

# **A Customized Approach to Improve Energy Efficiency at Water and Wastewater Facilities**

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# Presentation Outline

- Sustainable Water Infrastructure in Region 5
- The importance of energy Management
- Benchmarking in Portfolio Manager
- Indiana Energy Management Pilot Project



# ASCE 2009 America's Infrastructure Report Card

Aviation D

Bridges C

Dams D

Drinking Water **D-**

Energy D+

Hazardous Waste D

Inland Waterways D-

Levees D-

Public Parks & Recreation C-

Rail C-

Roads D-

Schools D

Solid Waste C+

Transit D

Wastewater **D-**

# Sustainable Water Infrastructure



The EPA Gap Analysis Report (2002) estimated if capital spending & investments in O&M remained at current levels, the potential gap in funding for water and wastewater infrastructure (vs. needs) between 2000 and 2019 would be **\$533 Billion**

# Sustainable Water Infrastructure



## Water shortage looms

Oct. 12, 2009 (Crain's) — The Chicago region faces a long-term water shortage that could hit some outlying suburbs by 2015, much sooner than previously anticipated, according to recently updated studies.

## County Water Rates May Surge

November 25, 2009 (Tribune) Customers [in a Chicago Suburb] may face a steep hike to replenish financial reserves that have all but evaporated. ... considering increasing water rates **42 percent** ...

GAO at least 36 states are anticipating water shortages by 2013

# Sustainable Water Infrastructure

...has the capacity to consistently and reliably perform now and over a long time horizon.



Courtesy ccorley

***That which is  
unsustainable is destined  
to fail at some point.***





# The Consequences of Infrastructure Failures



# The Region 5 SWI approach



## **Better efficiency through**

- Energy management
- Asset management
- Water efficiency
- Green infrastructure

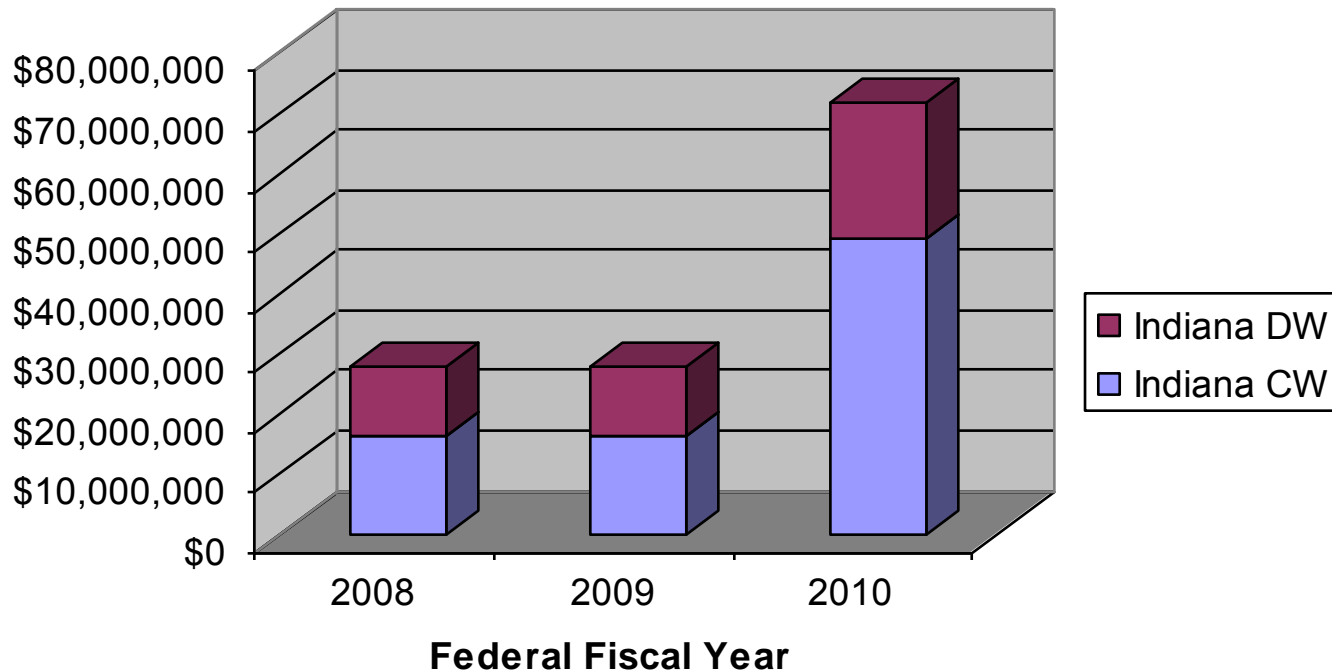
## **Better balance of wastewater and water system revenue and cost through**

