RMC
Water and Environment

Codigestion Basics

Digester Day

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Innovative Solutions for
Water and the Environment

Questions to Answer

- Codigestion – what is it?
- What are the risks and benefits? (process upsets, tipping fees, increased gas production, better financials)
- If we put food waste into a biosolids or manure digester, don't we contaminate the food waste?
- If we put food waste or some other outside waste into a biosolids digester, don't we increase the nutrient load to the wastewater plant?

Why Codigestion?

- Ability to shrink or eliminate fossil fuel usage at wastewater treatment facilities
- Minimization of carbon footprint
- Find innovative solutions to traditional problems
- Maximize beneficial use of “waste” materials

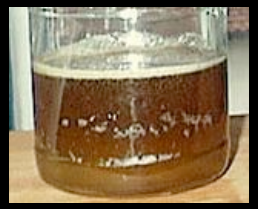
What is Bioenergy?

Carbon Dioxide

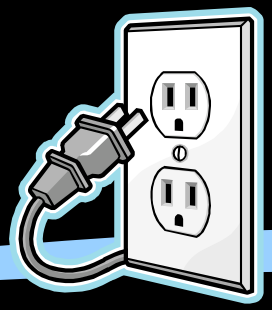
Biomass




Renewable Energy







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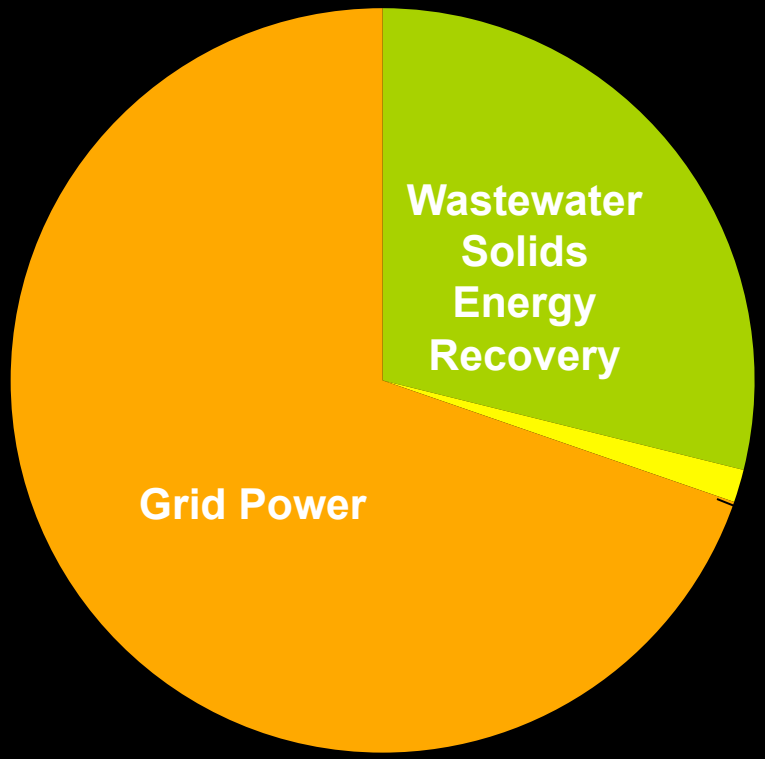
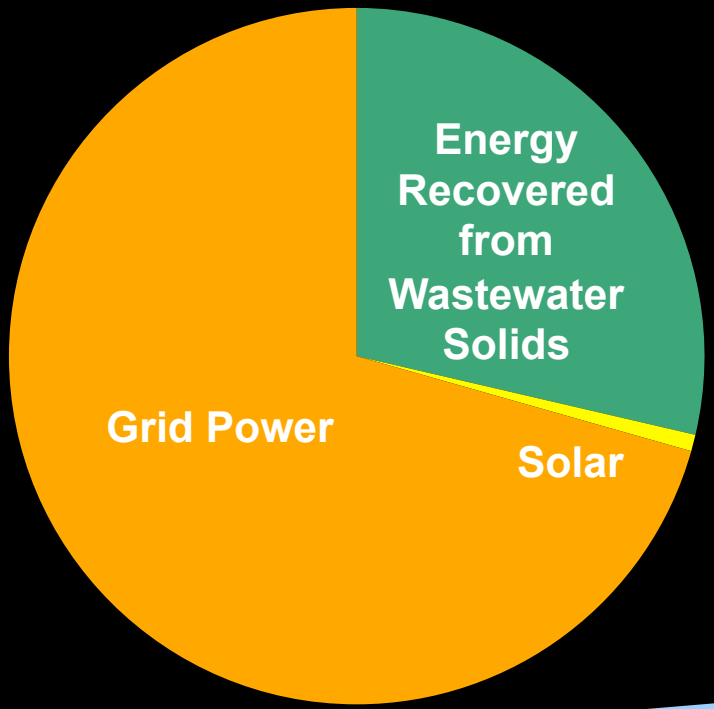
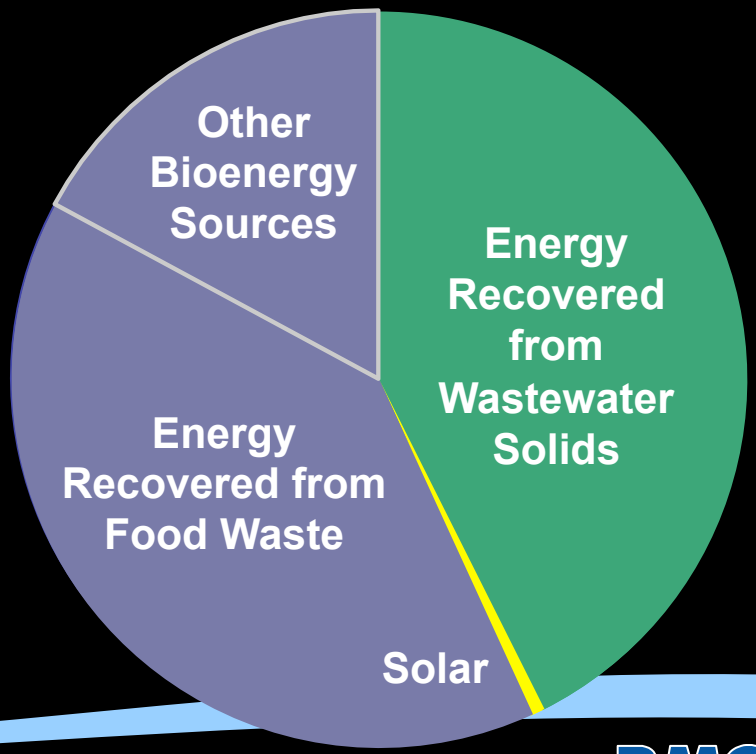
Energy Profile at a typical California WWTP

- Methane gas recovery in cogeneration engines
- Solar power
- Grid power



Co-Digestion = Energy Self-Sufficiency?





