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Composting, Air Emissions & the Environment

Green Momentum

Great Valley Center

May 7, 2008

Sacramento, CA

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www.ciwmb.ca.gov

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This Presentation

1. History, law and compliance efforts
2. Benefits of compost
3. Threats to the compost industry
4. CIWMB projects and goals
5. Statewide GHG planning

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A brief history of composting

…composting WAS "conventional agriculture"

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Integrated Waste Management Act

- Enacted in 1990; AKA AB 939
- All cities and counties must reduce solid waste sent to landfills by 25% in 1995, 50% in 2000 and after.
- Created waste management hierarchy
- Still the law in California

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The Heirarchy

CA Public Resources Code Section 40051

State and local government SHALL… promote the following waste management practices in order of priority:

(1) Source reduction.

(2) Recycling and *composting*.

(3) Environmentally safe transformation and environmentally safe land disposal…

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Local governments respond

- 368 curbside residential greenwaste recycling programs in California
- Nearly 3 mil. tons collected in 2006
- 209 jurisdictions pick up greenwaste from businesses, 161 from government properties, 96 from schools

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Massive public investment

Impact on diversion rates

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	2006 Est. Diversion Rate	Est. Div. Rate without composting
Bakersfield	47	35
Clovis	59	48
CWMA	50	43
Fresno City	55	45
Kerman	54	44
Modesto	38	21
Sanger	52	27

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Collection models vary

- Bakersfield, Modesto, Merced operate municipal composting sites
- Tulare, Kings, Fresno, Sacramento send green waste to privately-run facilities
- Stockton sends some to Modesto
- LA exports to Bakersfield area
- Bay Area sends to Solano & Stanislaus

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Compost systems

- **Open windrow:** all greenwaste composters in CA do this
- **Aerated Static Pile (ASP):** now in use to compost biosolids
- **Hybrids:** tarps and tubes and other new devices

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California's agricultural heartland has evolved into fertile ground for large-scale composting operations which serve nearby cities, farms and orchards.

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Marginal economics

- Compost facility tipping fees $7-35/ton
- End product sells for $5-12 ton
- Valley landfill tip fees as low as $20 ton; even lower for ADC
- Material handling costs higher for composters than for landfills
- Compost permitting costs going up

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Critical to sustainable agriculture

- Important outlet for farming and food processing by-products
- Displaces ag burning
- Reduces water use and pumping
- Improves soil tilth, biology
- Foundation of organic production
- Supplant use of synthetic N fertilizers and pesticides with high embodied energy

Increasing compost use…

…may decrease use of less sustainable methods.

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New Regulations

San Joaquin Valley Unified APCD rules

- **4565 (2007): biosolids & manure**
- **4566 (2009?): green material compost**

South Coast AQMD rules

- **1133 (2003): chippers, "co-compost"**
- **Green materials compost by 2010?**

State and Regional water board rules

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Why worry about compost emissions?

- Composting emits some Volatile Organic Compounds (VOCs)
- Some VOCs react with NOx and sunlight to create ground-level ozone
- Ground-level zone is a criteria pollutant under the federal Clean Air Act
- Local air districts must reduce criteria pollutants or face federal penalties
- Ground-level ozone harms human health

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Emissions Measurement Gear

USEPA Surface Isolation Flux Chamber assembly

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What are VOCs?

- Includes hundreds of compounds
- Some harmful, some not
- Up to 10x higher indoors than out
- Emitted by paint & varnish, cleaners & solvents, glues, photos & crafts, building materials, electronics & pesticides
- Relationship to ozone varies
- NOx reductions more important?

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How many VOCs can you count here?

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CIWMB Emissions Study

City of Modesto Compost Facility

Two main goals

- Measure emissions for the life-cycle of greenwaste and food waste compost windrows
- Test efficacy of two potential emissions-reducing practices (BMPs)

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Emissions-Reducing BMPs

- Additives: one feeds microbes; others forms crust on windrow
  - Cost: $1.50 per ton
- Pseudo-biofilter: Cover “active” windrows with 4”-6” layer of finished compost (2 re-applications)
  - Cost: 60 cents per ton

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Putting on the “pseudo-biofilter” compost cap

