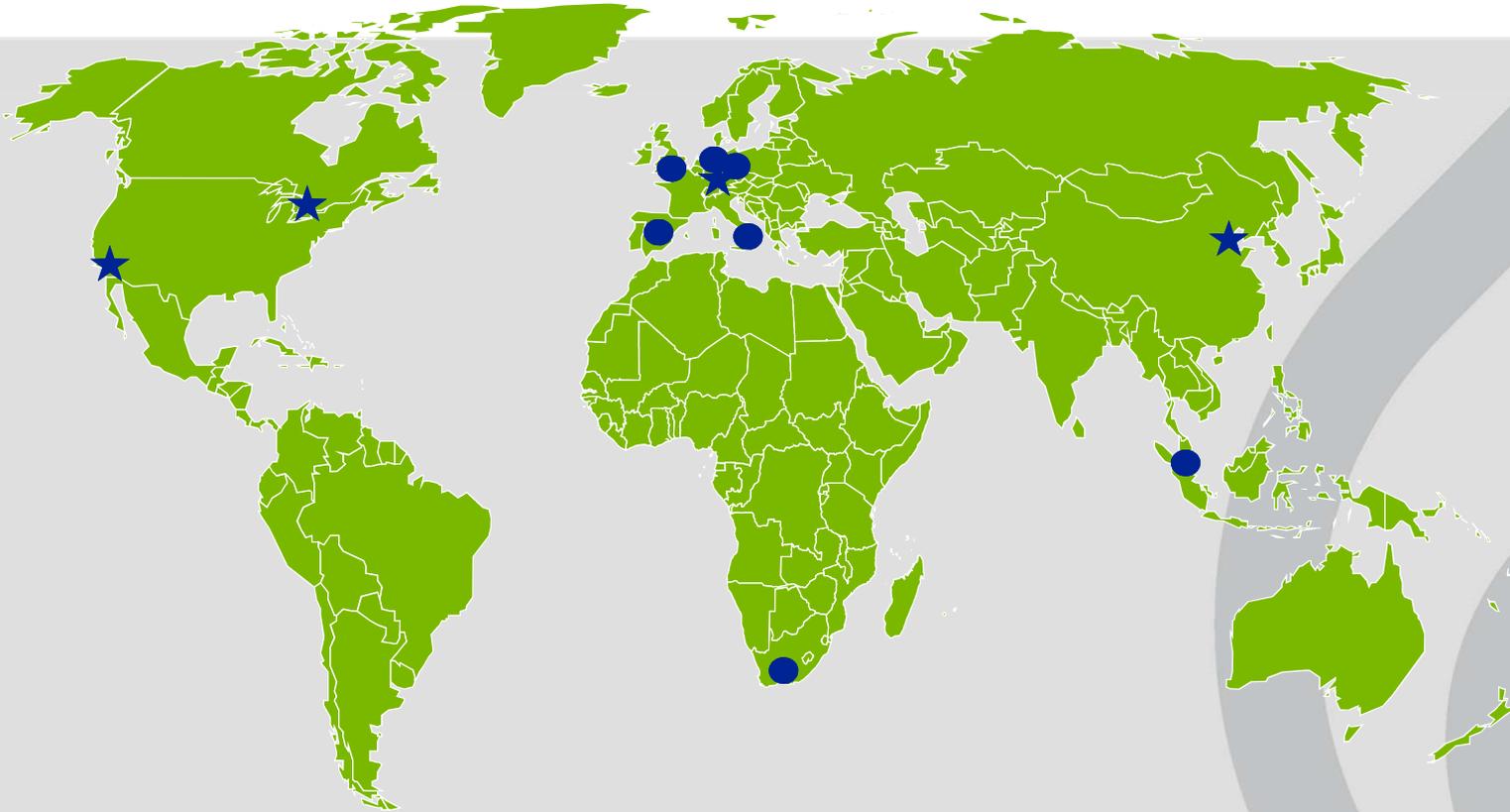




# *Mixed Waste Organics Extraction and Integrated Organics Management*

Los Angeles County  
March 17, 2016

# Anaergia's Global Footprint



**1,600 Projects, 380 MW, 12 Facilities, 29 Patents, 20 Years**



# The Anaergia Vision



Wastewater  
Biosolids



Source  
Separated  
Organics



Municipal  
Solid Waste



Food Processing  
Waste