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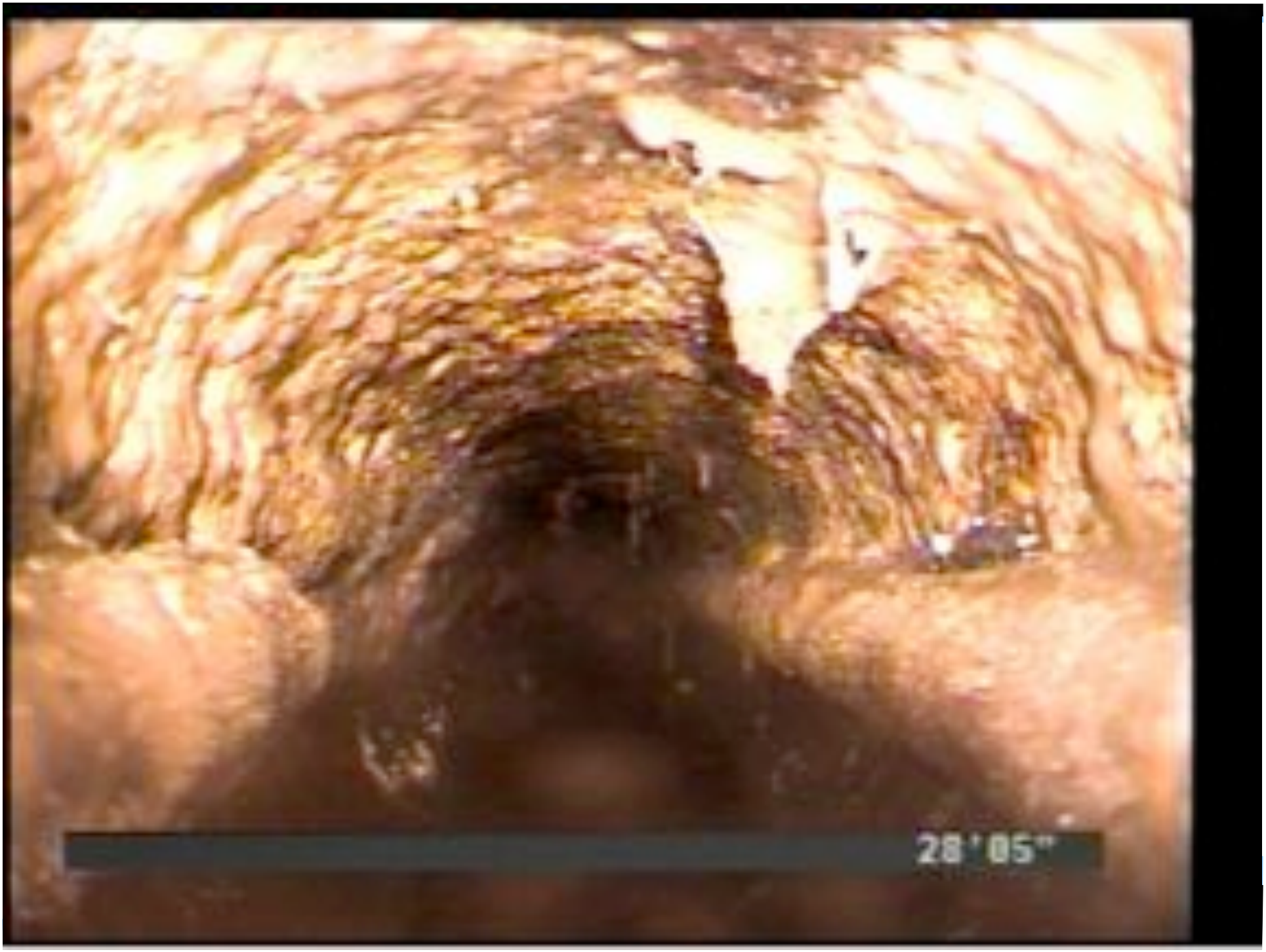
Codigestion Source Materials for a Typical Municipality

- Biosolids
- Yellow Grease = Cooking Oil
- Brown Grease = Waste Trap Grease
- Food Waste = Green Bin
- Other Industrial Organics (e.g. off-spec food products)

The Problem with FOG – Fats, Oil, and Grease

- U.S. EPA, Clean Water Act
- Requires elimination of dry weather stoppages (i.e., FOG blockages)
- CMOM – grease control program


28'05"


THIS SIDE UP
DO NOT REUSE
Canola Oil

What is Brown Grease?

