BIOSOLIDS MANAGEMENT

Will Management Change Under GHG Reduction Mandates?

Frank Caponi
PORS 2009
UC Davis

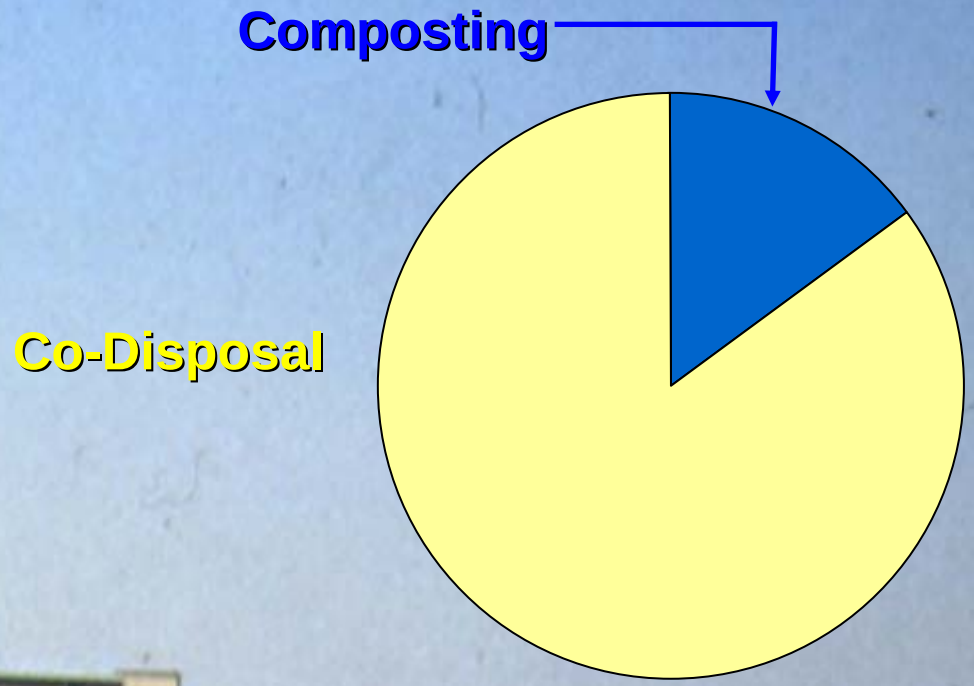
SANITATION DISTRICTS OF LOS ANGELES COUNTY

CONTEXT OF PRESENTATION

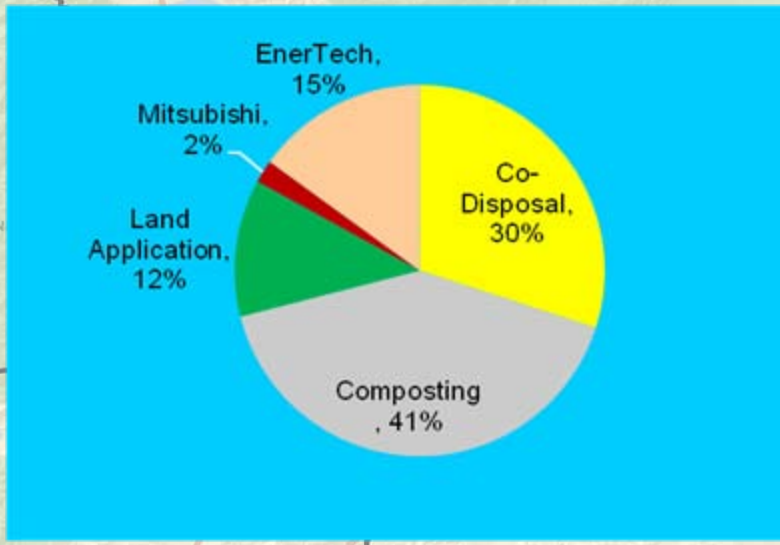
- Does GHG reduction currently play a role in our biosolids management programs?
- What types of evaluations/circumstances would we potentially use to move in that direction?
- Realities and barriers, barriers, barriers!!

