Water Utilities of the Future

Roundtable on Science & Technology
For Sustainability
May 20, 2014

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Effective Utility Management (EUM) Water Sector

http://www.watereum.org/
Moving Toward Sustainability

Practices to:

- Optimize planning and service delivery
- Ensure a reliable source of water consistent with customer needs
- Use energy and water efficient practices and technologies that foster water reuse, resource recovery, and green infrastructure
- Create systems that are resilient to short-term disasters and longer-term climate related challenges
- Build greater citizen and stakeholder understanding and support.
EUM Core Management Areas

- Product Quality and Operational Optimization
- Customer Satisfaction and Stakeholder Understanding & Support
- Employee Leadership & Development
- Financial Viability
- Infrastructure Stability
- Operational Resiliency
- Community Sustainability
- Water Resource Adequacy

Source: Moving Toward Sustainability and Effective Practices Report, April 2014
Water Development Stages

- **Potable Community**
  - Need for reliable, secure potable water supply
  - Water Infrastructure

- **Sewered Community**
  - Need to protect human health
  - Sewer Infrastructure

- **Drained Community**
  - Need for flood protection
  - Drainage Infrastructure

- **Waterways Community**
  - Need for protection & connection
  - Point & Non-Point Source Pollution Management Including Supply Management

- **WaterCycle Community**
  - Need to address natural resource limitations
  - Water Resource Management including fit for purpose water & conservation

- **OneWater Community**
  - Need for resilient, sustainable community
  - Integration of resource recovery & Integrated community design

Adapted from: Institutional Barriers to One Water Study (Currently Underway)
Traditional Utility Model

- POTW Utility Model
- Utility Centric Impact
- Regulatory Compliance
- TMDL
- MS4 Permits
- NPDES Permits

Drives Investment in Centralized Infrastructure
Emergent Utility Model

Total Water Management

- Restore Urban Creeks and Wetlands
- Landscape Irrigation
- Public Spaces
- Potable Water Supply
- Reuse Water Supply
- Stormwater
- Wastewater

Surface Water
Ground Water
Ocean
Utility of the Future Path

POTW Utility Model

Traditional Utility Model

Utility Impact
Regulatory Compliance

Transformative Entrepreneurial Business Model
Collective Impact
Ecological Uplift

One Water Utility of the Future
Case Study: Clean Water Services
Clean Water Services At-a-Glance
Transformative Business Model

- College of Clean Water & Center of Business Excellence
- Effective Utility Management
- Program Service Levels
- Financial Plan
- Goals Share Award
- Performance Based Pay

Strategy Execution

Strategy Development
How CWS Differentiates Itself and Continuously Innovates

Regulatory Flexibility & Partnerships Provides
Capacity to Execute

Watershed Based Permitting

Creates the Elbow Room to Invest in Mother Nature

Ecosystem Market Trading

Financial Stability
Money provides the freedom to act – William Buffett

Regulatory Compliance

Efficient & Effective Capital Deployment

Efficient & Effective O&M

Affordable Rates

Construction, Start-up & Operationalization of Alternative Approaches

Efficient & Effective O&M

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Public Education & Outreach

Customer Satisfaction

Create Understanding, Support & Trust

Creates Opportunity for Alternative Revenue Streams

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Financial Stability

- Strategic Investments in Watershed Health and Resource Recovery
- Lean/Six Sigma
- Addition of Surface Water Programs

Actual Expenditures (in 1,000's of Dollars)

- BPR
- w/o BPR

Fiscal Years: '90 to '12
Utility Financials

- Capital Construction: $57,257,305 (18.9%)
- Capital Outlay: $305,400 (0.1%)
- Operating Expenses: $57,213,057 (18.9%)
- Unappropriated Ending Fund Balance: $78,505,387 (25.9%)
- Restricted Bond Proceeds: $39,681,588 (13.1%)
- Debt Service: $36,218,839 (11.9%)
- Contingency: $18,897,065 (6.2%)
- Other Fund Level Outlays: $1,795,500 (0.6%)
Organizational Mindset Shift

• Expanded Mission and Vision
  ▪ From Plants and Pipes to the Watershed
  ▪ Rebranding to Clean Water Services
  ▪ Rebranding Facilities to Clean Water Works

• Culture Shift
  ▪ From Quality to Value
  ▪ BPR to Continuous improvement Orientation
  ▪ Goal Orientation
  ▪ Entrepreneurial and Watershed Focused
  ▪ Controlling our Destiny
Enhanced Business Model

