

US EPA ARCHIVE DOCUMENT

BIOSOLIDS MANAGEMENT

Will Management Change Under GHG Reduction Mandates?

Frank Caponi

PORS 2009

UC Davis

SANITATION DISTRICTS OF LOS ANGELES COUNTY



CONTEXT OF PRESENTATION

- Does GHG reduction currently play a role in our biosolids management programs?
- What types of evaluations/circumstances would we potentially use to move in that direction?
- Realities and barriers, barriers, barriers!!

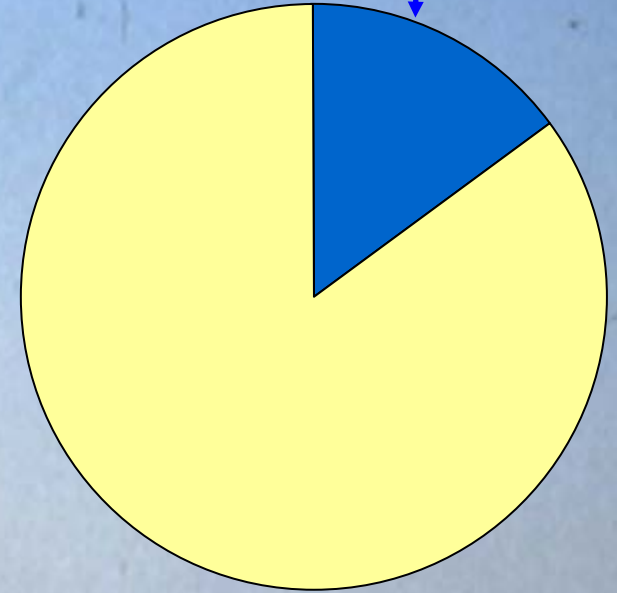
Wastewater Treatment Facilities Map



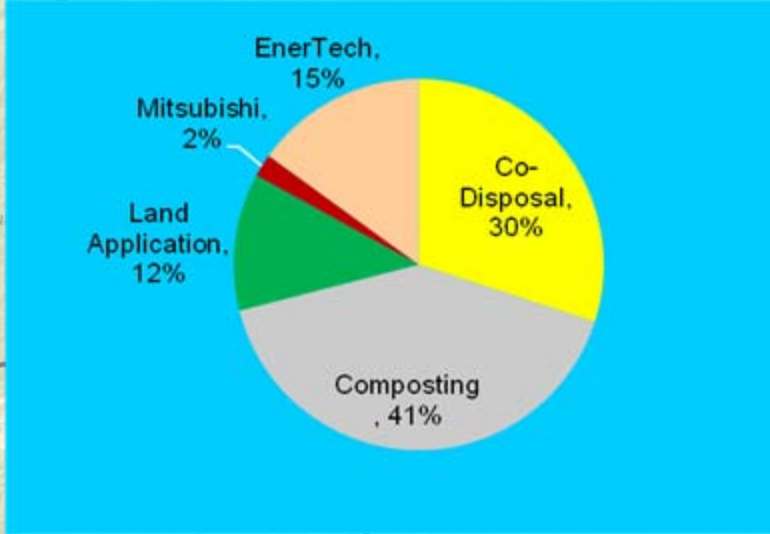
LACSD Pre-1990's Biosolids Management

Composting

Co-Disposal



Biosolids Management Circa 2009



**San Joaquin
Compost** — ★

★ **Honey Bucket
Farms**

**Synagro Kern
Compost** — ★

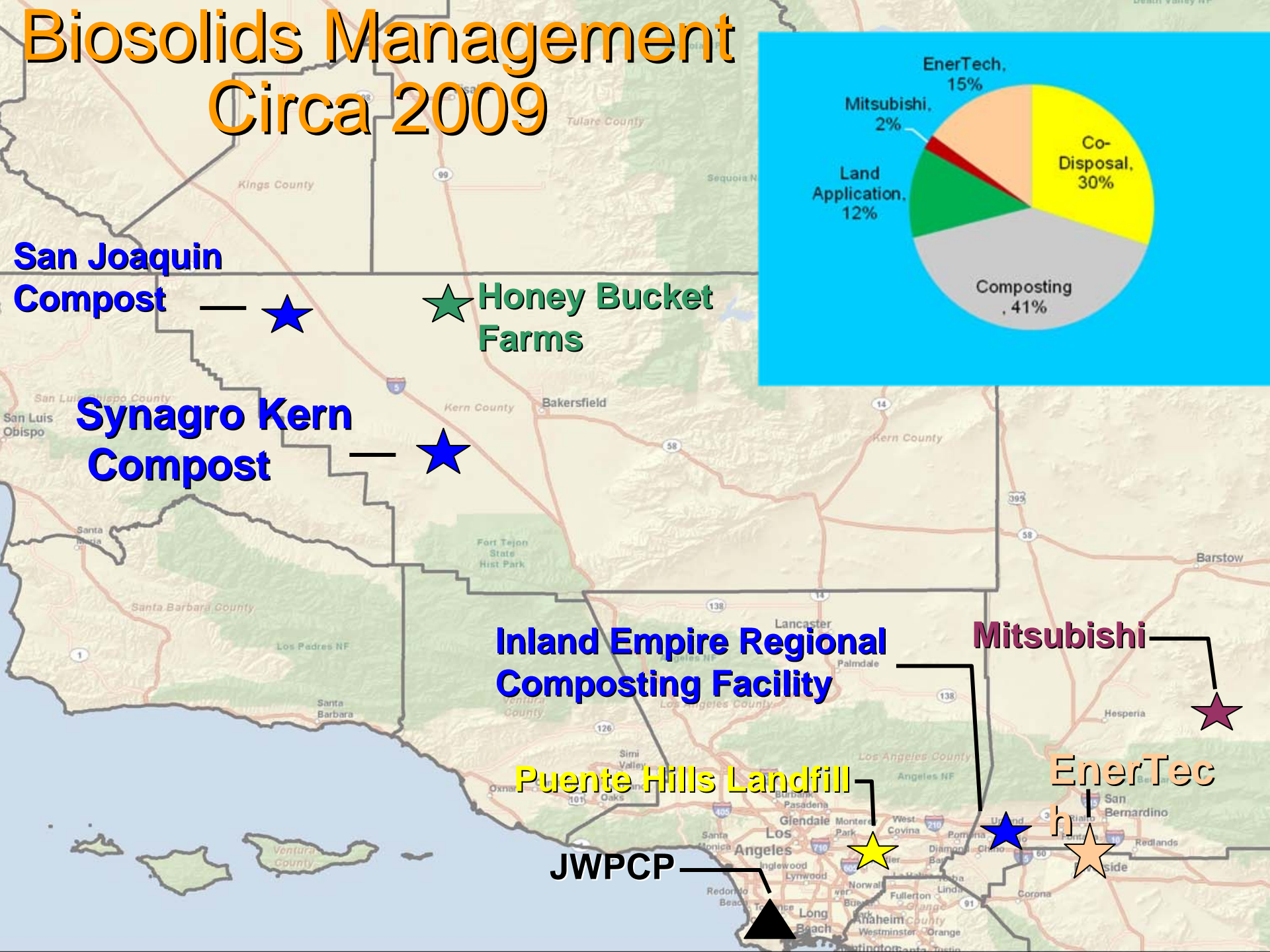
**Inland Empire Regional
Composting Facility**

