

# *Marin Sanitary Service &* **Central Marin Sanitation Agency**



## **Central Marin Commercial Food-to-Energy (F2E) Program**

NACWA Energy Workgroup

January 26, 2017

# Presentation Outline



- **Central Marin's Commercial Food-to-Energy (F2E) Initiative**
  - What is F2E?
  - Public-Private Partnership – CMSA and Marin Sanitary Service
- **Marin Sanitary Service F2E Program**
  - Quality Control
  - Transfer Station Improvements
  - MSS outreach, training, services, and collection statistics
- **CMSA F2E Program**
  - About CMSA
  - Treatment plant organic waste receiving facility
  - Anaerobic digestion and energy production
- **Program Metrics, Benefits, and Next Steps**
- **Questions**



# Commercial Food Waste to Energy Program

# Commercial Food Waste to Energy



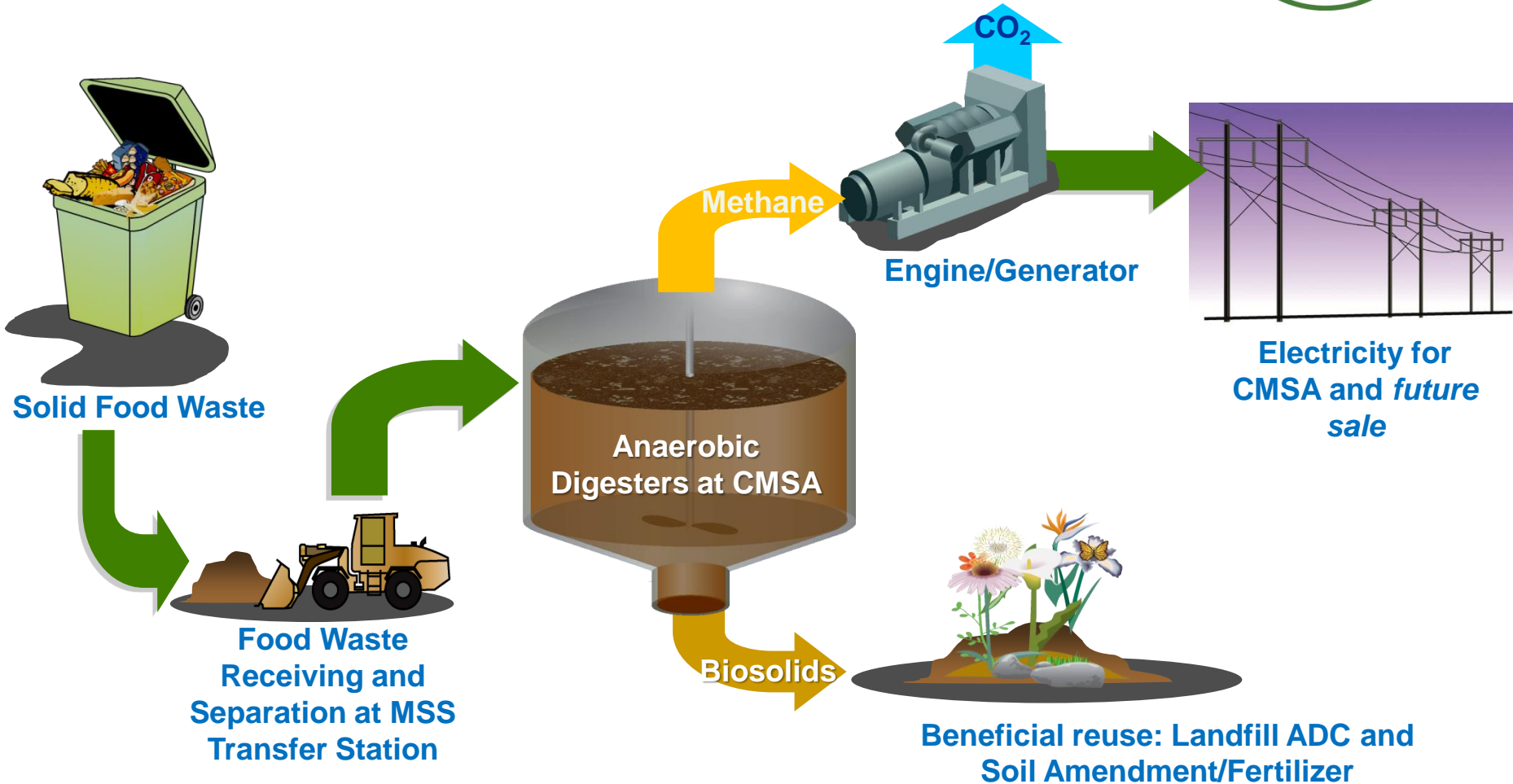
Central Marin Food Waste

**Process:**  
Anaerobic digestion



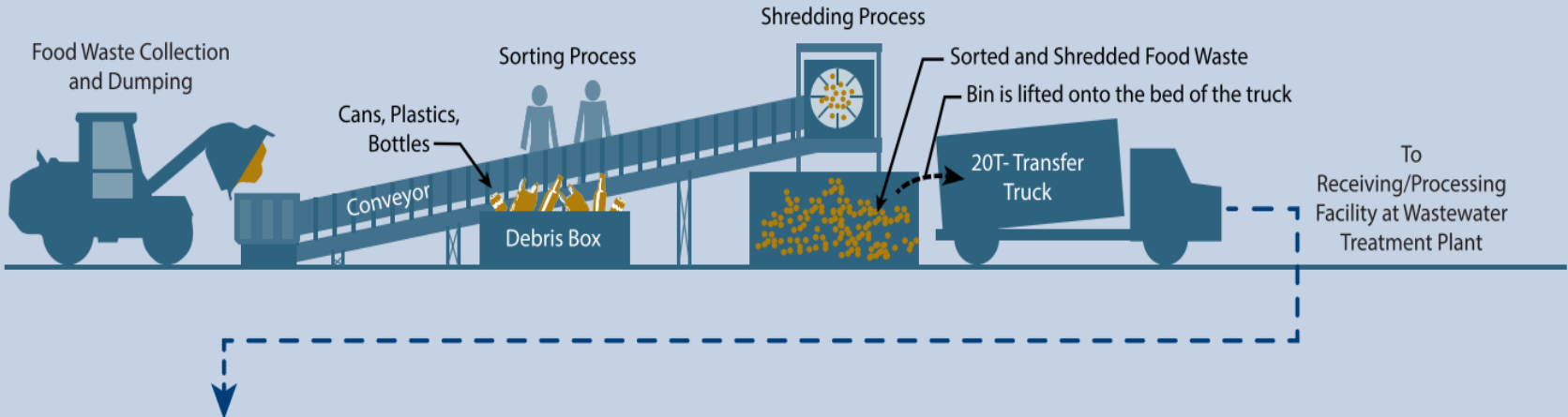
Biogas (methane)

