

Urban-Agricultural Community Digester Project

Briefing to Joint Committee on Energy Supply and
Energy Conservation

December 4th, 2008

By

Mason Conservation District



Purpose

- To provide information on:
 - Urban-Agricultural Community Digester Concept (UAC Digester)
 - Mason Conservation District Digester Project
 - Public Benefits of an Urban-Ag Community Digester Operation to recycle Organic Solid Wastes

Bottom Line

Processing Urban and Agricultural Organic Waste in a Community Anaerobic Digester can do the following:

- Reduce Water Pollution in Puget Sound
- Reduce Waste Volume shipped to Landfills
- Locally produce Renewable Energy
- Convert Waste to Fertilizer for Washington Farms
- Produce Revenue instead of just Consuming Cash for organic waste disposal and environmental clean-up

Washington Communities & Agriculture can now support and sustain each other with Community Anaerobic Digesters.

Agenda

- Background: How Hood Canal Low-Dissolved Oxygen Problem inspired the Urban-Ag Community Digester Concept
- Mason CD Digester Project:
 - Project History
 - Current Status
- Describe how the Urban-Ag Digester Operation will divert and recycle Organic Wastes
- Describe how Urban-Ag Digesters can sustain Washington Communities, Agriculture, and the Environment

Background

- Hood Canal Low Dissolved Oxygen:
 - Excess Nutrients → Large algae blooms
 - Algae blooms die off → Bacteria consumes algae
 - Bacterial process consumes Dissolved Oxygen
 - Result: Massive fish kills
- Shellfish Contamination is Major Problem!
 - Shellfish are filter-feeders that consume dissolved nutrients
 - Large Shellfish Areas in Hood Canal LDO Area closed due to bacterial contamination
 - Reduced Shellfish Farming = Reduced Nutrient Removal

Man-Made Nutrient Sources in Hood Canal

- 60%: Septic Systems
- 14%: Agricultural Animal Manure
- 13%: Salmon Carcasses
- 11%: Storm Runoff, incl. Fertilizer
- 1%: Forestry Fertilizer
- >1%: Point Source Discharge

Source: Hood Canal Low Dissolved Oxygen Preliminary Analysis and Corrective Action Plan, Puget Sound Action Team, May 6th, 2004

Evolution of Urban-Ag Community Digester Concept

- First: Digest Livestock & Fishery Wastes
 - Reduce Hood Canal Nutrients by 27%
 - Eliminates bacterial contamination
 - Reduces imported Farm Fertilizer
- Second: Include Food & Yard Waste
 - Hood Canal Nutrient Reduction increased to 38%+
- Third: Divert Municipal Organic Wastes from Landfills to Digester
 - Service Area now includes Oakland Bay Shellfish Protection District & other Sensitive Areas
 - More Participants = More Economical
 - Integrate into Existing Solid Waste System

Mason CD Urban-Ag Community Digester Project

- PSAT Innovative Approach Grant to analyze Anaerobic Digester benefits to Hood Canal – Final Report, 2006
- \$500,000 grant from Washington Conservation Commission to develop project
- Request for proposal issued for Feasibility Analysis & Preliminary Design

Mason CD UAC Digester Project: Current Status

- Digester Operation is economically feasible
- Cost to Build: \$3.5M
- Building site: Co-Located with Mason County Solid Waste Transfer Site
- Financing is nearly complete:
 - Existing \$500K Grant
 - \$2M+ committed from Private Lender
 - Requested Funding from Energy Freedom Program to form unique public-private partnership w/ Equity Investors
- Permitting discussions underway w/ DOE
- Planned Construction Date: Summer, 2009

Mason CD Urban-Agricultural Community Digester Operation

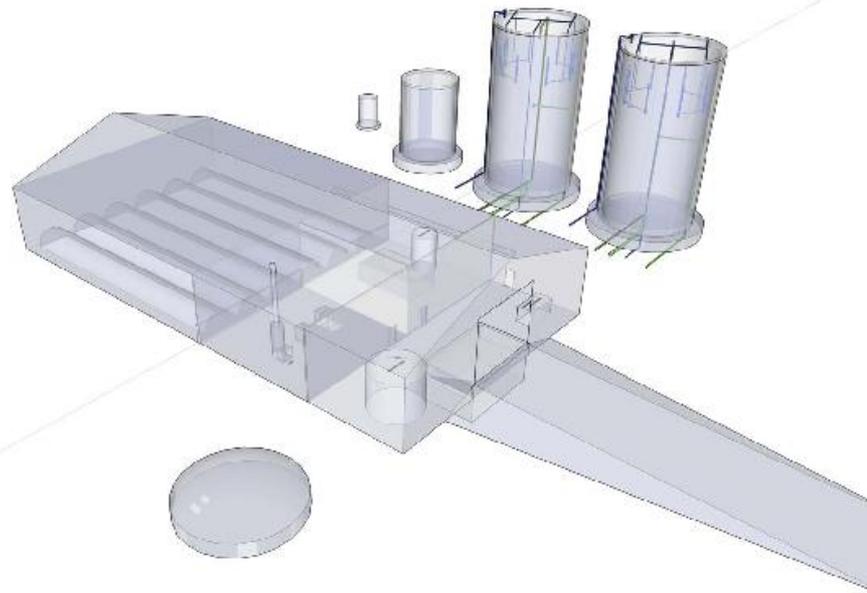
- Hood Canal farm & fishery wastes collected, shipped to Digester (<10 miles)
- Municipal waste collectors shift to 2-container pickup, organic waste delivered to Digester
- Digester destroys pathogens & produces solid or liquid fertilizer, clean organic fiber, and pipeline-quality biogas
- Fertilizers → Hood Canal Farms
- All other Fertilizer & Fiber → Top-Soil Producer
- Biogas Fuel pipeline to State Prison Boiler Plant
- Greenhouse Gas Credits also produce Revenue
- \$ Revenue pays for Construction & Operations

Project Layout Views



**DIGESTER SITE AND
GAS CONNECTION @ STATE PRISON**

Mason Conservation District
Community Digester and Nutrient Recovery Facility



Environmental Energy & Engineering Co.

Mason Conservation District

Public Benefits – Some, but not all!

- Protects Hood Canal now & Puget Sound in the future
- Sustain Ag & Shellfish Farms by eliminating pathogens & recycling farm waste to fertilizer
- Reduces organic waste shipments to landfills
- Reduces sanitary sewer loading from food waste
- Community digester revenues offset operating costs at a savings to the public & fund other conservation efforts
- Locally-produced renewable energy reduces dependency on imported fossil fuels
- New Energy Jobs promote Rural Development

Cost Effectiveness: Sewer vs. Community Digester

- Sanitary Sewer for Hood Canal:
 - \$60M (est.) to remove 60% of man-made nutrients
 - Unit Cost: **\$1,000K per 1% Reduction**
 - Built at Taxpayer Cost, supported by fees
- Community Digester for Hood Canal
 - \$3.5M to remove 38% of man-made nutrients
 - Unit Cost: **\$92.1K per 1% Reduction**
 - Generates Revenue for operation and to pay back construction costs

This does not account for additional benefits to areas served outside of Hood Canal.

Conclusion

- Mason CD Digester ready for construction
- Project will demonstrate Urban-Ag Community Digester benefits for Puget Sound
- Project will be truly successful when more Urban-Ag Community Digesters are put into operation