Mitsubishi — ★

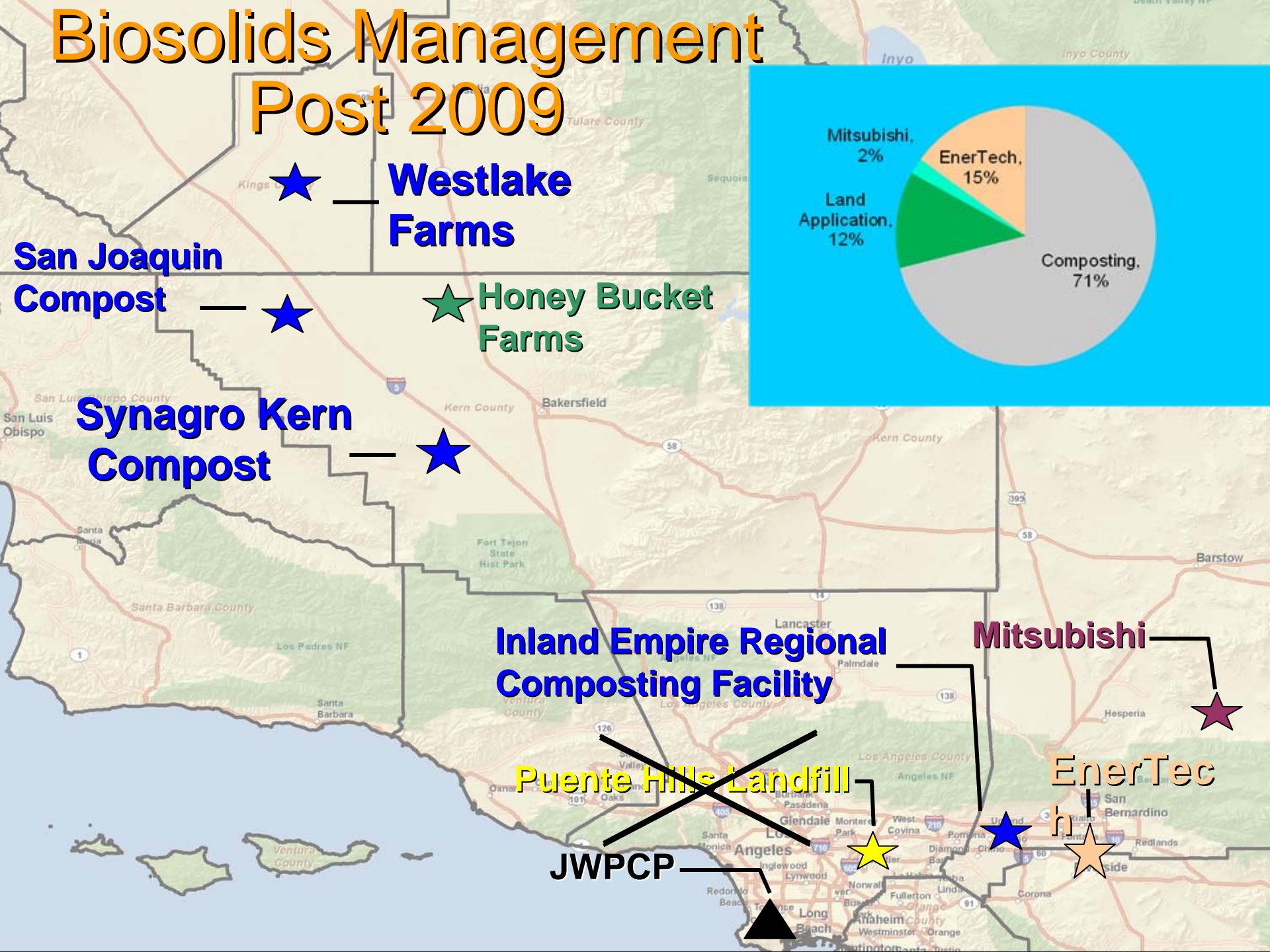
Puente Hills Landfill — ★

EnerTec — ★

JWPCP — ▲



Biosolids Management Post 2009



Post 2009

Westlake Farms

San Joaquin Compost

Honey Bucket Farms

Synagro Kern Compost

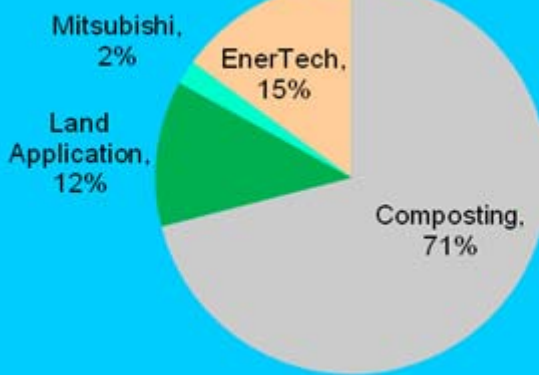
Inland Empire Regional Composting Facility

Mitsubishi

Puente Hills Landfill

EnerTec

JWPCP



GHG EVALUATION OF BIOSOLIDS MANAGEMENT

- To truly evaluate the best biosolid management methods, a comprehensive life cycle analysis should be performed
- Analysis would include:
 - Direct GHG emissions from process
 - Indirect emissions (e.g., electrical uses)
 - GHG emissions from fuel consumed in transportation and processing

GHG EVALUATION OF BIOSOLIDS MANAGEMENT (continued)

- Analysis would include:
 - Credits from avoided fossil fuel use from energy production
 - Credits from carbon sequestration
 - Qualitative credits, such as water savings from use of compost



California Integrated Waste
Management Board

JUNE 2009

Contractor's Report

To The Board ▲

**Life Cycle Assessment and Economic
Analysis of Organic Waste Management
and Greenhouse Gas Reduction Options**

DRAFT FINAL PROJECT REPORT

Produced Under Contract by

RTI International
R.W. Beck
Sally Brown
Matthew Cotton

Contract No. 99M0003

Evaluation of Green Waste Management Impacts on GHG Emissions Alternative Daily Cover Compared with Composting

By

Dung Kong, Ray Huitric, Mario Iacoboni, and Grace Chan

Solid Waste Management Department
Los Angeles County Sanitation Districts
Whittier, California

ABSTRACT

Green waste is a key component of California's solid waste stream and so is an important target for effective waste diversion. The California Integrated Waste Management Board (CIWMB) reports that about 15 million cubic yards of organics comprised largely of green waste are diverted annually in California. The diverted organics are principally used as compost and mulch in agricultural and urban green areas. In California, one of the most popular alternative waste diversion options is the use of green waste as landfill alternative daily cover (ADC). Green waste ADC reduces the need for importing clean daily cover soil and so helps conserve limited landfill volume. However when landfilled, green waste can generate methane, an important greenhouse gas (GHG), and so may be regarded as environmentally inferior to green waste composting.

