

US EPA ARCHIVE DOCUMENT

Waste to Biogas in the Pacific Southwest

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California Bioresources Alliance Symposium
September 18-19 | Sacramento

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U.S. EPA Pacific Southwest Region



Overview

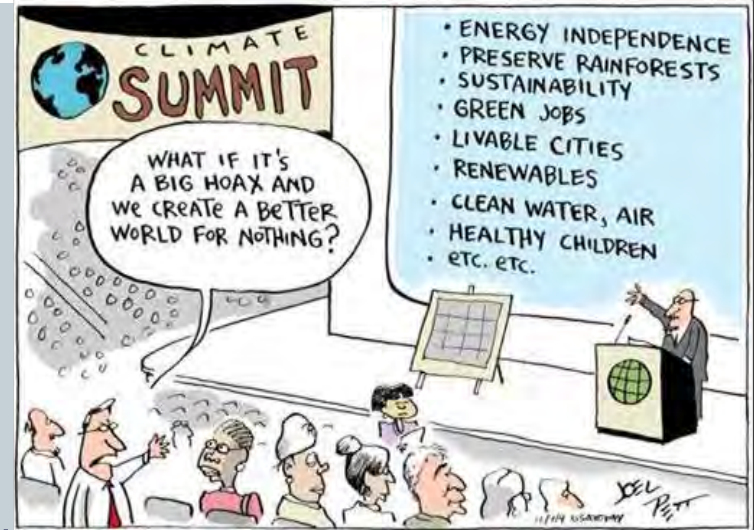
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- **Overview of R9 Sustainable Infrastructure program**
- **Challenges facing WWTF biogas projects**
- **Funding**
- **Co-digestion**
- **EPA Research & Resources**

Sustainable Infrastructure (SI) Goals

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- Water Efficiency
- Energy Efficiency
- Water Recycling
- Renewable Energy Production
 - Today's emphasis is on biogas production
 - ✦ Cross Media Benefits
 - Improves Air Quality & Water Quality; Generates Renewable Energy; Mitigates Climate Change
 - ✦ Great opportunity in Region 9, especially in CA
 - At least 450 MW from WWTFs (CEC Report, 2009)



Energy Use at Water & Wastewater Facilities

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- Energy represents the largest controllable cost of providing water services to the public, and is generally on the order of 30-60% of a city's energy bill



Barriers to biogas production

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- Capital costs/Funding
- WWTF flow
- Compliance (Air and Water)
- Technology
- Willingness to consider co-digestion, and availability of co-digestible materials
- Knowledge of biogas value, incentives/credit markets



Funding Solutions

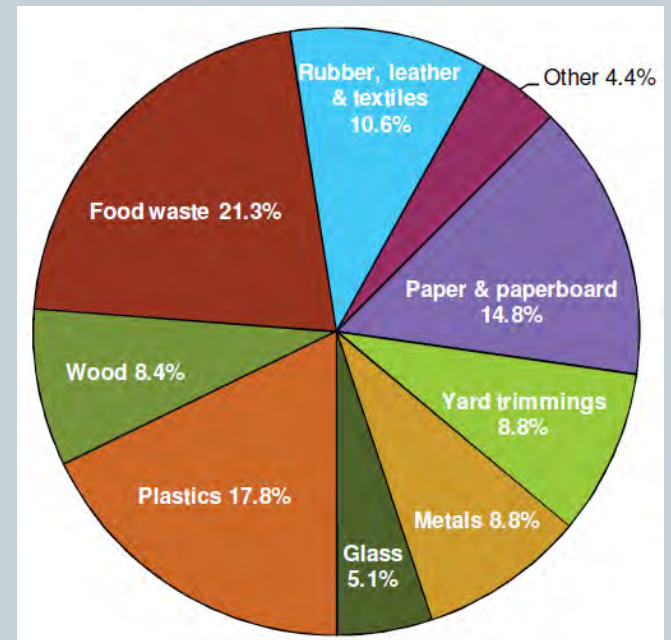
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- **Public Private Partnerships**
- **Incentives**
- **Bonds, Loans, and Loan Guarantees**
- **Grants**
- www.epa.gov/region9/waterinfrastructure/funding.html

Co-digestion at WWTFs

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- **Shrink pay-back periods**
 - Increase biogas production through the co-digestion of high-strength organic waste
- **Reduce landfill loads**
 - Food waste is our biggest missed opportunity
- **Use existing infrastructure**
 - In CA, 137 WWTPs with ADs have ~ 15-30% excess capacity



EPA R9 Research & Resources

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- **Research**

- Evaluating the Air Quality, Climate Change, and Economic Impacts of Biogas Management Technologies
- Co-digestion White Paper

- **Resources**

- Co-Digestion Economic Analysis Tool (COEAT)
 - ✦ <http://www.epa.gov/region9/organics/coeat/>
- Permitting tool Kit
 - ✦ www.epa.gov/region9/organics/ad/hwma-permitting-toolkit.pdf
- Waste to Biogas Mapping Tool (W2B)
 - ✦ www.epa.gov/region9/biogas

