligible for the RPS if 1) it uses a two-step process to create energy whereby in the first step (gasification<sup>3</sup> conversion) a non-combustion thermal process that consumes no excess oxygen is used to convert MSW into a clean burning gaseous or liquid fuel, and then in the second step this clean-burning fuel is used to generate electricity, 2) it is located in-state or satisfies the out-of-state requirements, and 3) the facility and conversion technology meet all of the following applicable criteria in accordance with Public Resources Code Section 25741, Subdivision (b)(3):

(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.

(f) The facility where the technology is used is in compliance with all applicable laws, regulations, and ordinances.

(g) The technology meets any other conditions established by the Energy

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<sup>2</sup> <http://www.energy.ca.gov/2010publications/CEC-300-2010-007/CEC-300-2010-007-CMF.PDF>

<sup>3</sup> "Gasification" is the terminology used in Public Resources Code Section 40117 as implemented by the California Department of Resources Recycling and Recovery (CalRecycle). The requirements of Section 40117 mirror the requirements of Public Resources Code Section 25741(b)(3), as applicable to solid waste conversion.

**Letter 4b – Natural Resources Agency, Department of Resources Recycling and Recovery (September 1, 2010)**

Natural Resources Agency

Arnold Schwarzenegger, Governor



**DEPARTMENT OF RESOURCES RECYCLING AND RECOVERY**

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September 1, 2010

Jaymie Brauer, Planner 2  
Planning & Community Development  
2700 M Street  
Bakersfield, CA 93301-2323

RE: Addendum to August 6, 2010 Letter - *State Clearinghouse No. 2008101091 Draft Environmental Impact Report for Liberty Energy Center Biofuels Gasification Project by Liberty Composting, Inc., SWIS No. 15-AA-0287, Kern County*

Dear Ms Brauer:

This letter is a supplement to CalRecycle’s comment letter sent to you on August 6, 2010 regarding the Liberty Energy Center Biofuels Gasification Project. In the previous letter CalRecycle staff indicated that we had not determined how the proposed facility should be classified relative to State statutes and regulations. In that letter, staff outlined areas that needed clarification to help us determine whether the facility met the definition of gasification, transformation, transfer/processing, or something else which would then determine the applicable permitting requirements.

Based on the information in the Draft EIR and our subsequent discussions with your agency, the Local Enforcement Agency for Kern County (LEA), the project proponent and its technical consultants, CalRecycle staff have determined that the facility is best identified as a gasification facility, as defined at Public Resources Code § 40117. Note, however that the facility could also be considered a transfer/processing station, as defined at Public Resources Code § 40200. In either case, the facility will need to obtain a full solid waste facilities permit from the LEA. State statutes and regulations that define the types and processes for solid waste facilities permits do not distinguish between gasification facilities and transfer/processing facilities, so the facility must obtain a permit under the transfer/processing station regulations (Title 14, §§ 17400 et seq.). As a gasification facility or a transfer/processing station the facility must be identified in the County Integrated Waste Management Plan’s Non-Disposal Facility Element. Please contact me if you have any questions at (916) 341-6405 or at [Christine.Karl@calrecycle.ca.gov](mailto:Christine.Karl@calrecycle.ca.gov).

4b-A

Sincerely,

Christine Karl  
Permitting and LEA Support Division  
Waste Compliance and Mitigation Program

Cc: Bill O’Rullian, LEA, [bill@co.kern.ca.us](mailto:bill@co.kern.ca.us)

*Please note: reply correspondence should be sent to 1001 J Street, P.O. Box 4025, Sacramento, CA 95812. Correspondence specifically to the attention of the Director of CalRecycle should be sent to the address on the letterhead.*

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<sup>4</sup> [http://www.co.kern.ca.us/planning/pdfs/eirs/liberty/liberty\\_feir\\_vol3.pdf](http://www.co.kern.ca.us/planning/pdfs/eirs/liberty/liberty_feir_vol3.pdf)

### APPENDIX B

California Waste disposal amounts and composition (strictly background information only)