This study uses GHG emissions estimated from life-cycle inventory methodology to compare green waste ADC and composting alternatives. A United States Environmental Protection Agency (USEPA) based life-cycle inventory methodology was developed that considers differences in transport, material handling, green waste emissions, capture and management, energy impacts, and carbon sequestration. The ADC analysis addresses the range of conditions at landfills particular to California landfills including the extent of gas recovery, the gas collection efficiency and methane energy recovery.

This study supports the reported benefits of composting but also shows that green waste ADC can actually be more beneficial in reducing GHG emissions when compared to the composting of green waste. This result indicates the importance of site-specific environmental analysis when considering organics management options.

In this study, details of the life-cycle GHG inventory analyses are provided. Results of the comparison between the two green waste management options are presented. The significance and implications of this study are discussed.

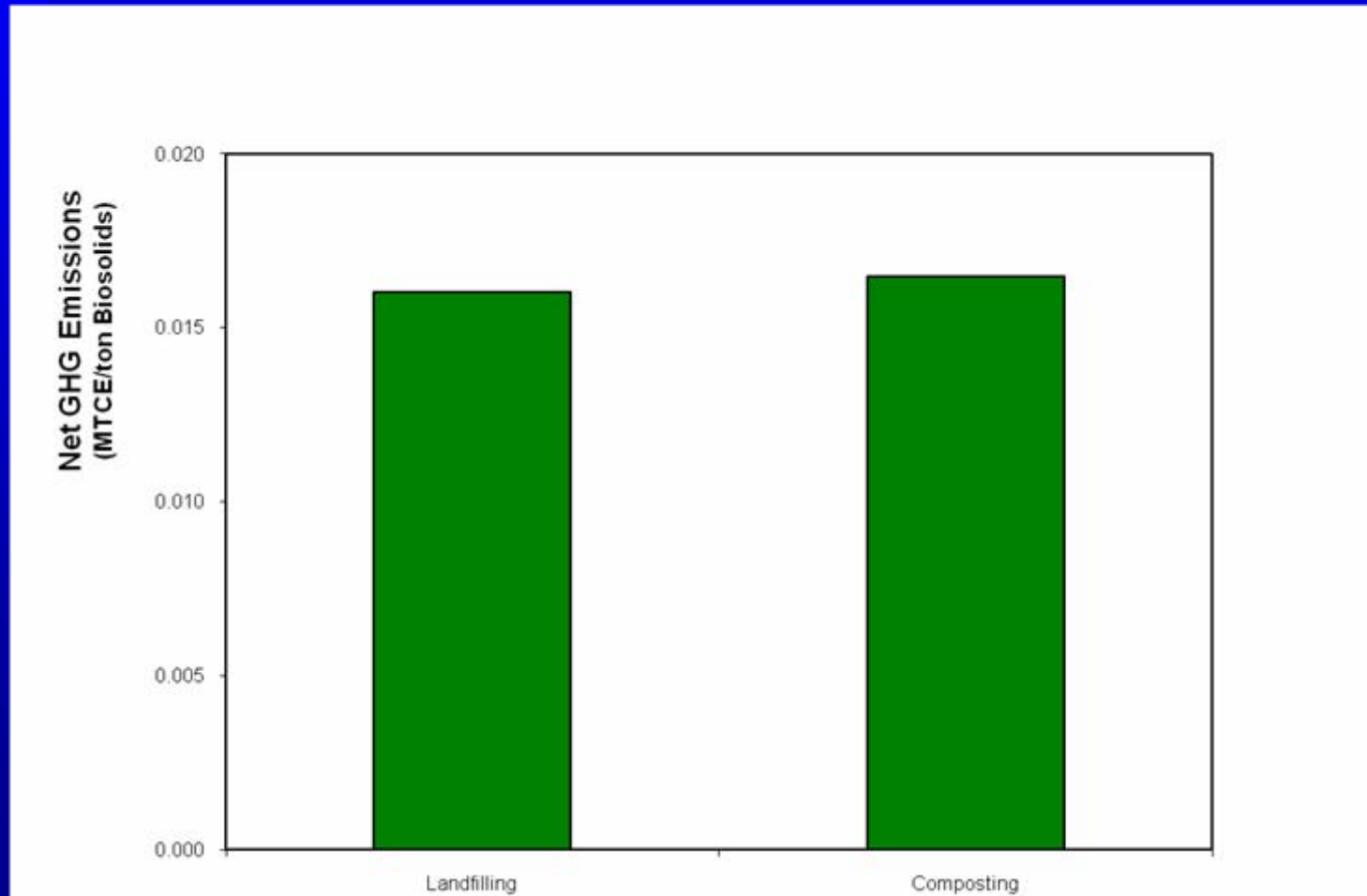
Summary

Net GHG Reductions (%C relative to initial weight)

<u>Model</u>	<u>Location</u>	<u>ADC</u>	<u>Composting</u>
LACSD	California	16.8	4.9
EPIC	Canada	12.0	0.0
USEPA WARM	US	22.0	5.0

