THE EVOLUTION OF A REGIONAL WASTEWATER MANAGEMENT SYSTEM: MATCHING TECHNOLOGY TO SUSTAINABILITY

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Living Earth Institute Projects

This is where Humla is. The red line is the approximate path we took. The small house symbol is where we spent the night.
Living Earth Institute Mission:
Empowering communities to protect their health and environment through the sustainable use of water resources.
The Holistic Approach

Tailoring Training

Micro-lending programs
Regional Service

- 1.5 Million customers
- 600 employees
- 350 miles (540 km) conveyance pipelines
- 5 treatment plants
- 43 pumping and 19 regulator stations

Resources created:
- Fertilizer (biosolids)
- Energy (biogas)
- Reclaimed water
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Case study- Seattle

Objective #1:
Remove contact between people and waste

Objective #2:
Employ appropriate treatment technologies

Objective #3:
Reclaiming Resources From Wastewater
Objective #1: remove contact between people and waste

- The birth of conveyance systems
- Fecal waste sent to nearest streams, rivers, marine bays

Early 1900s
Objective #1: remove contact between people and waste
Case study- Seattle

**Objective #2: Employ appropriate treatment technologies**

Seattle area builds dispersed small treatment facilities.

- Water bodies contaminated
- Beaches closed
- Small decentralized treatment ineffective

**1958 - Voters approve taxes for metropolitan system**

**1967 - Over 20 small treatment plants and multiple direct discharge pipes replaced**
Case study - Seattle

Objective #2: Employ appropriate treatment technologies

• 1960’s-Intensive **capital** expenditures began
• **Sustainable financing** for Operations & Maintenance
Our Treatment Plants Today

West Point

Brightwater

South Plant
Objective #2: Employ appropriate treatment technologies

SUSTAINABLE ECONOMICS

- System choices based on capacity to operate and maintain.
  - Technical and financial
- Asset Management Principles
- Applies to all scales
The sewer rate provides the required revenue... ($418 M)

- Monthly Sewer Rate $338 M ($36.10/month)
- Rate Stabilization $23 M
- Investment $1 M
- Other Income $10 M
- Capacity Charge-Hookup fee $46 M ($8,900/connection)

(81%)

(11%)
SUSTAINABLE ECONOMICS

... to fund the activities of the utility

- Debt Payments, ($239 M/yr)
- Interfund Loan Payments, ($20 M/yr)
- Intergovernmental Services, ($25 M/yr)
- Direct Capital Payments, ($36 M/yr)
- Operating Expenses, ($97 M/yr)
SUSTAINABLE ECONOMICS

Operating Expenses in 2013 Sewer Rate

- Salaries & Benefits ($45 M/yr)
- Biosolids ($5.0 M/yr)
- Electricity ($15 M/yr)
- Maintenance & Other Supplies, ($7.5 M/yr)
- Chemicals, ($7.3 M/yr)
- Other, ($17.2 M/yr)
SUSTAINABLE ECONOMICS

Sustainability-
Implementing technical, financial, operational elements to allow systems that we invest in today to provide services for the community long term.

Decision-making –
On what a community can AFFORD TO BUILD and what it can AFFORDABLY OPERATE AND MAINTAIN.
Objective #2: Employ appropriate treatment technologies

Asset management is essential for sustainability

- understand the **full economic cost** of equipment/assets.
- understand the long-term **capital funding** needs (20 or 100 years)
- institute **pricing and financing** strategies for today’s and future costs
- monitor the **condition and performance** of assets.
- Select the technologies/assets based on performance, **maintainability, operability**, and the customers ability to pay.
Asset Management
Objective #3: Moving from environmental protection to environmental enhancement—
“Reclaiming Resources from Wastewater”

- Using solids as fertilizer
- Producing energy
- Reclaiming water for irrigation
WHY?
Financial and environmental benefits:
• Revenue
• Avoided costs
• Energy Independence
• Carbon foot print reduction
RECLAIMING RESOURCES FROM WASTEWATER

Moving Toward Energy Independence

- Energy conserved (5-10%)
- Energy created and used on site (15%)
- Energy created and sold for profit (35%)

Equivalent to >50% energy needs
Over 7650,000 MMBTU saved

Making best alternative selections

Biosolids Production = 100,000 wet tons of per year =
Saves $8M/year over landfiling! ($13M-$5M)
OUTCOMES
SUSTAINABLE SANITATION SYSTEMS

The history of our mission

From this...

To this...
OUTCOMES
SUSTAINABLE SANITATION
SAVES LIVES

Study results: lower death rates overall (particularly in children) and absence of “diarrheal/digestive problems” as a reported cause of death.
Sustainability decisions:
- operability and maintainability
- conscious asset management
- rates and financing

Focus on the **process** for decision making... before decisions get made
SUSTAINABLE WASTEWATER MANAGEMENT SYSTEMS

Focus on the **process** for decision making

Build the sustainable future today:

Don’t build what you can build—build what you can operate, maintain, and afford
Thank You