

EXHIBIT G

CUSTODIAL BANKING AGREEMENT

This Agreement is entered into on this \_\_\_\_\_ day of \_\_\_\_\_ 201\_ between the \_\_\_\_\_  
 \_\_\_\_\_ (Customer), with an address of \_\_\_\_\_ and  
 WasteZero, Inc. (WasteZero), 8540 Colonnade Center Drive , Raleigh NC 27615, to grant  
 permission from the Customer to WasteZero to open a custodial bank account with First Federal  
 Bank, a Division of SCBT (First Federal), on behalf of the Customer. The Customer understands  
 this account will be in the name of WasteZero, carry the tax identification number of WasteZero  
 and authorized signers on the account will be properly authorized WasteZero employees.

WasteZero shall prepare the necessary documentation to establish a bank account on behalf of  
 the Customer with First Federal. WasteZero will deposit all checks for payments from the  
 retailers into this account. WasteZero will wire funds from this bank account to the Customer's  
 own bank account. WasteZero will provide a monthly report which includes the reconciled bank  
 account statement, invoice register, cash receipts journal and accounts receivable aging report no  
 later than thirty (30) days after the end of each month.

\_\_\_\_\_  
Municipality

Waste Zero, Inc.

\_\_\_\_\_  
Authorized Signature of Customer

\_\_\_\_\_  
Authorized Signature of WasteZero, Inc.

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

\_\_\_\_\_  
Printed Name of Authorized Signature

\_\_\_\_\_  
Printed Name of Authorized Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Date

15-59

RECYCLING SERVICES AGREEMENT

RECEIVED

This Recycling Services Agreement (the "Agreement") is made and entered into this 1st day of November, 2013 (the "Effective Date"), by and between The City of Fall River ("Generator") and, Casella Recycling, LLC ("Processor").

CITY CLERK  
FALL RIVER, MA

In consideration of the covenants and undertakings of the parties hereto and other good and valuable consideration, the sufficiency and receipt of which is hereby acknowledged, Generator and Processor hereby agree as follows:

1. DEFINITIONS

"Facility" means the Fall River Landfill / Transfer Station operated by Republic Services, Inc. located at 1080 Airport Road, Fall River, MA. Hours of Operation (for Generator's route truck movement) at the Facility shall be as follows:

- Monday through Friday      7:00am – 4:00 pm
- Saturday                      TBD

Holiday Closings: New Year's Day, 4<sup>th</sup> of July, Labor Day, Thanksgiving Day and Day after, Christmas Day, Presidents Day, Memorial Day .

Should additional hours be required for moving / loading trucks, arrangements can be made through mutual agreement between the Generator and Republic Services, Inc..

"Fall River - Single Stream Curbside Mix" means recyclable fibers and containers collected in a single collection container or vehicle and includes Cardboard, Office Paper (white and colored) Magazines, Newspapers, Junk Mail, Envelopes (manila and regular) File Folders, Computer Paper, Post IT Notes, Card Stock, Aluminum Cans, Tin Cans, Glass Bottles and Jars, Plastic Bottles (water and soda) PETE #1, Plastic Bottles (milk and detergent) HDPE #2 and #'s 3 through 7 plastics from Curbside Location sources and as defined in the Materials Acceptance Protocol. Single Stream Curbside Mix does not include excluded materials described in the Materials Acceptance Protocol attached as Schedule B.

2. RESPONSIBILITIES OF GENERATOR

2.1 Generator shall deliver or cause to be delivered to the Facility all Single Stream Curbside Mix as listed in Section 1, above, received by collections made by the municipal curbside program from the City of Fall River.

2.2 Acceptable/Unacceptable Materials

a. Generator shall comply with the Materials Acceptance Protocol attached hereto as Schedule B, and shall deliver and load onto Processors trucks only Acceptable

Materials to the Facility. Any material that is not "Acceptable Material" is "Unacceptable Material".

b. Processor shall have the right to inspect all inbound loads from the Generator. Processor shall have the right to reject any delivery from the Generator which contains or appears to contain by volume or weight more than 4 percent (4%) Unacceptable Material, or which contains or appears to contain any amount of hazardous, toxic, radioactive or similarly dangerous Unacceptable Material (each such rejected load an "Unacceptable Load"). The entire cost arising from Generator's delivery of any Unacceptable Load (including without limitation transportation, re-loading, clean-up, alternate disposal and the like) shall be the sole responsibility of the Generator. Title to Unacceptable Material shall not pass from Generator to Processor. Rejected material will be assessed a \$90 / ton trash gate rate.

c. Generator shall indemnify, hold Processor harmless, and promptly reimburse Processor for all damages, losses and expenses, including reasonable attorney's fees and federal, state or local fines and penalties, resulting from the inclusion of any hazardous waste or hazardous materials in any load delivered by the Generator to the Facility, regardless of any allegation that Processor should have discovered the inclusion of such materials prior to accepting delivery of such load.

2.3 Generator will make reasonable efforts to eliminate the scavenging of recyclables prior to delivery to the Facility.

### 3. RESPONSIBILITIES OF PROCESSOR

3.1 Processor will receive, process, and market all curbside collected Single Stream Curbside Mix delivered to Casella Recycling's facility at 24 Bunkerhill Industrial Park, Charlestown, MA, or the facility of Processor's choice, in its sole discretion, in 100 yard walking floor trucks from the Facility. Said material will come from the City of Fall River as defined in Section 1 of this Agreement. Processor will provide Generator and Facility with a monthly report which shall indicate the date, time, and net weight for each load, a report of the total tons received for that calendar month, and a billing / rebate summary.

### 4. TERM

4.1 Initial Term. The initial one (1) year term of this Agreement shall commence on the Effective Date and shall expire on December 14, 2014 (the "Initial Term").

4.2 Extensions and Renewals. The Term shall automatically extend for additional consecutive one (1) year terms unless either party, no less than thirty (30) days prior to the end of the then-existing term, provides notice to the other party of its intent to not extend for an additional term.

IN WITNESS HEREOF, the parties have executed this agreement as of the Effective Date.

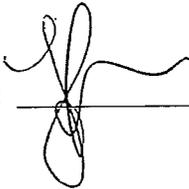
**PROCESSOR**  
Casella Recycling, LLC

By:

Name: Bob Cappadona

Title: Vice President

Date:



**GENERATOR**  
The City of Fall River

By:

Name: Mr. Kenneth C. Pacheco

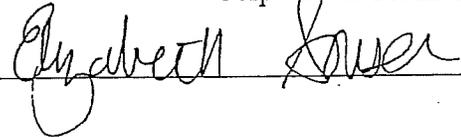
Title: Director, Department of Community Maintenance

Date:

10/7/2013

Approved as to Form and Manner:

Corporation Counsel



Date

By and with the approval of:

Mayor of the City of Fall River



Date

2014 DEC 11 P 4:42

CITY CLERK  
FALL RIVER, MA

15-184



SERVICE AGREEMENT FOR MUNICIPAL SOLID WASTE (NO SPECIAL WASTE) Landfill and Transfer Station

Customer: City of Fall River ("Customer")

Customer Address:

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

City: Fall River State: MA Zip: \_\_\_\_\_

e-Mail: \_\_\_\_\_ Start Date: 10 / 14 / 2014

Company: Browning-Ferris Industries, Inc. a Republic Services company ("Republic")

( ) Gate Rate(s) is (are) subject to change without notice  
( ) Agreement Specific Rate(s) and Terms: MINIMUM \_\_\_\_\_ Ton(s) per month MINIMUM CHARGE \$ \_\_\_\_\_ Per ton or \_\_\_\_\_ Per cubic yard or \_\_\_\_\_  
( ) VOLUME \_\_\_\_\_

TYPE OF WASTE RATE  
Municipal Solid Waste \$64.50\* Per ton or \_\_\_\_\_ Per cubic yard or \_\_\_\_\_  
Construction and Demolition \_\_\_\_\_ Per ton or \_\_\_\_\_ Per cubic yard or \_\_\_\_\_  
Debris \_\_\_\_\_ Per ton or \_\_\_\_\_ Per cubic yard or \_\_\_\_\_  
Other: \$ \_\_\_\_\_ Per ton or \_\_\_\_\_ Per cubic yard or \_\_\_\_\_  
Fuel Rec. Fee \_\_\_\_\_ Environmental Rec. Fee \_\_\_\_\_  
Estimated Monthly Tonnage \_\_\_\_\_ Admin Fee \_\_\_\_\_

BY: \_\_\_\_\_ TITLE: \_\_\_\_\_  
(AUTHORIZED SIGNATURE)

BY: \_\_\_\_\_ TITLE: \_\_\_\_\_  
(AUTHORIZED SIGNATURE)

CUSTOMER NAME (PLEASE PRINT) \_\_\_\_\_ DATE OF AGREEMENT \_\_\_\_\_

TERMS AND CONDITIONS

1. Additional Terms: The Disposal Fee (as defined below) will increase on July 1, 2015 by three percent (3%) and again on each July 1 thereafter during the Initial Term (as defined below) and the Renewal Term (as defined below) by three percent (3%) ("Disposal Fee Adjustment").  
Upon the execution of this Agreement and the complete execution of both the Administrative Consent Order by and among Republic, Customer and the Department of Environmental Protection and the Remediation Agreement by and between Republic and Customer, this Agreement shall replace in its entirety the Services Agreement for Municipal Solid Waste by and between Republic and Customer dated as of October 14, 2014, which is deemed terminated.  
Customer acknowledges and agrees that (i) the obligation of Republic (or any of its affiliates) to pay any host fees to Customer shall cease upon Closure (as defined below) of the Fall River Landfill located at 1080 Airport Road, Fall River, MA 02720 (the "Fall River Landfill"); and (ii) any materials deposited at the Fall River Transfer Station ("Disposal Facility") shall not be subject to any host fees payable to Customer or any affiliate thereof. "Closure" means the date the Fall River Landfill ceases accepting waste materials for disposal in the Fall River Landfill, excluding quantities of waste and/or materials for closure, post-closure and/or remediation purposes.  
2. Delivery of Acceptable Waste. Customer shall deliver all Acceptable Waste (as defined below) generated in the area served by Customer whether collected by Customer or Customer's subcontractor to the Disposal Facility.