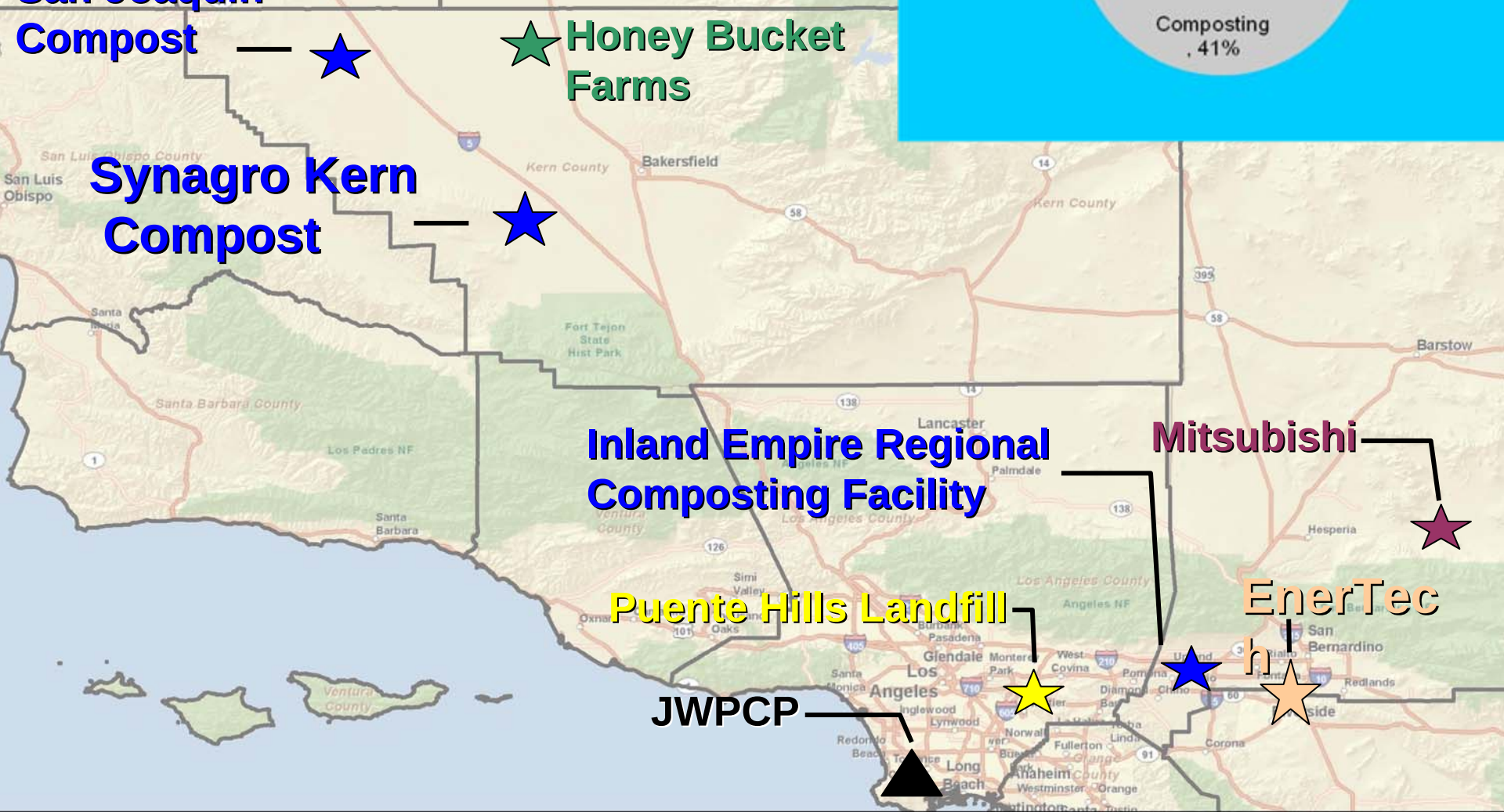
Wastewater Treatment Facilities Map

LACSD Pre-1990's Biosolids Management

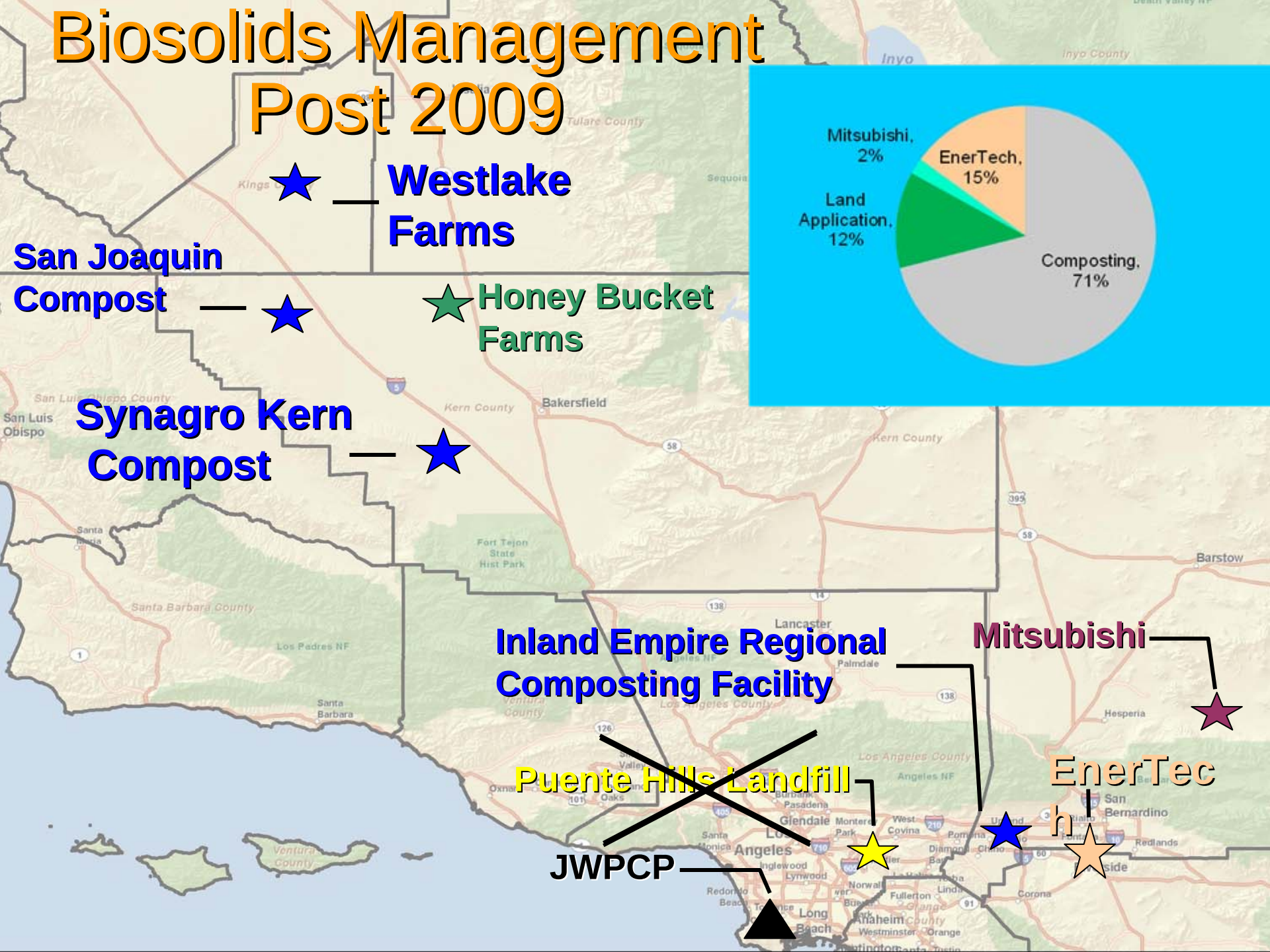


Biosolids Management Circa 2009