Sampling strategy

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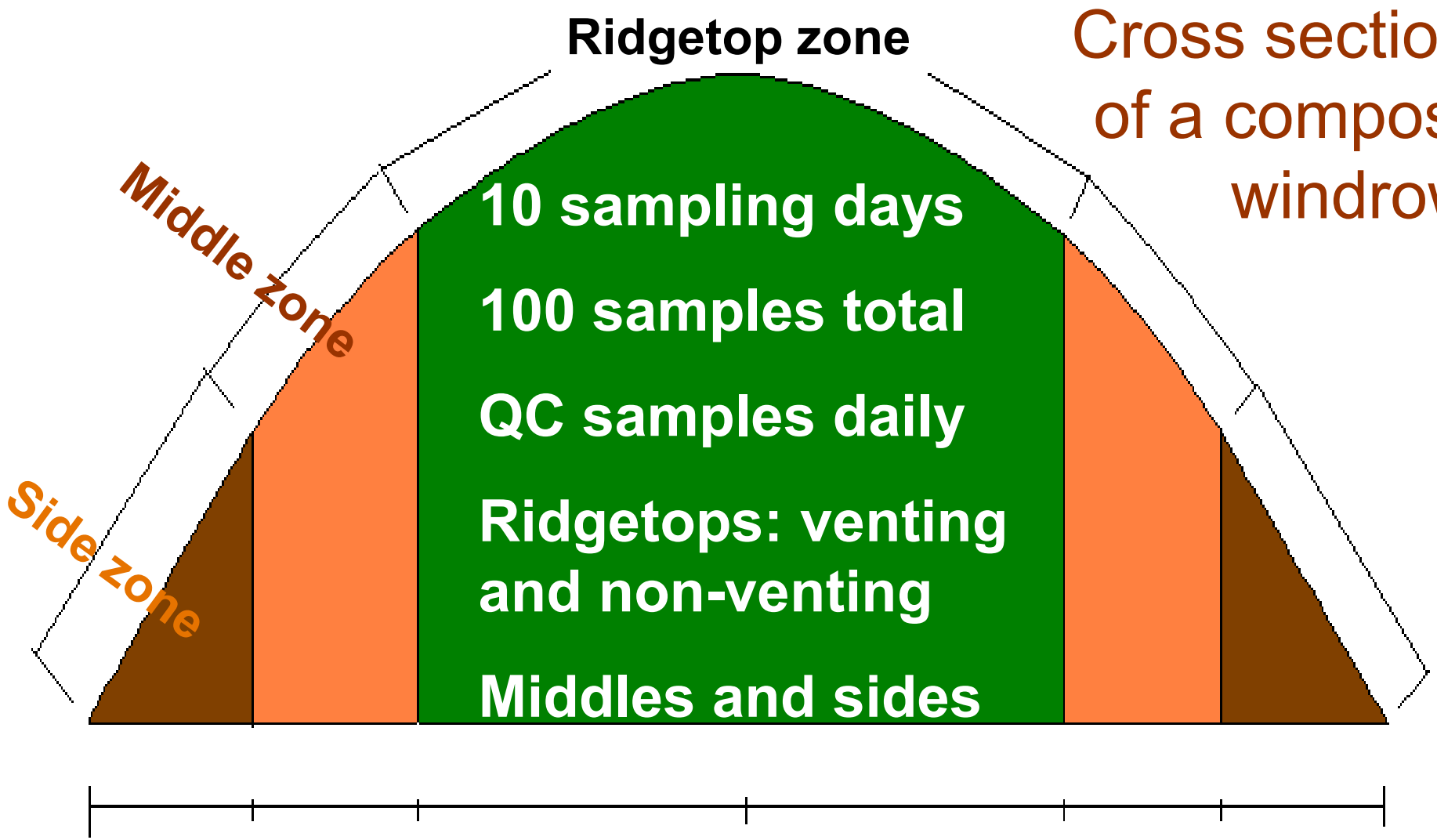

Cross section of a compost windrow

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Samples taken before and after a turning event.

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Modesto study conclusions

- 70-80% of VOCs emitted during first 2 weeks.
- 70-85% of VOC emissions vent through ridgetop.
- “Pseudo-biofilter” compost cap reduced VOC emissions up to 75% for first two weeks.
- Additives reduced VOC emissions 42% for first week but only 14% for first two weeks.
- 15% food waste roughly doubled VOC emissions compared to greenwaste.