- Fats, Oils, and Grease (FOG) that have come into contact with graywater
- High free fatty acid (FFA) Content: 50-100%
- Found in restaurant grease traps and interceptors

FOG Control Ordinances

- Most require installation of some kind of grease trap with basic BMPs
- More cutting edge:
  - Restaurants must install/upgrade to Automatic Grease Recovery Devices (AGRDs) within 3 years
  - AGRDs ensure daily recovery, dewatered grease, easy collection
  - AGRDs must be serviced & inspected every 90 days
  - All recovered FOG must be beneficially reused

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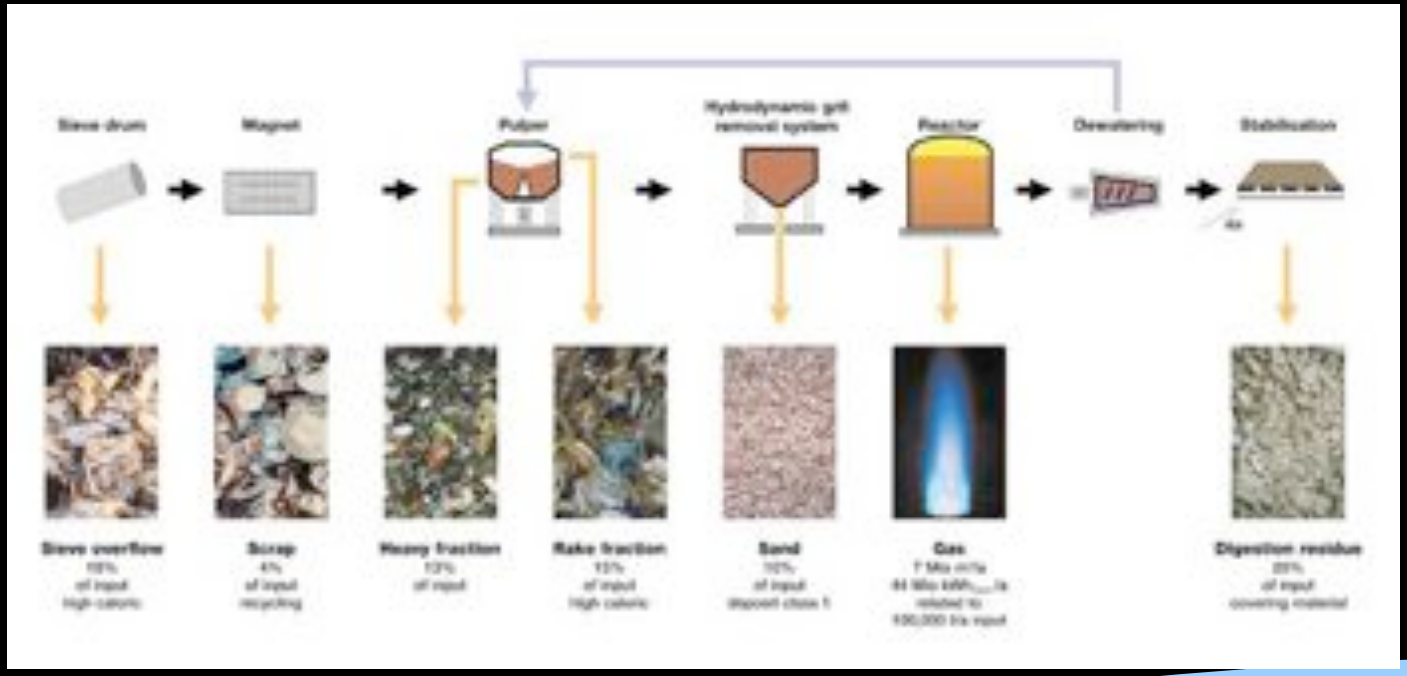
FOG Conversion Facility

Food Waste

- A new area for investigation
- Potential to generate more biogas (EBMUD)
- Requires more planning and study



Drivers for Creation of a Food Waste Program

- Zero waste goals
- Landfill organics bans
- Energy recovery from digestion process
- Greenhouse gas reductions
- Composting is proven/logical approach, but air emissions (VOCs) can be problematic

