



# Biosolids and Wastewater Sector Combat Climate Change: What Can We Learn From California?

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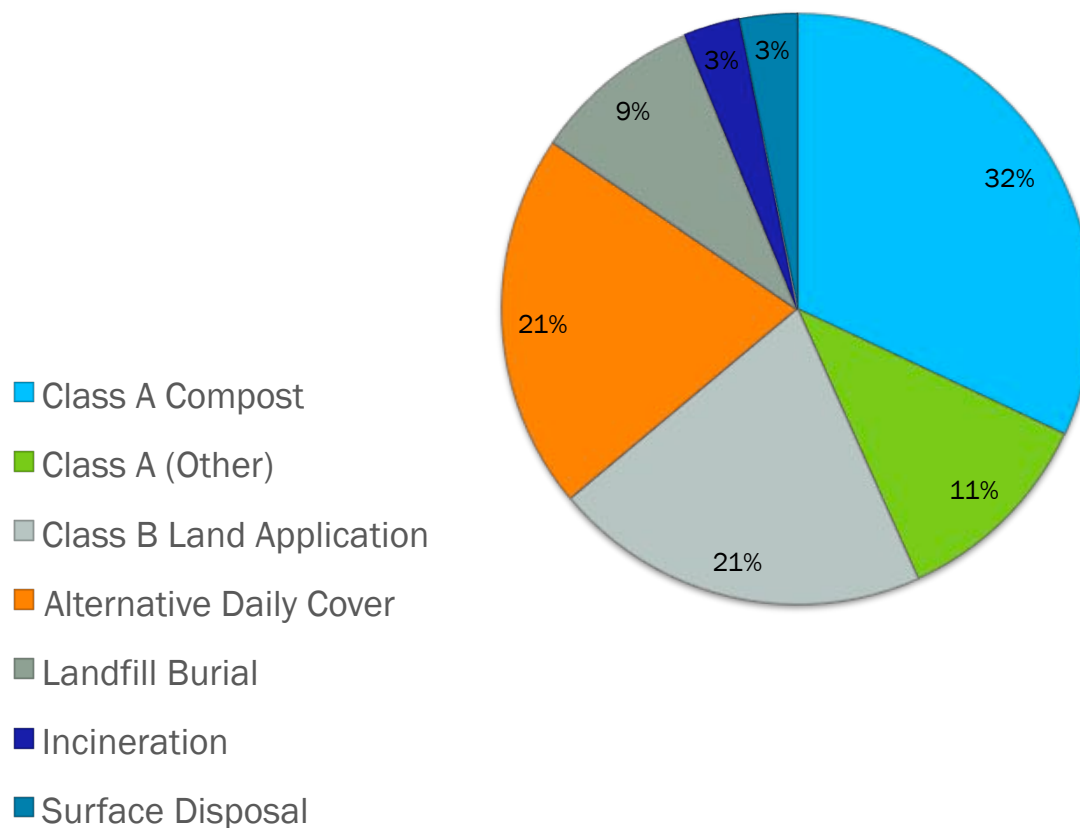
# Outline

- Background
  - How are California biosolids used?
  - Who regulates biosolids use?
- History of California biosolids programs
- Legislative drivers to mitigate climate change in California
- State focus on organics
- Biosolids as part of the solution



# Background

# California Biosolids Use, 2015



# California Statistics, 2015

- 665,000 dry metric tons generated
- 82% Beneficial Use
- 412,000 dmt (62%) Land Applied or Distributed
- 134,000 dmt (~20%) as ADC or Final Cover at Landfills
- 58,000 dmt (~9%) Landfill Disposal
- 20,000 dmt (3%) Surface Disposal (DLD)
- 20,000 dmt (3%) Incinerated



# How Are Biosolids Regulated?

## It's Complicated!

- **NPDES Permits** – Issued by Regional Water Boards, in collaboration with US EPA Region IX, State Water Board, and other agencies
- **US EPA Region IX** – Compliance (Retains Primacy)
- **State Water Board** – Biosolids land application General Order and site specific permits
- **Cal Recycle** – Responsible for Compost facilities and implementing landfill diversion goals
- **California Department of Food and Agriculture** – Monitors fertilizer and nutrient claims, licenses products, responsible for Healthy Soils Initiative
- **California Air Resources Board** – Responsible for statewide clean air emissions, including implementation of AB 32
- **Local Air Districts** – Potential for requirements on biosolids land application and/or composting, regulate incinerators and cogeneration units, receive reports on GHG emissions
- **County Ordinances** – Local regulation of biosolids