DOES FACILITY HAVE A HAZARDOUS WASTE GENERATOR I.D. NUMBER?  YES  NO  
Rate based on lbs/yd  
FOR OFFICE USE ONLY  
ID: \_\_\_\_\_  
NATIONAL ACCOUNT NUMBER: \_\_\_\_\_  
SITE NUMBER: \_\_\_\_\_  
REGULATORY SET: \_\_\_\_\_  
TERMINAL: \_\_\_\_\_  
REVISION: \_\_\_\_\_  
CPI: \_\_\_\_\_  
PROCESSED PURCHASE ORDER NUMBER: \_\_\_\_\_  
S.I.C.: \_\_\_\_\_  
TERRITORY SALES REPRESENTATIVE: \_\_\_\_\_  
TAX CODE: \_\_\_\_\_  
TAX EXEMPTION NUMBER: \_\_\_\_\_  
TRANS CODE: \_\_\_\_\_  
START/ORDER: \_\_\_\_\_  
DRUG/PLS: \_\_\_\_\_  
RENEW:  Z  C  C  
MIG:  Z  C  
CREDIT APPROVAL: \_\_\_\_\_  
CREDIT LIMIT: \_\_\_\_\_  
CONTRACT APPROVAL: \_\_\_\_\_  
ENTERED BY: \_\_\_\_\_  
DATE: \_\_\_\_\_

## TERMS AND CONDITIONS

### 3. Delivery Procedures, Operation of the Disposal Facility.

(a) Acceptance of Acceptable Waste. Republic shall have the right in its sole discretion to reject delivery of any waste offered for acceptance by Customer that does not constitute Acceptable Waste. "Acceptable Waste" means all waste that is authorized to be disposed of at the Disposal Facility under then applicable federal, state and local laws, regulations, ordinances, rules, permits, licenses, and governmental orders or directives (collectively "Applicable Laws") and checked on the first page of this Agreement and that is not Unacceptable Waste (as defined below).

(b) Operation of the Disposal Facility/Procedures. Customer's delivery of Acceptable Waste to the Disposal Facility, which shall occur only during the Disposal Facility's posted hours, shall be governed by the procedures applicable to customers utilizing the Disposal Facility as Republic may modify such procedures from time to time. Notwithstanding anything in this Agreement to the contrary, Republic shall have the right, in its sole discretion, to close the Disposal Facility, in whole or in part, either temporarily or permanently, at any time for any reason and the delivery of Acceptable Waste shall be suspended or adjusted accordingly. Upon any such permanent closure, Republic shall have the right to terminate this Agreement.

(c) Customer's Compliance with Applicable Laws. Customer shall collect, transport and deliver waste to the Disposal Facility in compliance with all Applicable Laws and the procedures referenced in Section 3(B).

(d) Title to Waste. Customer represents and warrants to Republic that either Customer or its customer shall hold clear title, free of all liens, claims and encumbrances, to the waste delivered by Customer to the Disposal Facility. Title to, and risk of loss and responsibility for, Acceptable Waste delivered to the Disposal Facility by Customer shall pass at the time such Acceptable Waste is removed from the delivery vehicle at the Disposal Facility. Title to Unacceptable Waste shall remain with Customer or its customer and shall never be deemed to pass to Republic.

4. Term. Unless sooner terminated pursuant to Section 7, this Agreement shall commence as of the start date indicated on the first page of this Agreement ("Effective Date") and shall remain in full force and effect for sixty (60) consecutive months following the Effective Date ("Initial Term"). Upon mutual agreement of Republic and Customer the Initial Term may be extended for one twenty-four (24) consecutive month term ("Renewal Term"). Upon expiration or termination of this Agreement, the obligations of Customer to deliver and of Republic to accept Acceptable Waste shall terminate, provided, however, that all other rights and obligations of the parties under this Agreement (including those with respect to payment and indemnification) shall survive such expiration or termination.

### 5. Disposal Fees.

(a) Fees. Customer shall pay Republic the Disposal Fee for all Acceptable Waste Customer delivers to the Disposal Facility as set forth on the first page of this Agreement (the "Disposal Fee").

(b) Payment Deposit. Republic shall transmit an itemized invoice to Customer of all Disposal Fees and other charges under this Agreement on a periodic basis as set forth on the first page of this Agreement. Customer shall pay all invoices within thirty (30) days after receipt of invoice. If Customer does not make payment by such date, Customer shall pay a late payment fee in an amount equal to the lesser of (i) one and one-half percent (1.5%) per month or portion thereof on the amount past due or (ii) the maximum amount allowed by Applicable Law. Customer also shall pay a fee of \$50 (which Republic may increase from time to time by notice to Customer) for each check submitted by Customer that is an insufficient funds check or is returned or dishonored. At any time after Republic becomes concerned about Customer's creditworthiness or after Customer has made any late payment, Republic may request, and if requested Customer shall pay, a deposit in an amount equal to one month's charges under this Agreement.

(c) Taxes and Other Charges; Cost Increases. In addition to the Disposal Fee, Customer shall pay all federal, state, local or other taxes, fees (including host fees), surcharges or similar charges related to the acceptance or disposal of Acceptable Waste or the operations or activities of the Disposal Facility that are imposed by law, ordinance, regulation, agreement with a governmental authority, governmental audit or otherwise (collectively, "Taxes/Host Fees/Charges"). In addition, Republic shall have the right to increase the

MUNICIPAL SOLID WASTE AGREEMENT (NO SPECIAL WASTE)

Disposal Fee from time to time by the pro rata amount (determined by relative tonnage of Acceptable Waste delivered by Customer and accepted by Republic for processing at the Disposal Facility divided by the total tonnage of waste processed at the Disposal Facility) of any increase in operating costs or capital costs of the Disposal Facility as a result of a change in Applicable Laws. Any such increase shall be effective immediately upon written notice by Republic to Customer.

(c) Disposal Fee Adjustment. In addition to the adjustments described in Section 5(C), the Disposal Fee shall be increased as set forth on the first page of this Agreement.

### 6. Unacceptable Waste.

(a) Delivery of Unacceptable Waste. Customer agrees that it shall not deliver any Unacceptable Waste to the Disposal Facility. If Customer delivers waste that contains both Acceptable Waste and Unacceptable Waste, the entire delivery shall constitute Unacceptable Waste if the Unacceptable Waste cannot be separated from the Acceptable Waste through the reasonable efforts of Republic, as Customer's agent to cause such separation, with the cost of such separation to be paid by Customer.

(b) Weighting and Inspection of Waste by Republic. Republic shall weigh all waste at the Disposal Facility and the weight so determined shall be final and conclusive on both Customer and Republic. Republic shall have the right, but not the obligation, to inspect any of Customer's trucks to determine whether the waste delivered is Acceptable Waste or Unacceptable Waste. Customer acknowledges and agrees that any failure by Republic to perform any such inspection or to detect Unacceptable Waste despite such inspection shall in no way relieve Customer from its obligation to deliver only Acceptable Waste or from its other obligations under this Section 6.

(c) Rejection of Unacceptable Waste. If Customer delivers Unacceptable Waste to the Disposal Facility, Republic may, in its sole discretion: (i) reject such Unacceptable Waste at Customer's expense; or (ii) if Republic does not discover such Unacceptable Waste in time to reject and reload such Unacceptable Waste, after giving Customer telephonic notice thereof and a reasonable opportunity to dispose of such Unacceptable Waste, Republic may, as Customer's agent, dispose of such Unacceptable Waste at a location authorized to accept such Unacceptable Waste in accordance with all Applicable Laws and charge Customer all direct and indirect costs incurred due to handling, delivery and disposal of such Unacceptable Waste, unless Customer otherwise elects to arrange for disposal of the Unacceptable Waste. If Customer elects to dispose of such Unacceptable Waste, it shall do so within such time period as Republic reasonably deems necessary or appropriate in connection with the operation of the Disposal Facility, including the preservation of the health and safety of its employees. If after electing to do so Customer does not dispose of the Unacceptable Waste within such time period, Republic may dispose of such Unacceptable Waste as Customer's agent, without further notice to Customer, and Customer shall pay the direct and indirect costs set forth above. Notwithstanding the foregoing, no notice shall be required by Republic to Customer for Republic to dispose of Unacceptable Waste as Customer's agent in emergency situations where in Republic's reasonable judgment a delay in such disposal could constitute a hazard to the Disposal Facility or any person on, about or near the premises.

(d) Definition of Unacceptable Waste. For the purposes of this Agreement, "Unacceptable Waste" means: (i) any material that is not Acceptable Waste; (ii) any material that by reason of its composition, characteristics or quantity is defined as a "hazardous material," "hazardous waste," "hazardous substance," "extremely hazardous waste," "restricted hazardous waste," "toxic substance," "toxic waste," "toxic pollutant," "contaminant," "pollutant," "infectious waste," "medical waste," "radioactive waste," or "sewage sludge" under any Applicable Law; (iii) any material that requires other than normal handling, storage, management, transfer or disposal; or (iv) any other material that may present a substantial endangerment to public health or safety, may cause applicable air quality or water effluent standards to be violated by the normal operation of the Disposal Facility, or because of its size, durability or composition cannot be disposed of at the Disposal Facility or has a reasonable possibility of otherwise adversely affecting the operation or useful life of the Disposal Facility.

### 7. Default.

(a) Events of Default. Each of the following shall be an event of default by Customer under this Agreement: (i) Customer fails to pay any amount due as and when the same becomes due under this

Agreement, or (f) Customer fails to perform any other term, covenant or agreement contained in this Agreement on its part to be performed and such failure continues for a period of thirty (30) days after written notice to Customer specifying the nature of such failure and requesting that it be remedied.

(b) Remedies on Default. Whenever any event of default by Customer shall have occurred and be continuing, Republic shall have the following rights and remedies, which shall be in addition to any other remedies provided by Applicable Law or this Agreement: (i) upon the end of any applicable grace period in this Section 7, Republic shall have the option to immediately terminate this Agreement unless during such period Customer has taken remedial steps the effect of which would be to enable Customer to cure such event of default within an additional fifteen (15) day period following the expiration of such grace period; and (ii) if Customer is then in default, Republic shall have the option, without terminating this Agreement, to stop accepting Acceptable Waste delivered by Customer until such default is cured or this Agreement is terminated. If Republic stops accepting Acceptable Waste, Customer shall pay Republic a service interruption fee in an amount determined by Republic in its discretion up to the maximum amount allowed by Applicable Law.

8. Indemnification. Customer shall indemnify, defend (upon request by Republic) and hold harmless Republic and its officers, directors, employees, agents, affiliates, parent, subsidiaries, successors and assigns (the "Republic Indemnified Parties") from and against any and all claims, counterclaims, suits, demands, actions, causes of actions, setoffs, fines, attachments, judgments, debts, losses, liabilities, damages, costs, expenses or other liabilities (including attorneys' fees, expert witness fees, litigation expenses, and court or other costs incurred in any proceeding) of any nature whatsoever (collectively, "Losses"), whether arising out of a claim or loss of or damage to property or injury to or death of any person, including any Republic Indemnified Party, or otherwise, caused by or arising out of (a) Customer's breach of this Agreement, or (b) Customer's negligence or willful misconduct.

9. Insurance. Customer acknowledges that Republic typically requires Customer, during the term of this Agreement, to maintain the following insurance coverage(s):

Workers' Compensation:

Coverage A  
Statutory  
\$1,000,000 each Bodily Injury by Accident  
\$1,000,000 policy limit Bodily Injury by Disease  
\$1,000,000 each occurrence Bodily Injury by Disease

Automobile Liability:  
Bodily Injury/Property Damage  
Combined - Single Limit  
\$3,000,000  
Coverage applies to all owned, non-owned, hired and leased vehicles (including trailers) and must include MCS-90 endorsement for pollution liability coverage.