- Full-cost pricing models
- Taking full advantage of SRF-subsidized financing



# Note: Increases in Revenue will Only Get us So Far

SRF Capitalization Grant Amount (Indiana)



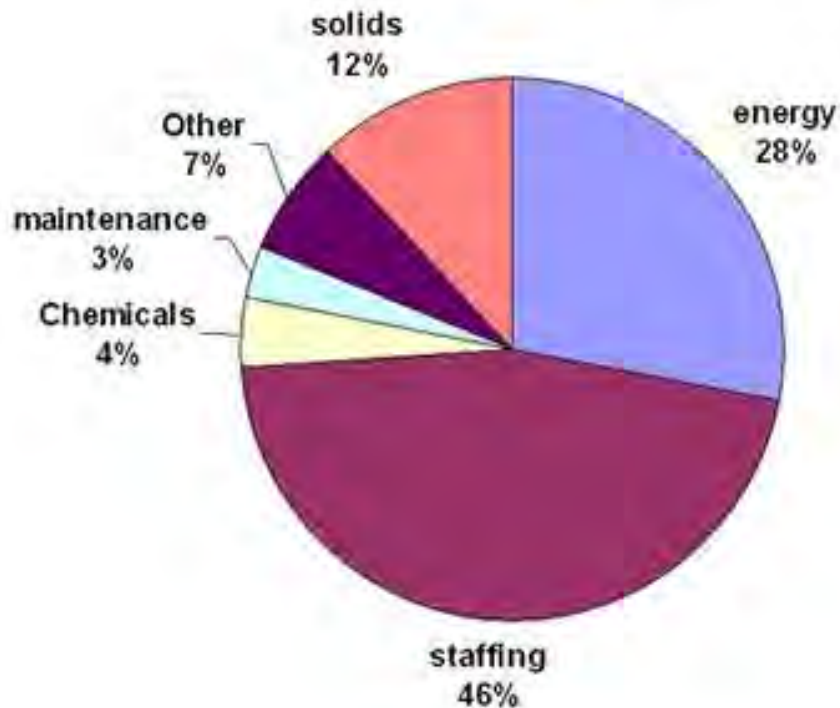
# Why Focus on Energy Management?

- **Water and Wastewater treatment represents about 3% of the nation's energy consumption**
  - \$4 billion spent annually for energy
  - Equivalent to about 56 billion kWh
  - Equates to adding about 45 million tons of greenhouse gases
- **Energy represents a controllable cost of providing water or wastewater services to the public**