# History of California Biosolids Programs

# In the beginning...

- 1989 Integrated Waste Management Act – Set goal of 50% diversion by 2000
- California utilities heavily invested in low cost, Class B land application
- Northern California utilities also relied on landfill alternative daily cover (ADC) during wet season
- Biosolids helped achieve municipal landfill diversion goals – part of the solution!





# Late 1990s-Early 2000s: Paradise Lost

- Counties began passing ordinances in the late 1990s banning Class B and Class A land application
- Some counties instituted permitting processes = practical ban
- Many Southern California utilities shifted to Class B land application in Arizona
- City of LA leads lawsuit against Kern County's ordinance



# Shift Toward Proactive Mode

- CASA established a biosolids program manager to assist with statewide technical and outreach support
- Regional organizations began sharing resources and information
- Individual agencies developed outreach materials and spent time in “host” land application communities
- Regional investment in merchant facilities and development of new projects
  - Bay Area Biosolids to Energy
  - Enertech
  - Multiple regional compost facilities



**Results: Land application in California stabilized**

# Global Warming Solutions Act (2006)

- Reduce GHGs to 1990 levels by 2020
- Requires aggressive, multi-agency actions
- Air Resources Board (CARB) tasked with strategy to reduce emissions of short-lived climate pollutants
- CalRecycle tasked with reducing methane emissions from landfills
- Utilities emitting above 10,000 metric tons of carbon must report GHG emissions
- CARB and CalRecycle must coordinate on organics diversion

# State Mandates (Goals by 2020)

- **Achieve 1990 levels of CO2 emissions**
  - 40% below 1990 levels by 2030
  - 33% Renewable Energy (50% by 2030)
- **75% Recycling of Solid Waste**
- **10% reduction in carbon intensity of transportation fuel**
- **Reduce Short Lived Climate Pollutants**
  - 40% below 2013 methane emissions by 2030
  - 50% organics diversion below 2014 by 2020
  - (75% organics diversion below 2014 by 2025)
- **Healthy Soils Initiative**

# How do Biosolids Fit In?

## Biosolids as Organics

- Biosolids not included in current regulatory definition of “Organics” – but seems likely in the future
- Organics used as ADC may be phasing out by 2020 or 2025
  - Northern California utilities relying on landfill ADC need to plan for the future
  - Landfill ADC capacity already limited in Bay Area
- Short Lived Climate Pollutant Strategy
  - Currently draft
  - 75% elimination of organics from landfills by 2025 to reduce methane emissions

# How do Biosolids Fit In?

## Biosolids as Solution Provider

- Excess digestion capacity available at WWTPs
  - Help with diversion by codigestion of organics
  - Opportunities for tip fees
  - Opportunities to produce more biogenic renewable energy as electricity, heat, transportation fuel, RNG
  - Cap and trade funds available for GHG reducing projects
- Biosolids help build healthy soils and improve drought resistance – part of the solution under the Healthy Soils Initiative – Long term carbon sequestration and avoidance of fossil fuel intense inorganic fertilizer

# Short Lived Climate Pollutants

- Policy paper identifies wastewater sector as part of the solution – not the problem
- CASA estimates POTWs could accept at least 75% of food waste currently landfilled
- Funding incentives and policy support is essential
- Working with all regulatory agencies and Governor's office
- Legislation now requires 75% organics diversion by 2025

# Cap-and-Trade Funding to Date

ARB Website as of Sept 22<sup>nd</sup>\*

- Transportation
  - ARB - Low Carbon Transportation (\$325M)
  - Caltrans - Low Carbon Transit Operations Program (\$145M)
- Clean Energy and Energy Efficiency Funding
  - CDFA - State Water Efficiency & Enhancement Program (\$75M)
  - DWR – Water-Energy Efficiency (\$70M)
- Natural Resources and Waste Diversion Funding
  - DFFP –  
Urban Forestry, Forest Health Restoration, & Reforestation (\$42M)
  - CalRecycle – Waste Diversion (\$31M)

