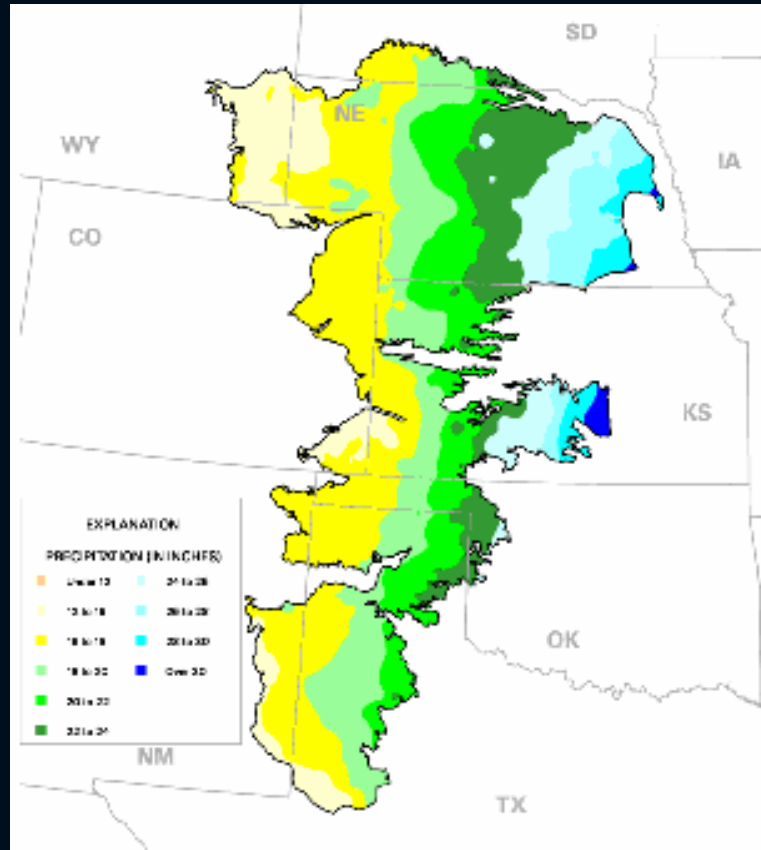


**Recharge The Ogallala  
And Other Aquifers Through  
Waste-To-Energy  
Technologies**

# Ogallala Rainfall Map



# **Waste-To-Energy**

**Is marketed and developed as**

## **BioWaste Energy Regional Industrial Parks**

- 💧 **Each park treats sanitary wastewater, municipal solid wastes, food processing wastes, and biodiesel refining wastes.**
- 💧 **All organic wastes can be accepted.**
- 💧 **Each Park is operated by BioWasteEnergy, A Division of WaterSmart Environmental, Inc.**

# Zero Capital Costs For

💧 Cities

💧 Counties

💧 Utilities

💧 Industrial Waste Generators

💧 Agricultural Waste Producers

💧 Animal Feed Lots

💧 Landfill Operators

# Regional Industrial Parks

- 💧 No tax money for their construction. Project financing is raised from financial markets. Sales and property taxes will not increase due to park construction.
- 💧 Always generate significant renewable energy credits because they have a positive impact on global warming. These credits increase park profits.
- 💧 Always increase farming property worth by creating greater value per acre than existing use.
- 💧 Have zero emissions to the environment.
- 💧 Have zero wastes that require landfill disposal.
- 💧 Always create both temporary and permanent jobs.

# Regional Industrial Parks

- 💧 **Generate 100% of a community's electricity demand thereby permitting a city to eventually disconnect from the grid.**
- 💧 **Generate 100% of a community's diesel fuel demand with biodiesel as a perfect replacement for petroleum diesel.**
- 💧 **Generate 100% of a community's demand for natural gas since digester methane gas is a perfect replacement for pipeline supplied natural gas.**
- 💧 **Enable the use of compressed natural gas (CNG) fuel for gasoline powered engines. CNG is cleaner burning than gasoline and significantly extends engine life.**

# Regional Industrial Parks

- ◆ Supply 100% of the local demand for fresh fish through fish farming activities. All fish raised will be Mercury free by being grown under cover. Mercury-free fish will be exported to the marketplace. Fish farming will be practiced 365 days/year using waste heat energy for heating of pond water during winter months.
- ◆ Produce biodiesel via microalgae farming 365 days/year.
- ◆ Fish and microalgae farming generate far greater value/acre than all other food production products. Processing fish and biodiesel refining are “value added” activities for the economic benefit of local farmers.

# Regional Industrial Parks

- ◆ Allow the full privatization of a community's wastewater treatment plant.
- ◆ Convert the community's potable water plant to membrane treatment. Membrane treatment is far more secure from terrorist attack than all lesser forms of water treatment. The cost of membrane conversion is included within total project financing. If the water plant is fully privatized the cost of potable water to citizens and businesses decreases by 20%.
- ◆ The electricity, natural gas, CNG fuel, and biodiesel fuel will also be sold at a discount.

