Organic Food Waste Demonstration Project: Lessons Learned and Future Plans

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Presentation Overview

- Program Background
- Demonstration Project
- Districts’ Solution
- Challenges
- Future Plans
How Did It All Start?

- 2011 - Districts completed feasibility study on co-digestion of food waste at Districts WWTPs.
- 2012 - Districts performed bench scale testing of co-digestion of Waste Management FW slurry at JWPCP.
- 2013 - Contract Agreement with Waste Management and Construction
- 2014 - Started Demonstration Project
JWPCP Demonstration Project
2014-2018
What Did the Demonstration Project Accomplish?

Food Waste Slurry Received at JWPCP

Tons Per Day Diverted

Jan-14  Jun-14  Nov-14  Apr-15  Sep-15  Jan-16  Jun-16  Nov-16  Apr-17  Sep-17  Feb-18
What Did We Prove With the Demonstration Project?

![Graph showing digester gas production over time](graph.png)

- **Control Dig.**
- **Test Dig.**

**Y-axis:** Digester Gas, cu. ft./d

**X-axis:**
- Jan-14 to Jan-17

**Key Events:**
- Start of Food Waste Addition
What Did We Learn From The Demonstration Project?
Now That We Know it Works…Develop Commercial Program

- Comprehensive solution for our member cities
  - Pre-processing, Receiving and Feed-in, Energy Recovery
- 4,000 TPD generated Los Angeles County
- Districts Capacity
  - Food Waste Processing 165 tpd
  - Food Waste Digestion Today: 250-350 tpd
  - Food Waste Digestion Future: 250-550 tpd
The Districts’ Comprehensive Solution to Food Waste

Flowchart:
- Food Waste
  - Pre-Processing
    - Anaerobic Digestion
    - Post-Treatment
      - Digester Gas
        - Fertilizers/Composting
        - Heat/Steam
        - Electricity
        - Biomethane
        - Vehicle Fuel
Food Waste Recycling Steps

Food Waste → Pre-Processing PHMRF

Puente Hills Materials Recovery Facility
Why Pre-process?
Site Selection

- Area to
  - Receive food waste
  - Pre-processing equipment
- Staffing and Material Handling Equipment
- Proximity to food waste sources
- Distance from JWPCP
Pre-Processing Area at MRF

Location of Food Waste Pre-Processing Area
Pre-Processing Technologies Evaluated

- Filter Press
- Hammer Mill/Bioseparator
- Chose Doda Bioseparator
  - Experience with Doda slurry from our JWPCP demonstration program
  - Commercially proven in U.S. at time of decision
DODA Bioseparator

- Feed Hopper
  (Bioseparator 1 Feeding Hopper)

- Primary Bioseparator
  (Bioseparator 1)

- Secondary Bioseparator
  (Bioseparator 2)
How Does the Bioseparator Work?

1. Food Waste Inlet from feed hopper
2. Dilution Water
3. Inorganics move up inside screen
4. Organics drop to bottom
Project Milestones

- 14 Months from Project Approval to Completion
  - Feb 2017 – Project Approved
  - May 2017 – Design complete, Doda Equipment & Tanks ordered
  - Sep 2017 – Construction begins
  - Apr 2018 – Startup & commissioning complete

- Capital Cost $2 million
Food Waste Preprocessing Facility

- Dilution Water Tank
- Slurry Tank #3
- Slurry Tank #1
- Slurry Tank #2
- Main Operating Control Panel
- Truck Loading Control Panel
- Primary and Secondary BioSeparators
- Rejects Bin
- Feed Hopper
Startup

- Week of April 23, 2018
- Started processing April 24 morning
- Processed 190 tons in the first four days of operation
- First slurry load to Joint Plant – April 25
Total Solids

- Total solids impact
  - Slurry flow in pre-processor
  - Transportation cost
- Total solids specification for anaerobic digestion - 8 to 16%
- Incoming food waste and dilution water
Incoming Food Waste

- Waste with High Water Content
- Waste with Low Water Content
- Waste with Medium Water Content
Bioseparator Cleaning
Food Waste Slurry

- Currently the MRF delivers 10 – 15 loads of slurry per week to the Joint Plant.
- A typical load is around 4600-4800 gallons.
The Second Step Is Food Waste Co-Digestion
For Now, Feeding Food Waste at Treatment Plant Headworks

JWPCP Liquid Waste Disposal Station
The Third Step is Energy Recovery From The Biogas

Food Waste

Pre-Processing
PHMRF

Anaerobic Digestion
JWPCP

Post-Treatment
Tulare Lake

Digester Gas

Fertilizers/Composting
Biogas Conditioning System

Existing CNG Station

Proposed Biogas Conditioning System (BCS) Location
How does it work?

- Single-pass membrane filtration system to integrate with existing CNG station to utilize 100% biogas
- Produce up to 2,000 GGE’s per day of RNG @ the CNG Station

Biogas
62% CH₄

RNG
90% CH₄
New Pipelines Are Needed To Transport the Biogas

24” Diameter HDPE Biogas Supply Line: 550’ Length

18” Diameter HDPA Tail Gas line: 1,250’ Length
There Are Business Challenges

- Locking-in food waste delivery contracts
- Tip fees to help recovery capital investment
- Regulatory and market uncertainty
- Maximizing biogas value
Looking Into The Future

- Develop receiving facilities at JWPCP as market develops
- Additional biogas reuse
- Another pre-processing system @ DART or SGTS
Thank You
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