Agricultural  
Waste



**Integrated  
Organics  
Solutions**



Renewable  
Power



Renewable  
Gas



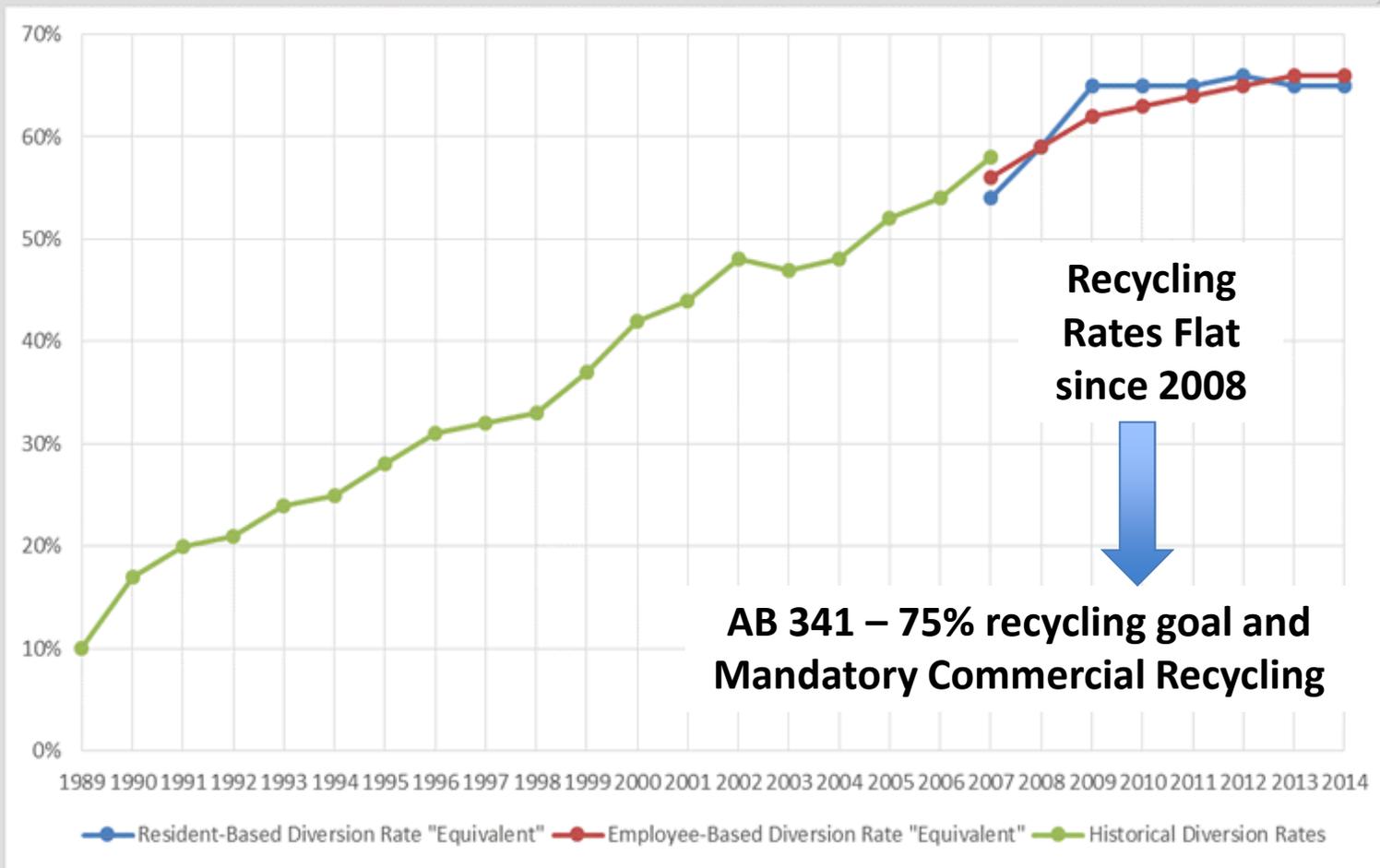
Organic  
Fertilizer



Clean  
Water

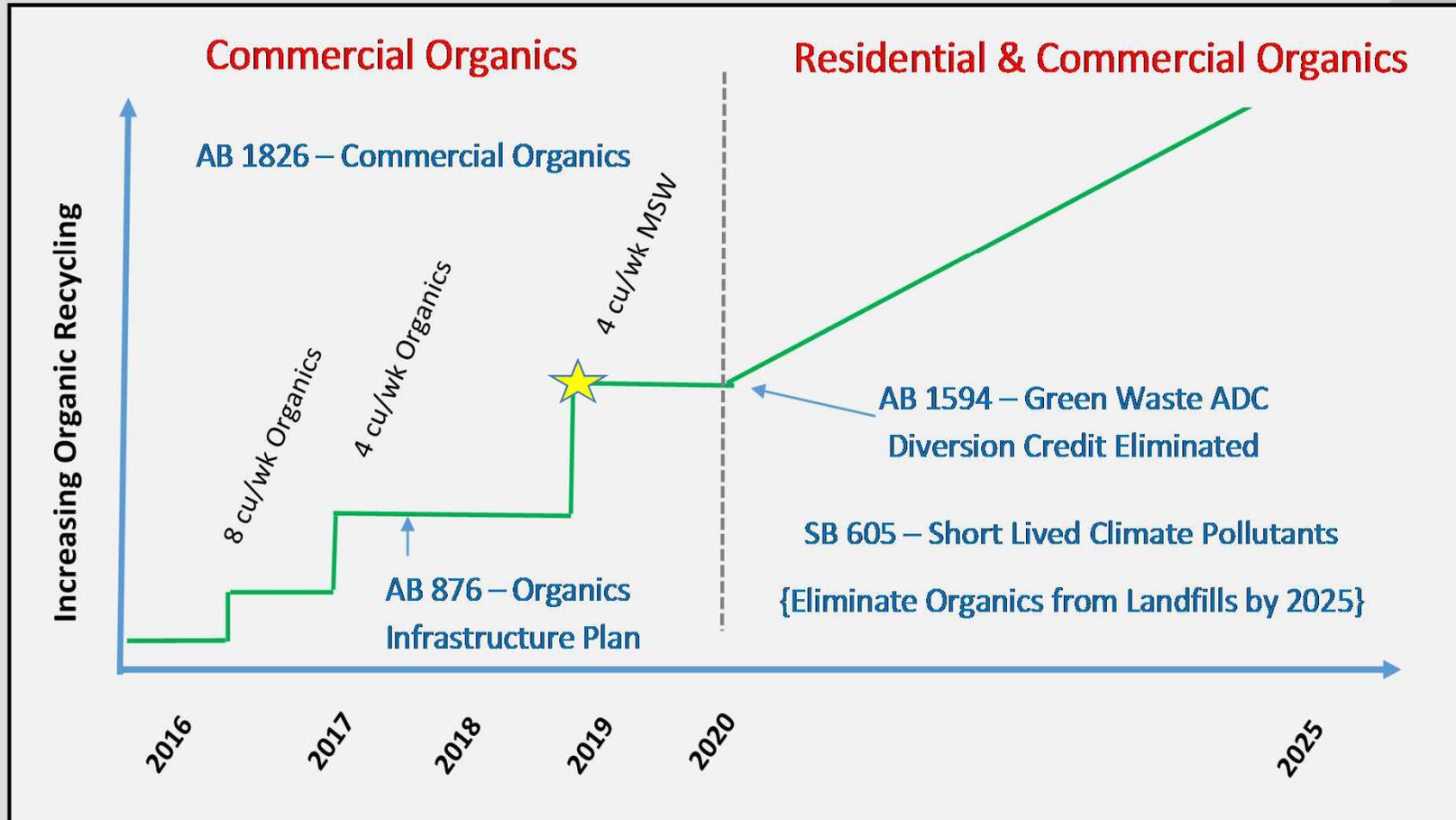


# AB 939 – California Leading the Way in Recycling



# California Organics Regulations

## Everything is driven by Climate Change



By 2019 – Organics Recycling will require a mixed waste processing solution. SSO becomes uneconomical

# Difficulties in Achieving High Organics Recycling Rates

## “Communities Struggle to Enact Residential Food Waste Collection Programs”<sup>1</sup>

- Low Participation & Capture Rates
- High Cost – compostable bags, collection
- High Contamination – up to 25%
- Difficult to implement in commercial and multifamily sector