Commercial General Liability:  
Bodily Injury/Property Damage  
Combined - Single Limit  
\$2,000,000 each occurrence  
\$3,000,000 general aggregate (including products/completed operations)

Customer represents and warrants to Republic that it is self insured and does not carry any independent or third party insurance coverage. Customer acknowledges and agrees that it will be fully and solely responsible for any Losses suffered by Republic as a result of Customer's breach of this Agreement.

10. General:

(a) Force Majeure. Except for Customer's obligation to pay the Disposal Fee and all Tax/Host Fees/Charges, neither party hereto shall be liable for its failure to perform hereunder due to contingencies beyond a party's reasonable control, including, but not limited to, strikes, labor disputes, riots, terrorist acts, compliance with or changes in Applicable Law, fires, the loss, suspension, revocation or non-renewal of any permit, license or approval with respect to Disposal Facility and/or acts of God ("Force Majeure"). Any failure or delay in performance because of a Force Majeure event shall not constitute a breach of this Agreement, but

shall entitle the affected party to be relieved of performance during the term of such event and for a reasonable time thereafter.

(b) Independent Contractor. Customer and Republic shall perform their obligations under this Agreement as independent contractors. Neither party nor any of its employees, agents or subcontractors shall be, purport to be, or be deemed, the agent of the other party.

(c) Assignment; Binding Effect. Customer may not assign this Agreement without Republic's prior written consent, which Republic may grant or withhold in its sole discretion. Republic may assign this Agreement without the consent of Customer, and Customer acknowledges and agrees that any such assignment by Republic shall release Republic from any liability under this Agreement from and after the date of the assignment. This Agreement shall be binding upon and shall inure to the benefit of the parties and their respective successors and permitted assignees.

(d) Entire Agreement. This Agreement supersedes all prior agreements, written or oral, with respect to the subject matter of this Agreement. Only a written instrument signed by both parties hereto may modify this Agreement.

(e) Severability. If any provision of this Agreement is held to be invalid or unenforceable for any reason, the remaining provisions hereof shall continue in full force and effect without being impaired or invalidated in any way. The parties agree to replace any invalid or unenforceable provision with a valid and enforceable provision that most closely approximates the intent and economic effect of the invalid or unenforceable provision.

(f) Waiver. No delay or omission by a party in exercising any right under this Agreement shall operate as a waiver of that or any other right. A waiver or consent given by a party on any occasion is effective only in that instance and shall not be construed as a bar to or waiver of any right on any other occasion.

(g) Governing Law. This Agreement shall be governed by and construed in accordance with the internal laws of the state in which the Disposal Facility is located, without giving effect to any choice or conflict of law provision or rule (whether of the state in which the Disposal Facility is located or any other jurisdiction) that would cause the application of the laws of any jurisdiction other than the state in which the Disposal Facility is located.

(h) Waiver of Jury Trial; Attorneys' Fees. By execution and delivery of this Agreement, each of the parties knowingly, voluntarily and irrevocably: (i) waives any right to trial by jury, and (ii) agrees that any dispute arising out of this Agreement shall be decided by court that without a jury. If any legal action or any other proceeding is brought for the enforcement of this Agreement, or because of an alleged dispute, breach, default, or misrepresentation in connection with this Agreement, the prevailing party shall be entitled to recover reasonable attorneys' fees and other costs (including litigation related costs and expert witness fees) leading up to and incurred in that action or proceeding, in addition to any other relief to which it may be entitled.

(i) Captions. The captions contained in this Agreement are for convenience and reference only and in no way define, describe, extend or limit the scope or intent of this Agreement or the intent of any provision contained in this Agreement.

(j) Counterparts; Third Party Beneficiaries. This Agreement may be executed in two or more original, facsimile or pdf counterparts, each of which shall be deemed an original and all of which together shall constitute but one and the same instrument. This Agreement is intended to be solely for the benefit of the parties hereto and their successors and permitted assignees and is not intended to and shall not confer any rights or benefits on any other third party not a signatory hereto, except as provided in Section 8 of, or expressly provided in, this Agreement.

The undersigned individual signing this Agreement on behalf of the Customer acknowledges that he or she has read and understands the terms and conditions of this Agreement and that he or she has the authority to sign the Agreement on behalf of Customer.

See Attached Signature page

CONTRACT ENDORSEMENT

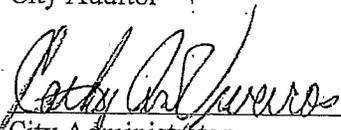
The attached Contract/Agreement by and between the City of Fall River and Republic Services is hereby endorsed.

In *Witness Whereof*, the City of Fall River has caused the hands and seals of its authorized representatives to be affixed hereto this 21<sup>st</sup> day November.

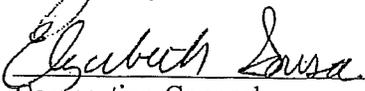
  
\_\_\_\_\_  
Director of Community Maintenance      Date 11/18/2014

  
\_\_\_\_\_  
City Auditor      Date 11/19/14

Replacing earlier contract  
15-184      15-168

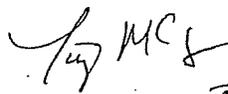
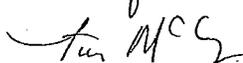
  
\_\_\_\_\_  
City Administrator      Date 11-24-14

Administratively reviewed and approved

  
\_\_\_\_\_  
Corporation Counsel      Date 11-18-14

Approved as to form and manner of execution

  
\_\_\_\_\_  
Mayor      Date 11/21/14

Solid waste disposal is exempt from 30B requirements.  
  


## AGREEMENT

This Agreement (the "Agreement") is entered into this \_\_\_ day of February, 2015 by and between Browning-Ferris Industries, Inc. (BFI), a Massachusetts corporation having a principal office at 18500 North Allied Way, Phoenix AZ 85054 and a local place of business at 1080 Airport Road, Fall River, Massachusetts 02720, and the City of Fall River (the "City") a Massachusetts municipal corporation having its principal offices at One Government Center, Fall River, Massachusetts 02722.

WHEREAS, consistent with modern solid waste management processes/as required by Massachusetts Department of Environmental Protection (MassDEP), BFI is closing and capping the Fall River Landfill (the "Landfill");

WHEREAS, solid-waste has been discovered buried on (i) approximately seven acres of property, hereinafter referred to as "subject property" never owned or operated by BFI adjacent to the Landfill; and (ii) outside of the existing and permitted Landfill on approximately one acre of BFI's property, which needs to be capped for proper disposal;

WHEREAS, the property that has never been owned or operated by BFI consists of: (i) the rear portion of a parcel of land adjacent to the Landfill currently owned by Fall River Freeholders Limited Partnership ("Freeholders"), (ii) the rear portion of a second parcel of land adjacent to the Landfill currently owned by the Lea Manufacturing Company aka "Rex-Cut Products Company" ("Rex-Cut"), and (iii) on the Northwest corner of the City's right of way for Horvitz Road adjacent to the Landfill (collectively the "Off-Site Property") as depicted on the plan entitled SITEC Environmental Off-Site Waste Area Conceptual Final Closure Plan dated August 27, 2014 (the "Off-Site Waste

(CW)

Plan”);

**WHEREAS**, based upon a review of historical records, it appears that the buried waste was disposed of at a time when the City operated the Landfill and when the area was part and parcel of the original landfill;

**WHEREAS**, BFI and the City have agreed to cooperate in the capping of the buried waste as set forth in this Agreement and the Corrective Action Plan dated October 29, 2014 (the “Corrective Action Plan”);

**WHEREAS**, the City agrees that BFI may accept and use mildly contaminated soil under the cap to grade and shape the buried waste areas as described in the Corrective Action Plan;

**WHEREAS**, the parties intend to apply to the MassDEP for approval of the Corrective Action Plan; and

**WHEREAS**, the City has agreed with Rex-Cut and Freeholders to acquire the subject property. Once the City has acquired the subject property the City intends to provide access to BFI for proper capping of the buried waste and implementation of the Corrective Action Plan on the Off-Site Property;

**NOW THEREFORE**, for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties hereto agree as follows:

1. The parties will cooperate fully with each other in applying to the MassDEP for any and all approvals required under applicable law to implement the Corrective Action Plan including, at a minimum, complying with the relevant portions of the MassDEP’s Revised Guidelines for Determining Closure Activities at Inactive Unlined Landfill Sites (the “Guidelines”) including holding

a public information session on the Corrective Action Plan, entering into a mutually acceptable Administrative Consent Order with the MassDEP; and applying for and obtaining a MassDEP BWPSW25 – CAD permit.

2. The parties recognize that the Corrective Action Plan may need to be modified or amended as a result of the MassDEP approval process, to reflect actual conditions in the field such as discovery of additional areas of buried waste and as necessary or convenient for the ease or expense of implementation of such plan. The parties agree to cooperate fully in making such modifications provided that such modifications do not materially affect the environmental benefit, cost, duration or difficulty of implementing the Corrective Action Plan. All references herein to the Corrective Action Plan shall be deemed to refer to the plan as so modified or amended.

3. Within 90 days after the Effective Date (as defined below) of this Agreement the City will take title to those portions of the Freeholders and Rex-Cut properties as are depicted on the Off-Site Waste Plan as “proposed limit of acquisition.” The City hereby grants BFI, BFI's contractors and subcontractors and other authorized employees, representatives and agents, full access and permission to enter upon the Off-Site Property to implement the Corrective Action Plan and all other work or actions required or contemplated thereunder (including, without limitation, the permanent placement, presence and maintenance of the buried waste, grading and shaping materials, capping system and all other related features such as a perimeter access road and drainage swales) and to perform routine post closure monitoring and maintenance. It is expressly

understood and agreed that "routine post-closure monitoring and maintenance" of the Off-Site Waste Area will be limited to inspecting, maintaining and repairing the cap system, associated storm water management features, and perimeter roadway; periodic environmental monitoring of monitoring points, if any, located on the Off-Site Waste Area; and filing requisite reports of the same with the MassDEP all as described in a MassDEP approved post-closure plan. It is furthermore understood and agreed that "routine post-closure monitoring and maintenance" expressly excludes any responsibility or liability for the waste underneath the capping system on the Freeholders, Rex-Cut or City properties and for any soil, landfill gas, groundwater or surface water contamination or remediation arising from such buried waste.

4. BFI will notify the City twenty-four (24) hours prior to entering the Off-Site Property to commence the Corrective Action Plan.

5. In performing the Corrective Action Plan on Off-Site Property, BFI, its contractors and subcontractors and its other authorized employees, representatives and agents shall use best practices and their solid waste disposal industry experience in accordance with the Corrective Action Plan and the MassDEP CAD permit.