W2B overview

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Waste To Biogas Mapping Tool

This tool is designed for decision-makers with significant technical expertise in the fields of waste management, wastewater treatment, and biogas production. To submit comments on how to improve

The Waste to Biogas Mapping Tool is an interactive map created to connect organic waste producer potential users (e.g. wastewater treatment; facilities) for the purpose of biogas production through food scraps and fats, oils, and grease (FOG) to a wastewater treatment plant or dairy digester. Co-

Facility Name
SOUTH BAYSIDE SYSTEM AUTHORITY**

Facility Types:
Wastewater Treatment Facilities With Digester

Address:
1400 Radio Road
Redwood City, CA 94065

Average Dry Weather Flow (MGD):
20

Total Technical Potential:



Please refer to the [Mapping Updates](#) for an explanation of the Total Technical Potential calculations.

EMP COGEN?

YES

Using Methane?

YES

Accepting Grease?

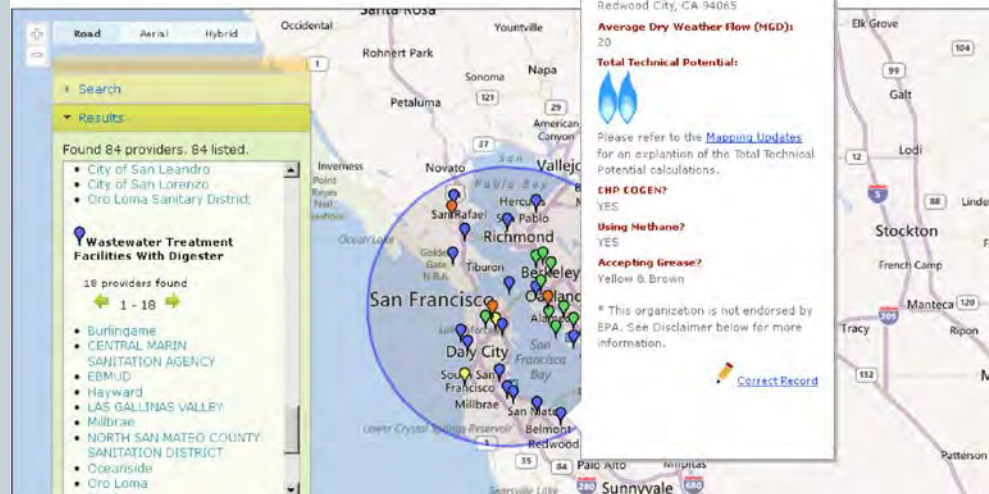
Yellow & Brown

* This organization is not endorsed by EPA. See Disclaimer below for more information.

[Correct Record](#)

wable energy. This includes [Contact Us](#) section.

cessing facilities) and high strength wastes such as bios to save and make sewer pipes.



Search

Street address, zip, or city:

94105

Input New Address

Programs In Your State:

Choose All/None

Dairies

Dairy Digesters

Fat/Oil/Grease Collection Sites

Food Processing Facilities

Wastewater Treatment Facilities With Digester

Organics Collection Programs

Landfills

Fat/Oil/Grease Haulers

Search distance: 50 miles

Search

Calculating Total Technical Potential

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- Detailed Explanation on-line
- See “Mapping Updates” tab

Pacific Southwest, Region 9

Serving: Arizona, California, Hawaii, Nevada, Pacific Islands, Tribal Nations

Pacific Southwest
Waste To Biogas Mapping
Tool Home

Mapping Tool Updates

Purpose

Instructions

Natural Gas Providers

Contact Information

FAQs

About EPA Region 9 (Pacific
Southwest)

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Waste To Biogas Mapping Tool

The Waste to Biogas Mapping tool (W2B) i

There's new and updated information for the following existing categories: Food processing F
Dairies, Dairies with digesters, and Wastewater Treatment Facilities. Two new categories hav
Please note W2B only has landfill information for CA, and hauler information for CA, AZ and NV.

The most substantial changes were made to the following categories: Dairies, Dairies with Digesters and Wastewater Treatment Facilities (WWTF). EPA Region 9 has estimated total technical energy potential for CA dairies and WWTFs throughout Region 9. To demonstrate how one facility's energy potential compares to others region-wide, the updated W2B mapping tool graphically represents energy potential with blue flames. The number of blue flames symbolizes a given range of total technical energy potential. Please see the chart below.