\*Only showing sources available to POTWs



# Adopted Allocation of Cap-and-Trade Funds FY 2016/17 (per AB 1613)\*

- Transportation
  - ARB - Low Carbon Transportation (\$150M)
- Natural Resources and Waste Diversion Funding
  - CNRA – Urban Greening Programs (\$80M)
  - DFFP – Urban Forestry, Forest Health Restoration, & Reforestation (\$40M)
  - CalRecycle – Waste Diversion (\$40M)
- General Agricultural Activities (CDFA)
  - Methane Reduction (SB 1383 – SLCP reduction) (\$50M)
  - Healthy Soils Program (\$7.5M)
  - State Water Efficiency & Enhancement Program (\$7.5M)

\*Only showing sources available to POTWs

# Where Else Can Biosolids Benefit the Environment?

# Superfund Mine Reclamation

- Tremendous opportunity to recycle biosolids – turning moonscapes into habitats
- USEPA strongly supports!
- Mine reclamation near Prescott, AZ using CA biosolids compost in 2013 – great success!
- Working to expand the practice



# Reclamation of Fire Ravaged Land

- Very effective in reclaiming land
- Revitalize the soil with organic matter, increased water holding capacity, and biodiversity of biomass
- Reduce erosion, improve water quality, & reduce severity potential of future fires
- Standing research team from CA and elsewhere
- Seeking funding through WE&RF TCR Effort



# Brownfields Site Remediation

- Brownfields are often contaminated with lead, arsenic, cadmium, etc.
- Biosolids very effective at mitigating contamination
- Dr. Basta (Ohio State) has been working with DTSC – new approved method for determining bioavailability of arsenic
- Strong support to reclaim As contaminated sites with biosolids





# Case Studies



# Los Angeles County Sanitation District

- Guiding principles:
  - Reliable outlets for large quantities of biosolids
  - Interest in novel technologies
  - Interest in “controlling their own destiny”
- Owns and operates landfills, chose to develop composting capacity within region
- Uses a diverse portfolio of land application sites, private and agency owned compost, and landfills to manage biosolids
- Experiments in innovative technologies (e.g. pyrolysis)
- First in region to begin accepting source separated organics; conducting research on impacts to biosolids program



299 MGD treatment plant, generates  
119,000 dry metric tons annually

# Central Marin Sanitation Agency

- Located north of San Francisco
- Serves approximately 120,000 people and San Quentin Prison
- Wide range of influent flows: 7MGD (ADWF) to 116 MGD (PWWF)
- Large excess digestion capacity (hydraulic detention time ~35 days)
- Opted to accept FOG (~15,000 gpd, 6 days a week) starting in 2013 and food waste in 2014
- Codigestion program has nearly doubled biogas production, doubling cogen runtime on biogas



9 MGD treatment plant, generates 1,400 dry metric tons annually



# CMSA Food Waste Program Quality Control

- First line of defense: **the source**
  - Extensive generator outreach
  - Staff training and monitoring
  - Worked with generators to create labeled and external collection containers
- Second line of defense: **Contamination Removal**
  - Haulers remove contaminants prior to arrival at the WWTP
    - When tipping into truck
    - After emptying contents on tipping floor
  - Further pretreatment at the WWTP – drum screen paddle finisher