Biosolids Management Post 2009



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. IWM06075

California Environmental Protection Agency

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

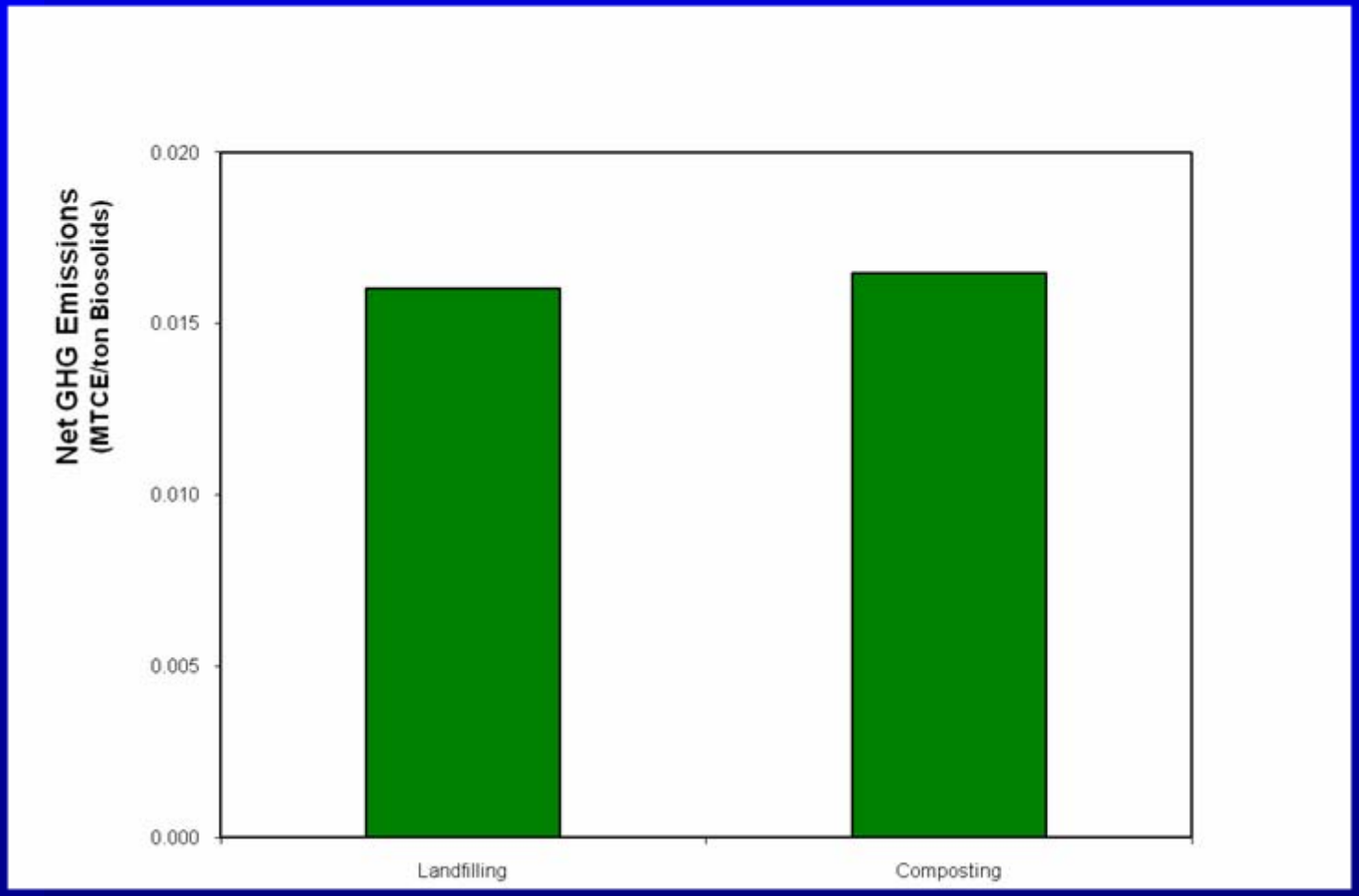
Net GHG Reductions (%C relative to initial weight)

Model	Location	ADC	Composting
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***