- ***GW ADC reduces carbon 3+ times more than composting***

LACSD – Draft LCA of Managing One Wet Ton of Biosolids (Landfilling vs. Compost)



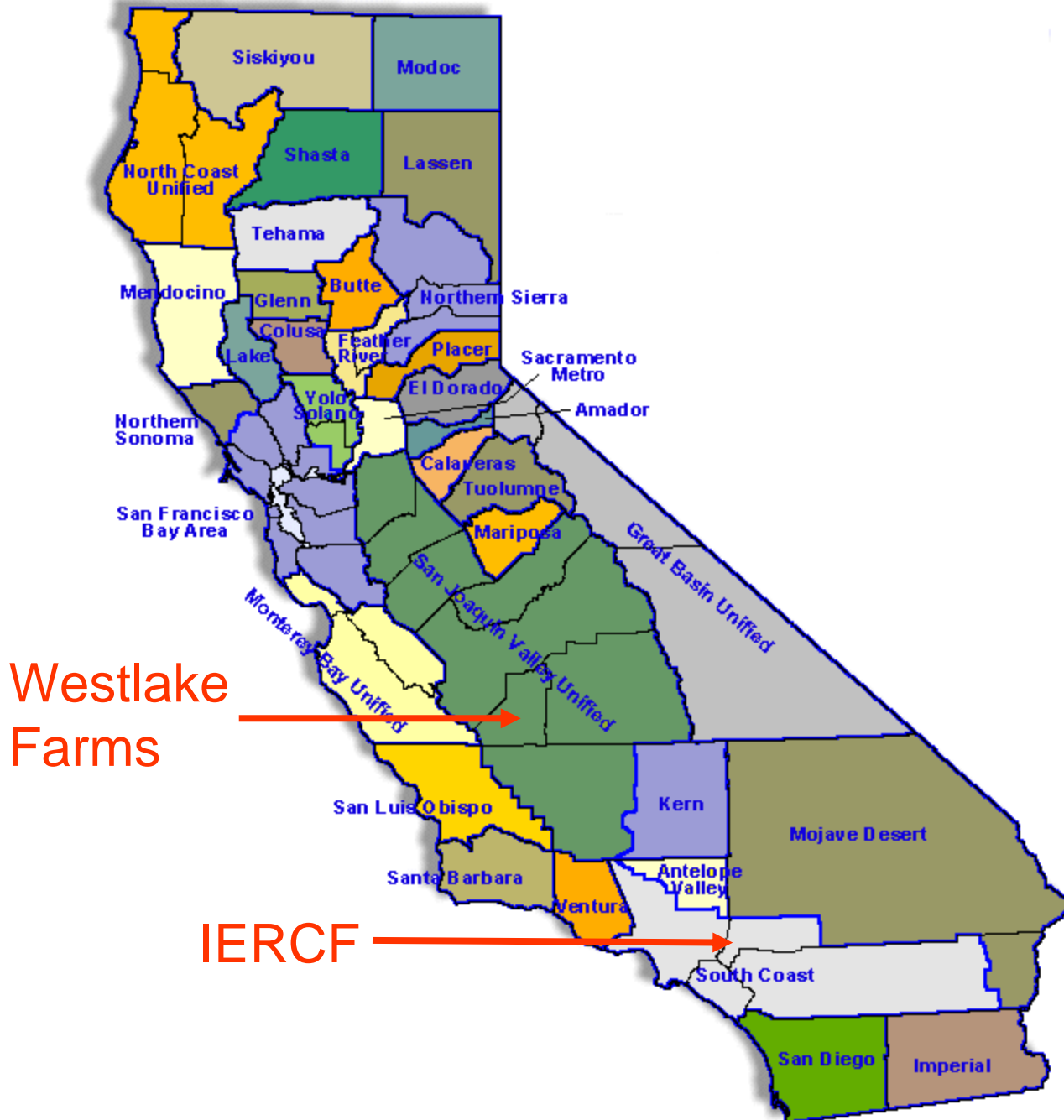
SENSITIVITIES IN LCA

- Analysis not sensitive to transportation distance (in general)
- Analysis sensitive to landfill collection efficiency
- Analysis sensitive to carbon sequestration

REALITY OF MANAGING BIOSOLIDS at LACSD

- GHG is not the prime consideration
- Options need to be diverse – contracts important
- Puente Hills Landfill is closing in 2013
- Counties banning biosolids is a real
- Siting Compost Facilities is becoming increasingly difficult because of criteria pollutant emissions