6. At its sole cost and expense, the City shall have the right to monitor implementation of the Corrective Action Plan on Off-Site Property. BFI shall provide the City with detailed reports related to the implementation of the Corrective Action Plan and the efforts made to secure sufficient revenues to cover

the cost of the Corrective Action plan. These reports which shall include both revenues and expenses in a format which shall make the City aware of the then status of the financial situation/obligations contemplated in paragraph ten (10) below shall be provided every 30 days and until completion.

7. The City shall not interfere with, but shall cooperate fully with all aspects of the Corrective Action Plan.

8. The parties acknowledge that BFI, its contractors, subcontractors, and other authorized employees, agents and representatives do not currently have, and will not hereby acquire any interest in the Freeholders, Rex-Cut or City properties other than the access right expressly granted by this Agreement and the Administrative Consent Order contemplated by this Agreement and shall not be deemed to be owner, operator or otherwise legally responsible for such properties under applicable law. Nothing contained herein and no action taken by BFI pursuant to this Agreement or said Administrative Consent Order, in connection with the Corrective Action Plan or otherwise with respect to the Rex-Cut, Freeholders, or the City properties shall be deemed to constitute an admission by BFI or to render BFI legally responsible or in any other way liable for existing waste buried on those properties or any damage arising therefrom and BFI hereby expressly disclaims any responsibility or liability whatsoever for the same.

9. Before entering the Off-Site Property to implement the Corrective Action Plan, BFI, at its own expense, shall procure and maintain, or require its contractors, subcontractors or other authorized representatives or agents to procure and maintain, throughout the implementation of the Corrective Action

Plan, policies of liability insurance issued by insurance companies duly qualified or licensed to issue policies of insurance in the Commonwealth of Massachusetts reasonably acceptable to the City, that are primary as to any other existing, valid and collectible insurance, insuring the City against loss or liability caused by or in connection with BFI's (or its contractor's, subcontractor's or duly authorized representatives' or agents') activities on the Off-Site Property, in amounts not less than those described in this Paragraph. BFI shall deliver to the City a certificate evidencing these policies, that the City is named as an additional insured (other than Worker's Compensation), and that the policies will not be canceled prior to thirty (30) days advance written notice to the City. These policies shall include:

- A. Commercial General Liability Insurance Occurrence Form; or the equivalent, including Blanket Contractual Liability, that shall have combined single limit coverage of at least \$1,000,000 per occurrence, and \$2,000,000 in the aggregate, for Bodily Injury and Property Damage, including Personal Injury; and
- B. Workers' Compensation Insurance as required by law, and Employers' Liability Insurance that shall have a minimum limit of at least \$1,000,000 per employee and per accident.

10. BFI agrees to make reasonable best efforts consistent with the Corrective Action Plan to secure sufficient revenues from the acceptance of grading and shaping material to cover the cost of the Corrective Action Plan at no cost to the City. If the revenues received by BFI for the acceptance of grading and shaping materials

do not cover the reasonable costs incurred by BFI in implementing the Corrective Action Plan, the City and BFI shall each be responsible for payment of eighty-five percent (85%) and fifteen percent (15%), respectively, of such shortfall. In such event BFI shall notify the City of its share of the shortfall in revenues and BFI agrees to amortize the City's share of the shortfall over the remaining term of the Landfill and Transfer Station Agreement. Such amortization shall be calculated by dividing the total amount owed by the remaining months in the then remaining term of the Landfill and Transfer Station Agreement, as that term may be adjusted from time to time, plus interest on the balance due at a rate of seven percent (7%) per annum, which shall be paid by the City monthly in addition to the amount due from the City to BFI under said Agreement. If (i) at the completion of the work in the Corrective Action Plan the average tipping fee paid to BFI for acceptance of grading and shaping materials is greater than fifteen dollars (\$15) per ton; and (ii) the total revenues received by BFI for the acceptance of grading and shaping materials exceeds the actual total costs incurred by BFI in implementing the Corrective Action Plan, then in such event, BFI shall share the excess revenue with the City equally. BFI shall make such payment to the City within ~~one~~ ninety  (90) days of completion of the work in the Corrective Action Plan.

11. The City shall not assess, charge or collect and BFI, its contractors, subcontractors; other authorized employees, agents, representatives; and any vendor, transporter or generator of grading and shaping material (including, without, limitation mildly contaminated soil) shall not be required to pay any tax, fee or any other amount to the City on account of the transportation, delivery,

acceptance, use or disposal of the grading and shaping material or any other materials used by or incorporated into the implementation of the Corrective Action Plan.

12. Should any provision of this Agreement be declared or determined by any court to be illegal or invalid, the validity of the remaining parts, terms, or provisions shall not be affected thereby, and such illegal or invalid part, term, or provision shall be deemed not to be a part of this Agreement.

13. This Agreement is binding on the parties' successors and assigns.

14. This Agreement together with the Administrative Consent Order identified above constitute the entire agreement between the parties relating to the implementation of the Corrective Action Plan and supersedes all prior agreements, communications, and understandings between them, if any, written or oral with respect to the same, including, but not limited to, the Agreement between BFI and the City, dated November 7, 2014 and the First Amendment to Agreement dated December 10, 2014, both of which are of no further force and effect. No other promises or agreements shall be binding or shall modify this Agreement unless signed by the parties hereto.

15. The Agreement shall be governed by and construed in accordance with the laws of the Commonwealth of Massachusetts.

16. All notices or other submissions required or appropriate under the Agreement shall be sent by first class mail, nationally recognized overnight delivery service or certified mail, return receipt requested, to the addressees described in below:

If to BFI:

Browning-Ferris Industries, Inc.  
144 Turnpike Road, Suite 230  
Southborough, Massachusetts 01772  
Attn: Area President

cc.  
Republic Services, Inc.  
18500 N. Allied Way  
Phoenix, AZ 85054  
Attn: General Counsel

If to the City:

Corporation Counsel  
City of Fall River  
One Government Center  
Fall River, Massachusetts 02722

17. The parties to this Agreement and their representatives signing below state that such representatives are authorized to sign this Agreement on behalf of the parties and to bind the parties to this Agreement.
18. This Agreement may be executed in counterparts each of which shall be deemed an original, and all of which, when taken together, shall constitute one and the same instrument and shall be enforceable against the party executing same.
19. The Effective Date of this Agreement is the date on which the last party signs this Agreement.
20. This Agreement is entered into on the basis of law, regulations, permit terms, conditions, facts and expectations as of the Effective Date of this Agreement. Any Change in Law or Unforeseen Circumstance that occurs after the Effective Date of this Agreement shall excuse the affected party from performance hereunder for the time necessary to meet the requirements of the Change in Law

or alleviate the Unforeseen Circumstance, except for obligations to make payment.

21. "Unforeseen Circumstance" means any event that is beyond the reasonable control of the relevant affected party to this Agreement and is not caused by the intentional act or lack of reasonable due diligence of such party and which adversely affects the performance by such party. Unforeseen Circumstance shall include an act of God (except for weather conditions normal for the geographic area), Change in Law, earthquake, flood, fire or similar casualty, an act of public enemy, war blockade, insurrection, riot, general arrest or restraint of government or people, civil disturbance, strike, labor dispute or any similar occurrence.

22. "Change in Law" means any change, amendment, expansion, or change of interpretation or application of the same of any state, federal, or local constitution, law, regulation, rule, ordinance, standard or permit condition, or the application of any City ordinance or regulation after the Effective Date of this Agreement which materially and adversely affects the cost and design, construction or operation of the Corrective Action Plan.

23. Except as expressly stated and provided in this Agreement, the parties disclaim any express or implied representations, warranties, covenants, indemnities and releases.

24. This Agreement is subject to the express condition that the MassDEP has granted all final approvals for all aspects of the Corrective Action Plan within 280 days of the Effective Date of this Agreement.

IN WITNESS WHEREOF, the parties have caused this Agreement to be executed as a sealed instrument as of the dates set forth below their respective signatures.

Browning-Ferris Industries, Inc.

By: \_\_\_\_\_ Date: \_\_\_\_\_  
Jeffrey Burdick

Title: Vice President

City of Fall River:

Paul C. [Signature] 2/13/15  
Director of Community Maintenance Date

[Signature] 2-13-15  
City Administrator Date

Approved as to Form, Manner

And Execution

[Signature] 2-13-15  
Corporation Counsel, Acting Date  
C. Samuel Suffer

Mayor

Date

## Appendix C

### Recordings of the Public Hearings

**May 27, 2015:** <http://vod.frgtv.us/video/129090887>

**June 10, 2015:** <http://vod.frgtv.us/video/130389692>

## Appendix D

### **Submitted Written Materials from Public Hearings**



## News

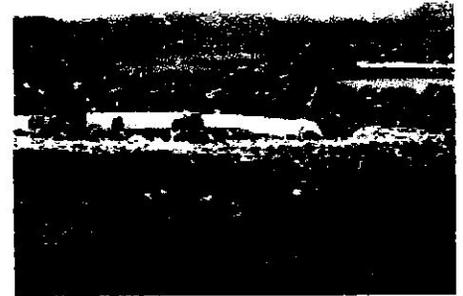
[Energy \(/News/Topic/Energy/\)](#) | [Ecotrope \(/News/Blog/Ecotrope/\)](#)

# 3 New Waste-To-Energy Projects In Oregon

by **Cassandra Profita** (</contributor/cassandra-profita/>) Ecotrope | Jan. 11, 2013 4:16 a.m. | Updated: Feb. 19, 2013 1:27 p.m.

Several new projects in Oregon propose to turn garbage into energy sources including hydrogen, crude oil and methane.

With more and more waste-to-energy technologies emerging, Oregon environmental regulators are updating their permitting system to accommodate them. A public meeting next week



(<http://res.cloudinary.com/bc/media.s3.amazonaws.com/wj/content/uploads/2012/12/IMcopy.jpg>)

The Oregon Department of Environmental Quality is updating its permitting system to address new projects that aim to make energy out of trash.

(<http://www.deq.state.or.us/lq/sw/conversiontechnology.htm>) will address new rules for so-called “conversion technology” that turns trash into energy.

“Our rules were written 20 years ago and didn’t really anticipate or take into account these types of facilities,” said Brian Fuller of Oregon Department of Environmental Quality. “We’ve been seeing more and more interest in these types of facilities, and more questions to DEQ about how these facilities would be regulated.”

While they’re not as effective as recycling, he said, projects that turn plastics into oil, garbage to gas and food scraps to electricity offer waste management options that are greener than landfilling or incinerating trash.

Three projects in particular have motivated DEQ to propose new rules for facilities that turn trash into energy:

### **Vaporizing Trash In Arlington**

Jeff Surma is co-founder of a company called InEnTec, a company that has developed a way to essentially vaporize solid waste using plasma technology. Its plasma arc gasification facility is nearing completion at Waste Management's Columbia Ridge landfill in Arlington.



The plasma technology is “essentially a controlled bolt of lightning that we operate inside a chemical reactor,” Surma said. At Columbia Ridge, the system takes in municipal solid waste, i.e. garbage, breaks it down into its elements and reforms them into hydrogen gas.

