

DOCKETED

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Presentation - Now I Know How the Dinosaurs Felt or How to Experience Extinction in Real Time

Additional submitted attachment is included below.

Now I Know How the Dinosaurs Felt or

How to Experience Extinction in Real Time



Overview

- Euphemisms and the Evolution of the Waste Disposal Industry
- Do California's Laws to Divert Organics from Landfills mean the Ice Age of the Landfill Gas Industry has begun?
- Has California lost sight of the "disposal" element of waste disposal?
- Can alternative facilities for organics disposal be constructed under California's current laws and regulations?
- What are the cost implications for waste disposal in California?
- Will California's environmental vigilantism infect other states? (Brace yourself!)

Waste Disposal Euphemisms Through the Ages

➤ **Night Soils**

- What humans would deposit in a toilet today

➤ **Chamber Pot**

- A vessel into which Night Soils were deposited

➤ **Honey Buckets**

- The means by which larger volumes of Night Soils were transported away for disposal

➤ **Wastewater Treatment Plant or Publicly Owned Treatment Works**

- A human sewage treatment facility

➤ **Sanitary Landfill**

- An oxymoron! Where municipal and other solid waste is put so that it is out of sight, if not out of mind

Today's Sanitary Landfill Practices Mimic the Animal Kingdom to Improve on the Open Dump



Hey!! A little privacy, PLEASE!

1. Dig a Hole
2. Deposit Waste
3. Cover with Dirt

From Whence Comes Landfill Gas?

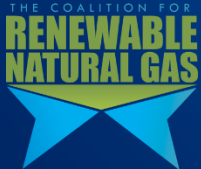
- Landfill gas is the off gas from Anaerobic Microbial Action on Organic materials deposited in landfills
- Get humble, those of you in the landfill gas industry!
 - You are in the business of collecting the flatulence of tiny, tiny bugs

Can All Landfill Gas Generated Be Collected?

➤ NO!



Enter....the California Environmental Crusaders



California's Environmental Approach

- **AB 32 – California's Global Warming Solutions Act and related regulations – requires mandatory landfill gas collection and destruction at all of California landfills, regardless of size**
- **If you can't collect all landfill gas generated, then eliminate the source and require recycling and diversion of organics from landfills**
 - 1989 – 50% recycling goal by 2000
 - 2011 – AB 341 – 75% recycling goal by 2020
 - 2014 – AB 1826 – requires businesses, public entities and multi-family residences that generate 4 cubic yards or more of solid waste per week to arrange for recycling services



Words Matter - Political Mandates Must Line Up with Reality

- The key word in a program for Solid Waste Disposal is “DISPOSAL”
- For any recycling program to be sustainable, there must be a market for the materials being recycled
- How can California’s laws and regulations to divert solid waste and organics from landfills best be illustrated?



Uh Oh!!!

What Are California's Other Environmental Goals?

- 50% Generation of Electricity from Renewable Sources
- 50% Reduction in Use of Fossil-Based Transportation Fuels
- Low Carbon Fuel Standard

So....What Methods Can Be Used in California to Recycle Diverted Organics and “Dispose” of Them?

➤ **Composting**

➤ **Anaerobic Digestion**

- Wastewater Treatment Plants (POTWs)
- Dairy Waste Digesters
- Organic Waste Digesters

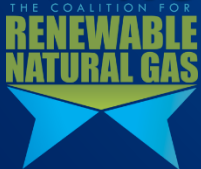
➤ **Gasification**

- All organic types, including woody biomass in forest & agricultural residues

➤ **Other Technologies (in development)**

- Organics to Diesel
- Organics to Methanol

➤ **NOT Incineration**



Composting

- **Least expensive alternative**
- **Difficult permitting issues in urban areas**
 - Odors
 - Dust, VOC and particulate emissions
- **No energy value from organics realized**
- **Can composted material be marketed as soil amendment in volumes that could be created?**
 - Limits on plastics and glass content
- **What happens if compost materials cannot be marketed?**