# What is Food to Energy?

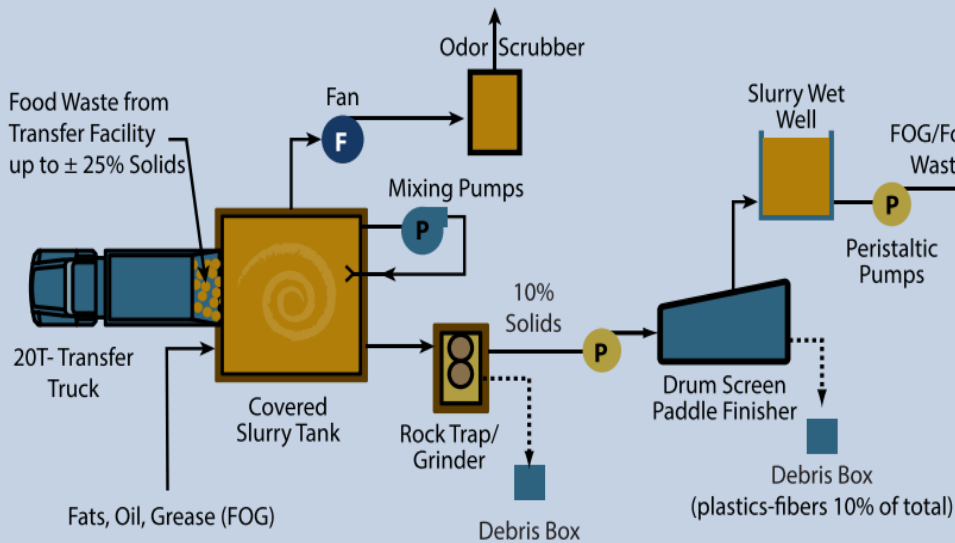


# F2E Processing @ MSS and CMSA

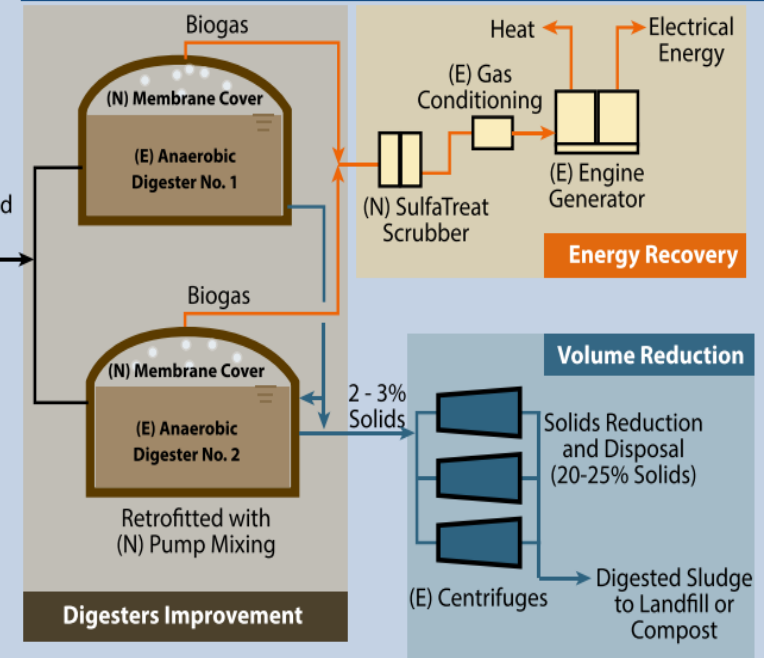
## New Food Waste Separation Facility at Solid Waste Transfer Facility



## New Receiving/Processing Facility at Wastewater Treatment Plant



## Existing and New Facilities at Wastewater Treatment Plant



# Public-Private Partnership



**Central Marin Sanitation Agency**



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# MSS F2E Program



# First Line in Quality Control

- Customer Enrollment: pre-consumer food waste
- Staff Training & Monitoring; Retraining
- Tools for Success
  - Labeling & Signage
  - Kitchen Layout
  - Internal and External collection containers



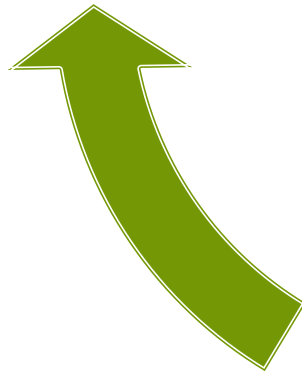
## Second Line in Quality Control: Contamination Removal Protocol



Removes  
contaminants  
after tipping on  
floor



Removes visible  
contaminants  
from cart prior  
to dumping



Removes visible  
contaminants  
from cart as  
contents tipped  
into truck







**CLEAN FEEDSTOCK**



# MSS Tipping Floor



## Loading materials onto the conveyor





# MSS Processing Equipment



# Hopper, Belts, and Magnet



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# CMSA FOG/F2E Program



# Central Marin Sanitation Agency

## - CMSA



- Regional Wastewater Agency in San Rafael, Marin County
- Serves about 110,000 people and San Quentin State Prison
- Joint Powers Agency (JPA) with four satellite collection agencies
- Wide range of influent flows: 7MGD (ADWF) to 120.5 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