Emissions likely lower than previously thought

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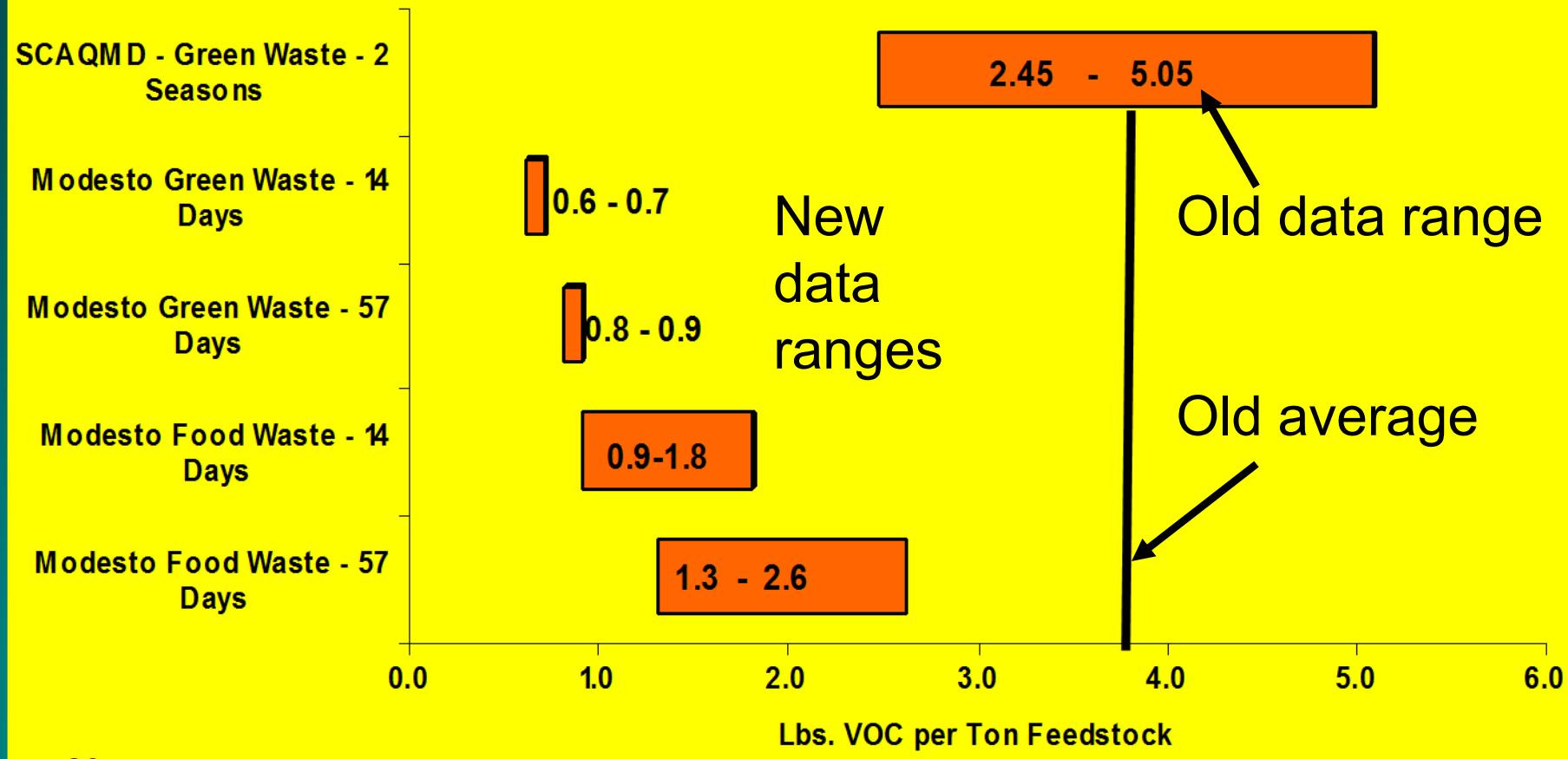

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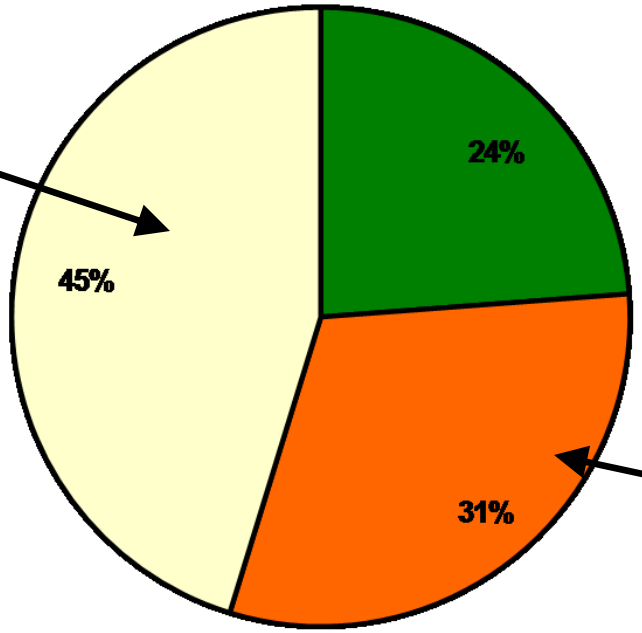
CIWMB Strategic Directive 6.1

Reduce organics sent to the landfill by 50% by 2020

Materials still going to California landfills



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Compost & Climate change

- AB 32: reduce GHG 25% by 2020; adopt plan by Jan. 1, 2009
- Composting can reduce methane emissions from landfills and N20 emissions from agriculture
- Methane 21x worse than CO2
- N20 296 x worse than CO2

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ETAAC Recommendations

- Remove barriers to composting
  - "Composting offers an environmentally superior alternative to landfilling these same organics"
- Reduce agricultural emissions through composting
  - "Compost has been proven to reduce the demand for irrigation, fertilizers and pesticides, while increasing crop yields…"

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Organics Life Cycle Analysis

- Newest CIWMB-funded effort
- Big-picture accounting for major organic diversion strategies
- Quantify benefits and debits of composting
- Critical to AB 32 efforts
- Final report early 2009

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Where do we go from here?

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Download the study

"Emissions Testing of Volatile Organic Compounds from Greenwaste Composting at the Modesto Compost Facility in the San Joaquin Valley"

http://www.ciwmb.ca.gov/publications/organics/44207009.pdf

***AND*, see the article in this month's issue of BioCycle magazine.**

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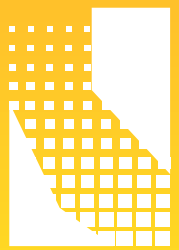

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