(<http://res.cloudinary.com/bi-media.s3.amazonaws.com/wj-content/uploads/2013/01/Inl>)

InEnTec uses plasma technology to turn garbage into hydrogen gas.

Hydrogen is used for industrial manufacturing – for making silicon chips, for example – and it can also be used to make electricity in fuel cells. The unit at the landfill in Arlington still needs a hydrogen purification unit to complete the process, Surma said, but by summertime the facility should be fully operational.

“We’ve been working at this for a long time, and it’s finally at a point where it’s commercially viable,” said Surma.

The hydrogen produced at the plant would compete with hydrogen produced with natural gas at other facilities, but Surma said there are companies looking for “green hydrogen” that hasn’t been derived from a fossil fuel.

### **Plastics To Oil In Portland, Brooks**

The Beaverton company Agylix has found a way to turn non-recycleable plastics into crude oil using a chemical process called pyrolysis. The process heats the waste plastic into a gas and condenses it into synthetic crude oil, removing impurities so it can be refined into fuel later. Its technology is used at a demonstration facility in Tigard, but there are also two commercial-scale projects in the works: One at the Agri-Plas recycling

facility in Brooks (<http://ecotrope.opb.org/2012/11/oregon-company-proposes-turning-plastic-into-oil-in-brooks/>), and one at a Waste Management facility in Portland.

The Agri-Plas facility would take materials that wouldn't otherwise be recyclable – like plastic planting pots used in agriculture – and turn them into a synthetic crude-oil that can be sold to refineries. The facility would be able to produce roughly 2.6 million gallons of oil a year from 23 million pounds of plastic.

### **Anaerobic digestion**

A company called JC Biomethane is building a plant in Junction City that will put organic waste – food scraps and yard debris – into a digester that produces methane gas. It's a lot like the methane digesters farmers are now using to generate electricity from cow manure.

“You're utilizing anaerobic bacteria to consume volatile organic material and create methane,” said project spokesman Dean Foor. “The biological part is the same. The tank shape and mixing technology are different.”

The methane is burned to turn a turbine that creates electricity. The Junction City facility will have 1.55 megawatts of electricity – enough to power about 1,500 homes – when it is completed later this year.

The waste this company is using would otherwise be composted, but Foor argues the anaerobic digestion creates fewer greenhouse gas emissions than composting, which emits nitrous oxides. The process will also produce a compost tea that Foor said will offset at least 1,000 acres of conventional fertilizers made from fossil-fuels.

Fuller said the new rules will take environmental impacts such as odor issues from anaerobic digesters into account, as well as potential contaminants in oil made from plastics. The agency's air and water quality permits will address pollution emitted by the new facilities.



(<http://res.cloudinary.com/bi-media.s3.amazonaws.com/w1/content/uploads/2013/01/JC>

JC Biomethane is building Oregon's first non-farm methane digester to turn food scraps and yard waste into electricity in Junction City.

Waste-to-energy technologies are a useful tool in reducing waste, Fuller said, but they're not as efficient as recycling.

“When you send a milk jug to a recycling plant to be made into another container the energy savings are greater than the energy you're creating with the oil,” he said. “In theory, you can recycle something over and over again, but here if you're taking plastic and turning into oil and the oil is burned as fuel, that resource is gone.”

[Garbage \(/news/blog/ecotrope/tag/Garbage/\)](/news/blog/ecotrope/tag/Garbage/) [Waste-to-energy \(/news/blog/ecotrope/tag/Waste-to-energy/\)](/news/blog/ecotrope/tag/Waste-to-energy/)

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**6 Eco-Innovators To Inspire You This Year (/news/blog/ecotrope/6-eco-innovators-to-inspire-you-this-year/)**

[\(/news/blog/ecotrope/oregon-industry-wants-gm-salmon-labeled/\)](/news/blog/ecotrope/oregon-industry-wants-gm-salmon-labeled/)  
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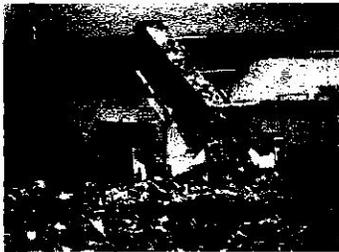
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## Turning Trash into Gas: The Future of Plasma Gasification

By Alex Co  
April 3, 2013 05:04

Situated along the highway in Arlington, Oregon, what looks like a hill from afar reveals its true identity only upon a closer look. This is the 700-acre Columbia Ridge Landfill, one of the largest in the United States. Each week, 35,000 tons of mostly household trash arrives here from Seattle, Portland, and other communities.

While recycling has become more deep-rooted in public culture, two-thirds of household waste still ends up in landfills. Therefore, conventional recycling strategies are not the complete answer. But what lies tucked away in the southwest corner of the Columbia Ridge Landfill could be a solution.



The Columbia Ridge Landfill receives 35,000 tons of trash each week from Seattle, Portland, and other communities. A plasma gasification plant on site aims to process 25 tons of waste per day at full capacity. Courtesy of Oregon Live.

The Columbia Ridge Landfill is home to the first large-scale commercial plant in the United States that uses a technology called plasma gasification. Developed in part by Jeff Surma and S4 Energy Solutions, the plant converts municipal household garbage into syngas, a mixture of hydrogen and carbon monoxide. Unlike conventional waste processing methods such as incineration, the process does not produce harmful byproducts like dioxins; instead, the



The syngas stored in these tanks is a mixture of mainly hydrogen and carbon monoxide and is produced as a result of the plasma gasification process. After further purification, the syngas can either produce fuel or be converted into fuel. Courtesy of IGP Energy.

syngas produced can be used as fuel or sold to industry, a groundbreaking recycling feat that has brought plasma gasification increased attention nationwide.

Here is a step-by-step overview of the process:

From the *Wired* article ([http://www.wired.com/magazine/2012/01/\[\\_\]trashblaster/all/](http://www.wired.com/magazine/2012/01/[_]trashblaster/all/))

- 1. Gasification:** The waste is shredded and travels to the top of a large tank, mixing with steam and oxygen and falling into a 1,500 degree Fahrenheit furnace. This gasification transforms a majority of the waste into a mixture of gases that heads to the syngas chamber.
- 2. Plasma Blasting:** The undestroyed material enters another specially insulated cauldron where two electrodes create an electric arc (akin to a bolt of lightning) that produces a stream of plasma, breaking down the gases into their constituent atomic components and producing more syngas.
- 3. Hazardous Material Collection:** A joule-heated melter sits at the bottom of the second cauldron and traps any hazardous material left over from the plasma-blasting in a slurry with molten glass.
- 4. Recycling:** The slurry is drawn out of the system and becomes inert. In this state, the molten glass can be converted into low-value materials like road aggregate. Any metals are also captured here and later recycled into steel and other products.
- 5. Fuel Capture:** The syngas captured consists mostly of hydrogen and carbon monoxide. After purification, it can either produce electricity or be sold and converted to fuels.

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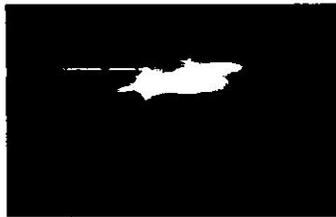
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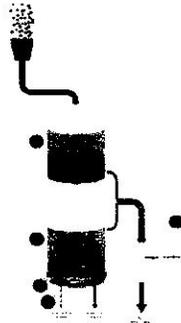
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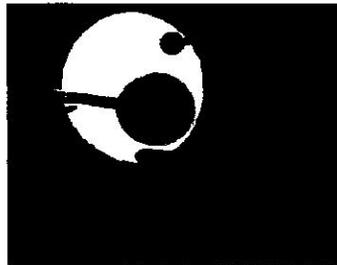
Two electrodes can create an electric arc of plasma, which has a unique ability to break gases down into their constituent atoms. Courtesy of Biomass Magazine.

Theoretically, the process seems foolproof because all byproducts of the reactions are dealt with and useful resources are generated. However, some environmentalists believe this efficiency discourages recycling and the development of renewable products while encouraging more apathy toward trash. Furthermore, up to this point plasma gasification has been too energy- and capital-intensive to handle mass amounts of municipal trash in landfills. "The problem has been over the years trying to find that economic sweet spot," said Joe Vaillancourt, the liaison between S4 and Waste Management, a \$15.4 billion company headquartered in Texas.



Surma and the team behind S4 hope to address these challenges soon. Since the plant at Columbia Ridge is a test facility, they are working to fine-tune the process until the technology becomes ready for expansion. A significant breakthrough was installing a gasifier on top of the electric arc; this "pre-heats" most of the trash so that the plasma heater uses less energy on the remainder of the process. S4 also hopes to make the plant self-sustaining, so that the syngas will be burned to supply the power necessary to run the melter in the system. By S4's predictions, once the Columbia Ridge facility is running at full capacity, it will process 25 tons of waste per day.

Meanwhile, corporations such as Waste Management are actively channeling funds toward research on plasma gasification and similar technologies. Increased market in the past few years has taken plasma gasification from small companies to a national level; in August 2012, for example, the Department of Agriculture announced a \$105 million loan guarantee to Fulcrum BioEnergy to build a similar system outside of Reno, Nevada. This complex, which Fulcrum hopes to have running by 2014, would use three plasma melters to process 400 tons of waste daily, an unprecedented feat for a commercial plasma waste facility. The increasing number of initiatives like this one is a sign that trash is changing at the corporate and even national level. Slowly but surely, we are developing ways to combat our trash problem and redefine the way we think about it.



