San Francisco's FOG to Biodiesel Project

San Francisco Water, Power, Sewer Staff Presentation

Outline

- Introduction to FOG and trap waste
- Trap waste dewatering
- Brown grease to biodiesel
- Expected outcomes


N
Oceanside
Water Pollution Control Plant

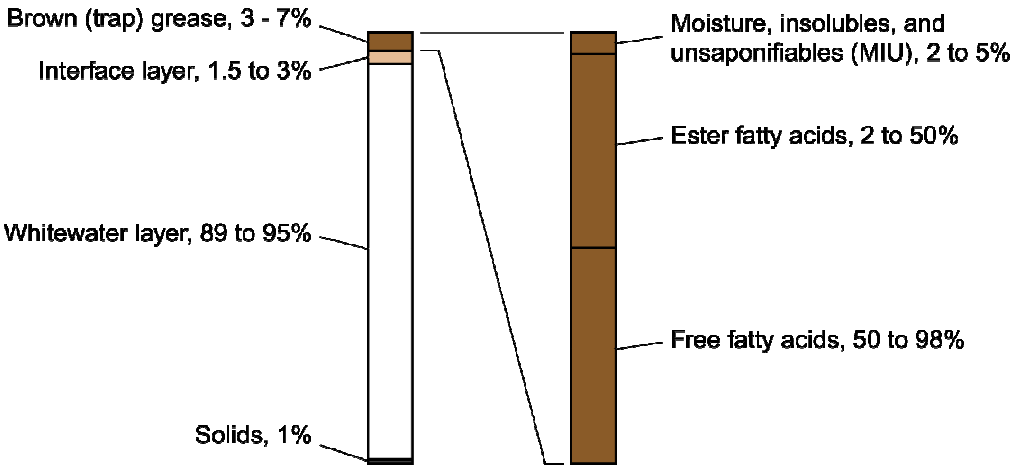
What is FOG?

- **F**ats, **O**ils, and **G**rease – comes from restaurants and households
- FOG can create flooding, odor, and treatment problems
- In SF, major source of FOG are the 2,600 grease producing restaurants
- SFPUC spends >$3.5 million/yr on grease-related service calls


FOG build up in sewer


FOG blockage cleared from sewer

Composition of Trap Waste



Estimated COD concentration by volume (mg/L)*:

Brown Grease Layer: 2,610,000
Interface Layer: 292,000
Whitewater Layer: 3,000 – 5,000

*Oleic acid ($C_{18}H_{34}O_2$) was used to represent chemical composition of brown grease

FATS, OIL AND GREASE (FOG) TO BIODIESEL PROJECT

Goal 1

Demonstrate that co-location of FOG-to-biodiesel facility and Wastewater Treatment Plant (WWTP) provides unique advantages.

Goal 2

Demonstrate that brown grease can be recovered cost-effectively from waste FOG and concentrated to 99% purity.

Goal 3

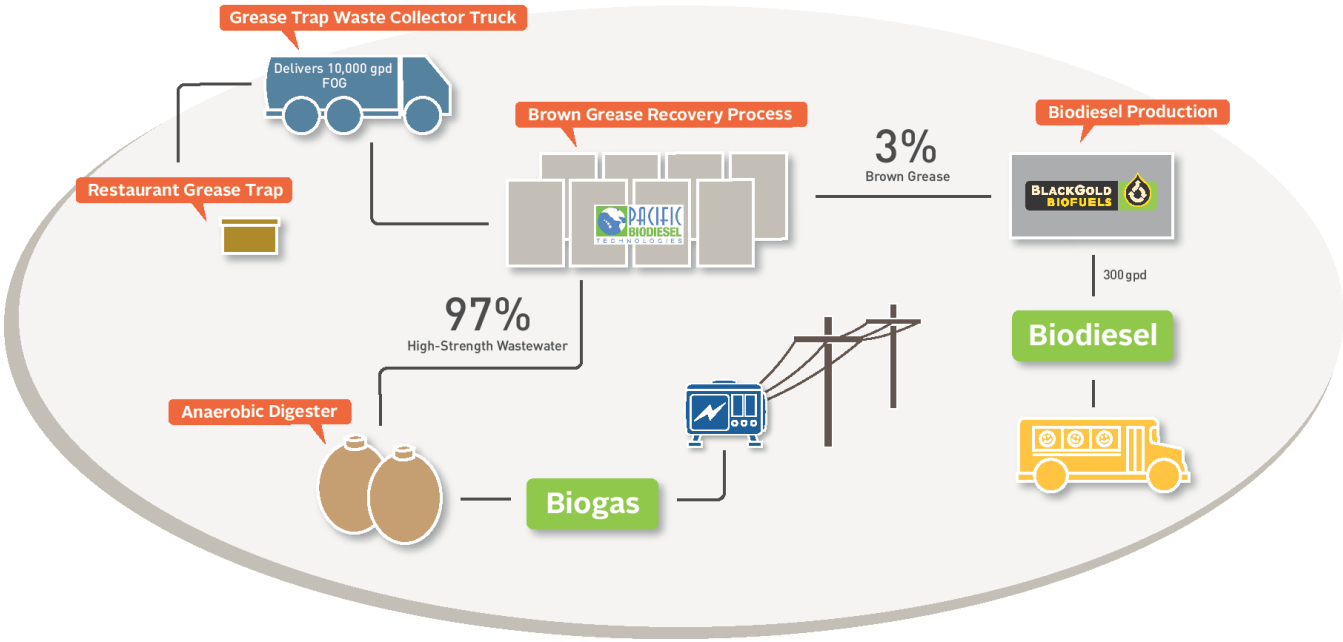
Demonstrate that locally sourced energy can be produced from low quality urban grease.

