Presentation Outline

- What is Central Marin Sanitation Agency?
- Central Marin’s Food-to-Energy (F2E) Program
- Marin Sanitary Service’s F2E program elements
- CMSA’s F2E program elements
- FOG/F2E Program Benefits and Metrics
- Regulation of the FOG/F2E Facility?
- Questions?
Central Marin Sanitation Agency
Central Marin Sanitation Agency - CMSA

- Regional Wastewater Agency in San Rafael, Marin County
- Serves about 110,000 people and San Quentin State Prison
- JPA with three satellite collection agencies
- Wide range of influent flows: 7MGD (ADWF) to 116 MGD (PWWF)
- Contract services:
  - Collection system O&M for San Quentin Village
  - Pump station O&M for SQ prison and Corte Madera
  - P2 for six local agencies
Central Marin Food Waste to Energy Program
Commercial Food Waste to Energy

Process: Anaerobic digestion

Central Marin Food Waste

Biogas (methane)
What is Food to Energy?

Solid Food Waste

Food Waste Receiving and Separation at MSS Transfer Station

Anaerobic Digester

Methane

Engine/Generator

CO₂

Electricity for CMSA and future sale

Biosolids

Soil Amendment and Fertilizer

Food Waste

Solid Food Waste
Public-Private Partnership
F2E History

- 2008-2009
  - PG&E letter – Grants for GHG emissions reduction study/project
  - Methane Capture Feasibility Study - project by CMSA, San Rafael, and MSS

- 2009-2010
  - F2E Workplan approved by CMSA Board: Engineering predesign and CEQA initial checklist; Presentations to Central Marin city and town councils

- 2010
  - F2E integrated into CMSA Digester Improvements/FOG Facility project

- 2012
  - Update presentations to cities, towns, and Board of Supervisors
  - FOG/Food Waste SOP required in renewed NPDES permit
  - CalRecycle’s LEA will regulate as a Limited Volume Transfer Operation

- 2013
  - Food Waste Processing and Disposal Agreement executed
  - CMSA and MSS constructed F2E facilities and began operation
  - CMSA prepared facility SOP for SF Bay RWB, and regulation began by LEA
Marin Sanitary Service
F2E Program
MSS F2E Roll-Out

- There are over 250 food waste generators (restaurants, delis, grocery stores) in the MSS service area.

- The estimated amount of food waste that could be collected if all generators participate in the Program is up to 20+ tons per day.

  - **Pre-consumer** commercial food waste would be collected and then transferred to the MSS Transfer Station for processing.
    - Eventually include **post-consumer** food waste

- **Roll-out plan** – 3 years
  - Recruit all eligible commercial food waste generators

- **Program outreach**
  - Kitchen staff training
  - Frequent monitoring
Tipping Area
MSS Pre-processing Equipment
Hopper, Belts, and Magnet
Food Waste Load for Processing
F2E Collection Statistics

**Customers** 67

**Collection Days** 6

**Avg. Route HRS** 4.0

**Avg. Cart Weight** 132 lbs

**Avg. Daily Weight** 4.2 tons
CMSA FOG/F2E Facility Program
CMSA F2E Facility Layout

2009 conceptual layout - based on EBMUD facility

Food waste from Transfer Facility - 25% ± Solids

20T-Transfer Truck

Dilution Water (Treated Effluent)

Slurry Tank

Fan

Odor Scrubbers

Rock Trap/Grinder

Peristaltic Pumps

Debris Box

Peristaltic Pumps

Drum Screen Paddle Finisher

Debris Box (plastics - fibers 10% of total)

Food Waste 10% Solids to Existing Digester
F2E/FOG Facility
Paddle Finisher and Dumpster
Digestion - Anaerobic Digesters
Biogas Purification – Step 1
Biogas Purification – Step 2
750 kW (1000 hp) Engine Generator
First FOG Load – November 2013
First Food Waste Load – January 2014
FOG/ F2E
Program Metrics and Benefits
FOG and Food Waste Program Metrics

- **Amounts Received**
  - *FOG*: up to 15,000 gallons per day, 6 days a week
  - *Food waste*: average 4.2 tons/day, 6 days a week

- **Biogas Generation**
  - Previous daily average (1/2008 – 10/2013): 127,000 ft$^3$
  - *Program daily average*: 233,000 +/- ft$^3$

- **Volatile Solids Ave**: 91% for FOG; 91% for food waste

- **Digester Hydraulic Residence Time Ave**: 35 days +/-

- **Cogenerator runtime on biogas**
  - Historic average: 7-9 hours/day
  - Current daily average: up to 16 hours/day
FOG and Food Waste Program Metrics (as of July 2013)

- Reject Material: 5.3% of delivered weight
- Minimal operational issues with new facilities and equipment
- Digester health has remained stable and has not been affected by the new organic loading
- Facility Construction Cost = $1.9 million
- Simple payback: 2.9 years – 7.8 years

Next:

- Analyze biosolids production history: increase or decrease?
- Begin process to revise PG&E interconnection agreement
Biogas Gas Production - Oct 2013 to Oct 2014
Benefits of F2E Program

- A local renewable energy project
- Increases CMSA’s energy self-sufficiency
- Utilization of existing CMSA infrastructure and equipment capacity
- Potential for CMSA to export energy (future)
- Reduces greenhouse gas emissions – about 2,000 metric tons per year (Cap and Trade value?)
- Reduces landfilling of food waste; reject material is composted
- Helps achieve local agency and County of Marin zero-waste goals
CMSA Capacity for FOG and Food Waste

- Digester Solids Treatment Capacity:
  - 100%
- Excess Capacity:
  - 68% Additional Food Waste
  - 54% FOG & Food Waste
  - 27% WW Solids
- Electrical Power to Plant:
  - 600 kW (Plant load)
- Export Power Above 600 kW Plant Load:
  - 750 kW (Existing Cogen capacity)
- 2nd Cogen unit, fuel cell, or Microturbine
- Biogas
  - 20 tons of Food Waste
  - 5,000-gal FOG and 20 tons of Food Waste

 WW Solids

 Cogen
Facility Regulation
Regulation of the Facility

- SOP requirement included in CMSA’s 2012 NPDES permit
  - Based on language provided by Greg Kester (CASA) in late 2011
  - CMSA develops facility SOP

- CMSA submits Enforcement Agency Notification letter to LEA
  - LEA informs CMSA the facility will be regulated as Limited Transfer Station Operation in October 2012

- SWRCB letter sends letter to POTWs in September 2013
  - RWB notification requirements and organic receiving facility SOP development
  - CMSA notifies RWB, updates facility SOP, and prepares detailed O&M SOP

- LEA contacts CMSA in December 2013 to schedule first inspection

- LEA and RWB regulating CMSA until regulations modified – 10/14?
Facility SOP

- **Purpose Section** – compliance with NPDES permit and SWRCB letter
- **Description** – explains facility location, size, operation, etc.
- **Definitions** – 15 definitions of terms used in the SOP
- **FOG/FW Acceptance** – how and when loads are accepted
- **Unloading** – explains unloading process and quantity limits
- **Processing and Digester Feed Operations** – how these are handled
- **Interference** – how we determine if loads will or have caused a problem
- **Spill prevention, vector/odor control, and O&M sections**
- **Eight reference cited**
Questions or Comments?

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Benefits: Reduces Carbon Footprint

- Less CO₂ than landfill or composting
- Less CO₂ from shorter truck hauls
- Renewable energy replaces energy from fossil fuels

![Greenhouse Gas Carbon Dioxide Equivalent of Commercial Food Waste](chart.png)