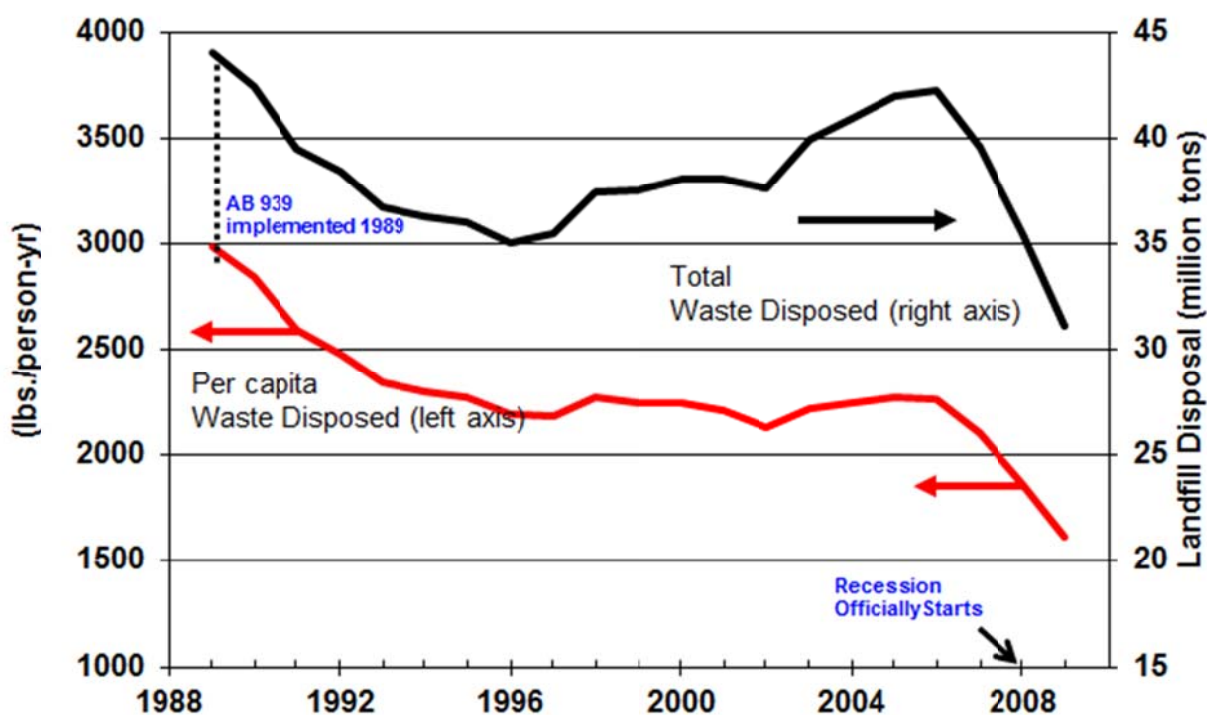


Figure. 1 Per-capita and total landfill disposal in California

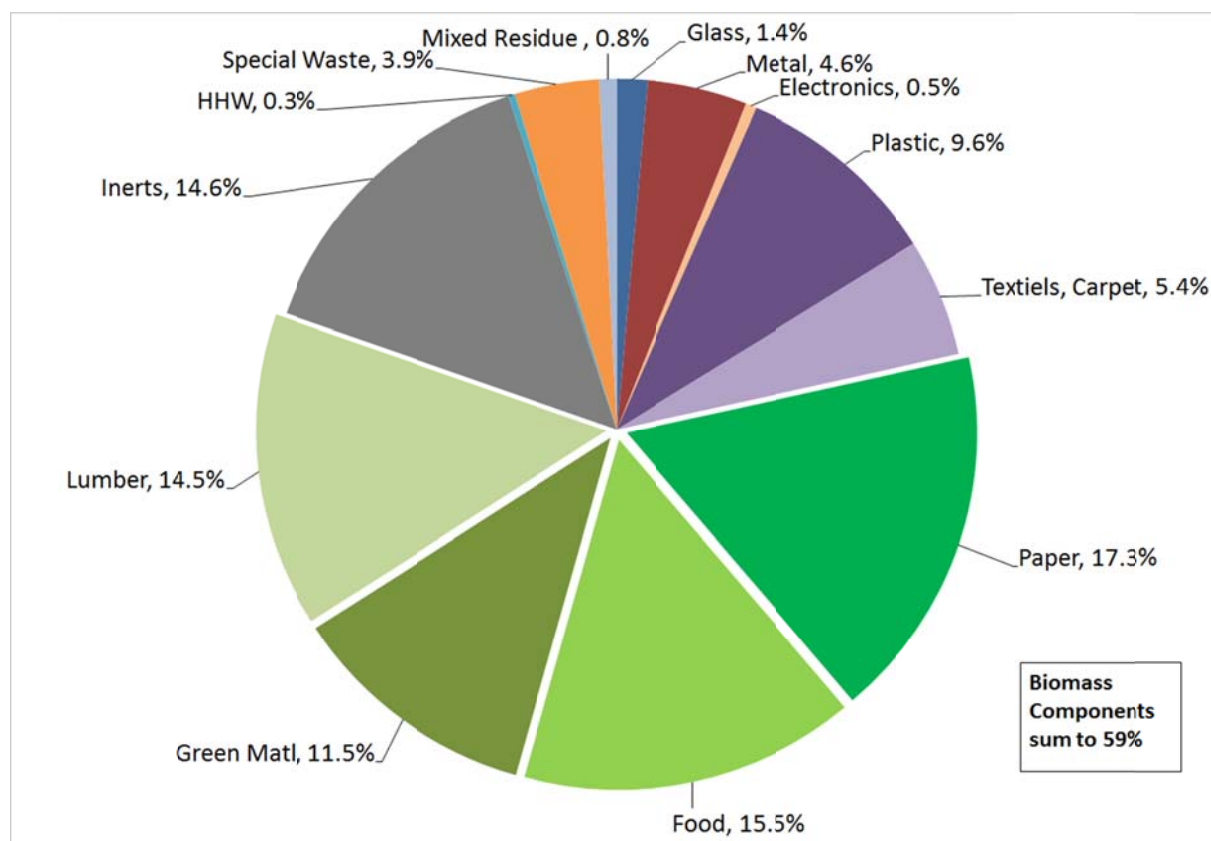


Figure 2. Composition of California Waste Disposal Stream (Cascadia,, 2008)

Table 1 California MSW Disposal by component with Potential Energy Recovery Amounts.

