

**Anaerobic Digestion of Municipal Solid Waste Workshop**  
**April 12, 2010**

# **Deployment of Anaerobic Digestion (AD) of MSW: An Update**

**Jacques Franco**

CalRecycle

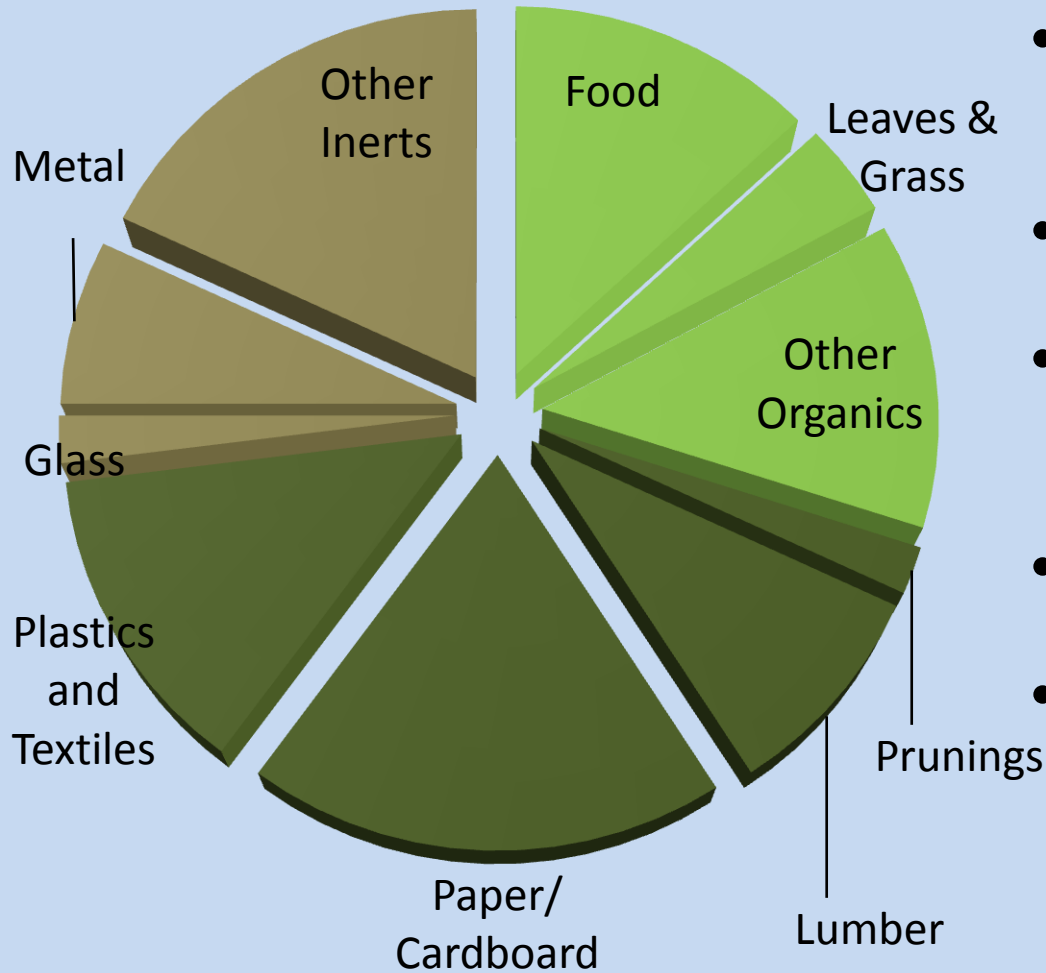
Climate Change & Technology Group



# Overview

- Resource base and policy drivers
- Anaerobic Digestion (AD) in Europe
- California AD Projects
- Pilot & Research Projects
- Resources

# California landfilled waste stream



- 39 million tons MSW landfilled per year
- 70% carbon based
- Energy potential 15,000 GWh/year
- 8% of State electricity
- About 25% suitable for Anaerobic Digestion

Source: CalRecycle

# Conversion Technology Drivers

(a partial list)