# Regional Industrial Parks

- ◆ Permit the continuance or elimination of community trash recycling programs. Each park will recycle ferrous and non-ferrous metals (beer and pop cans) and nothing else.
- ◆ Will accomplish stormwater treatment by beneficially using it as municipal solid waste dilution water.
- ◆ Will be organized as for-profit corporations. Each park will share its annual profits with the city or county on a 50:50 donation basis to enhance municipal payroll compensation and to help fund routine municipal projects.
- ◆ Can be implemented through a simple city or county concession agreement.

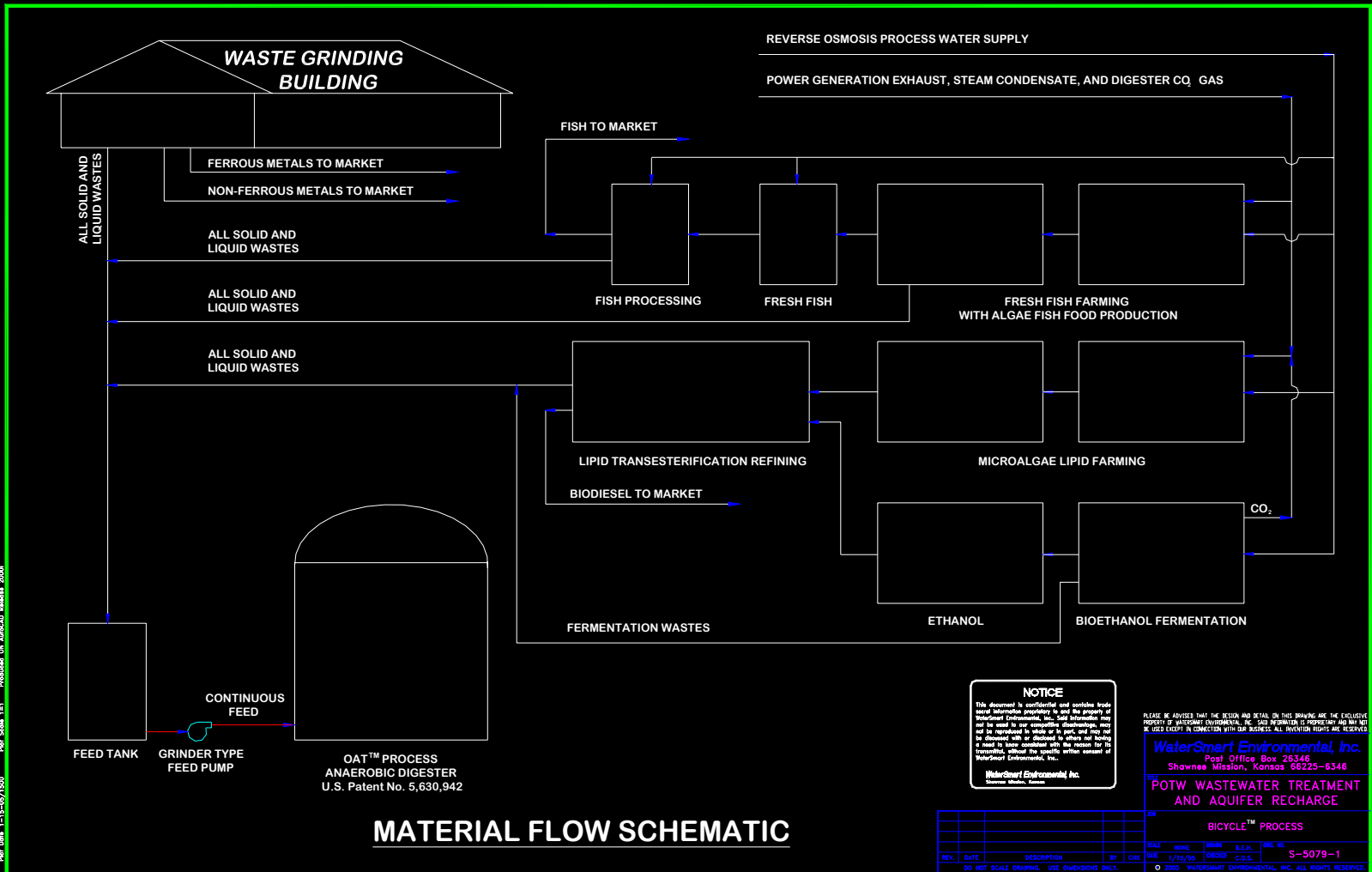
# WaterSmart's Waste-To-Energy Anaerobic Treatment Process

- 💧 Has been carefully designed to recycle 100% of its residuals.
- 💧 Therefore, no material left over requires landfill or other disposal.