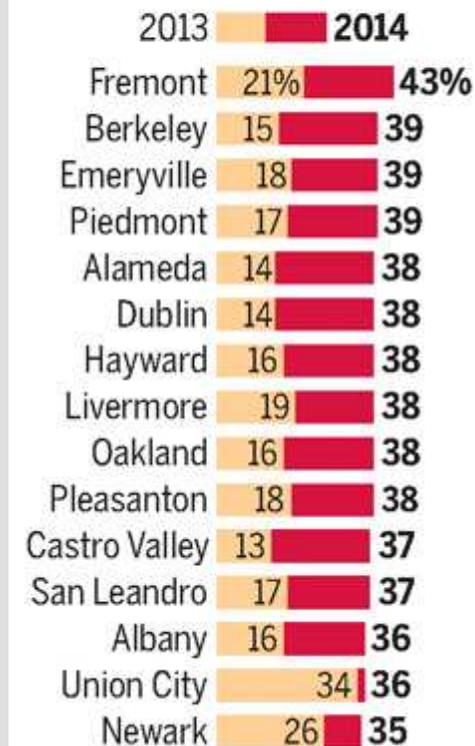
# SSO Programs Challenged to meet Climate Change Goals

- Alameda County has instituted residential food waste programs since 2008.
- Alarming dip in participation shows fatigue in participation.
- Regardless, still has a tremendous amount of food waste in disposal



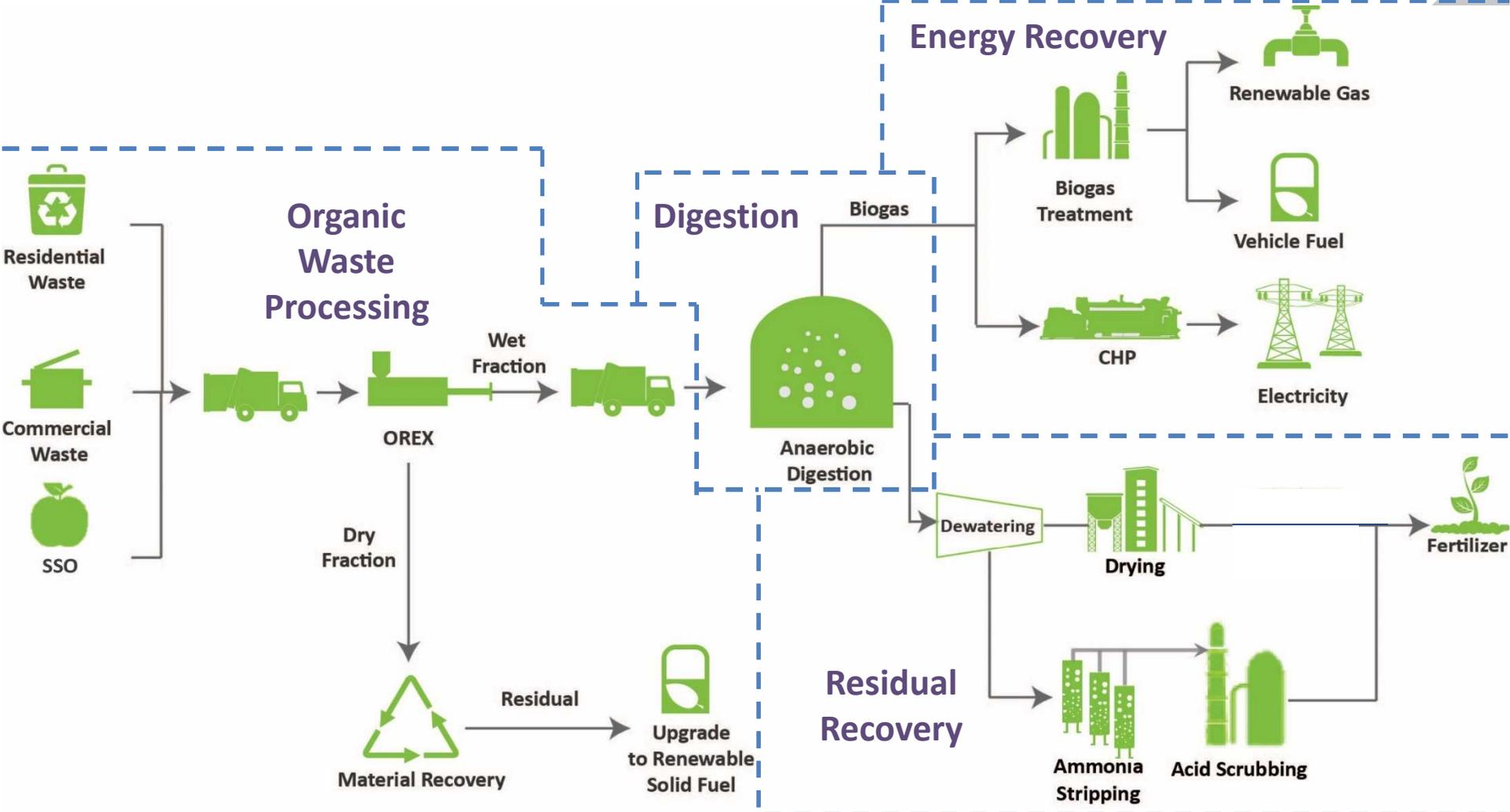
## Trash separation dips

Percentage of trash that is food scraps inside Alameda County residential garbage cans, instead of green waste bins:



Source: StopWaste  
BAY AREA NEWS GROUP

# Integrated Organics Solutions



# Organic Waste Processing (OREX)

*Generation 1*



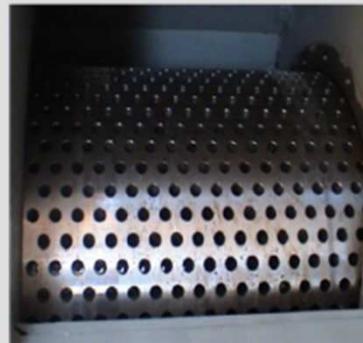
**Kaiserslautern, Germany**



*Generation 2*



**Ventspils, Latvia**



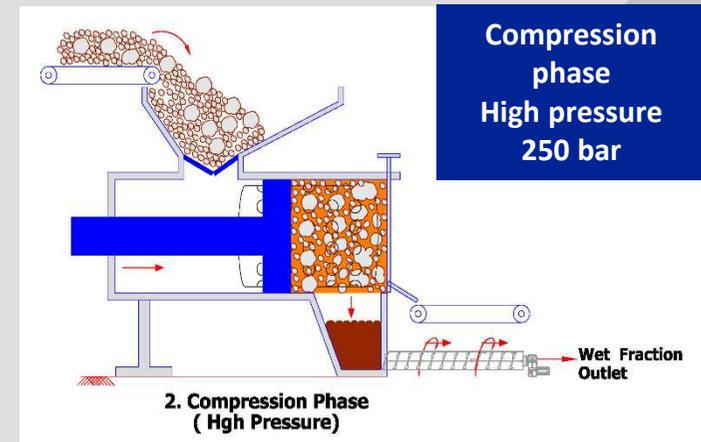
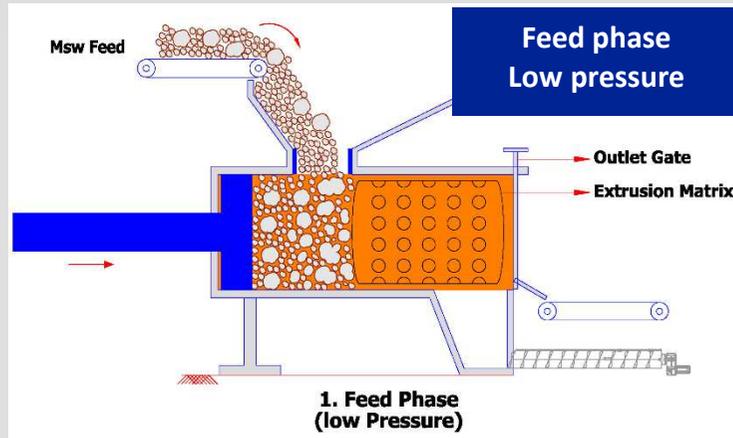
*Generation 3*



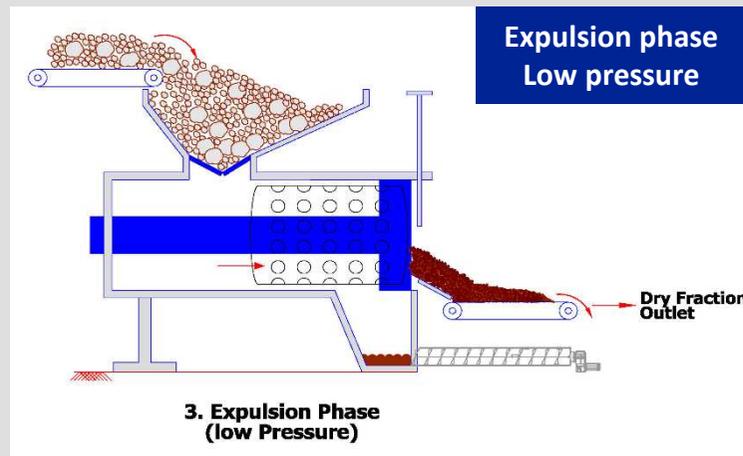
**OREX 500 Gescher, Germany**



# OREX Operating Principal



90%+  
putrescible  
organics  
recovery



- 18 to 22 second cycle time.
- Continuous operation.