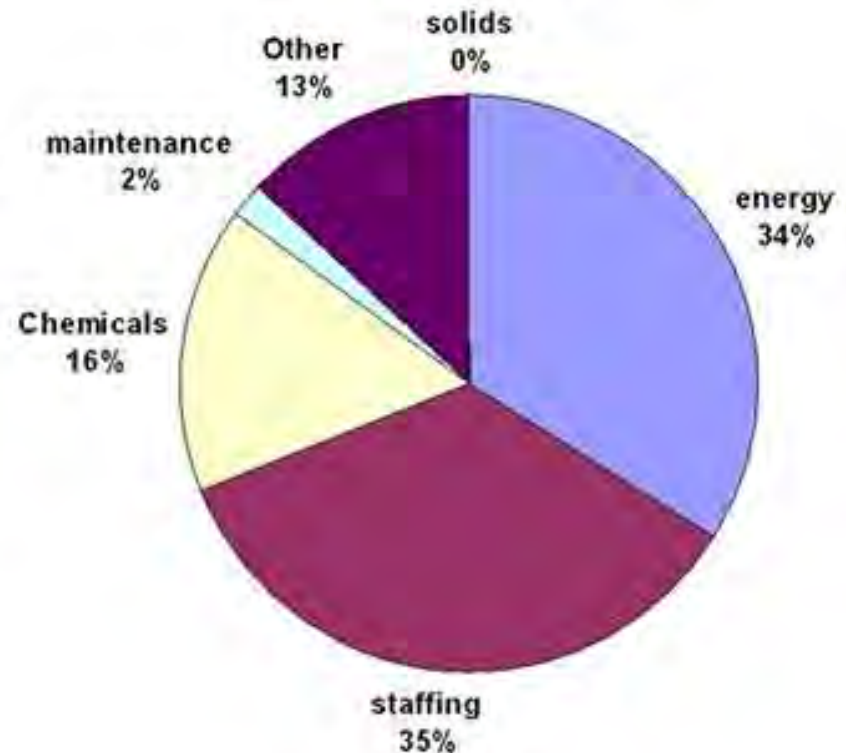


# Efficiency Opportunities: Industry Average O&M Budgets

Wastewater Plant



Water Plant



Courtesy Efficiency Maine

# Why Focus on Energy Management?

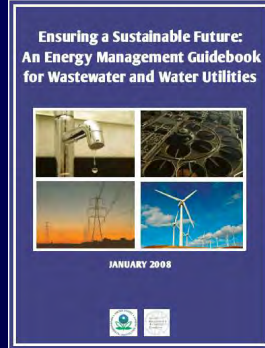
- **Energy issues are not going away** and are likely to only get more serious
- **Individual projects are fine but something is needed to pull them together,** systematically, to ensure continued focus on energy efficiency

# Energy management is an opportunity to address...

- Climate change
- Operating costs
- Areas of progress



# Resources and Events



- Energy management guidebook (2008)
- Energy management workshop (Lafayette, 2008)
- Energy management brochure (2009)
- Energy efficiency & nutrient control workshop (Edwardsville, 2009)
- Portfolio Manager Assistance (2010)
- Energy management pilot EPA Reg. 5 & IDEM (Statewide, 2009-2011)





# Customized Approach to Improve Energy Efficiency

[www.epa.gov/waterinfrastructure/bettermanagement\\_energy.htm](http://www.epa.gov/waterinfrastructure/bettermanagement_energy.htm)

## Designed to help utilities:

- Systematically assess current energy costs and practices
- Set measurable performance improvement goals
- Monitor and measure progress over time

**Uses a management system approach for energy conservation, based on the successful Plan-Do-Check- Act process [based on Environmental Management Systems (EMS)]**

### Ensuring a Sustainable Future: An Energy Management Guidebook for Wastewater and Water Utilities

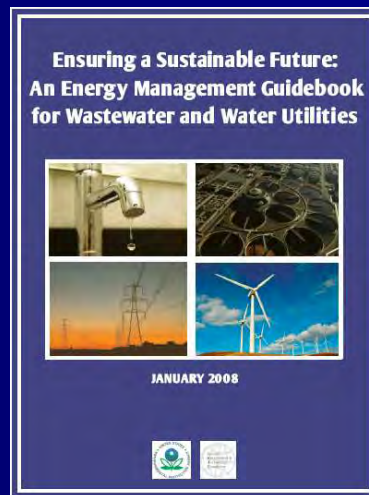


JANUARY 2008



# **“Customized”**

**A flexible process to take advantage of emerging opportunities and unique circumstances of each utility.**



# Guidebook Approach “P-D-C-A”

1. Make a commitment
2. Pay attention
3. Write things down
4. Do the work and Check the results
5. Let others know
6. Repeat