# Material Flow Schematic No. 2



**MATERIAL FLOW SCHEMATIC**

Plot Date: 11-15-09/1:00 PM Plot Scale: 1:1 Plotter: HP DesignJet 2400C

# More Than 50 Existing North American MSW-To-Energy Plants Use Incineration To Generate Electricity

- 💧 Other than scrap metals no other valuable co-products are produced.
- 💧 Associated air pollution is always a concern.
- 💧 The resulting ash must be landfill disposed.
- 💧 The plant's owner/operator makes very little profit.
- 💧 Consequently, existing MSW-to-energy technology is held in low esteem by both investors and environmentalists.

# One Major Reason For Low Profits--

## The High Moisture Content Of Municipal Solid Wastes (MSW)

- 💧 The efficiency of incineration technology is **Greatly Diminished** by the ever present high moisture content of MSW.
- 💧 Incineration Technology is a **Dry Process**.
- 💧 Anaerobic Digestion is a **Wet Process**.

# Anaerobic Digestion

- 💧 Is already being used by municipalities to generate methane gas to fuel electric power generators.
- 💧 Is already being used by dairies and concentrated animal feeding operators to produce fuel and generate electricity.
- 💧 Is already being used by the food and beverage industry to generate electricity.
- 💧 Can be used to produce methane gas from municipal solid wastes.

# Each System Component Is Established Technology

- 💧 MSW sorting to remove beer and pop cans.
- 💧 Size reduction (grinding).
- 💧 Slurry mixing.
- 💧 Anaerobic digestion.
- 💧 Carbon dioxide compression.
- 💧 Methane compression.
- 💧 CNG fuel for gas generators.
- 💧 Reverse osmosis membrane treatment.

# Digester Co-Products

- 💧 Methane gas
- 💧 Carbon dioxide gas
- 💧 Digester solids
- 💧 Liquid fertilizer concentrate
- 💧 Reverse osmosis permeate water

# Methane Gas

- ◆ Is dried, compressed, and beneficially used as a fuel to power internal combustion engines or *gas turbines* to generate electricity.
- ◆ Waste heat from power generation equipment is beneficially used to make steam. The steam is used to make additional electricity. When two methods are simultaneously used to make electricity its power generation is referred to as **combined cycle**. The efficiency of combined cycle generation is about 15% greater than simple cycle electricity generation.
- ◆ The compressed methane gas (called CNG) can also be used to fuel transportation equipment like city and county buses and trucks.
- ◆ The compressed methane gas can also be used to manufacture anhydrous ammonia and urea fertilizers.
- ◆ No methane gas from the anaerobic treatment process is released to the environment.

# Carbon Dioxide Gas

- 💧 Some is used in making dry ice.
- 💧 The balance is beneficially used in the photosynthesis of carbohydrates during fish farming microalgae farming.
- 💧 No carbon dioxide will be released to the environment.

# Digester Solids Composition

- ◆ Ground glass, ground sand, ground rubber, ground leather, and ground plastics.
- ◆ Highly insoluble sulfides of Cadmium, Calcium, Copper, Iron, Lead, Manganese, and zinc, Chromium Oxides, and Calcium salts. These metals and salts are beneficial, necessary, and valuable micronutrients in soil.
- ◆ Approximately 1-1-1 N-P-K (Nitrogen, Phosphorus, and Potassium).
- ◆ Qualifies as Class “A” Biosolids in compliance with 40 CFR Part 503.
- ◆ Also qualifies as an organic fertilizer.

# Solids Management

- 💧 May be sold to the marketplace as an organic fertilizer or soil conditioner at 30% moisture content.
- 💧 May be sold as animal bedding.

# Liquid Fertilizer Concentrate

- 💧 Contains about 20-10-10 N-P-K in a concentrated 10% dissolved solids water solution.
- 💧 Will also contain soluble aluminum, magnesium, and sodium salts.
- 💧 Is sold to the marketplace.

# Reverse Osmosis Permeate Water

- 💧 Is used as boiler water make-up in producing high pressure steam for steam turbine generators.
- 💧 The balance can recharge aquifers such as the Ogallala (High Plains Aquifer).
- 💧 Orange County, California has been successfully recharging its aquifer with RO permeate water for the last 25 years.
- 💧 **If the 250 communities on the Ogallala implement the Waste-To-Energy Industrial Park Technology the High Plains Aquifer will begin refilling to its former (prior to 1940) size because recharging will then exceed depletion.**

# For Project Feasibility Studies And Other Inquiries

**Project Developer: Bestore, Inc.**

**Point Of Contact: Bob Shankel**

**Phone: 913.322.1455**

**Fax: 913.322.1455**

**email: [rshankel@everestkc.net](mailto:rshankel@everestkc.net)**