# OREX Commercial Operating Units

Description of experience/ reference	Country	Capacity	Year
Sorting and treatment of mixed MSW	Kaiserslautern (Germany )	50,000 t/a	2006
Sorting and treatment of mixed MSW	Alessandria (Italy)	100,000 t/a	2007
Treatment of separately collected bio-waste	Castelceriolo (Italy)	25,000 t/a	2008
Treatment of separately collected bio-waste	Viareggio (Italy)	20,000 t/a	2008
Sorting and treatment of mixed MSW / industrial waste	Premier Waste (UK)	100,000 t/a	2008
Treatment of mixed MSW, RDF production	VamWijster (Netherland)	200,000 t/a	last changes 2009
Vagron (MBT) anaerobic digestion of organic fraction from MSW	Groningen (Netherland)	100,000 t/a	last changes 2009



**1<sup>st</sup> OREX Line in North America installed in San Francisco**

**Anaergia**

# OREX Processing Line



Bag Opening  
(not shredding)



Course Screen



OREX

- Reduces Collection Cost vs SSO Collection w/Wet/Dry Routing
- Achieves Maximum Organics Recovery
- Complements Dry/MF Commercial Recycling Line
- Organics Polishing System cleans Wet Fraction, ensuring beneficial use of digestate (ensures full value of diversion by exceeding CA compost regulations).

# Installation of First North America OREX



# Clean Digestate is a Marketable Resource

Dirty digestate is waste regardless of nutrient value

Conventional organics separation processes do not meet CalRecycle standards for land application



**Hammer Mill**  
(SSO Digestate Compost)



**Trommel Screen**  
(MSW Digestate Compost)

**ANAERGIA ORGANICS RECOVERY PRODUCES CLEAN DIGESTATE**



# OREX Flexible to Any Level of Contamination



Wet Fraction from MSW or WCW  
30-35% TS

**30 to 35% recovery from MSW**  
**50 to 70% recovery from WCW (wet commercial waste)**

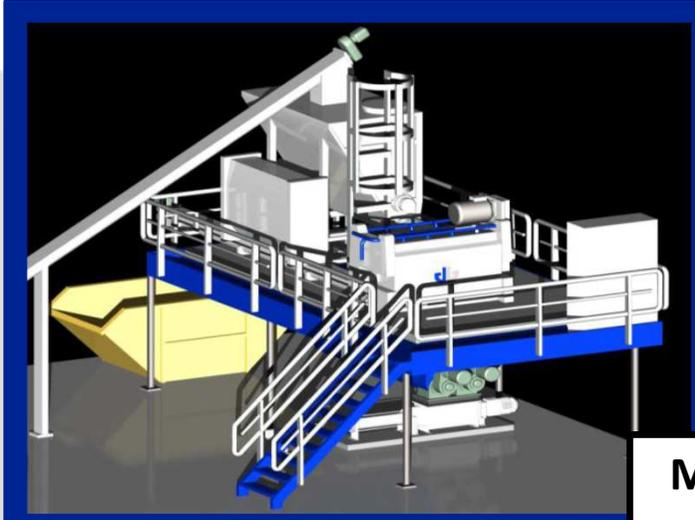
Wet Fraction from SSO  
20 – 25% TS

**70 to 95% recovery from SSO**



# Organics Polishing System (OPS)

*Two stage plastic film and grit removal system*



Min. - 85%  
removal of  
plastic film  
and grit



# Mini OREX Testing in North America



OREX Test Press – Test Scale

- Anaergia tested at eight sites in North America
- 5 in CA and now at LACSD
- Complements *standard* waste characterization



Waste to be Sampled

# North America Testing Results

- New York City (*New Yorkers call it the “Garlic Press”*)
- General results of the tests indicate that with material fed in the < 6 to 8” range:
  - **Single Family Residential – 30 to 35% organics recovery**
  - **Multifamily Residential – 35 to 55% organics recovery**
  - **Wet Commercial Waste – 50 to 70% organics recovery**
  - **Source Separated Organics – 70 to 95% organics recovery**
- <2% physical contaminants > 2mm and low metals content
- Highly digestible with VS/TS in the 85 to 92% range