# F2E/FOG Facility





# Drum Screen Paddle Finisher



# Digestion - Anaerobic Digesters





# Biogas Purification – Step 1





# Biogas Purification – Step 2



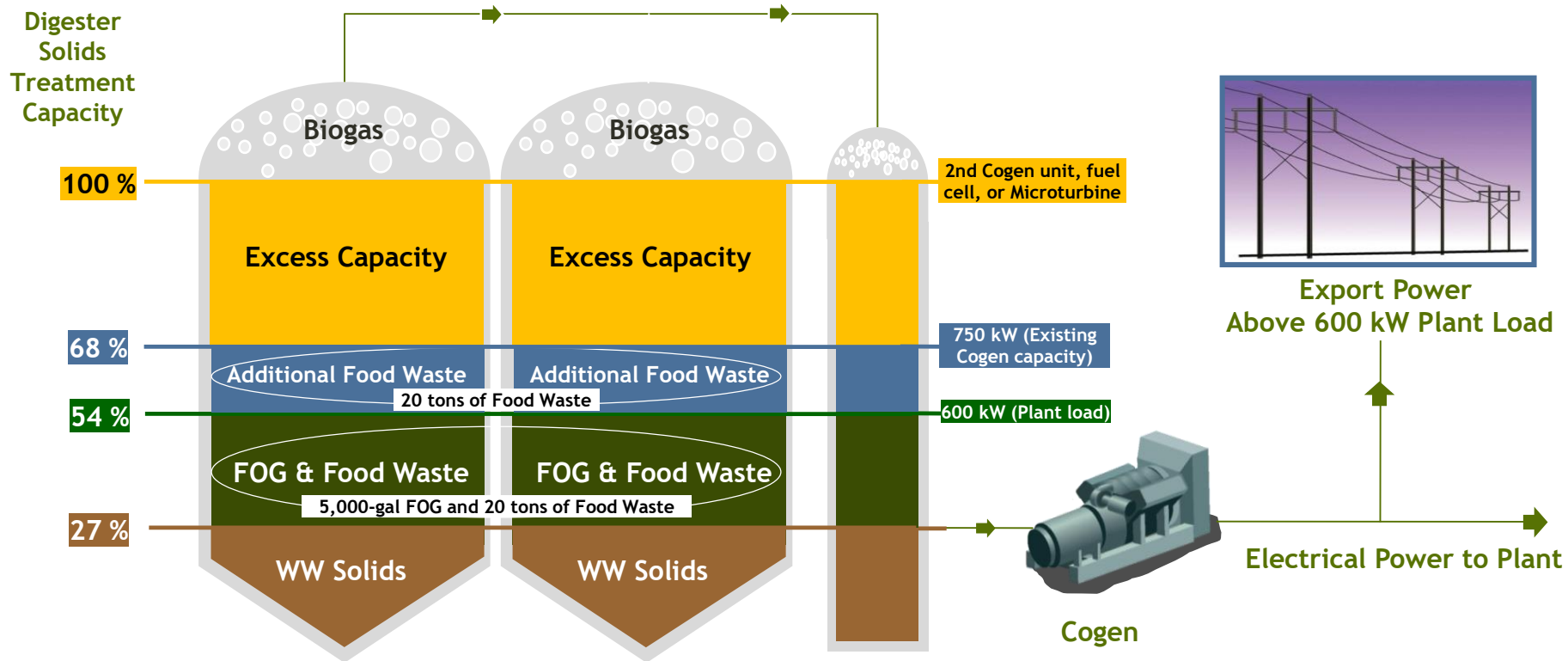


# 750 kW (1000 hp) Engine Generator





# CMSA Capacity for FOG and Food Waste





# First FOG Load – November 2013



# First Food Waste Load – January 2014



# Permitting and Operation



- MSS regulated by CalRecycle, and CMSA is regulated by the San Francisco Bay Regional Water Board.
- CalRecycle Regulations changes on January 1, 2016
  - Wastewater agencies that receive organics for co-digestion with wastewater solids in anaerobic digesters exempt from regulations
- CalRecycle's Local Enforcement Agency (LEA) approved a Solids Waste Transfer Station Permit amendment for MSS.
- CMSA Notified S.F. Bay Regional Water Board that the facility is operational
  - NPDES permit Standard Operation Procedure (SOP) developed
- Digester health has remained stable and has not been affected by the new organic loading
- Minimal operational issues with new facilities and equipment



# FOG/ F2E Program Metrics and Benefits





# FOG and Food Waste Program Metrics

- Amounts Received
  - *FOG: up to 20,000 gallons per day, 6 days a week*
  - *Food waste: average 7.5 tons/day, up to 6 days a week*
- Biogas generation increase from *127,000 ft<sup>3</sup> (5-yr average) to over 300,000 ft<sup>3</sup>/per day.*
- Volatile Solids Ave: *93% for FOG; 91% for food waste*
- Digester Hydraulic Residence Time Ave: *35 days +/-*
- Cogenerator runtime on biogas increased from approximately *7-9 hours/day up to 23+ hours/day (average); and 24 hr operation most days*
- Program Expenses:
  - CMSA facility cost: \$2 million (\$1.9 for construction)
  - MSS equipment cost: \$530,000
  - MSS operating costs: \$315,000 (collection, processing, disposal, outreach)

# Benefits of F2E Program



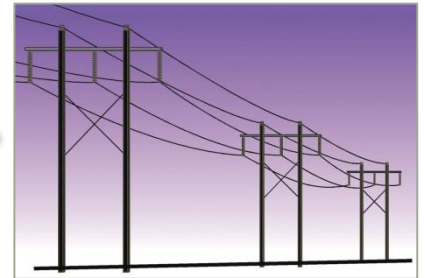
- A local renewable energy project
- Reduces landfilling of food waste; reject material is composted
- Increases CMSA's energy self sufficiency to align with State renewable energy generation goals
- Utilization of existing CMSA asset capacity – cogen and digesters
- CMSA to deliver energy to local utility grid in future
- Reduces greenhouse gas emissions – about *2,000 metric tons per year*

# FUTURE OF F2E



Pipeline injection  
for other local  
uses.

**POTENTIAL EXCESS  
ENERGY AND METHANE**



Send electricity  
back to the grid.



Fuel vehicles

## Next Steps for CMSA



- Obtain certification from the California Energy Commission as a renewable power generator
- Modify the Agency's utility interconnection agreement to allow delivery of power to the local grid
- Negotiate a power sale agreement terms and price with the two local energy providers
- Complete biogas utilization tasks in the Agency's 2017 Master Plan
- Deliver power and determine how to use future excess biogas





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