Promise of the Project:

Refined brown grease has been demonstrated to produce 60% more biogas in anaerobic digesters.

Onsite management of wastes from FOG-to-biodiesel project can be provided with no negative impacts to the WWTP's process.

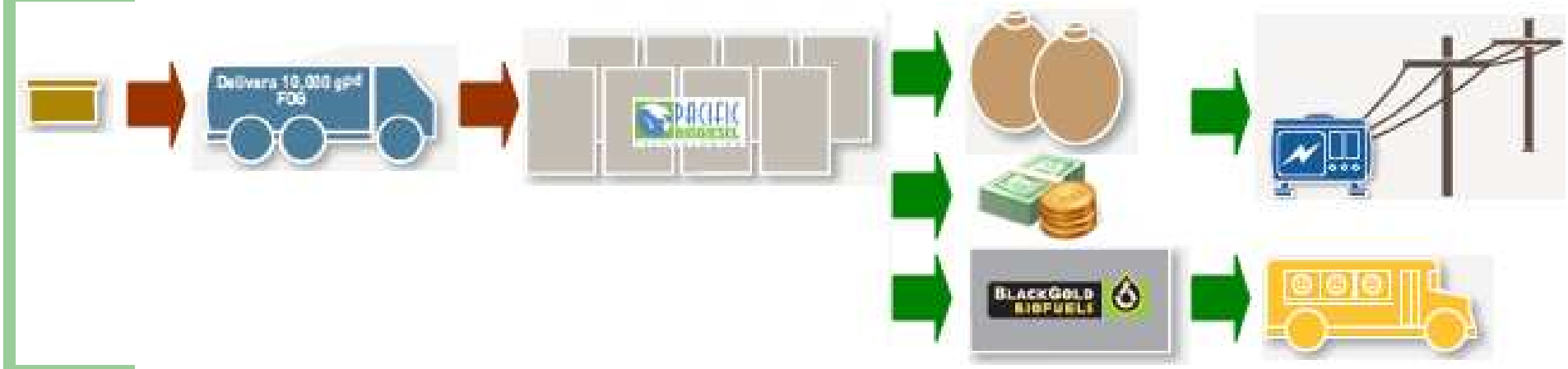
Technologies demonstrated have potential to "close the grease loop", transforming a waste stream into a local energy resource.