**1- AB 32** - Global Warming Solutions Act of 2006

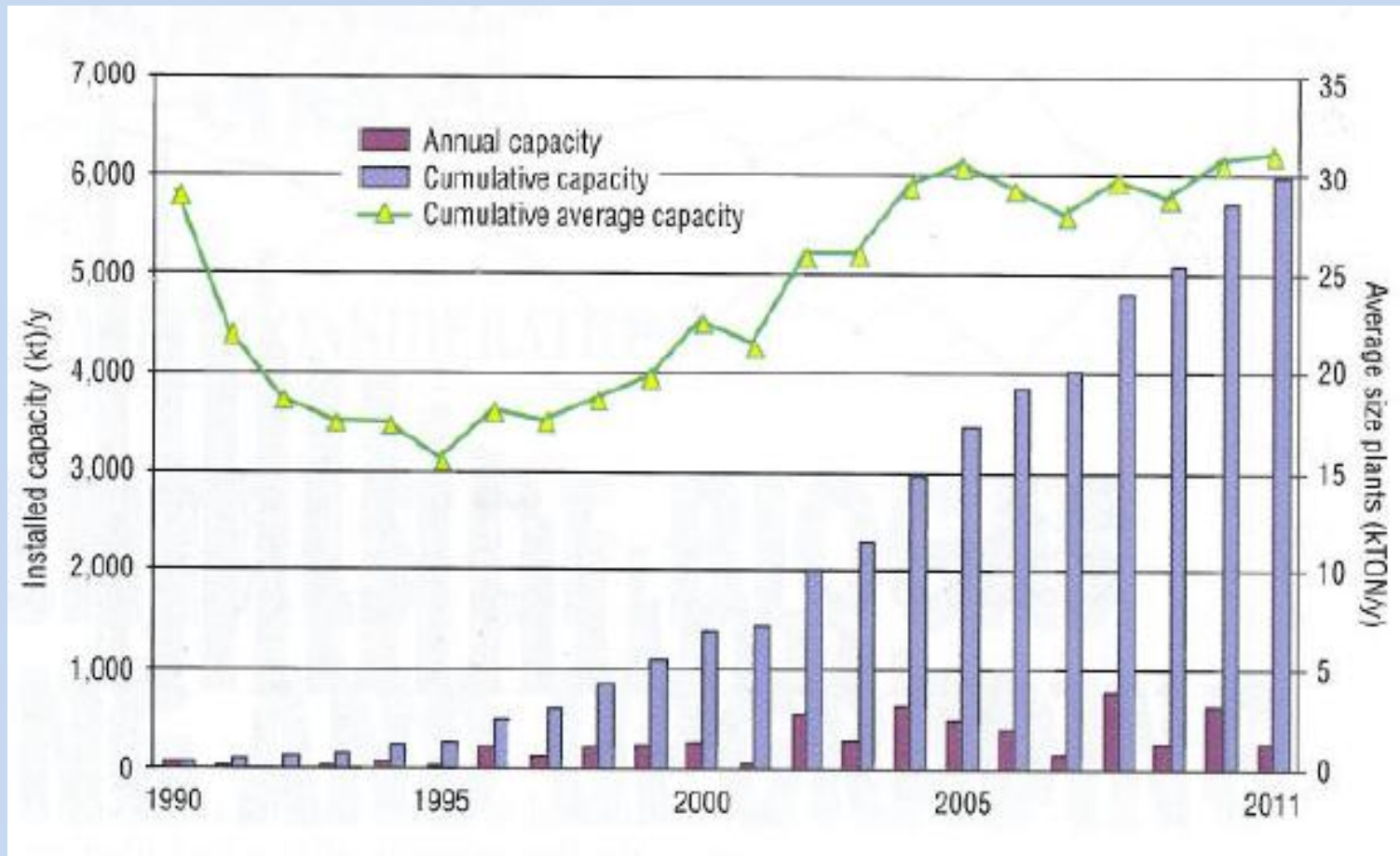
Anaerobic Digestion measure

**2- Renewable Portfolio Standard** - 33% by 2020

**3- Low Carbon Fuel Standard:** Deliver