California Air Districts

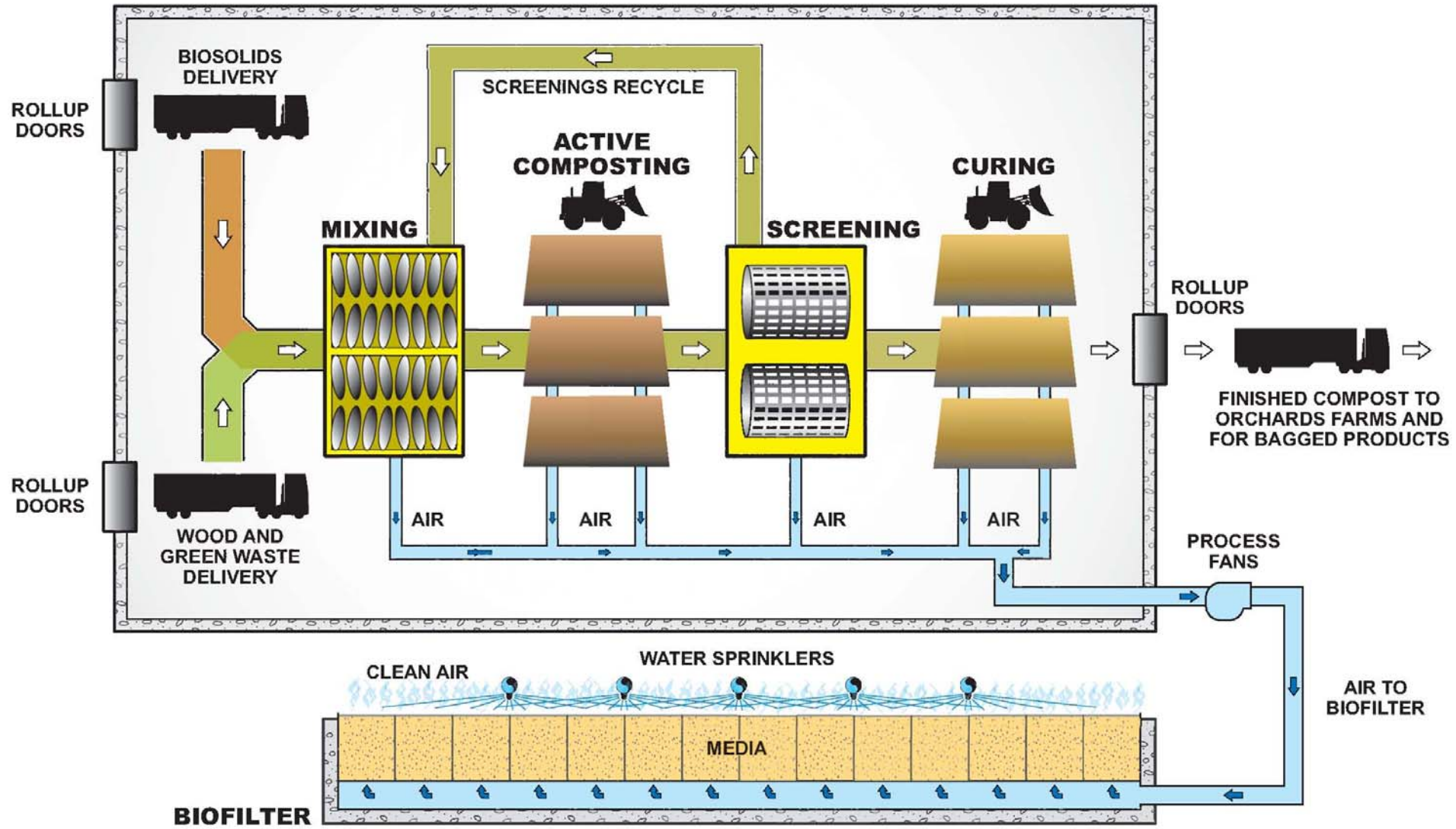


SCAQMD Rule 1133.2

- Adopted January 2003
- Requires Full Enclosure of Active Composting
- 80% removal of VOC and ammonia







Biofilter Air Header





Permits & Regulatory Compliance*

- ◆ California Environmental Quality Act (CEQA) – Initial Study
- ◆ Conditional Use Permit – City of Rancho Cucamonga
- ◆ SCAQMD
- ◆ Cucamonga County Water District – Water/Sewer
- ◆ Santa Ana Regional Water Quality Control Board
- ◆ San Bernardino County/California Integrated Waste Mgmt Brd
- ◆ State Department Health Services
- ◆ West Valley Vector Control
- ◆ U.S. EPA, Region IX

* Over 20 different Permits/Approvals

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CEQA Performed
Today Would Require
a GHG Analysis

* Over 20 different Permits/Approvals

IERCA EMISSIONS LIMITS

- VOC = 8.4 TPY
= 95.5% control from Rule 1133.2 baseline of 1.78 lb/ton throughput
- NH₃ = 10 TPY
= 96.6% control from Rule 1133.2 baseline of 2.93 lb/ton throughput
- Biofilter control η from IEUA RP-5 Renewable Energy Project
- Rule 1401 HRA MICR = $5.24/10^6$
- Toxics based on Griffith Park biofilter test results