SANITATION DISTRICTS OF LOS ANGELES COUNTY

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



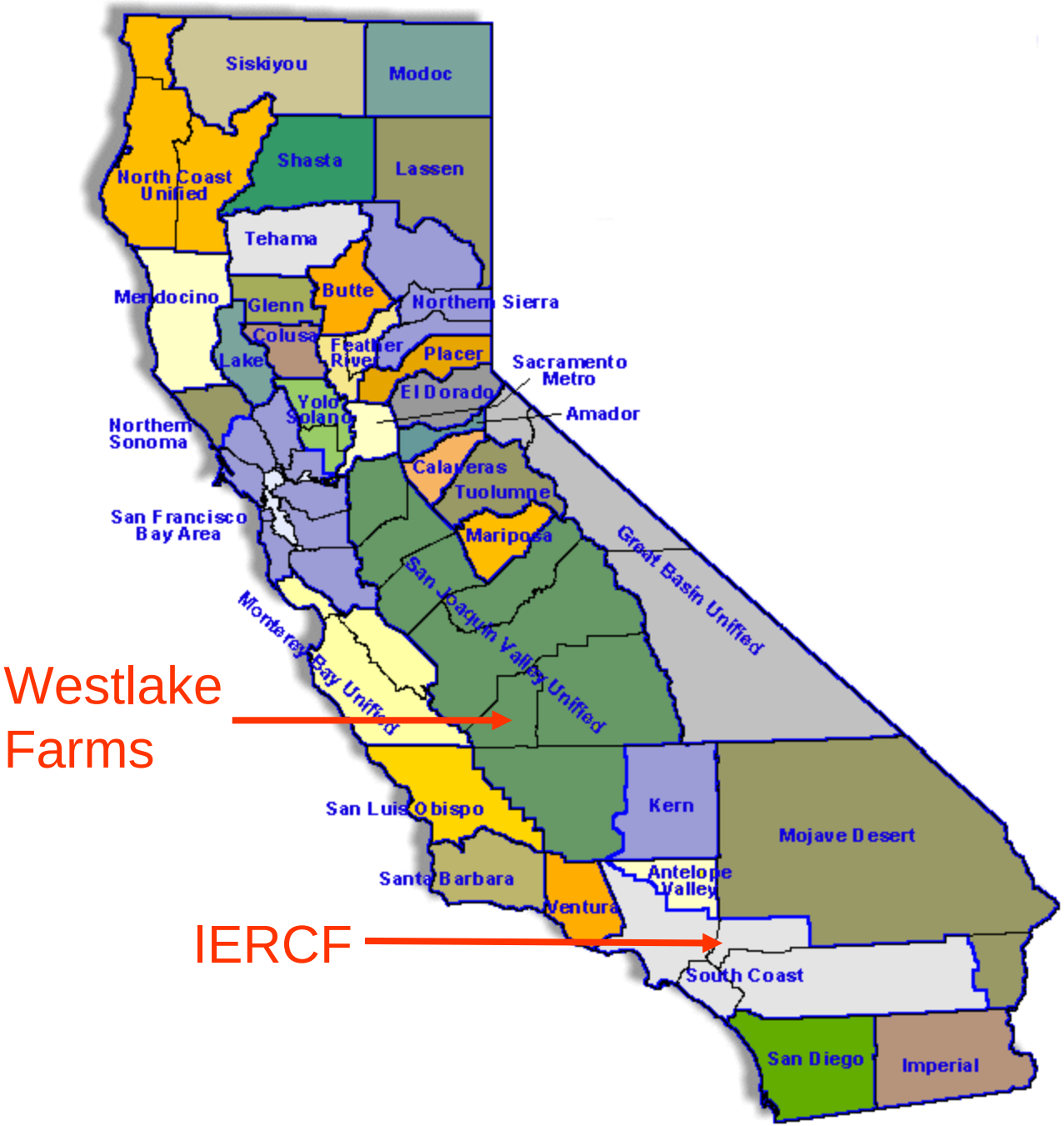
SENSITIVITIES IN LCA

- 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

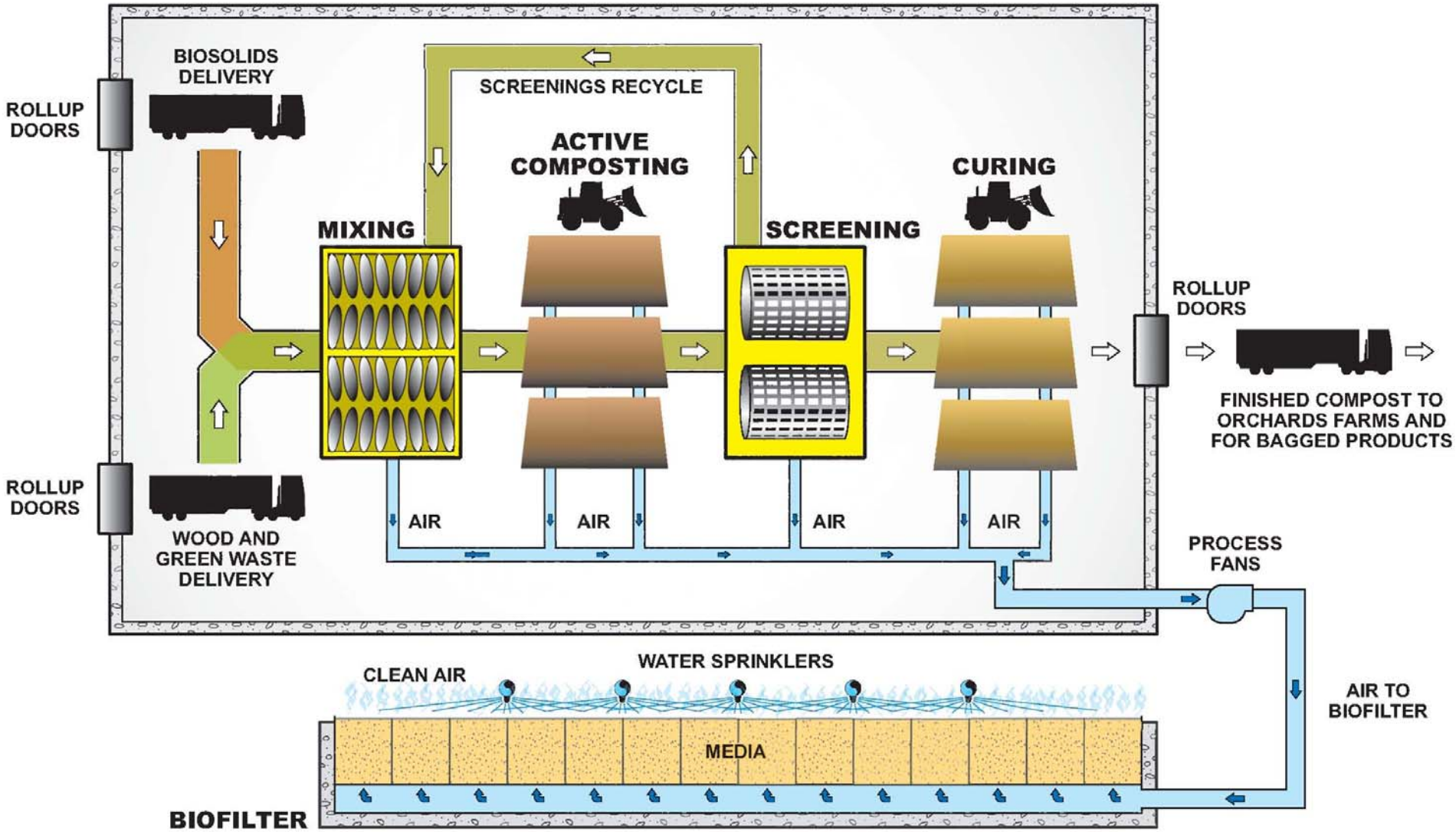


Westlake Farms

IERCF

SCAQMD Rule 1133.2

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


BIOSOLIDS DELIVERY
ROLLUP DOORS
SCREENINGS RECYCLE
ACTIVE COMPOSTING
CURING
MIXING
SCREENING
ROLLUP DOORS
FINISHED COMPOST TO ORCHARDS FARMS AND FOR BAGGED PRODUCTS
ROLLUP DOORS
AIR
AIR
AIR
AIR
WOOD AND GREEN WASTE DELIVERY
PROCESS FANS
WATER SPRINKLERS
CLEAN AIR
AIR TO BIOFILTER
MEDIA
BIOFILTER