automotive energy by 2020  
with 10% less greenhouse gases than 2010

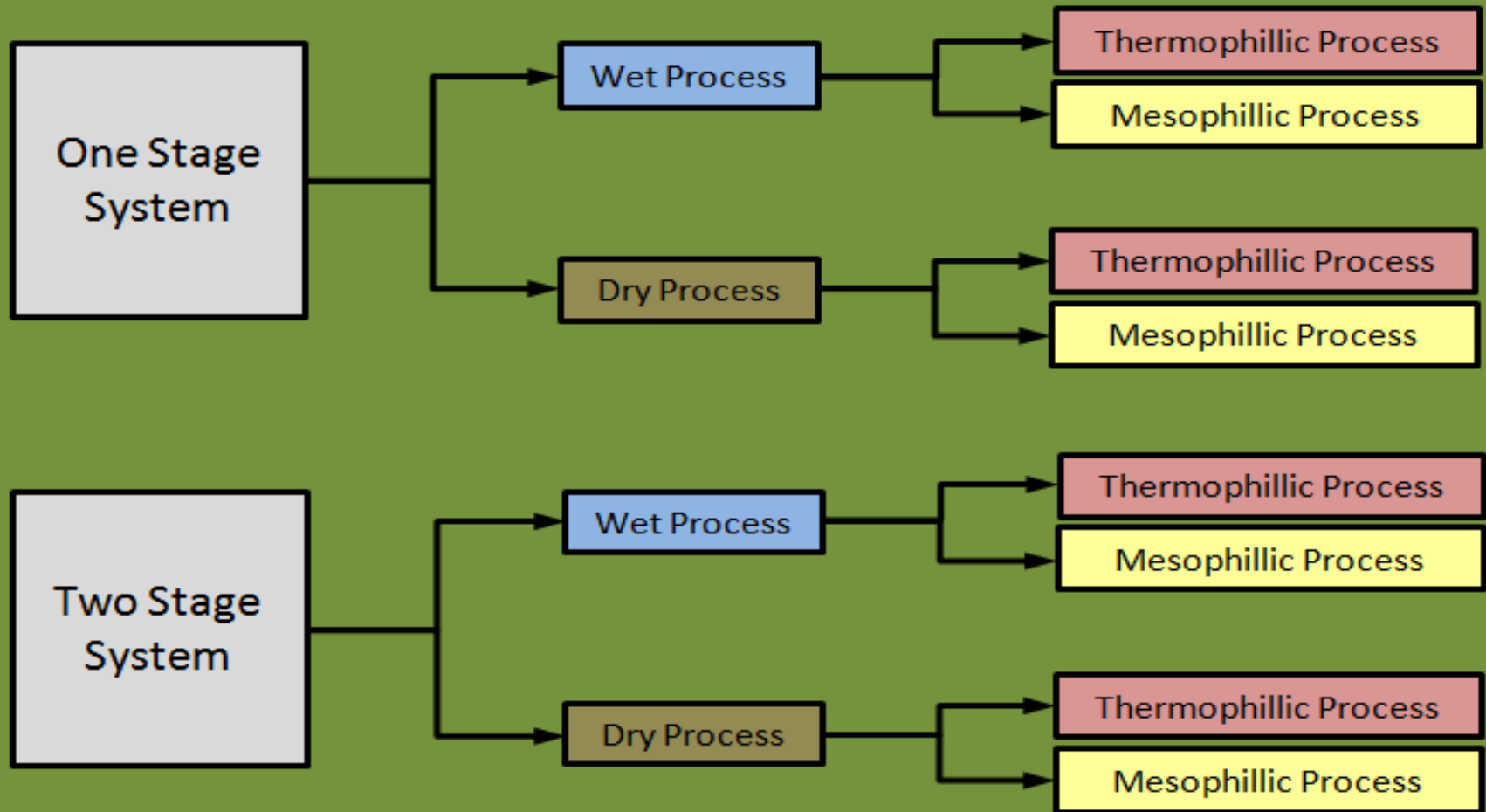
**4- CalRecycle Strategic directives 6.1 & 9.2** – Organics diversion  
and Bioenergy & Biofuels R&D