# Dedicated Digestion - London



- **Dagenham, UK (London)**
- **Substrate:** Municipal Source Separated Organic Waste
- **Capacity:** 30,000 TPY
- **Energy Output:** 1.4 MWe, 2.8 MW Total

# High Solids Anaerobic Digestion is Capital Efficient

## Omnivore™ Retrofit Creates Capacity

### High solids retrofit:

1. High Solids Mixers
2. Recuperative- or Pre-thickening



- Increase capacity by 3x
  - HRT = 8-10 d
  - SRT = 24-30 d
- Low power
- Low polymer
- Customize capacity

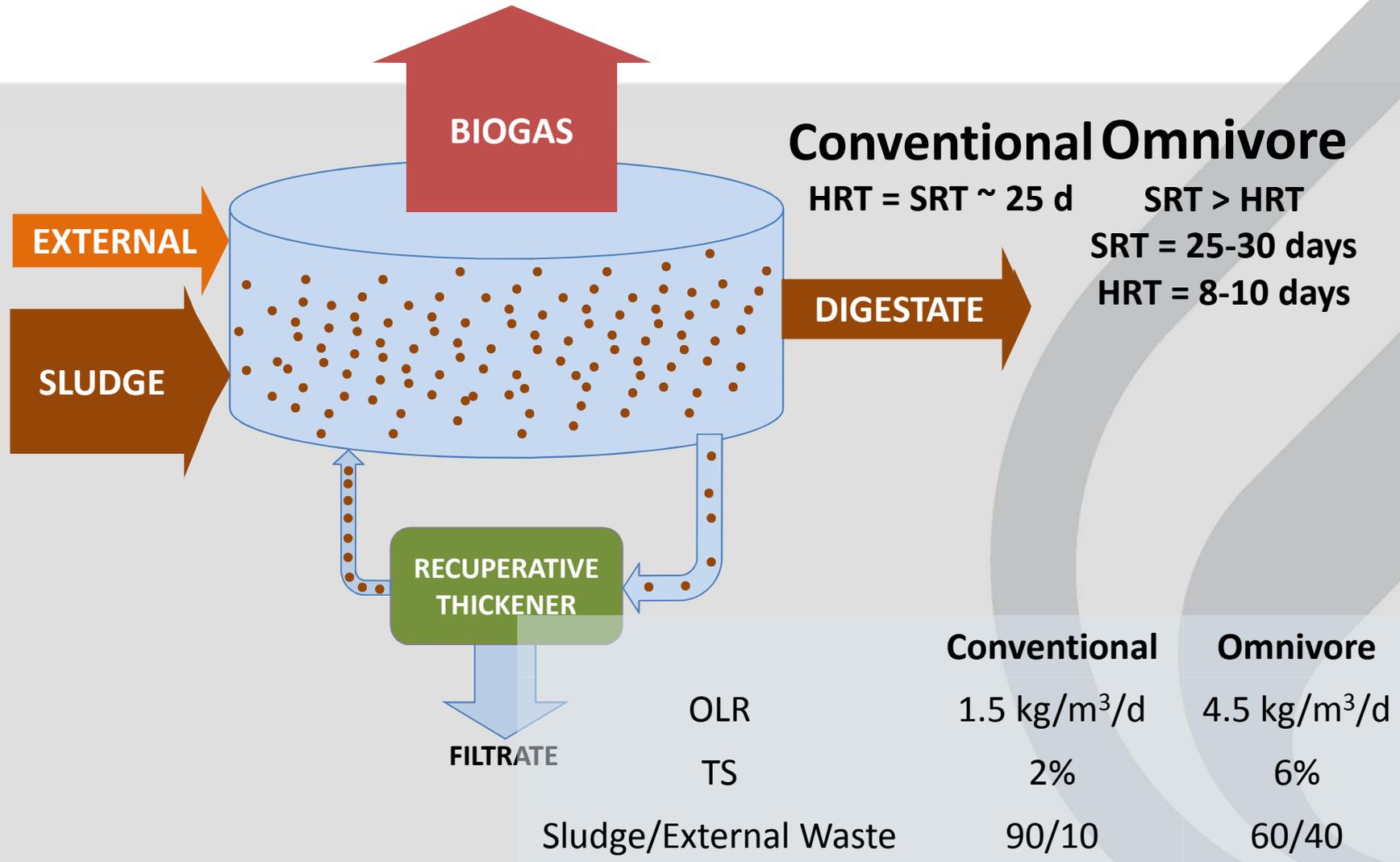


- Isolated service boxes for safe in-situ mixer adjustment
- Adjust position while operating