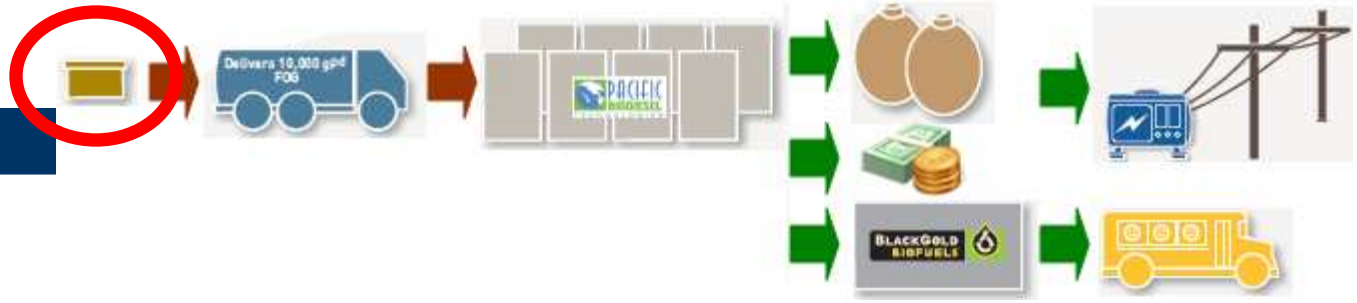


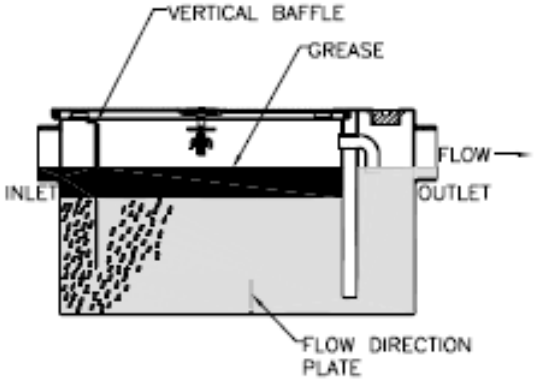


FOG Recovery Overview



Grease Trap Waste

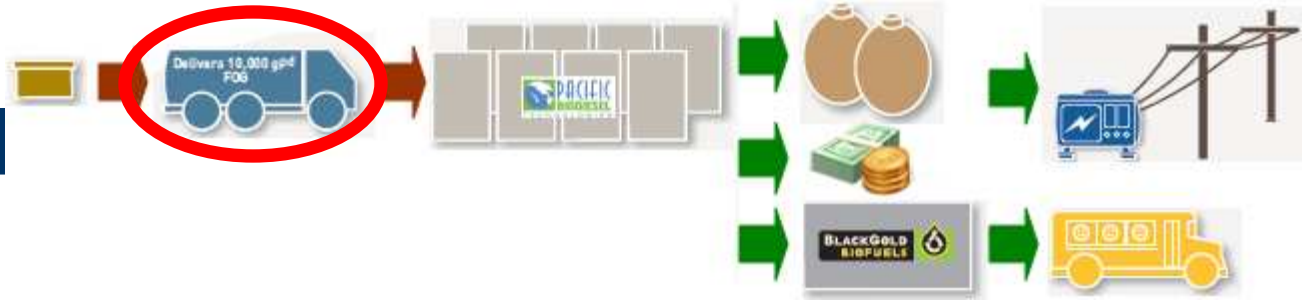




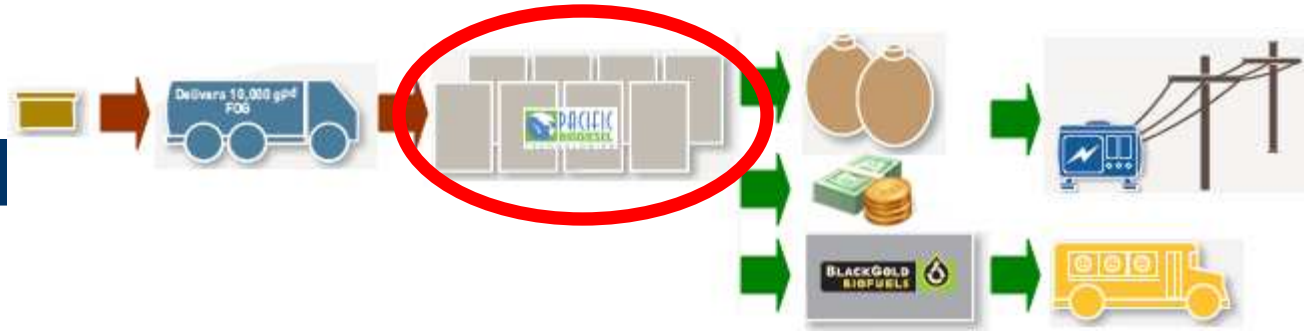
Source: ZURN

Source: Wikipedia

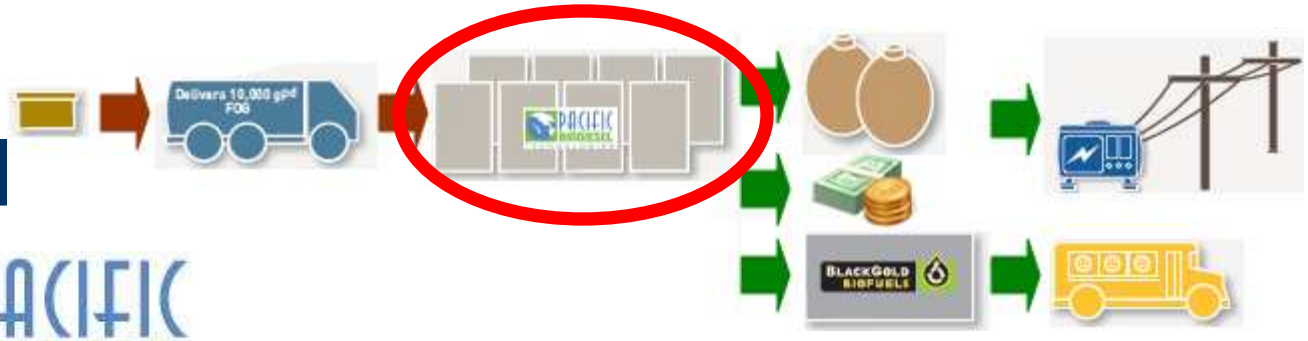
