Regional Food Waste Anaerobic Digester

Presented by:

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Environ Strategy Consultants, Inc.

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Environ Strategy Corporate Highlights

- Founded in 1997 by President Jinghui Niu, P.E.
- ESCI's corporate headquarters is located in Orange, CA with branch office in Sacramento
- ESCI is conducting several ongoing alternative energy projects located throughout CA, NV, OR and WA
- ESCI has 40+ Environmental Professional Engineers, Geologists and Environmental Technicians
- Over 25 years of hands-on biologic treatment experience including food waste Anaerobic Digesters

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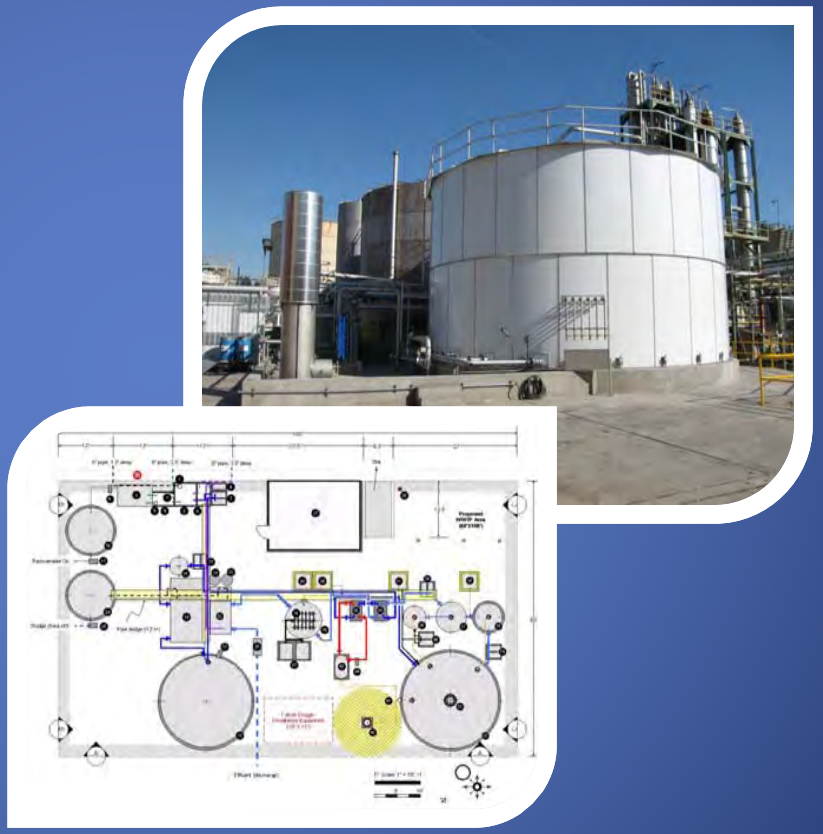
ESCI Experience with Food Waste Anaerobic Digester (AD) Projects.

- Inland Empire Utilities Agency (IEUA) – Liquid and solid food waste
- MillerCoors LLC – Brewery waste and wastewater
- Ventura Foods LLC – Food processing oily wastewater
- Sunkist – Citrus juice processing wastewater



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IEUA RP-5 Anaerobic Digester Site Plan

Site Aerial

RP-5 SHF Background

- IEUA is the POTW
- IEUA built RP-5 Solids Handling Facility (SHF) in 2002 for AD of Dairy and Food Waste in Chino CA
- State of California & Federal Grant Funds = $17M to date-Total investment approx. $40M inc. land
- Solid Dairy Wastes from local farms were received and placed into a Plug Flow Digester starting in 2002
- IEUA operated the plant for several years using dairy food waste to create biogas unsuccessfully
- In 2005 two above ground stirred digesters were added to allow the introduction of food waste to supplement the dairy waste
- The two additional digesters are 1.2 MG each in capacity

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RP-5 SHF Background (continued)

- IEUA shut it down in 2009 due to low gas production and lack of financial resources to continue
- IEUA hired a consultant to study the options going forward
- Consultant cited need of adequate feed stock was main cause of lack of gas and generation of funds; recommended lease to third party
- IEUA issued an RFP to establish a lease agreement with a third party to operate RP-5 SHF and ESCI was selected
- ESCI has a 10 year lease to operate the facility and use food waste for biogas production and sell power to IEUA
- ESCI took over in 2010 and began liquid food waste operations in August 2011

RP-5 Infrastructure

- 15 acre site
- Administrative Office
- Solids Receiving Building
- Plug Flow Digester (1MG)
- Two Stirred AD Reactor Tanks (1.2MG each)
- 4 Storage Tanks for Liquid Food waste (15k gal each)
- 2 - 1.5 MW engines
- BioFilter for Odor Control
- Biogas Compressor & Tanks

IEUA Permitting

Existing permits:

- EA Notification for solid food waste processing.
- Revising air discharge permit increased food waste and biogas generation volumes.
- ESCI worked with IEUA to obtain a wastewater discharge permit to industrial sewer.
- Some of the permit revisions may require additional CEQA review however existing CEQA is adequate to start.