# European Installed Anaerobic Digestion Capacity

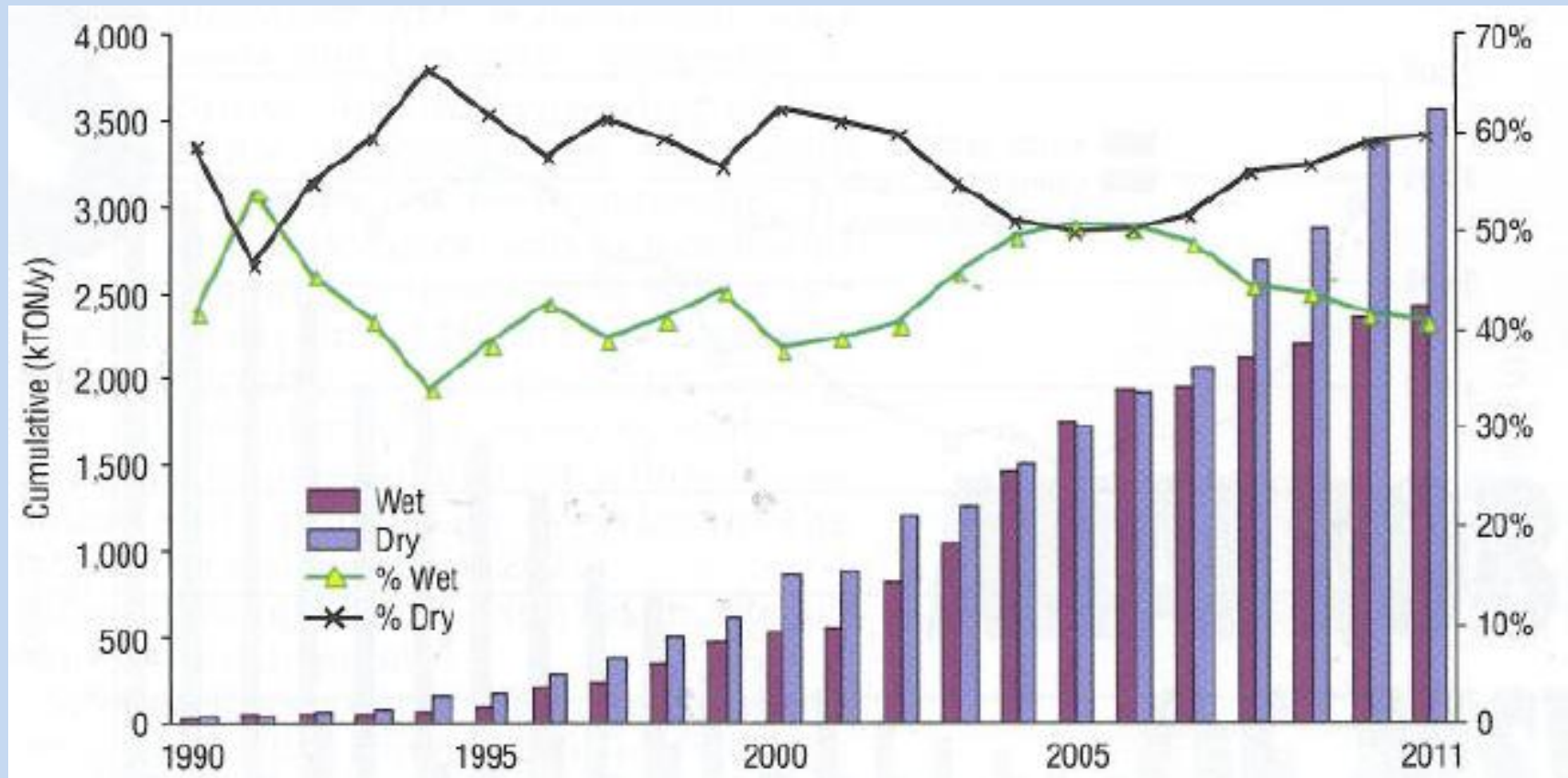


Source: De Baere & Mattheeuws, Biocycle – Feb '10

# Simplified AD system types



# European Installed Anaerobic Digestion Capacity



Source: De Baere & Mattheeuws, Biocycle – Feb '10

# Evaluation of Conversion Technologies for Municipal Waste Management

## Jurisdiction Sponsored Evaluations **(a partial list)**

- City of Los Angeles
- County of Los Angeles
- City & County of Santa Barbara
- Salinas Valley Solid Waste Authority
- Cities of San Jose, Tulare, San Diego & Santa Cruz