Any hazardous material that escapes destruction by the plasma heater falls into a slurry with molten glass. The slurry is slowly drawn out and cools to become inert, when it can then be converted into low-value materials such as road aggregate. Courtesy of WordPress. (<http://everythinggreat.wordpress.com/tag/molten-glass/>)

 By Alex Co  
April 3, 2013 05:04

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**Gasification of Municipal Solid  
Waste Using the InEnTec  
Plasma Enhanced Melter®**

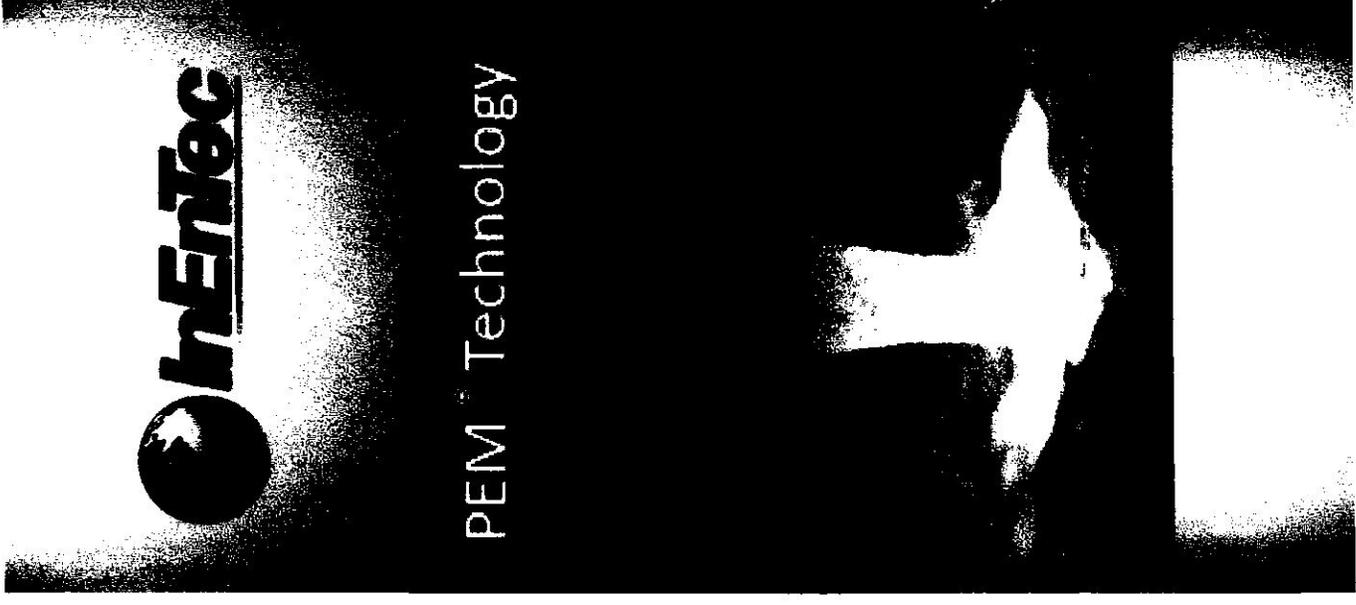
**Jeff Surma**  
**President and CEO**  
**S4 Energy Solutions, LLC**



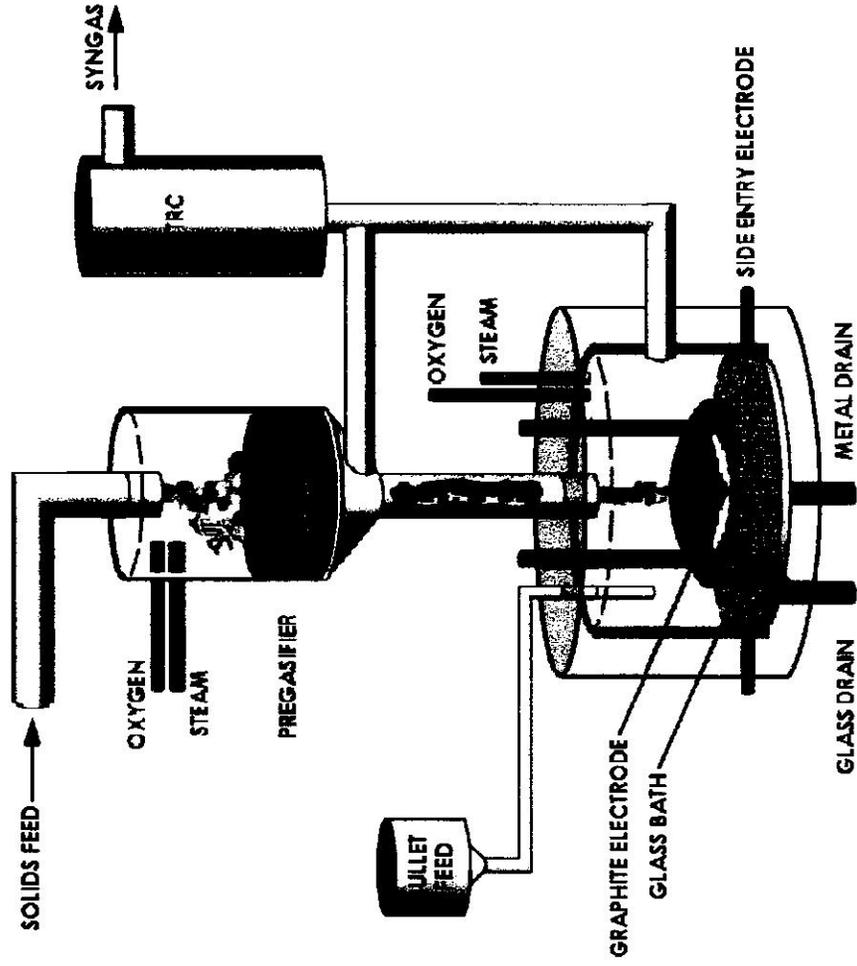
# InEnTec MSW Gasification Technology



PEM Technology



# EM Overview

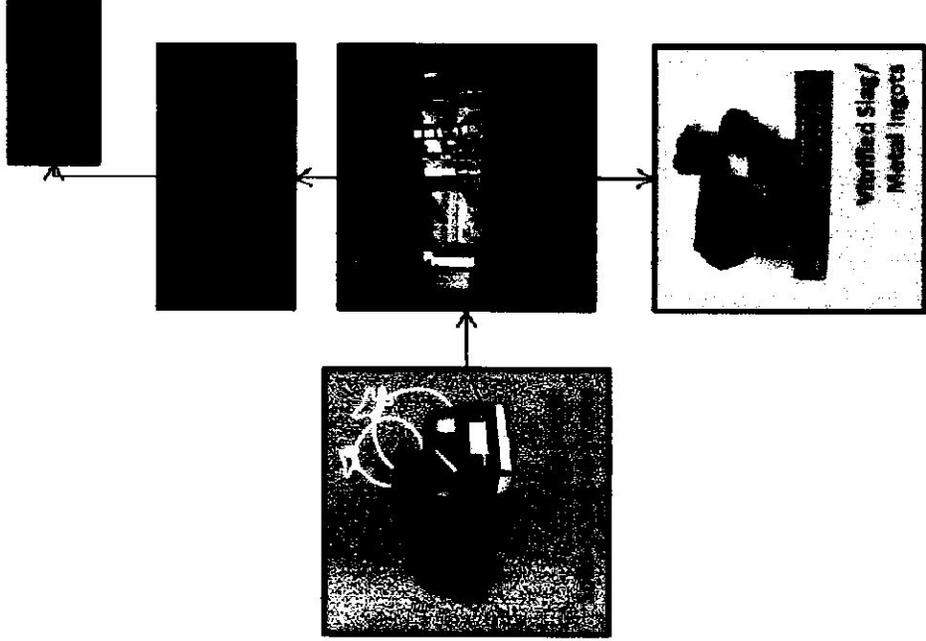
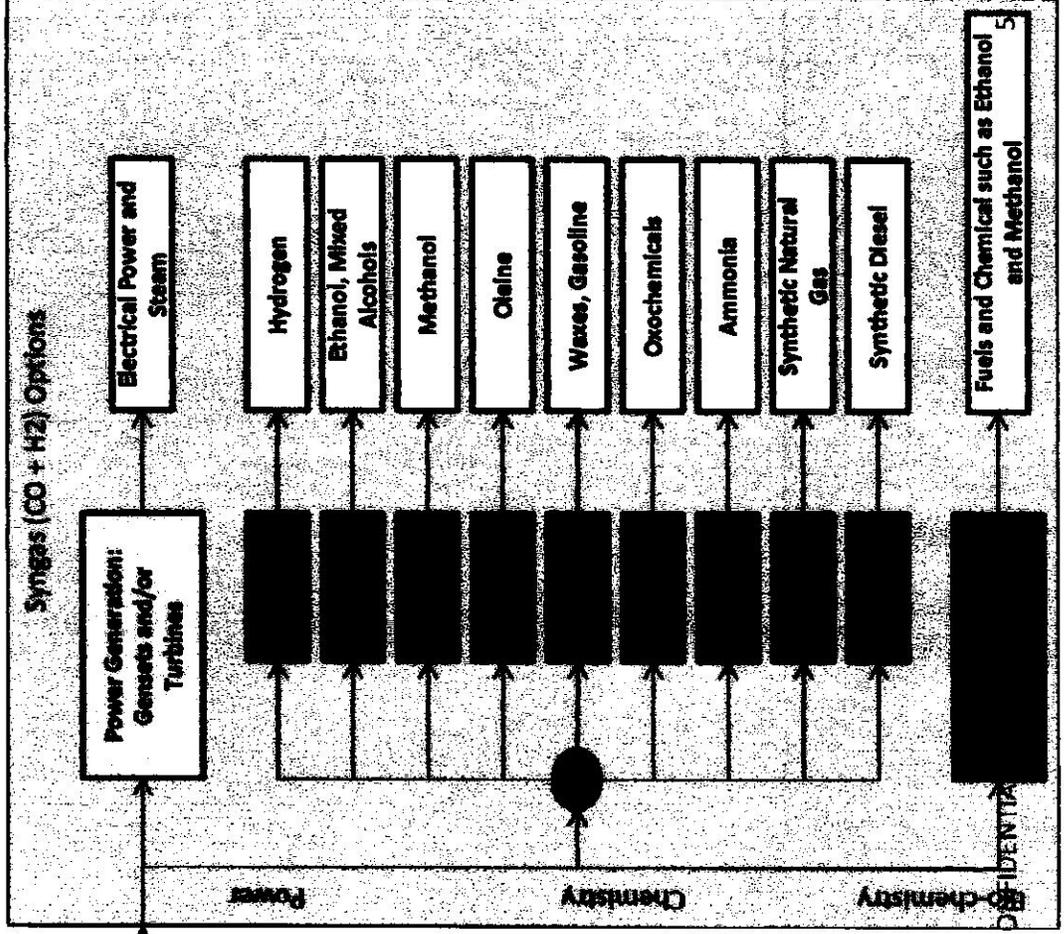


## Plasma Enhanced Difference



- Ultra low tar and no un-wanted byproducts in produced syngas
- Robust process even with feed variability
  - Moisture – wide acceptable range
  - Feed calorific value - can adjust to variability
  - Ash – many inorganics that are problematic in other gasifiers can be easily processed
  - Liquids, solids and co-feeding of containerized feed
- Materials with high ash can be processed into value added byproducts