Food Waste Is A Key Component to Meeting Landfill Diversion Goals

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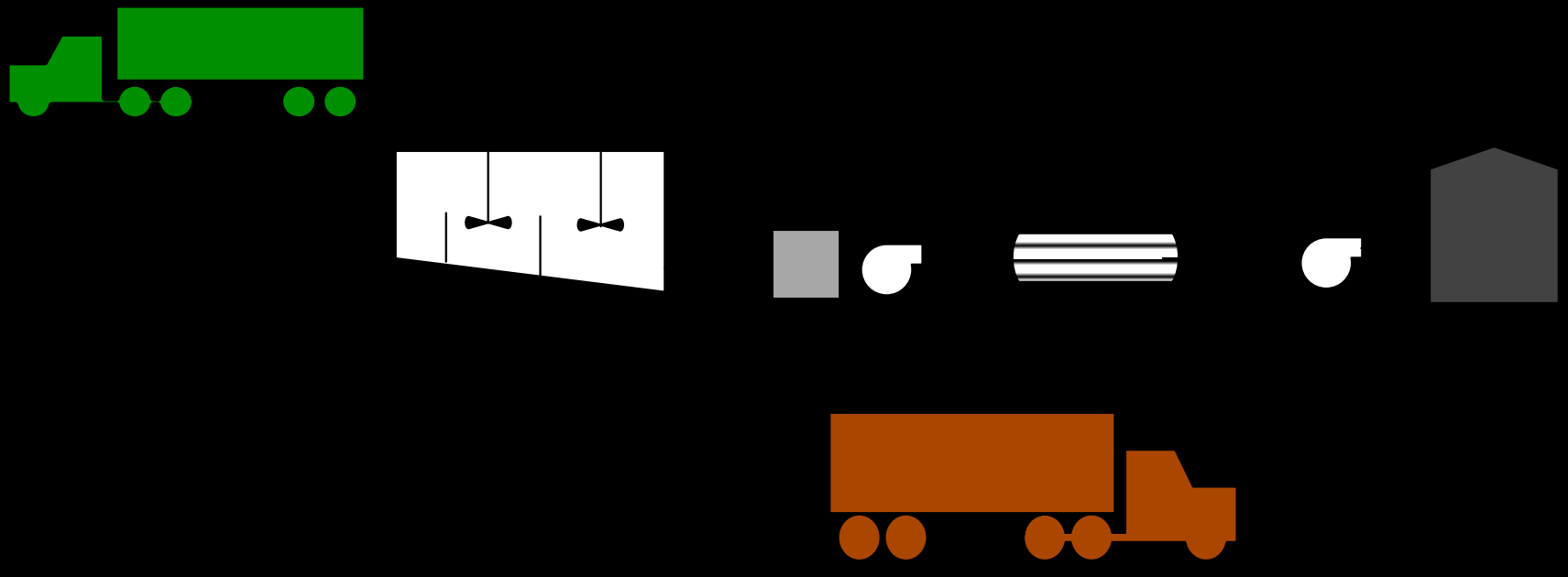
Food Waste