Grease Trap Hauler Unloading



FOG Recovery



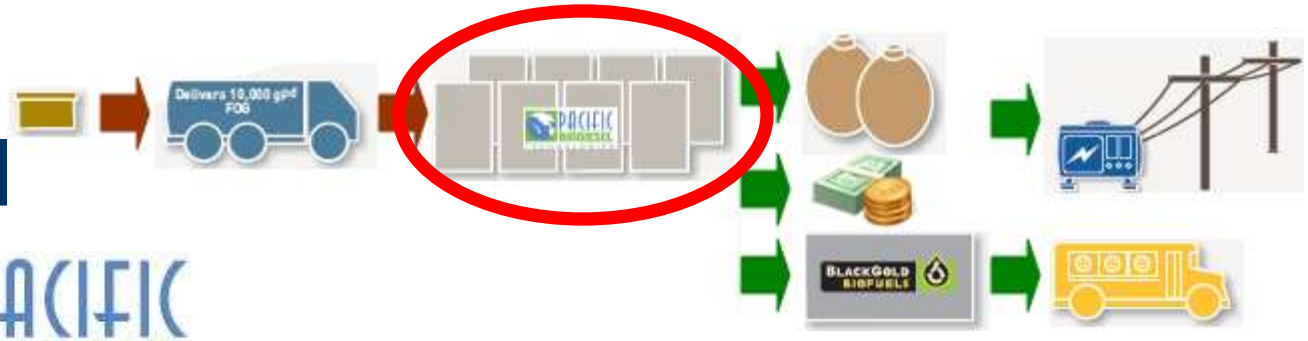
FOG Recovery (cont)



- Pacific Biodiesel Tech, LLC
- 10,000 gpd (Spec'd)
- <2% MIU*

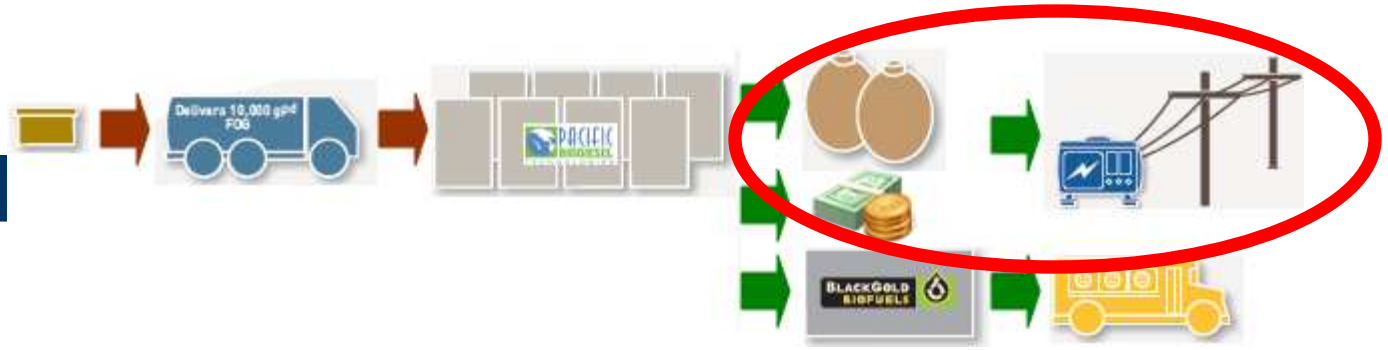
MIU = Moisture, Insolubles, and Unsaponifiables