Total Technical Potential	
Number of Flames	kWh/year
	1 - 9,958,992
	9,958,993 - 19,918,761
	19,918,762 - 29,878,166
	29,878,1672 - 39,837,558
	39,837,559 - 49,796,953
	49,796,954 and up

Total Technical Potential

WWTF assumptions

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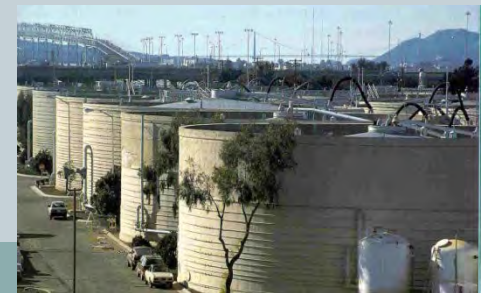
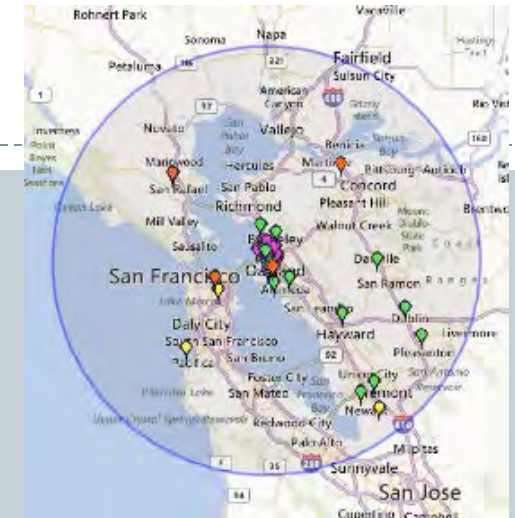
- Calculated Electricity Potential w/ and w/out co-digestion of FOG for 158 WWTFs in R9

Without co-digestion	With Co-digestion
Flow based on '09 Annual Biosolids report	Same
1 MGD equates to 26 kW & 2.4 MMBtu/day	Same
	Co-digestion capacity estimate: 1/10% of flow
	Methane potential based on 1 WWTF (Millbrae)
	Electricity generation averaged from 4 engine types
	90% efficiency

EBMUD in Oakland, CA

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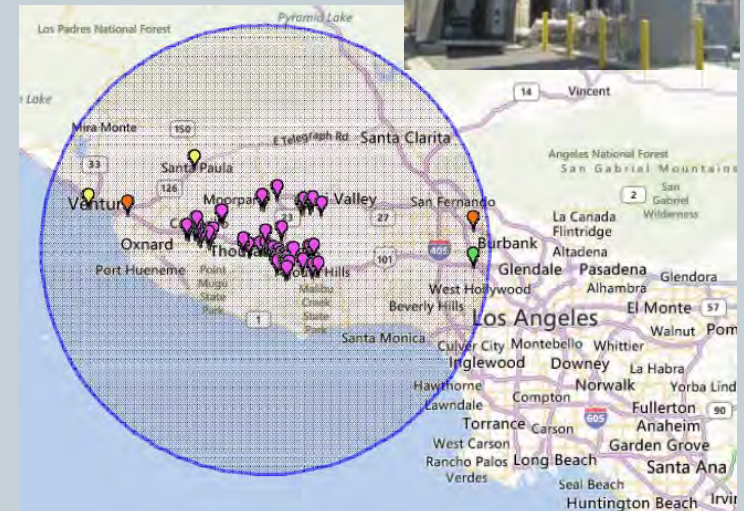
- **ADWF 67 MGD; Design Flow 168 MGD**
 - i.e. Ample excess capacity: 4 empty digesters @ 2 million gallons each
- **Surrounded by organic waste!**
 - W2B identifies 974 Food Processing Facilities & 11 communities with Organic Collection Programs—all within a 50 mile radius
- **W2B estimated 36,859 MWh; In 2012, EBMUD generated 42,000 MWh**
- **By co-digesting a volume of food waste equal to <1% of ADWF, biogas generation more than doubled**



Hill Canyon in Thousand Oaks, CA

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- **ADWF 9.5 MGD; Design Flow 14 MGD**
 - ~.9 million gallons excess digester capacity
- **Surrounded by organic waste!**
 - W2B identifies 668 Food Processing Facilities, 1 community with an Organic Collection Program, 11 FOG haulers—all within a 50 mile radius
- **W2B estimated 5,177 MWh; In 2012, Hill Canyon generated 4,600 MWh (a very bad year)**
- **By co-digesting a volume of food waste equal to ~.2% of their ADWF, Thousand Oaks generates 2.5 x as much biogas**



Updates?

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- National WWTF data using www.biogasdata.org
- National LMOP & AgSTAR datasets
- Updated CA dairy data
- Updated estimates for food waste potential
- National Organic Collection Program data
- Updated, more targeted NAICS data for the entire country?

445110 Grocery stores	311511 Fluid Milk Manufacturing	311520 Ice Cream & Frozen Dessert Manufacturing	311615 Poultry Processing
311224 Soybean and Other Oilseed Processing	311512 Creamery Butter Manufacturing	311611 Animal Slaughtering	311710 Seafood Product Preparation & Packaging
311225 Fats and Oils Refining and Blending	312130 Wineries	311612 Meat Processed from Carcasses Processing	311812 Commercial Bakeries
311221 Wet Corn Milling	311513 Cheese Manufacturing	311613 Rendering and Meat Byproduct	312120 Breweries

Questions?

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www.epa.gov/region09/waterinfrastructure