# Evaluation of Conversion Technologies for Municipal Waste Management

- **Jurisdiction Sponsored Evaluations** (partial list)
  - City of New York
  - Taunton, Massachusetts
  - Toronto, Ontario, Canada
  - San Lucie County, Florida
  - Delaware Solid Waste Management Authority
  - Connecticut Resources Recovery Authority

# Anaerobic Digestion of Food Waste Water Treatment plants **(A partial list)**

- East Bay Municipal Utility District
- Sacramento Co. Regional WWTP – SMUD
- City of San Rafael – Central Marin Sanitation
- City of Riverside
  
- Humboldt Co. Waste Authority



Photo: J. Franco – City of S. Jose WWTP

# East Bay Municipal Utility Food waste digestion project



*Photos by EBMUD*

# Planned California AD projects (partial list)

Inland Empire Utility Agency (IEUA), Chino

- Post MRF organics, up to 500 tpd

GreenWaste-Zanker Rd, San Jose

- Post MRF organics, 150 tpd



# Proposed CR&R, Perris AD Project (150 tpd)



- Will digest various organic residuals
- In negotiations with City and County of Los Angeles
- ArrowBio technology developed in Israel (facilities in Australia & Israel)

# Planned California AD projects (partial list)

- Garden Highway Foods, Rancho Cordova
  - Pre consumer food waste, 150 tpd
- Grand Recycling, City of Industry
  - Pre consumer food waste, 150 tpd



# CalRecycle Sponsored Research & Demonstration Projects

- UC Davis Biogas Energy Project
  - aka** Anaerobic Phased Solids Digester
- Yolo County Landfill. In-Situ AD compost Project
- Rotary Drum Reactor technology assessment project