# Syngas Key to Value-Added Products



## **Columbia Ridge Facility, Arlington, Oregon**

### **Status**

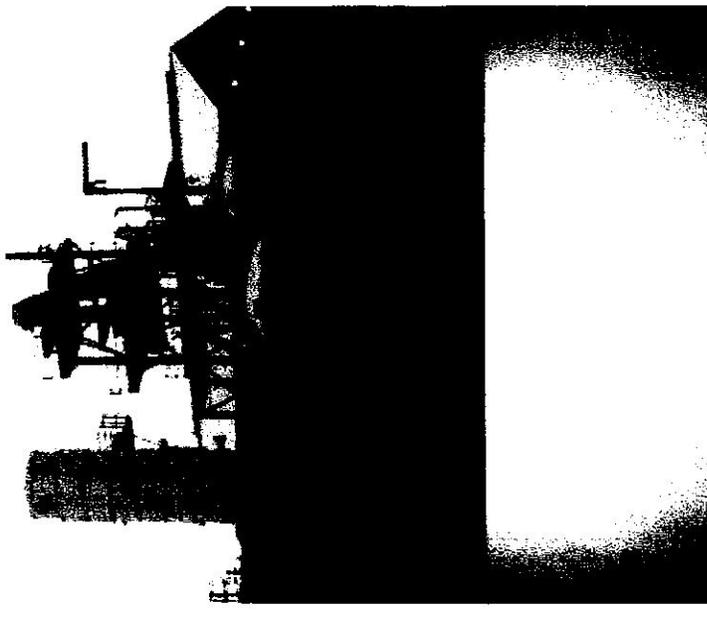
- Construction started August 2010
- Construction completed April 2011
- Commissioning May through August 2011
- Commercial pilot operations began November 2011

### **Plant Capability**

- Commercially hardened design
- Feedstock capacity of 25 tpd of high carbon waste (e.g., medical, ASR, high plastic MSW etc.)
- Initial operations will not include conversion of syngas into product
- Facility to convert syngas to a liquid product will be added in the near term