Digested Residual

Compost

EBMUD Pretreatment Process



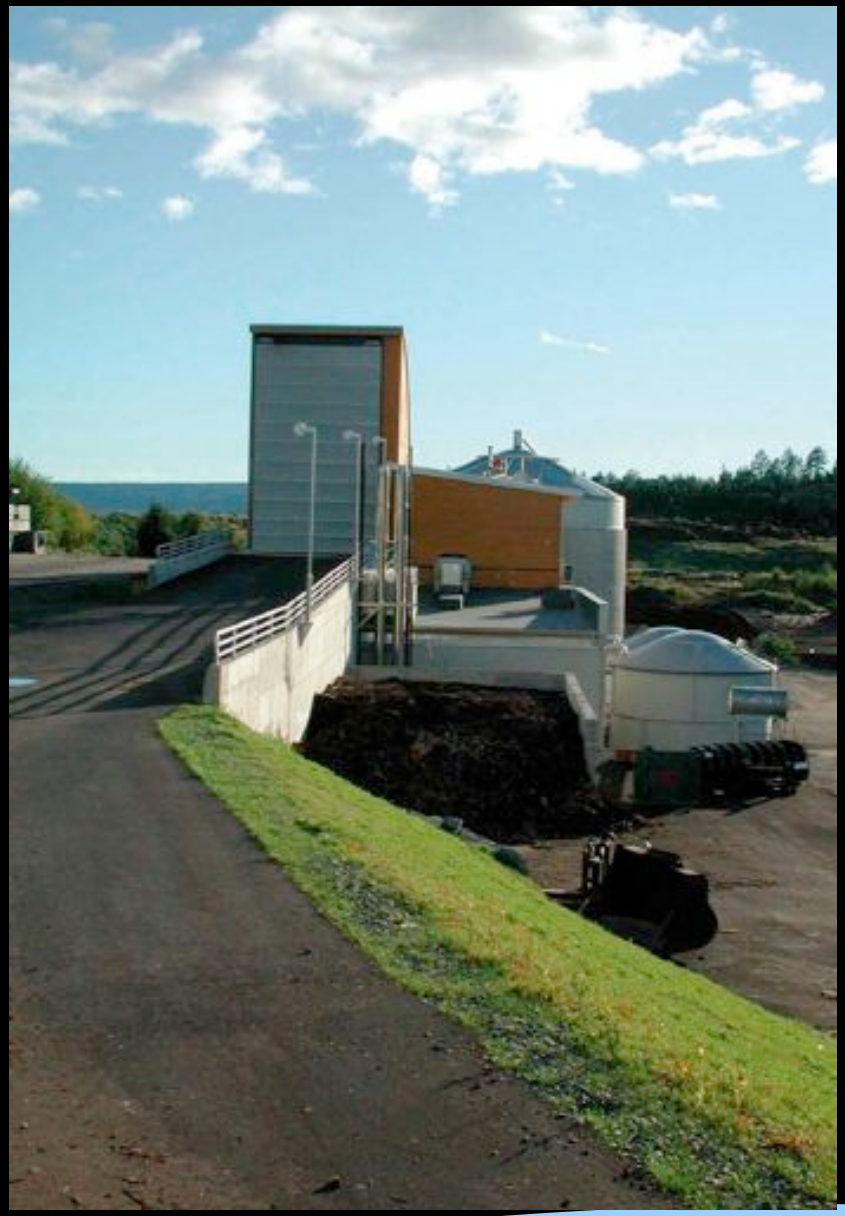
BTA Process®
(Canada Composting Inc)

Toronto, Canada

- **Input/material to be treated:**
- Source – separated household waste
- Operating on demonstration scale since 2006
- Processes 25,000 metric tons/ year
- Operational issues with organic waste only digesters (ammonia inhibition)

Plant at Lillehammer

- Source – separated household waste and food waste from industrial sector.
- Capacity: 14,000 t/a
- For every 1000 kg input, there is approx. 380 kg reject and 150 kg of digestate. The plant makes about 300 kWh of electricity per 1000 kg of post-reject waste.
- Biogas converted to electrical power; THP steam and digester heat.
- In operation since 2001



Benefits of Codigestion to a Municipality

- All types of organic waste can be treated in one plant
- Efficient recovery of biogas, a renewable energy source
- Closed system with a minimum of smell/odor
- Energy can be recovered as electrical power, combined heat & power, compressed biogas (CBG) upgraded to vehicle fuel
- Revenue from tip fees (SF Bay agencies $0.03-$0.15/ gallon)

Codigestion Impacts on a WWTP

- Challenges:
  - Preprocessing: off-site? Pumpable? Truckable?
  - Control of incoming wastes/need to establish permit program
  - Pretreatment of wastes to remove debris and protect equipment
  - Ensuring sufficient digester capacity
  - Potential for process upsets – need to provide uniform feed
  - Effect on biosolids and/or organics end use
  - Unknown effect on nutrient content in sidestream
  - Odor potential at receiving area and during maintenance
  - **Public outreach**

Implementation Scale

- Industrial/liquid food waste
- FOG
- Source Separated Food Waste

Questions?

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