# UC Davis Biogas Energy Pilot Project



*Photo: Ruihong Zhang, UC Davis*

# UC Davis Biogas Energy Pilot Project



Food Leftovers



UC Davis Campus

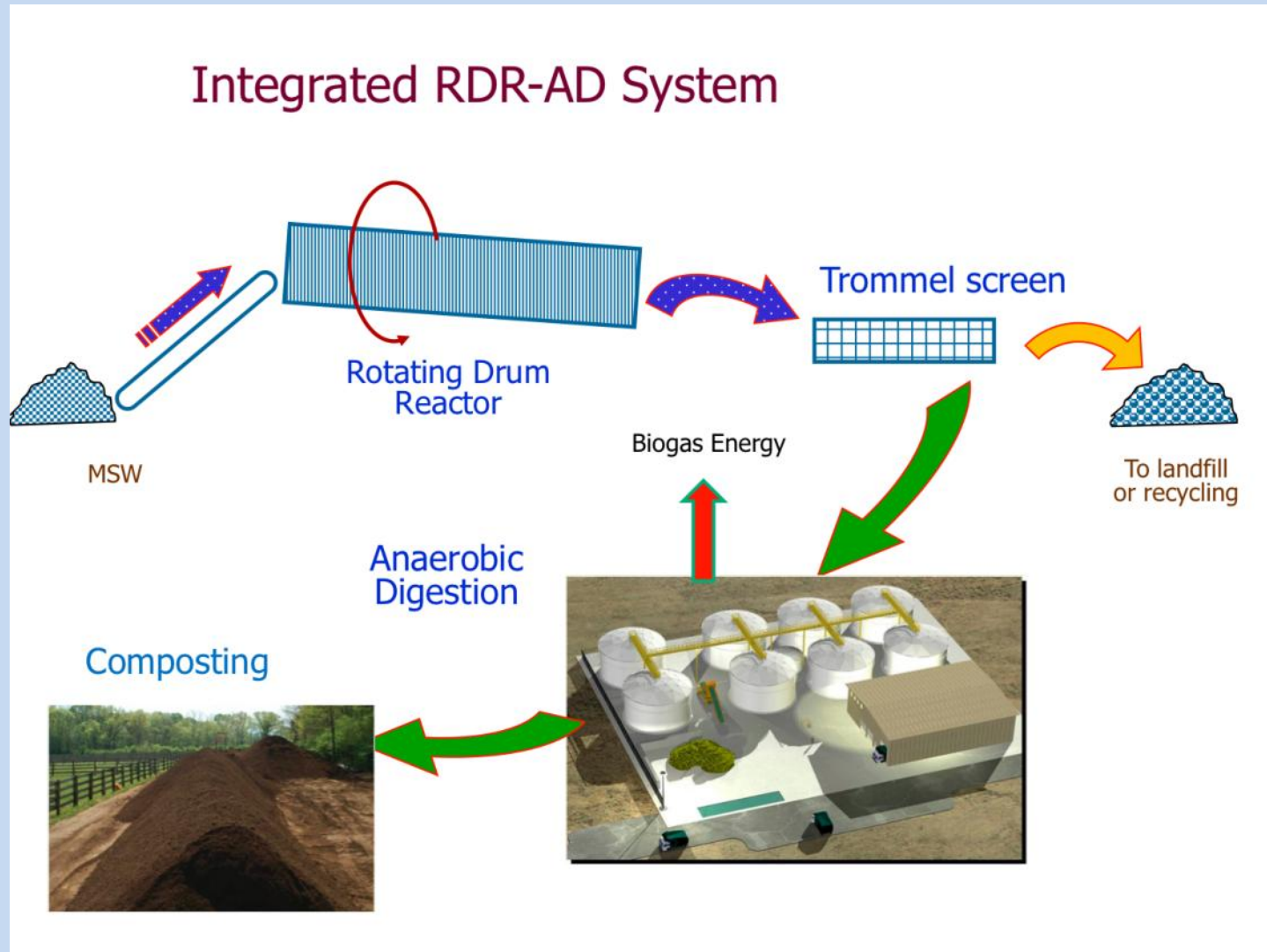
Restaurants

# Yolo County Landfill In-Situ AD Compost Pilot Project



*Photo: Ramin Yazdani, Yolo Co.*

# UCD Rotating Drum Reactor (RDR) Project



# UCD Rotating Drum Reactor Project



**Raw MSW**

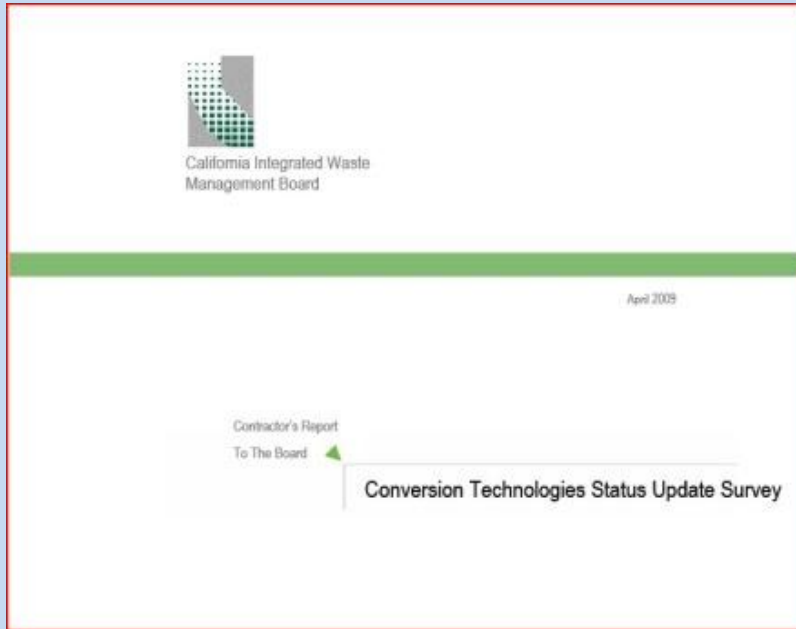