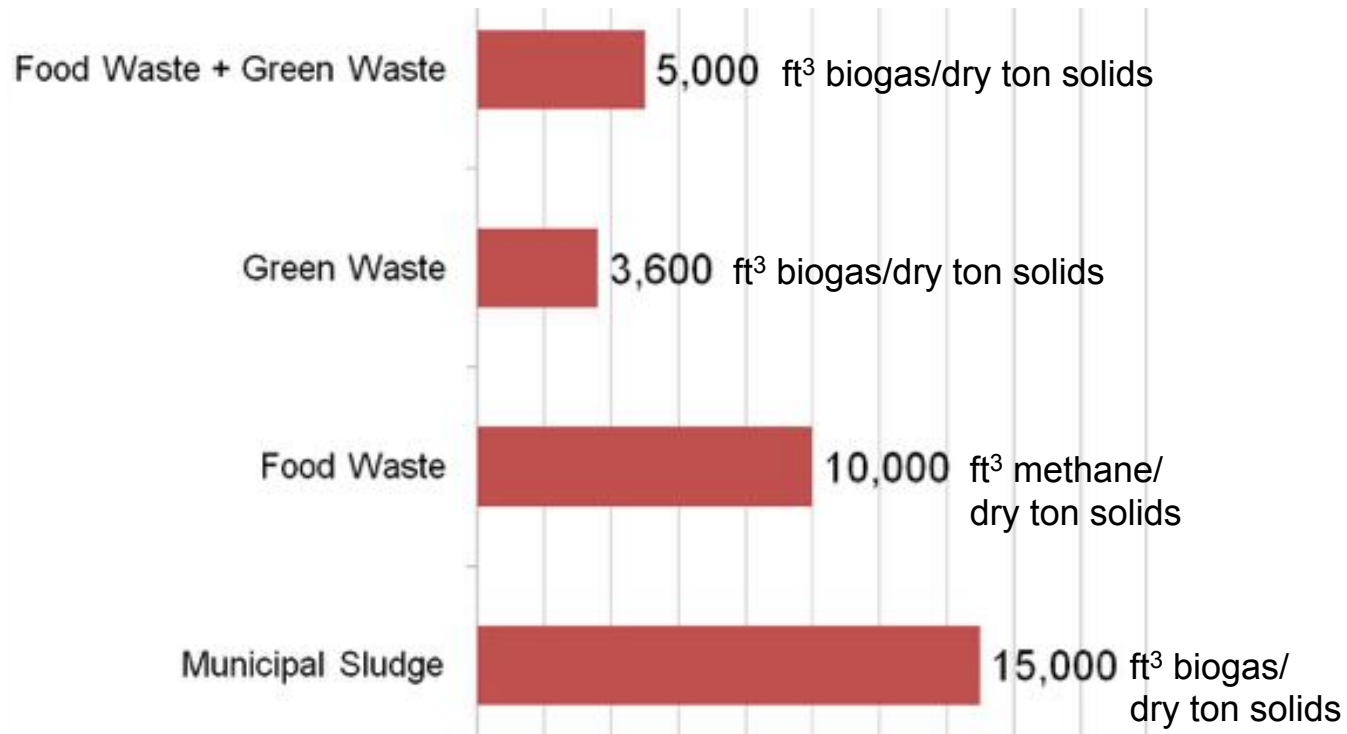
# East Bay Municipal Utilities District

- Large secondary treatment plant
- Began codigestion program as a means to use excess digester capacity
- Take in FOG, industrial organics, and source separated organics
- “Green factory” sends power back to the grid
- Examining impacts of organics regulations on biosolids end use and codigestion program



50 MGD treatment plant, generates  
16,000 dry metric tons annually

# EBMUD's Program Backed by Research



# Pre-treatment is critical

- Contract with hauler
  - Hauler performs pre-processing
  - Delivers pre-processed food waste
  - Arrives to EBMUD at 25–35% solids
- Developed processes to further remove contaminants in pre-processed food waste
- Liquid organics and FOG also received at this facility



*Photographs from EBMUD  
Presentation at [www.bacwa.org](http://www.bacwa.org)*

# Program Success Factors

- First high strength waste program developed in California
- Business oriented:
  - Open 24/7
  - Clear fee structure
  - Established permitting process
  - Excellent highway access
- In-depth research to assess process impacts and biogas generation
- On-site power production expanded gradually as program evolved
- Iterative improvements to receiving station





# Key Decision Points for California Utilities

- Preprocessing:
  - Off-site?
  - Pumpable?
  - Truckable?
- What type of agreements?  
Single hauler?
- Codigestion or separate digestion?
- How much digestion capacity?





# Conclusions

# California Biosolids: From Pariah to Solution Provider

- Biosolids as part of the climate change solution:
  - Codigestion
  - Biogenic energy from biogas
  - Organics diversion through land application and other beneficial uses
  - Improve drought resistance
  - Reclaim fire ravaged lands
- Some counties potentially opening up to land application
- Biosolids benefits to soils articulated by state agencies





Thank you.  
Questions?

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