Plants, Pumps, Pipes and Public Health + Watershed Health + Resource Recovery
Water-Energy Nexus

- Energy Conservation
- Electrical Energy Generation
- Alternative Fuels Generation (CNG)
- Ecological Uplift
- Materials Recovery
- Nutrient Recovery
- Clean Water for Reuse

Clean Water Services
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Clean Water Works
Resource Recovery Facilities
Ecological Uplift & Collective Impact
On A Watershed Scale
Agricultural Ecological Uplift
Multiple Benefits & Collective Impact

Irrigation Efficiency

Wetland Enhancement

Riparian Buffer

Conservation

Water Quality

Management Plan
Urban Ecological Uplift & Community Connection
Conveyance & Field Operations
Natural System Restoration Into Infrastructure CIP
Resource Recovery

Before

After

CleanWater Services
Entrepreneurship & Innovation

• Clean Water Institute
  ▪ Not-for-Profit entity to commercialize District intellectual property and provides technical assistance for watershed approaches
  ▪ WASSTRIP is licensed through Clean Water Institute to a private company and is generating revenue for the District
  ▪ Creation of Clean Water Grow Product
  ▪ Other Innovations currently in research

• Willamette Partnership
  ▪ Incubated and successful spin-off of a Not-for-Profit focused on Ecosystem based approaches to Trading.
Water-Energy Nexus

- Energy Conservation
- Electrical Energy Generation
- Alternative Fuels Generation (CNG)
- Ecological Uplift
- Materials Recovery
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- Clean Water for Reuse

Clean Water Services
Energy’s Financial Impact

Operating Budget = $57M

- Labor: 59%
- Other M&S: 20%
- Contracted Services: 7%
- Electricity: 7%
- Capital Outlay: 1%
- Natural Gas: 1%
- Chemicals: 5%

CleanWater Services
Annual Power Usage

- **2009**: 56,338,718 kWh
- **2010**: 59,394,966 kWh
- **2011**: 59,229,455 kWh
- **2012**: 59,763,648 kWh
- **2013**: 59,040,171 kWh

*4% population increase for 2009 - 2013*

**Wastewater Treatment Department**
Annual Power Usage
kW-hr

- Cogen: 21 million (35%)
- PGE: 38.5 million (64%)
- Solar: 0.5 million (1%)
<table>
<thead>
<tr>
<th>Project</th>
<th>Total Cost</th>
<th>Grant/Incentive</th>
<th>District Investment</th>
<th>Annual Energy Savings</th>
<th>Payback</th>
<th>Date Completed</th>
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<tbody>
<tr>
<td>RC Digester Tubes</td>
<td>$681,305</td>
<td>$549,097</td>
<td>$132,208</td>
<td>1,000,000 kWh</td>
<td>2 years</td>
<td>2013</td>
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<td>Durham Solar</td>
<td>$524,238</td>
<td>$302,445</td>
<td>$221,793</td>
<td>450,000 kWh</td>
<td>8 years</td>
<td>2013</td>
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<td>RC Hydronic Heat</td>
<td>$144,626</td>
<td>$72,313</td>
<td>$72,313</td>
<td>261,582 kWh</td>
<td>5 years</td>
<td>2013</td>
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<td>Hillsboro UV Upgrade</td>
<td>$490,000</td>
<td>$200,273</td>
<td>$289,727</td>
<td>625,853 kWh</td>
<td>11 years</td>
<td>2013</td>
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<td>RC East Blower VFD Upgrade</td>
<td>$284,402</td>
<td>$121,528</td>
<td>$162,874</td>
<td>316,477 kWh</td>
<td>6 years</td>
<td>2012</td>
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<td>Durham MLR Pump VFD Upgrade</td>
<td>$124,179</td>
<td>$42,942</td>
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<td>193,094 kWh</td>
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<td>RC Aeration Mixer VFD Upgrade</td>
<td>$43,569</td>
<td>$21,785</td>
<td>$21,784</td>
<td>327,976</td>
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<td>Durham Turbo Blower</td>
<td>$461,000</td>
<td>$177,054</td>
<td>$283,946</td>
<td>553,294</td>
<td>9 years</td>
<td>2013</td>
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</table>
Honoring our Past...Charting the Future

Celebrating 40 Years of Clean Water
Questions?

dennisd@cleanwaterservices.org