- High torque, constant torque mixers
- Intermittent operation for less power

# Omnivore Concentrates Biomass



# Utilizing WWTP Infrastructure – Omnivore 3X Capacity Increase at VVWRA



Omnivore Site Overview



High Strength Waste Receiving Station



Recuperative Thickener SST 225

# Anaheim Energy – 2017

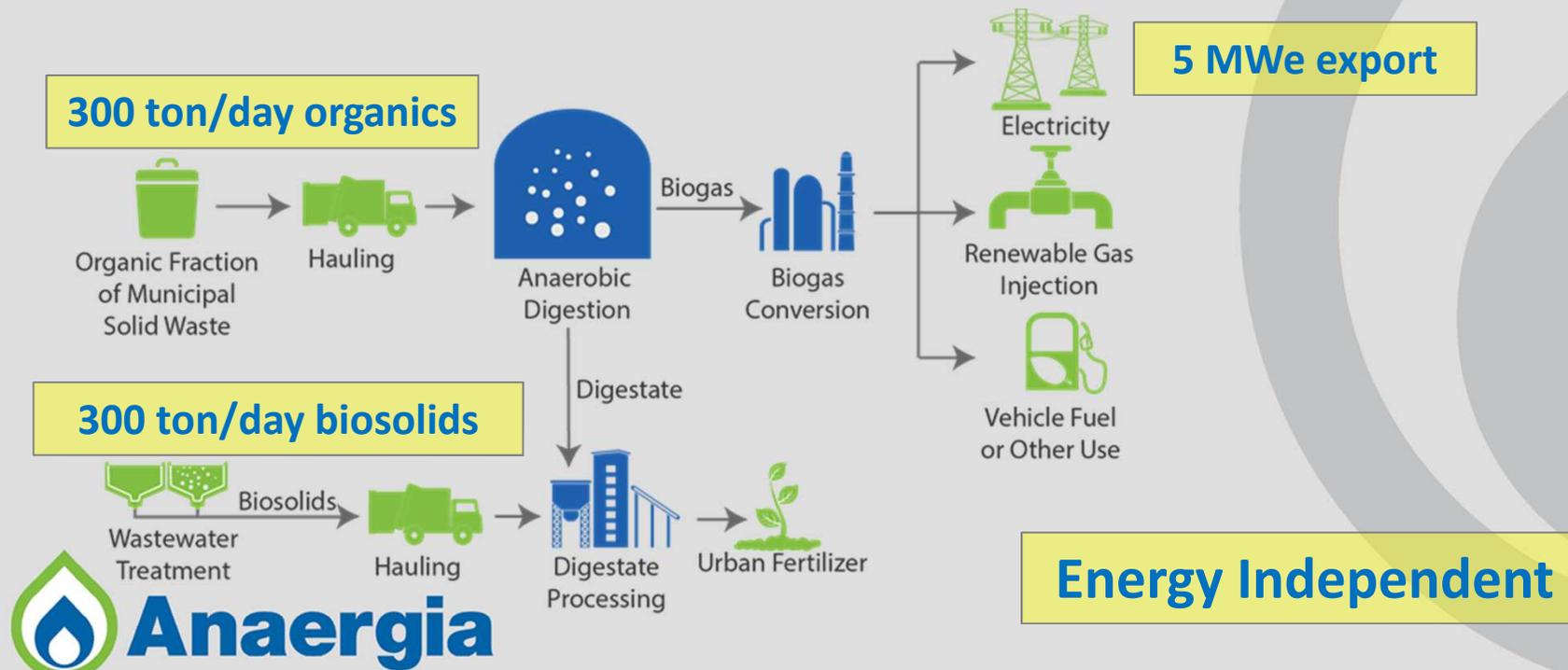
## *(Republic Services)*



- Phase I: 85,000 TPY wet fraction, Phase II: 170,000 TPY wet fraction
- 4 MW PPA with Anaheim Public Utilities
- Digester Site on < 2 acres



# Rialto BioEnergy Facility (Athens Services)



# Summary

- OREX Processing Lines offers a key technology for diverting organics from MSW – regardless of contamination. Maximum recovery/lowest collection cost.
- Preprocessing Organics is just one part of the puzzle of an **Integrated Organics Solution** – must consider digestion, and maximizing energy & residual recovery (contamination is biggest threat).
- Organic specific testing should be done to complement standard waste characterization.
- All technologies proposed are commercially proven at multiple facilities globally.

# Questions