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

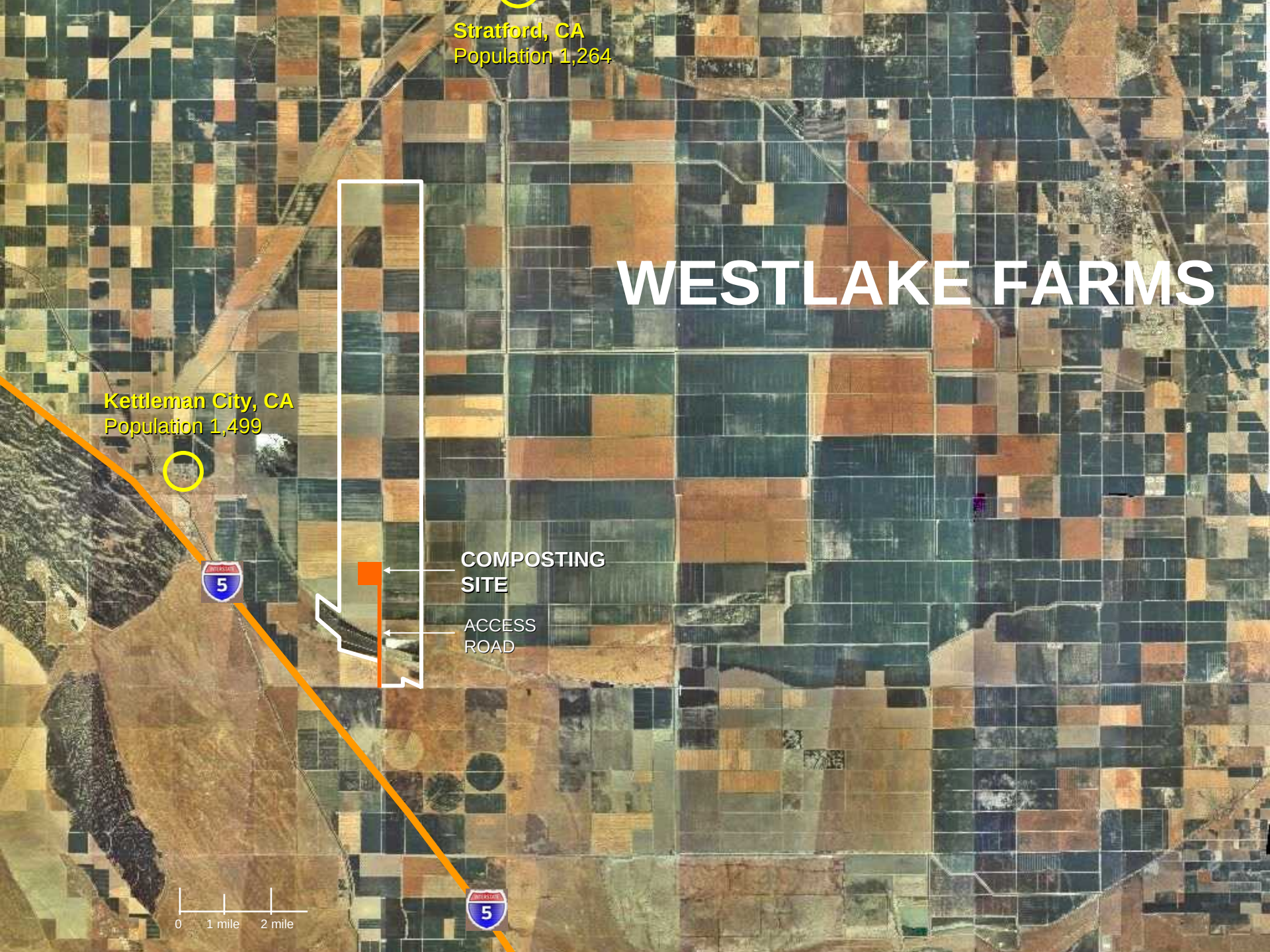
* Over 20 different Permits/Approvals

IERCA EMISSIONS LIMITS

- VOC = 8.4 TPY
  = 95.5% control from Rule 1133.2 baseline of 1.78 lb/ton throughput
- NH_3 = 10 TPY
  = 96.6% control from Rule 1133.2 baseline of 2.93 lb/ton throughput
- Biolfilter 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