**Organics**



**Inorganics**

# Recent Cal Recycle Publications



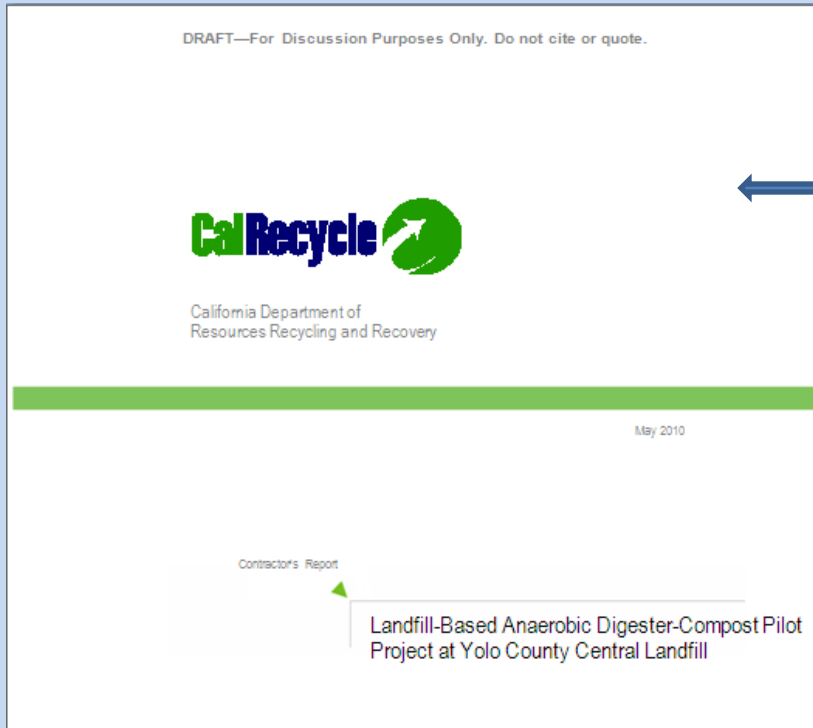
## 4/09 - Conversion Technologies Status Survey

## 3/08 - Current Anaerobic Digestion Technologies Used for MSW organics treatment

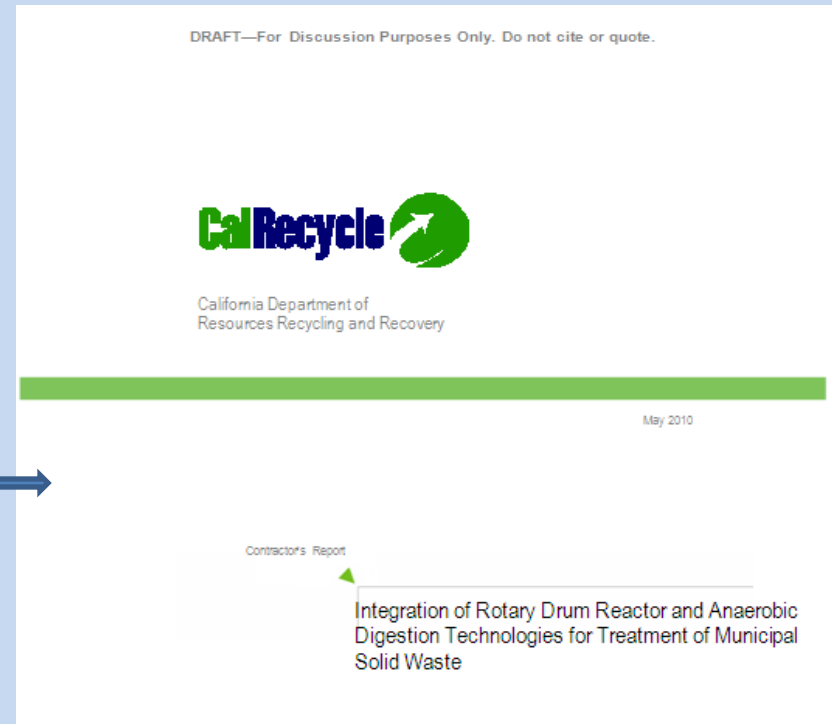


[www.calrecycle.ca.gov/Organics/Conversion/](http://www.calrecycle.ca.gov/Organics/Conversion/)