# How to Customize Your Energy Management

## 1. Make a commitment

*Visibility, commitment and involvement are keys to success.*

- Establish energy improvement leadership (key individuals)
- Gain top management commitment (board, mayor)
- Get employee buy-in



# How to Customize Your Energy Management

## 2. Pay attention

- Find the bills and identify baseline energy use
- Identify energy-using assets and practices
- Develop measurable energy objectives and targets
- Establish an energy champion / energy team
- Consider your energy Challenges
- What have you done already?
- What is missing?



# How to Customize Your Energy Management

## 3. Write things down

- Define your priorities to help focus energy goals
- Use decision criteria to rank priorities
- Write down your energy improvement plan
- Monitor and measure progress





# How to Customize Your Energy Management

## 4. Do the work and Check the results

- Provide support and resources to carry out the plan
- Allow for a dynamic and adaptable process



[http://farm1.static.flickr.com/246/523072112\\_9f96719d85.jpg](http://farm1.static.flickr.com/246/523072112_9f96719d85.jpg)

# How to Customize Your Energy Management

## 5. Brag

- Peers, employees, management, community
- Say it in terms people understand
- Get the recognition you deserve



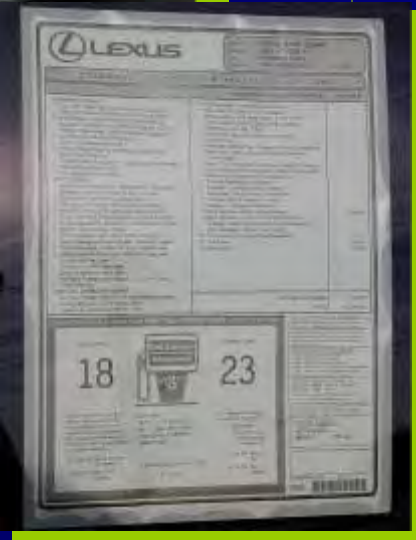
# Benchmark:

- Compare energy use of your facility to a national average of similar facilities.
- Compare energy use against a baseline to track energy use and improvements.
- ENERGY STAR provides a free online benchmarking tool called Portfolio Manager.

# How Well Does the Facility Perform?



Fuel Efficiency  
MPG



Is 18 MPG high or low for an automobile? Answer: Low

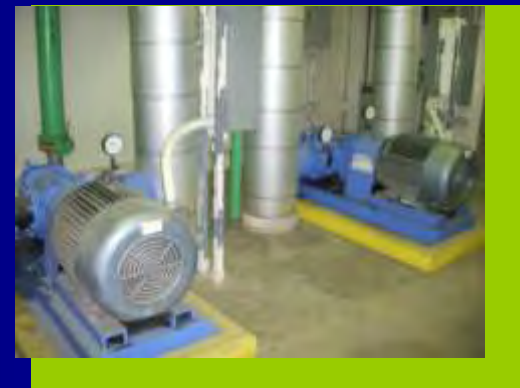
Is 1500 kWh/MG high or low for a wastewater plant? Answer: Don't know

Energy  
Performance

EPA  
Benchmarking



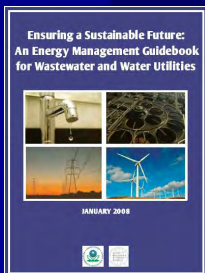
Facility Name	City	State	Population	Flow (MGD)	Energy (kWh/MG)	Cost (\$/MG)
Alameda County Wastewater Treatment Plant	Alameda	CA	1,100,000	100	1,500	\$0.15
San Francisco Wastewater Treatment Plant	San Francisco	CA	800,000	100	1,500	\$0.15
Los Angeles Wastewater Treatment Plant	Los Angeles	CA	4,000,000	100	1,500	\$0.15



# Benchmarking with Portfolio Manager for Wastewater



- Enter energy consumption and cost data into your a Portfolio Manager Account.
- This tool helps
  - benchmark energy performance,
  - assess energy management goals over time
  - identify strategic opportunities for savings.