SJVAPCD Rule 4565

- Adopted March 2007
- 80% removal of VOC
- Implement BMPs



Stratford, CA
Population 1,264

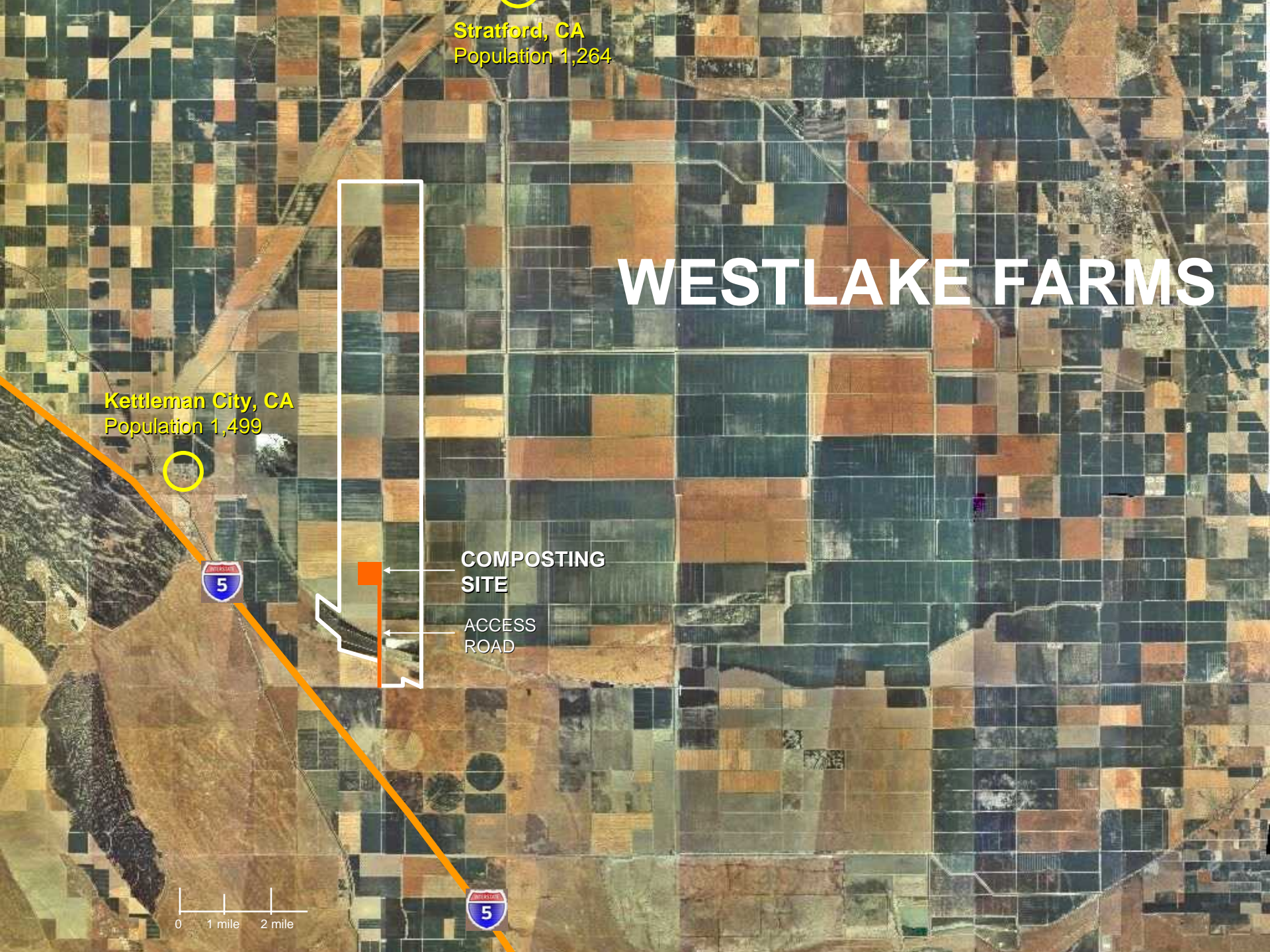
Kettleman City, CA
Population 1,499

WESTLAKE FARMS

COMPOSTING
SITE

ACCESS
ROAD

0 1 mile 2 mile

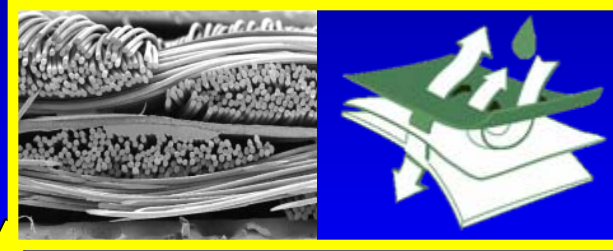


FABRIC COVERS



Gore™ Cover System

Gore Cover



Weather Resistant

Oxygen Sensor

Heat

Odors / Volatile Compounds

Moisture

CO₂

Temperature Sensor

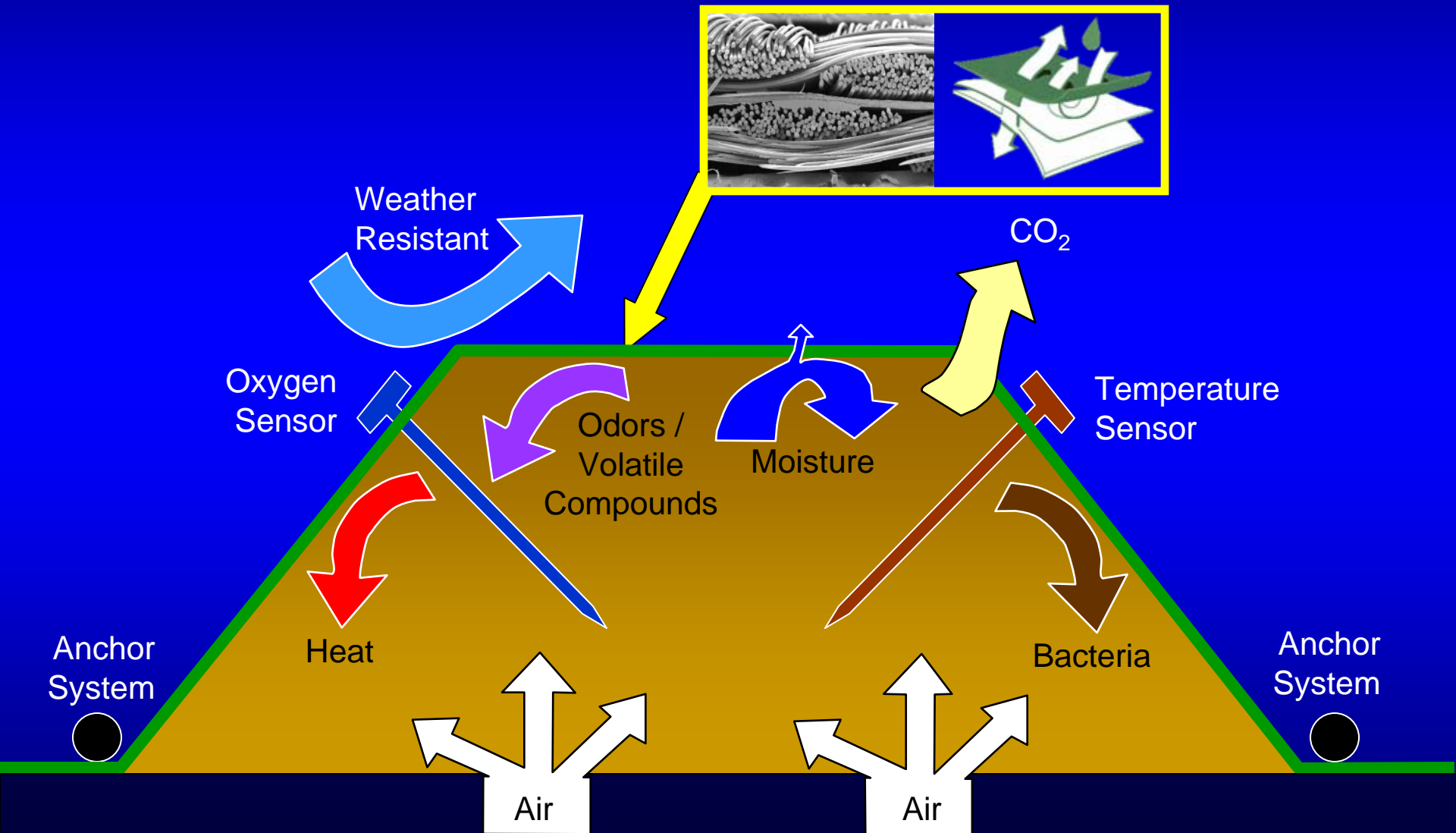
Bacteria

Anchor System

Anchor System

Air

Air



GORE COVER SYSTEM



OTHER GHG ISSUES

- Will the wastewater industry be regulated under CARB's AB32 Cap and Trade program?
- If not, will the wastewater industry be able to maximize offset generation?
 - Treatment under federal climate regulation
- Either direction could influence biosolid management in the future

CONCLUSION

- Biosolids management can not be based only on GHG considerations
- Real world issues such as available contracts and regulatory mandates will often become the overriding consideration
- There still remains uncertainty on how wastewater treatment will be treated in developing GHG programs