FOG Recovery (cont)

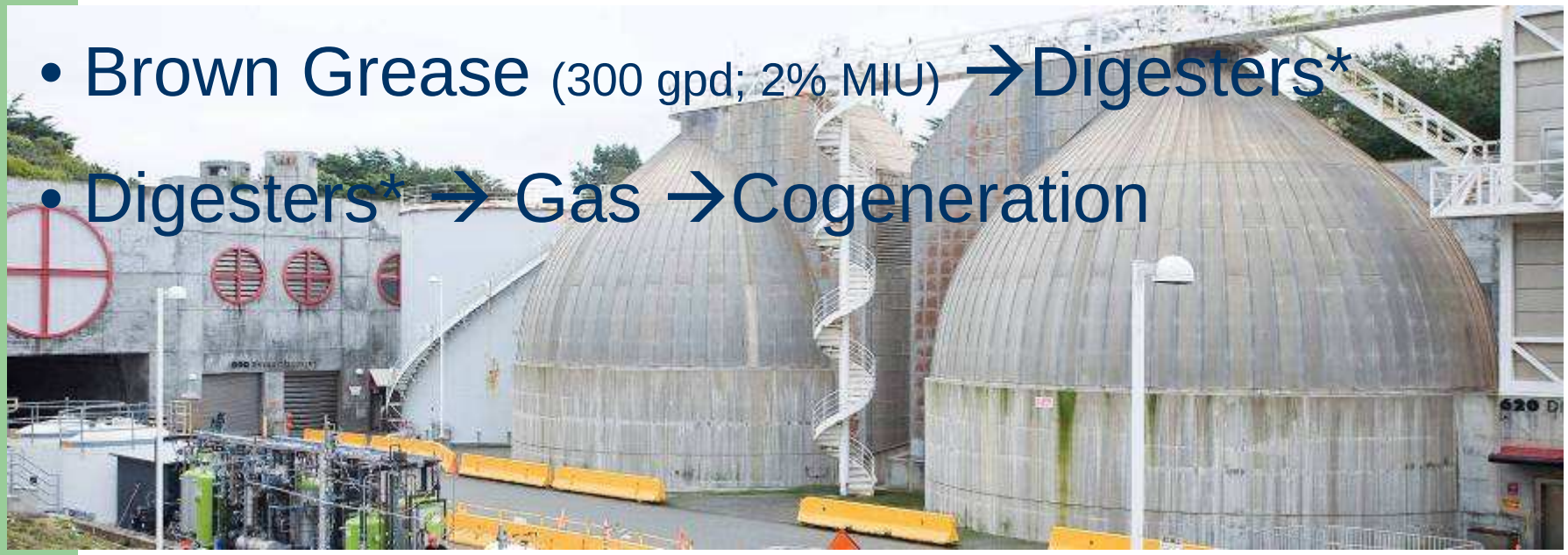


- ~Gravy Separator

Energy Generation



- White Water (~9,700 gpd; 1% FOG) →Digesters*
- Brown Grease (300 gpd; 2% MIU) →Digesters*
- Digesters* → Gas →Cogeneration



* Digesters = Anaerobic Digesters

Energy Generation (cont)

- Brown Grease Sales
- Cogeneration
- Boiler Fuel:
  - ✓ Arizona, Hawaii, Oregon, and Nevada
  - ✗ California

Biodiesel Production (cont)

Biodiesel Production

BLACKGOLD BIOFUELS

Converting our Crudest Wastes into our Cleanest Fuels

- BlackGold Biofuels, Inc
- 300 gpd (Spec'd)
- ASTM D6751

Project Outcomes

- Greenhouse gas analysis
- Socioeconomic analysis
- Business case
- Technical report

Questions?