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Current Status

- Start-up in January 2012
- Liquid food waste from local food producers
- Adding solid food waste processing equipment at the front end of the system
- Power generated from the biogas sold to IEUA for the first phases
- Pilot for CNG

Repairs to Existing Equipment

- Digesters were filled with solids and required cleaning
- Pipes had solids in them and required cleaning
- Electronic controls and equipment needed repair
- Pumps and other equipment required repairs or replacement
- Methane flare had to be repaired
- Biofilter materials and piping was replaced
- Food waste tank piping had to be repaired
- Gas and wastewater piping had to be repaired

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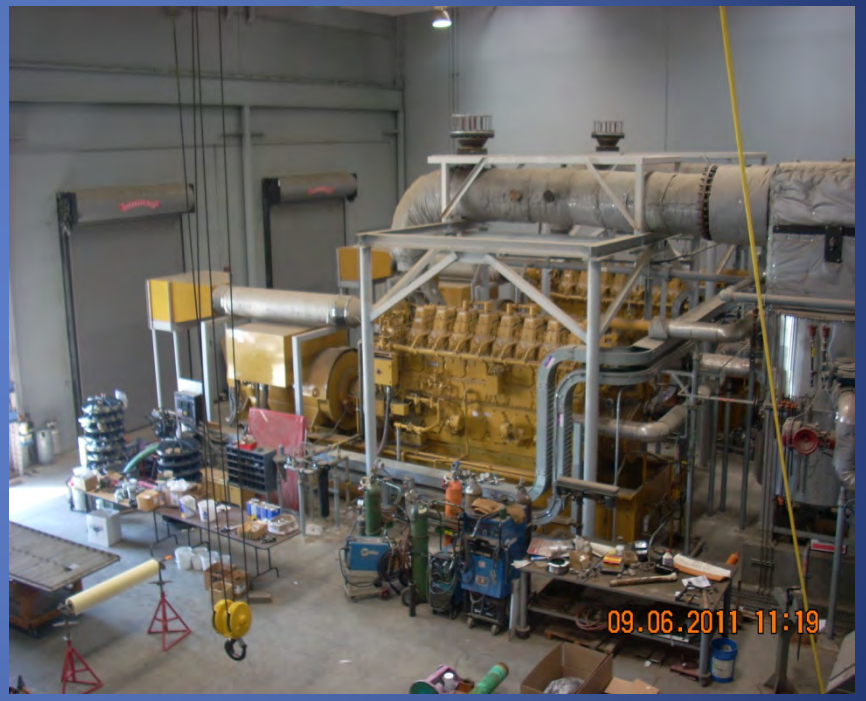
Start up Considerations

- Filled digesters with waste water to check for leaks
- Added seed sludge and liquid food waste
- Methane was created and sent to the flare and boilers
- Adjustments were made to chemical dosing to sustain methane content
- Additional liquid food waste is added as biologic activity increases in the digester
- Engines require commissioning on biogas and source testing
- Biofilter closely monitored and operated to minimize any odor issues



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Start up Considerations (cont)

- Mixing inside the digester can be improved and various methods are available (best if mixing equipment is added before filling the digester)
- Flare should be sized for the appropriate flow and there should be an ability to adjust the burners
- The solids removal systems should utilize various technologies with cost reduction as a major factor
- Air permit revisions need to be obtained during pre-start up phase

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Start up Considerations (cont)

- Equipment startup and shakedown process always generates more equipment repairs than expected– start testing and repairs early
- Create a strong communication link between the operations team and management – builds trust and can expedite task review/approval
- Air permit rules and regulations are complex and dynamic – communicate project needs to air district to facilitate timely permit review and approvals
- Waste contracts need to be negotiated and in place with a variety of food waste sources to provide the best possible selection of feedstocks

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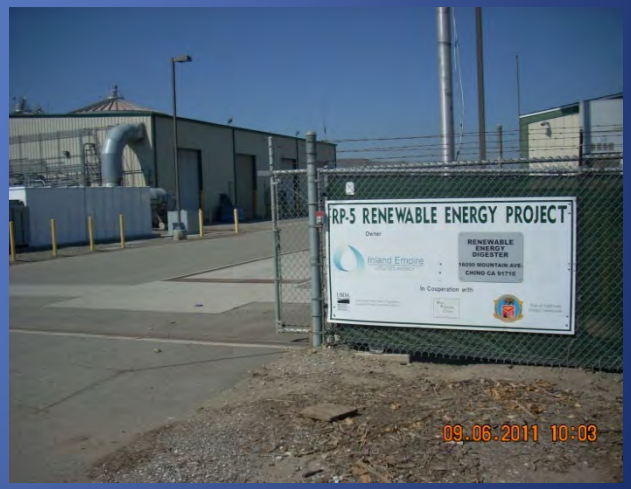
IEUA AD Project Summary

- Full Scale Project- 200 to 500 tpd of Food Waste provided by local commercial sources
- Largest Food Waste AD Project in California
- Renewable Energy from Biomass- Food Waste to Biogas via the AD system
- Site/Facility Permits are *In-place*- Operation can Start Quickly compared to other AD projects
- Critical/Key Equipment is *In-place*- and some equipment is new and never been used
- Started Food Waste AD in January 2012- sooner than other food waste AD projects in California
- Eliminates Up to 50 Daily Truck Trips– Food Waste from local sources is diverted from landfills and consumed by AD process with methane recovery



Questions ?

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Thank you

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