Food Waste Recycling Steps

1. Food Waste
2. Pre-Processing
3. Anaerobic Digestion
4. Digester Gas
5. Post-Treatment
6. Fertilizers/Composting
7. Heat/Steam
8. Electricity
9. Biomethane
10. Vehicle Fuel
Three Processes Requiring Project Development and Construction

1. Food waste processing at Districts Solid Waste facilities

2. Food waste receiving and digestion at Districts Joint Water Pollution Control Plant in Carson

3. Energy recovery from additional digester gas created from food waste
Food Waste Receiving and Processing at Puente Hills MRF

● Current
  – Receiving about 80 tpw source separated food waste at PHMRF

● Near term
  – Installation of Doda system at PHMRF*
  – Capacity up to 165 tpd
  – Will use all available space at PHMRF

● Long term
  – Other MRFs
Food waste is collected from sources such as restaurants, food processing plants, cafeterias and grocery stores. Tipped material is inspected prior to processing.

Food waste is processed to remove physical contamination (e.g., utensils, cans, packaging, and heavies) using a Doda two-stage bioseparator.

The processed food waste is loaded into tanker trucks for delivery to the Districts Joint Water Pollution Control Plant in Carson.
Food Waste Processing at PHMRF

Location of Food Waste Processing Area
Food Waste Processing at PHMRF

Processes up to 165 tpd SSO => 2 shifts, 7-hours per shift
Digesting the Waste
How a Digester Works

Input – Organic Materials
Food scraps, yard trimmings etc.

Output – Biogas
Used for energy production

Hydrolysis → Acidogenesis

Methanation

Acetogenesis

Output – Natural Fertilizers
Adding Food Waste to Digesters Increases Biogas Production

Adding 10-12% (v/v) food waste slurry to sludge could double biogas production.

Food Waste Slurry characteristics: Total Solids ~ 14% by wt., Volatile Solids ~ 92% by wt., COD ~ 222,400 mg/L
Existing Demonstration Program

- The Districts and Waste Management entered into a demonstration program agreement

- WM is processing food waste slurry at off-site location and delivering to JWPCP, with a target food waste diversion rate of 62 tons per day

- AT JWPCP, the slurry is injected into one digester for co-digestion at 9% food waste slurry on a liquids basis and 30% food waste on a solids basis

- The program demonstrated that co-digestion of food waste at a wastewater treatment plant is feasible and does not significantly impact treatment plant operations
Food Waste Receiving and Digestion at JWPCP

- Currently (2014-present)
  - Receiving 62 tpd from Waste Management
  - Developing commercial tipping fee structure

- Near term (summer 2017)
  - 335 tpd food waste capacity at liquid waste disposal station

- Long term (2020)
  - 310 tpd direct injection into the five south digesters and use of LWDS for excess
Food Waste Receiving at JWPCP

- Currently exceeding 62 tpd, one digester capacity
- Liquid Waste Disposal Station viewed as a bridge project
  - Up to 335 tpd standalone
  - Estimated 240 tpd in conjunction with 310 tpd to digesters

- Upgraded food waste receiving facilities
  - Designing for 310 tpd (capacity of 5 south digesters)
  - Requires demo of rect digester and entrance improvements.
Liquid Waste Disposal Station at JWPCP

Septic Tanker Dumping
Food Waste Receiving at JWPCP
New Receiving Station for South Digesters
Energy Recovery

● Currently
  – 300-700 kW additional power at TEF from food waste digestion ($20-30K per month)

● Near term
  – Convert digester gas to 2300-3500 gge/day CNG for vehicle fueling
  – Expand existing fueling station if contracts can be negotiated with haulers or other fleets

● Long term
  – Options include pipeline injection, electricity, hydrogen, biosolids drying
Biogas Condition & Station Expansion at JWPCP

- Potential to take current CNG fueling from 1425 GGE/day to 2325 GGE/day or to 3500 GGE/day RNG fueling

<table>
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<th>400 scfm 2325 GGE</th>
<th>600 scfm 3500 GGE</th>
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<td>Biogas Conditioning System Capex</td>
<td>$5 million</td>
<td>TBD</td>
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<tr>
<td>Fueling Station Expansion Capex</td>
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- $2.5 million grant received from California Energy Commission
- CEQA has been initiated
CNG Vehicle Fueling Project at JWPCP

CNG Station Expansion

Biogas Conditioning System
Moving Forward-Summary of Current Projects

- **Food processing equipment at Puente Hills MRF**
  - Equipment purchased
  - In design
  - Startup March 2018

- **Food waste receiving at JWPCP**
  - Start receipt at LWDS late 2017
  - Full scale receiving station in preliminary design
  - Startup early 2020

- **Phase I energy recovery-digester gas to vehicle CNG**
  - RFQ to technology providers May 2017
  - Balance of system in design
  - Startup late 2018

- **JWPCP capacity estimated at 550 tpd diverted food waste by 2019**
Thank you. Questions?

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“So, this Humpty Dumpty guy falls off the wall and I think, Dang, ain’t lettin’ this go to the food waste bin.”