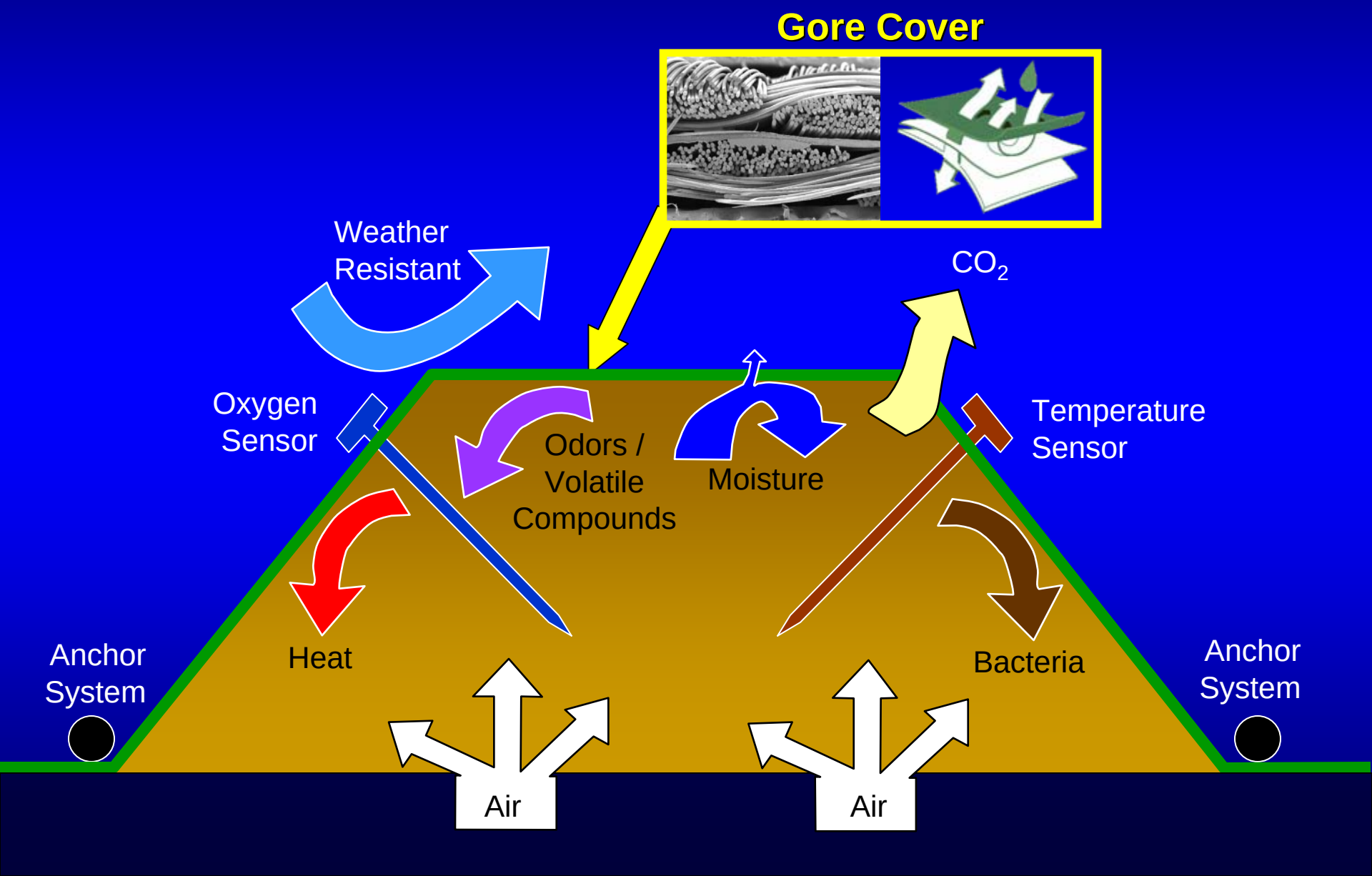
SJVAPCD Rule 4565

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


Stratford, CA
Population 1,264
WESTLAKE FARMS
Kettleman City, CA
Population 1,499
COMPOSTING SITE
ACCESS ROAD
5
5
0
1 mile
2 mile

FABRIC COVERS

Gore™ Cover System



GORE COVER SYSTEM

OTHER GHG ISSUES

- Will the wastewater industry by 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