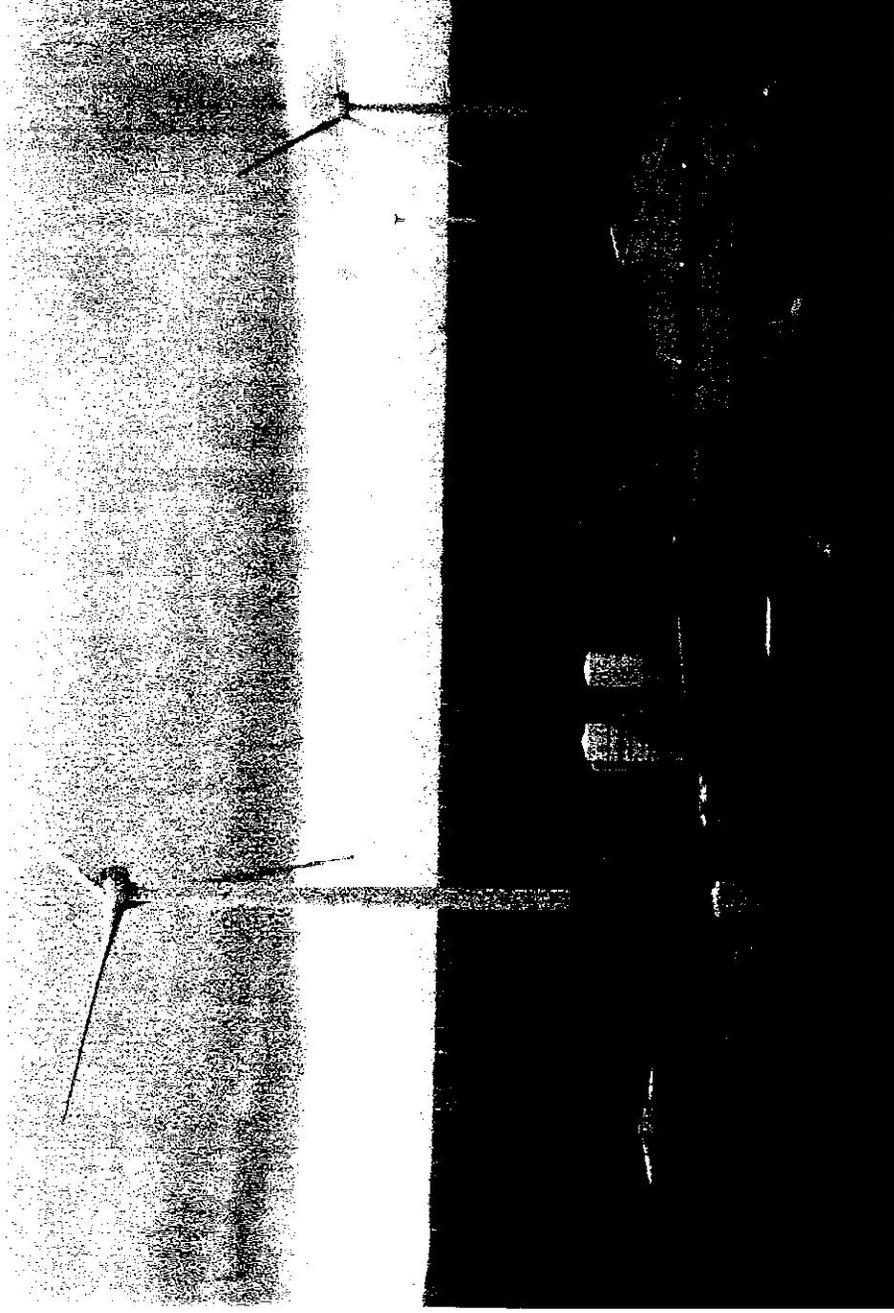


**S<sup>4</sup>Energy**  
SOLUTIONS

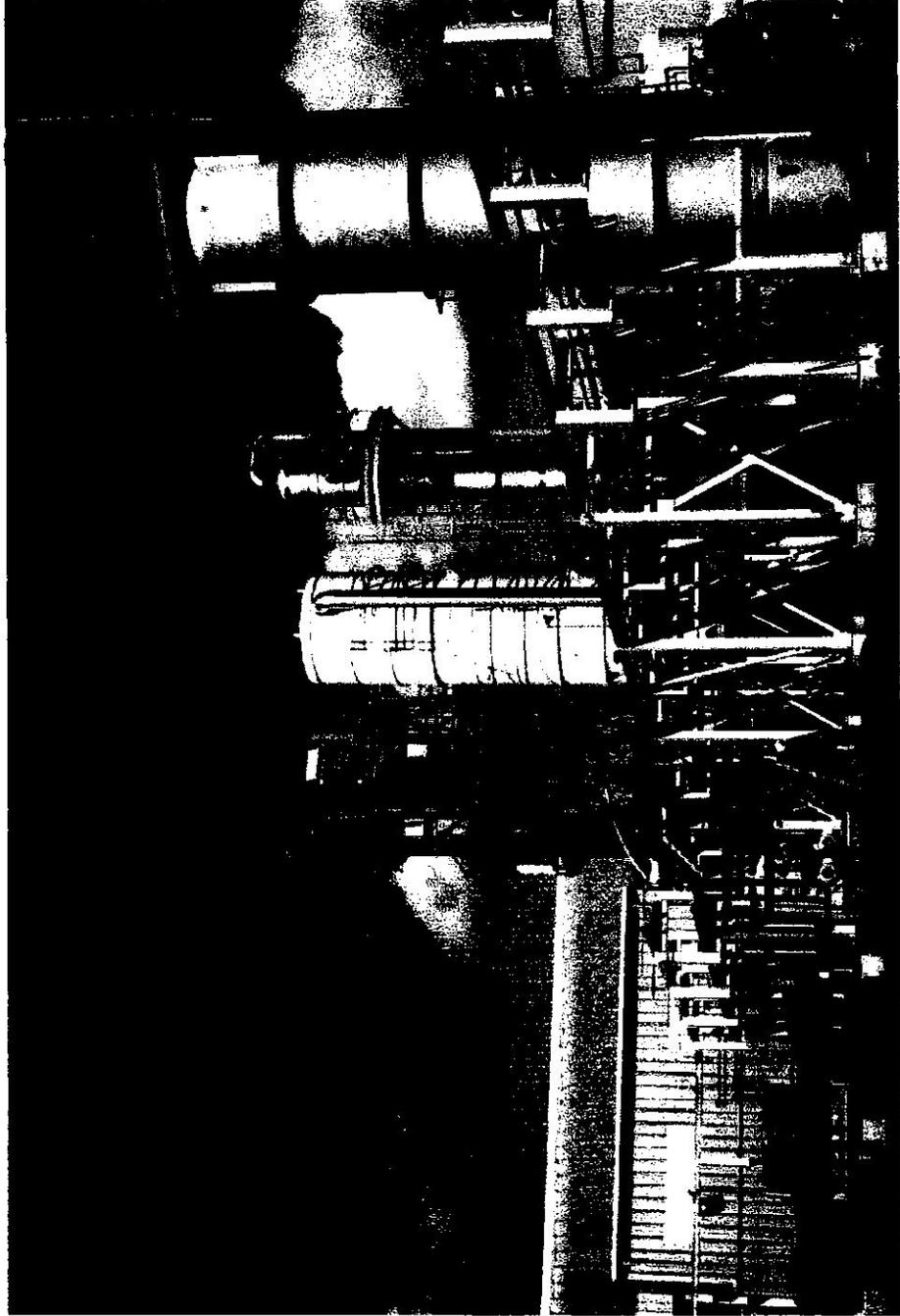


Columbia Ridge Facility, Arlington, Oregon

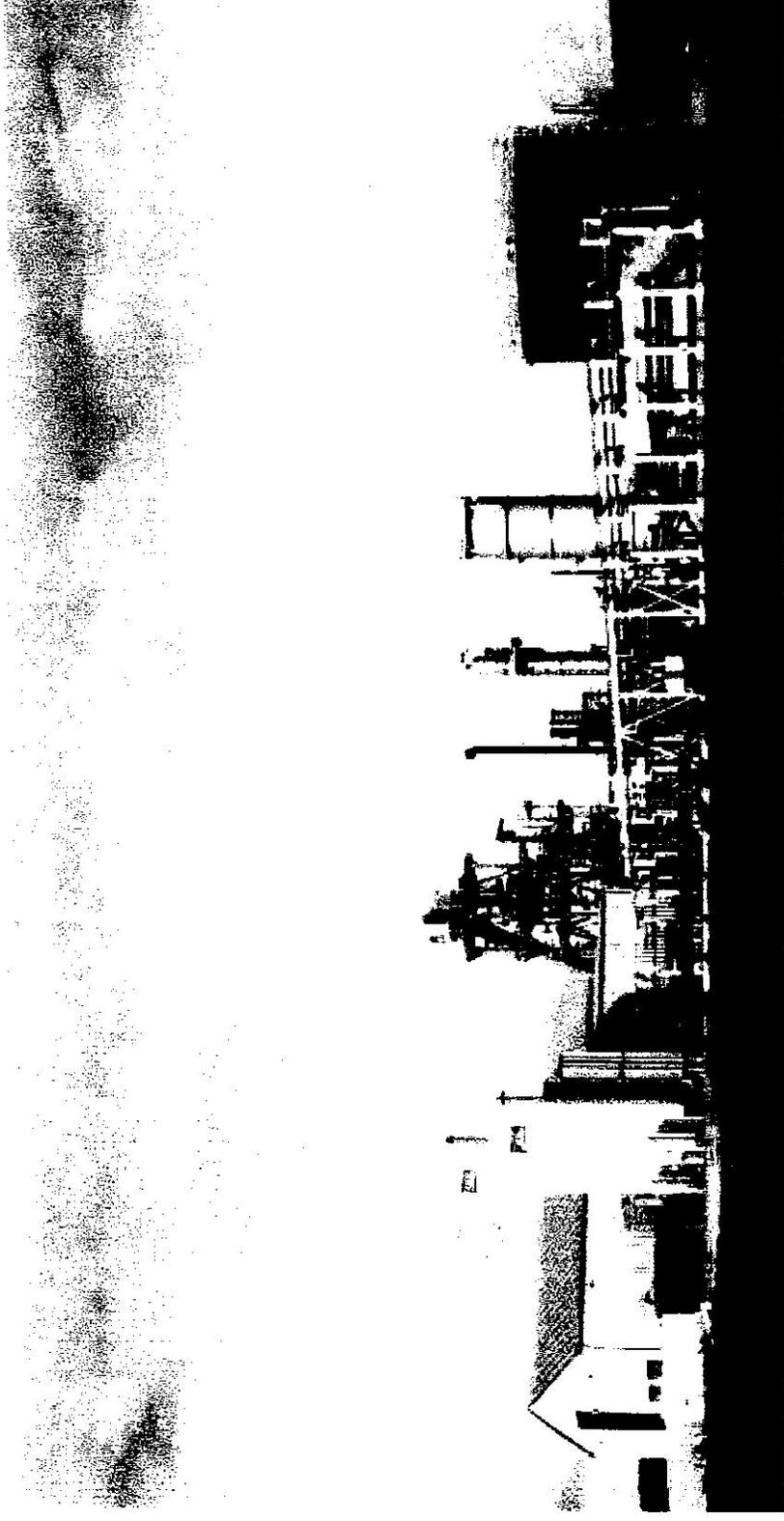
**S4Energy**  
SOLUTION



Columbia Ridge Facility, Arlington, Oregon **S4Ener**  
SOLUTIONS



Columbia Ridge Facility, Arlington, Oregon





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## METRO NEWS

# Plasma gasification one option for the Portland region's trash

**By Jodi Garber-Simon** Bylined writers are Metro staff. Stories with a byline do not necessarily represent the opinions of Metro or the Metro Council. Metro News is committed to transparency, fairness and accuracy.

Submitted:  
May 04, 2015 03:45pm

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Portland metro residents and businesses are famously committed to recycling what they no longer need, donating items for reuse, and composting food scraps and yard debris.

Still, the Portland metropolitan area still generates more than a million tons of garbage per year. That garbage has to go somewhere, and it is Metro's responsibility to manage it in a way that protects the environment, protects people's health, and gets good value for the public's money.

As the Metro Council considers where to send the region's garbage starting in 2020, landfills remain the most readily available, and likely the least expensive, option for getting rid of trash. But there will be other methods on the table. One method the Metro Council may consider is gasification, a process where, with very little oxygen and a very high temperature, most of the solid waste is transformed into a gas that can be used to make electricity or heat.

At a gasification facility, garbage collected from homes and businesses is deposited in a gasifier, a low-oxygen chamber that heats it to a very high temperature. The waste never burns, but is turned to ash, hydrogen and carbon monoxide gas. This gas is called syngas, and can be used to make electricity, heat, steam and synthetic chemicals. Each gasification plant uses its syngas differently.

While gasification of coal and peat has been around since the 1800s – the resulting gas was used for lighting and cooking – gasification of garbage is a newer process. Gasification of a mix of materials, such as the mix found in the average trash can, is more complicated primarily because the resulting gas has impurities.

"Over the past 10 years, until they figure out the best ways to clean the syngas, they're taking that syngas and burning it to get the energy," said Marco Castaldi, associate professor in the chemical engineering department at The City College of New York / City University of New York. "Any time you burn a hydrocarbon, you will get emissions. The question is, how much?"

Castaldi studies combustion and gasification of solid waste. He said gasification is a promising newer technology but not all the kinks have been worked out yet.

"If you do the calculations, you can theoretically show that a gasification system that makes syngas and converts it to fuel has the possibility to be more efficient than combustion," Castaldi said.

Steven Weber, vice president of business development at Covanta, a solid waste and energy company that provides gasification technology, said he is passionate about gasification.

"When you're putting material in landfills," Weber says, "you are wasting a valuable resource."

Covanta, a leader in solid waste combustion, has been developing a gasification technology for several years.

"The market was clamoring for non-combustion types of systems," Weber said. "More than 90 percent of the technologies we looked at for gasification required sorting through the trash. So we took mass burn proven technology and evolved it. We made incremental and meaningful improvements in existing technologies."

Weber said that because gasification relies on processes that use less oxygen, Covanta can use less space and build smaller facilities than traditional combustion facilities.



The Cleergas facility in China converts garbage to electricity. Courtesy Covanta

With gasification you get approximately a 90 percent reduction in the volume of solid waste and 75 percent reduction in mass, meaning 100 tons of waste turn

into 25 tons of ash, Weber said.

At Covanta's demonstration gasification plant in Tulsa, Okla., the materials leftover as ash have been deemed non-hazardous by the Environmental Protection Agency. Weber said the ash is used for daily cover at landfills.

David Garcia de Herreros, North American representative for Urbaser, a solid waste management company, said gasification is a method his company recommends to clients on occasion. An advantage of gasification, as de Herreros sees it, is that "you may be able to get a higher decomposition rate and less product at the end."

However, he said that because gasifying solid waste is a newer technology, there is a lack of historical data on gasification and not many facilities in the world that do it.

Castaldi, whose scientific research has shown that emissions from combustion and gasification are very similar, said current research shows that combustion is the most reliable and efficient method of converting trash to energy.

But, he said he understands the interest in gasification. "My opinion of why people are pushing this is combustion has a stigma associated with it. Gasification groups can say, 'Hey, we're not incineration.'"

Castaldi said there is great potential in gasification, especially with additional scientific discoveries.

"The holy grail of syngas is called hot gas cleanup. You can clean syngas when it's cool, but to cool it down, you have to throw away all that energy," Castaldi said. "There is a huge effort to find technologies for that that's been going on for 30 years."

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Haverhill Facility

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Energy-from-Waste Facility



Covanta Haverhill Associates, LLC  
Haverhill, Massachusetts

Covanta Haverhill Associates, LLC, is located on a 147 acre area in the Ward Hill Neck section of Haverhill, Massachusetts. The site is bordered by Interstate Route 495 to the east and by the Merrimack River to the north, south and west. Covanta Haverhill is owned and operated by Covanta Energy, Inc. and began commercial operation in June 1989.

Technical Data

Facility Address:  
100 Recovery Way  
Haverhill, MA 01835  
(978) 372-6288

Site:  
147 acres

Commercial Operation:  
June 1989

Energy-from-Waste System:  
Two 825 ton-per-day waterwall furnaces with massburn Martin® reverse-reciprocating grates and ash handling system

Boiler Design:  
225,000 lbs/hr at 865 psig/830°F superheater outlet steam conditions

Air Pollution Control Equipment:  
Semi-dry flue gas scrubbers injecting lime, fabric filter baghouses, nitrogen oxide control system, mercury control system, and continuous emissions monitoring (CEM) system

Rated Refuse Capacity:  
1,650 tons per day

Energy Generation at Rated Capacity:  
Up to 49 megawatts from one condensing steam turbine generator

Sold to:  
An energy wholesaler for use on New England's power grid

Covanta Haverhill



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## Appendix E

### Speakers at Public Hearings

#### **Pubic Meeting held on May 27, 2015**

##### Speakers:

David Meade

Michelle Dionne

John Pacheco

Joshua Silva

Joshua Fonte

Jordan James Silvia

#### **Pubic Meeting held on June 10, 2015**

##### Speakers:

Trott Joseph Lee

Richard Branco

City Councilor Jaisel Correia

## Appendix F

### Discussion Outline

#### Fall River MSW Rail Based Disposal Options

1. Financial objective of City of Fall River
  - a. Reduce current cost of disposing of Fall River MSW only
  - b. Expand revenue and income by operating regional transfer station with significant MSW volume
2. Rail based alternatives
  - a. Ship by rail to Covanta/SEMASS using existing railcar method
    1. Construct transfer station with rail siding
    2. Load and compress rail hopper cars
    3. Install covers
    4. Ship on local shortline (MCRR) to SEMASS for unloading
    5. Generally same as current Yarmouth station method
  - b. Ship by rail in containers loaded on flat cars
    1. Transfer station can be remote from rail siding
    2. 20 ft containers loaded and compressed at station
    3. Containers drayed to rail siding and transloaded on flat cars
    4. Shipped out of state to least expensive accepting facility
    5. Requires substantially more volume than Fall River only
3. Potential financial advantages
  - a. Incremental savings on cost of Fall River only MSW disposal at Covanta/SEMASS
  - b. Possible significant incremental revenue and income *if* competitive as regional MSW disposal option.

## Appendix G

### *Solid Waste / Recycling / Yard Waste*

#### **Solid Waste Totals Curbside**

FY 2011 37,927 tons  
FY 2012 35,956 tons  
FY 2013 30,576 tons

#### **Recycling Totals Curbside**

FY 2011 2,886 tons Single Stream  
FY 2012 3,330 tons Single Stream  
FY 2013 5,195 tons Single Stream

#### **Yard Waste Totals Curbside & Drop-off**

FY 2011 3,634 tons  
FY 2012 4,129 tons  
FY 2013 4,831 tons

#### **Total Recycling Revenue**

FY 2011 \$24,105.00  
FY 2012 \$23,642.00  
FY 2013 \$56,702.00

- **Current Disposal Location** - Fall River Landfill
- **Owner of Landfill** – BFI / Republic
- **Landfill Closing Date** – October 1, 2014
- **Current Tipping Fee** – \$58.48 per ton
- **Number of Households Curbside Collection** – 33,000

### *Collection and Hauling Methods and Costs*

**Solid Waste, Recycling, Yard /Waste Curbside Collection** – City owned and operated trucks  
**Recycling / Yard Waste Vehicles** – 22

**How is Waste Currently Transported to Termination Points?** – Collection vehicles and Roll-off Trucks

**What Style Trucks are in the City’s Fleet?** – Semi-automated side loaders, Automated Side Loaders, Rear Loaders, Front Loader and Roll-off ‘s

**What is the Annual Labor Cost for Collections** - \$1,247,400.00 Based on 22 FTE’s

**What are the Annual Maintenance & Repair Costs for Collections** - \$310,000.00

**What is the Annual Fuel Procurement** – \$245,000.00

**What is the Annual Capital Replacement Cost** – Non-existing

**What is the Annual Replacement Reserve** – Non-existing

**What is total number of streets?** – 750

**What is the total street mileage?** – 255 miles

**What is the square miles of the City?** – Approximately 15 square miles

**School Collections** – 17 building

17 - 8 yard cardboard only

**Compactor MSW** – 11 building

170 - 95 gallon single stream recycling

## Appendix H

### **Municipal Solid Waste as a Fuel Report**