	Landfilled <sup>a</sup> (Mt -as is)	% of Total	Ash <sup>b</sup> (% wb)	Ash (Mt y <sup>-1</sup> )	HHV <sup>b</sup> (MJ/kg, ar)	HHV contribution to composite stream (MJ kg <sup>-1</sup> as received)	Moisture <sup>b</sup> (%wb)	Landfilled (Mt dry)	HHV (MJ/kg, dry)	Primary Energy by Component (EJ) <sup>c</sup>	Primary Energy by Component (%)	Electricity Potential <sup>d</sup> (MWe) (GWh y <sup>-1</sup> )	
Paper/Cardboard	6.9	17.3	5.3	0.4	16	2.77	10	6.2	17.8	0.100	26	632	5,540
Food	6.2	15.5	5.0	0.3	4.2	0.65	70	1.8	14.0	0.023	6	211	1,844
C&D Lumber	5.8	14.5	5.0	0.3	17	2.47	12	5.1	19.3	0.089	23	563	4,933
Other Organics	1.7	4.3	10.0	0.2	8.5	0.37	4	1.6	8.9	0.013	3	84	732
Leaves and Grass	1.5	3.8	4.0	0.1	6	0.23	60	0.6	15.0	0.008	2	37	326
Prunings, trimmings, branches and stumps	1.3	3.3	3.6	0.05	11.4	0.38	40	0.8	19.0	0.014	4	86	753
<b>Biomass Components of MSW Total</b>	<b>23.3</b>	<b>58.8</b>		<b>1.2</b>		<b>6.9</b>		<b>16.1</b>		<b>0.25</b>	<b>64</b>	<b>1613</b>	<b>14,128</b>
All non-Film Plastic	2.5	6.2	2.0	0.05	22	1.37	0.2	2.5	22.0	0.049	13	312	2,730
Film Plastic	1.3	3.4	3.0	0.04	45	1.53	0.2	1.3	45.1	0.055	14	350	3,062
Textiles	2.1	5.4	7.0	0.15	17.4	0.94	10	1.9	19.3	0.034	9	215	1,881
<b>Non-Renewable Carbon Compounds Total</b>	<b>6.0</b>	<b>15.0</b>		<b>0.24</b>		<b>3.84</b>		<b>5.7</b>		<b>0.14</b>	<b>36</b>	<b>876</b>	<b>7,673</b>
Other C&D	5.8	14.6	100	5.8	0	0		5.8					
Metal	1.8	4.6	100	1.8	0	0		1.8					
Other Mixed and Mineralized	2.2	5.5	100	2.2	0	0		2.2					
Glass	0.6	1.4	100	0.6	0	0		0.6					
<b>Mineral Total</b>	<b>10.4</b>	<b>26.2</b>		<b>10.4</b>		<b>0.0</b>		<b>10.4</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Totals</b>	<b>39.6</b>	<b>100</b>		<b>11.8</b>		<b>10.71</b>	<b>19</b>	<b>32.2</b>	<b>13.2</b>	<b>0.385</b>	<b>100</b>	<b>2489</b>	<b>21,800</b>

a) California waste stream composite data (<http://www.calrecycle.ca.gov/Publications/General/2009023.pdf>),

& California Solid Waste Generation and Diversion (<http://www.calrecycle.ca.gov/LGCentral/GoalMeasure/DisposalRate/Graphs/Disposal.htm>) Accessed 28 March, 2011

b) Adapted from Tchobanalglous, G., Theisen, H. and Vigil, S.(1993),"Integrated Solid Waste Management", Chapter 4, McGraw-Hill, New York & Themelis, N. J., Kim, Y. H., and Brady, M. H. (2002). "Energy recovery from New York City municipal solid wastes." Waste Management & Research, 20(3), 223-233.

c) EJ = 10<sup>18</sup> J (exajoule) ) EJ = 10<sup>18</sup> J (exajoule) and is approximately equal to 1 Quad (1 Q = 1.055 EJ)

d) Electricity generation calculations assume thermal conversion means for low moisture stream (paper/cardboard, other organics, C&D Lumber, all plastics and textiles) and biological means (anaerobic digestion) for the high moisture components (food and green waste). Energy efficiency of conversion of matter to electricity by thermal

means is assumed to be 20%. Biomethane potentials of 0.29 and 0.14 g CH<sub>4</sub>/g VS for food and leaves/grass mixture respectively are assumed for biogas production which is converted at 30% thermal efficiency in reciprocating engines. Capacity factor of 1 is used.

Note: Does not show green ADC in totals