Anaerobic Digesters

- **More expensive than composting**
 - Digesters must be procured & built to replace landfills for organics
- **Some energy produced in form of biogas**
 - Can be upgraded to Renewable Natural Gas for onsite use or delivery into natural gas pipeline system
- **Organic materials only reduced 10% to 50%**
- **Residual Digestate is still organic and needs to be diverted from landfill**
- **Recovered water from process requires permitting & disposal**
- **Digestate must be further processed into compost material or otherwise marketed as soil amendment**
- **What if digestate cannot be marketed? How is disposal accomplished? What happens to sustainability of process?**
- **Co-digestion of organics in WWTP results in biosolids and its heavy metal content mixing with organic digestate**
 - Boosts biogas energy output
 - Adds difficulty in marketing resulting mix of biosolids and digestate

Gasification

- **Most expensive conversion technology**
- **Produces most energy - ~ 90% conversion**
 - Syn Gas produced – CO & H₂
 - Methanation Process converts Syn Gas to RNG
 - Could also convert Syn Gas to Methanol
 - Presents permitting issues with local fire marshals
- **Residual material is a vitrified solid, slag, ash or biochar that could be deposited in landfill, used for road beds or other potential markets**
- **California laws present barriers to gasification**
 - Must be zero emission technology, which can't be met due to thermal oxidizer to destroy removed trace constituents from Syn Gas and certain other limited emission sources
 - Limited to 500 tons per day capacity per project

California's Silo Form of Regulation Creates Conflicts that Obstruct Accomplishing Environmental Goals

- **Each California agency resides in a silo and only cares about its regulatory mandate**
 - Air Resources Board – clean air
 - Water Board – clean water and its disposal
 - CalRecycle – solid waste disposal
 - California Energy Commission – energy policy and regulation
 - Public Utilities Commission – oversight of public utilities for natural gas, electric power and transportation



Who Is in Charge to Harmonize California's Regulations so as to Accomplish its Environmental Goals?

- Currently --- No One!
- How can the current regulatory environment in California as to how to implement the range of technologies needed to convert and dispose of the organics diverted from landfills and the large woody biomass resource in California best be illustrated?



What Needs to Happen in California?

- **All available technologies to process diverted solid waste & organics need to be allowed under regulatory scheme**
 - 38,000,000 tons per year of solid waste are generated each year in California
 - Doesn't include woody biomass waste created
- **Regulations of various agencies need to be harmonized to accomplish this goal**
 - Governor's Office likely needed to head this effort
- **Anaerobic Digestion and Gasification + Methanation both produce gas that can be upgraded to pipeline quality Renewable Natural Gas**
 - RNG helps meet other California environmental goals: renewable electric power, displace fossil fuel for transportation, in-state production of low carbon fuel for transportation
- **In-state RNG needs access to California's natural gas pipeline system to be used to accomplish environmental goals**
 - AB 1900 – to be discussed



What Will it Cost Californians for Disposal of Diverted Solid Waste and Organics?

- **Billions of Dollars**
- **Sanitary landfill infrastructure will need to be supplemented with alternative disposal technologies**
- **Tipping fees will need to increase from \$40 - \$65 per ton to \$80 - \$140 per ton**
 - Don't subsidize tipping fees – let disposal costs remain with waste producers and not rely on Legislative appropriations for sustainability
- **Increased tipping fees will assist financing of projects that produce RNG**
 - Reduces uncertainty of RINS market that currently limits term of RINS purchase agreements
- **If Material Recovery Facilities are required to separate waste streams to divert organics, this will add to costs**

Where Will Alternative Organics Processing Facilities Be Located?

- Likely will be co-located at sanitary landfills
- Already have appropriate zoning and truck traffic
- Would allow for upgrading of collected landfill gas along with biogas or Syn Gas produced by anaerobic digesters or gasification facilities

Is the Solid Waste Diversion Phenomenon Limited to California?

- It's occurring in Europe
- It's being discussed in the Northeast
- Historically, California's laws and regulations have proven to be contagious
- The good folks in the Heartland of the U.S. may have too much common sense to be infected
- But.....stay tuned



Who Will Lead the Educational Effort to Harmonize California's Regulatory Scheme Pertaining to the Technologies Required to Process Diverted Organics?

- The Same Trade Association that led the effort to adopt AB 1900, which overturned the Hayden Amendment
- The Coalition for Renewable Natural Gas
- And how will that effort be illustrated?



Thanks for Listening!!

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