# Space Types Eligible for ENERGY STAR Rating

Hospitals



Retail



Office Buildings



Hotels



Medical Office Buildings



Waste Water Treatment Plants



Courthouses



Financial Centers



Warehouses



Dormitories



Supermarkets



Schools





# Access to Portfolio Manager

[www.energystar.gov/benchmark](http://www.energystar.gov/benchmark)

- It's free, requires user name and password, and allows multiple users.
- Information is secure and confidential.

# Develop criteria that will work best at your wastewater plant

- Project feasibility
- Opportunities for renewable energy
- Energy reduction potential
- Availability of funding
- Existing need for equipment upgrade
- Return on investment
- Regulatory requirement
- Support of other priorities
- Ease of implementation



# Brag: New England Case Study

**Bravo!**

## BATH WATER DISTRICT

Replaced throttling valves with variable frequency drives on two 75 HP raw water pumps and three 150 HP treated water distribution pumps



Total Project Cost	Annual Energy Savings	Estimated Operating Cost Savings	Simple Payback	Efficiency Maine Incentive	Payback After Incentive
\$59,870	375,940 kWh	\$30,074*	2 years	\$14,968	1.5 years

\* Assumes \$0.08 / kWh blended cost in 2003

# How to Customize Your Energy Management

1. Make a commitment
2. Pay attention
3. Write things down
4. Do the work and check results
5. Brag

## 6. Repeat

- Apply lessons learned
- Adjust and correct as you get toward your goals
- An on-going process



# Indiana Energy Management Pilot Project 2009-2011

September 2009 – Pilot kick off

October 2009 to February 2010 – EPA and IDEM visited the utilities to look at plants

October 2009 to May 2010 - Monthly all hands, check-in calls. Energy Management assistance by GETF

June 2010 to August 2010 – Technical assistance on-site provided by IDEM and Siemens

September 2010 - Mid-project workshop will share lessons learned and identify energy reduction targets

September 2011 – Final report

# Project Participants

Angola WW  
Bloomington WW  
South Bend WW  
Lafayette WW

Logansport DW and WW  
Mishawaka DW and WW  
Valparaiso DW and WW  
West Lafayette WW





# Project Components

- Energy Use Benchmarking
  - Portfolio Manager
  - Collecting baseline data- tracking
- Energy Management assistance
  - Technical assistance from EPA, IDEM, Siemens
- Roundtable Discussions and monthly trainings
- Facility Improvements
- Partnerships
  - Idea sharing among participants

# Project's Expected Results

- Pilot communities gain knowledge about energy management and have customized energy management plans
- EPA and IDEM gains a set of case studies and a worked examples of the Guidebook available to share with other facilities
- Pilot communities are established as leaders in their industry and set example for other communities as energy leaders

# Energy Management



## Next Steps

- Work on an improved Portfolio Manager, and Guidebook supplement
- Gather and distribute lessons learned
- Continue to work with pilot utilities
- Provide outreach tools on energy management.

# Resources



- Portfolio Manager Quick Reference Guide  
[http://www.energystar.gov/ia/business/downloads/PM\\_QuickRefGuide.pdf](http://www.energystar.gov/ia/business/downloads/PM_QuickRefGuide.pdf)
- Energy Management Guidebook  
[http://www.epa.gov/owm/waterinfrastructure/pdfs/guidebook\\_si\\_energymanagement.pdf](http://www.epa.gov/owm/waterinfrastructure/pdfs/guidebook_si_energymanagement.pdf)

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