# Forthcoming CalRecycle Publications



← **5/10 - Landfill-Based Anaerobic  
Digester-Compost Pilot Project at  
Yolo County Landfill**



**5/10 – Integration of Rotary Drum  
Reactor & AD technologies for the  
treatment of MSW**

[www.calrecycle.ca.gov/Organics/Conversion/](http://www.calrecycle.ca.gov/Organics/Conversion/)

# Resources

## **Project funding sources:**

Economic Incentives 6/15/09 workshop link

[www.calrecycle.ca.gov/organics/events/econIncentive](http://www.calrecycle.ca.gov/organics/events/econIncentive)

## **Jurisdictions Conversion Technologies Evaluation Reports:**

[www.calrecycle.ca.gov/Organics/Conversion/Events](http://www.calrecycle.ca.gov/Organics/Conversion/Events)

**California Biomass Collaborative Forum - May 11-12, UC Davis**

[biomass.ucdavis.edu/](http://biomass.ucdavis.edu/)

# Resources

- CalRecycle Conversion Technologies (CT) link: [www.calrecycle.ca.gov/Organics/Conversion/](http://www.calrecycle.ca.gov/Organics/Conversion/)
- CT mailing list: [www.calrecycle.ca.gov/Listservs/](http://www.calrecycle.ca.gov/Listservs/)

# Strategic Directive 6.1

- 50% reduction of organics in the waste stream by 2020.
- Over 15 million tons of organics need to be recycled annually.
- Will require a growing infrastructure (composting, anaerobic digestion, etc.).

Difficult and costly for compost facilities to comply with increasingly stringent air and water quality regulations.

Anaerobic digestion is a promising technology for managing organic material.

How does anaerobic digestion fit into CalRecycle regulatory structure?



# CalRecycle Regulations

If feedstock is compostable material, the facility will typically be regulated as a compostable material handling facility.

If feedstock is not compostable, the activity will typically be treated as a transfer and processing facility.

# Tier Placement

- Type of Feedstock
- Quantity
- Location

# **How Anaerobic Digestion Fits Current Board Regulatory Structure**

[www.calrecycle.ca.gov/Publications](http://www.calrecycle.ca.gov/Publications)

# **CalRecycle Program EIR for Anaerobic Digestion Facilities**

\$250,000 contract with Environmental Science Associates (ESA) to develop Program EIR.

Assess environmental impacts of siting new and expanding existing anaerobic digestion facilities.

# Central Valley Regional Water Quality Control Board Dairy Digester Program EIR

\$742,000 contract with ESA to develop a region-wide EIR for manure digester and co-digester facilities.

Individual dairies, groups of dairies linked by gas collections systems, and at centralized locations within the Central Valley region.

# **Changes to the California Integrated Waste Management Board**

Senate Bill 63 eliminated the CIWMB effective January 1, 2010.

## **California Department of Resources Recycling and Recovery (CalRecycle)**

Division of Recycling moves from the Department of Conservation to CalRecycle.

# Public Comment Workshops

- Status of permits under consideration
- Update on ongoing projects
- Opportunity for public comment on activities



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## Welcome to CalRecycle

### Celebrating 40 Years of Earth Day

The designation of Earth Day 40 years ago may have been the defining campaign to protect the environment and help preserve our planet's resources.

An estimated 20 million Americans in communities large and small took to celebrate the first Earth Day on April 22, 1970. Now, as the 40th anniversary draws near, published accounts predict as many as 1 billion people worldwide will participate in Earth Day celebrations.

From tree-plantings to community cleanups, from cultural festivals to educational programs, Earth Day helps convey a deeper appreciation for all that Mother Nature has given us. It also encourages personal commitments to be good stewards of our natural resources, and to help lead us onto a path toward a healthier world for future generations.

Read more at CalRecycle's [Earth Day 2010](#) Web site.

Information For...

# Questions?

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Thank you!