

# Focus on Energy

## Energy- Environment Technical Forum Clean Energy Opportunities at W/WW Facilities

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**Focus on Energy  
SAIC  
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# Presentation Outline

- Focus Program
- Focus Approach
- Implementation
- Real World
- Best Practices
- Questions

# Focus on Energy

## A Part of the Solution

- Residential, Business and Renewable Energy Programs
- Serves over 1,000,000 customers of 89 utilities throughout Wisconsin.
- Provide education, technical expertise and financial assistance
- Program funds come from the ratepayers (average is 1.2% of rates)
- Trade-off is paying 10 to 15% rate increases to pay for more >\$2,500 per kW power plants verses
- Focus on Energy at <\$400 per kW

# How Does It Work?

- Prescriptive/Direct Incentives
- Custom Incentives/Grants
- Technical Support
- Feasibility Study Grants
- Information & Education

# Energy Baseline

Find out where you're at  
(baseline)...

...so you can figure out where  
you want to go  
(benchmark).

# Water/Wastewater Approach

- Site surveys
- Data requested
- Discussions with operators
- Assessment approach
- Assessment report



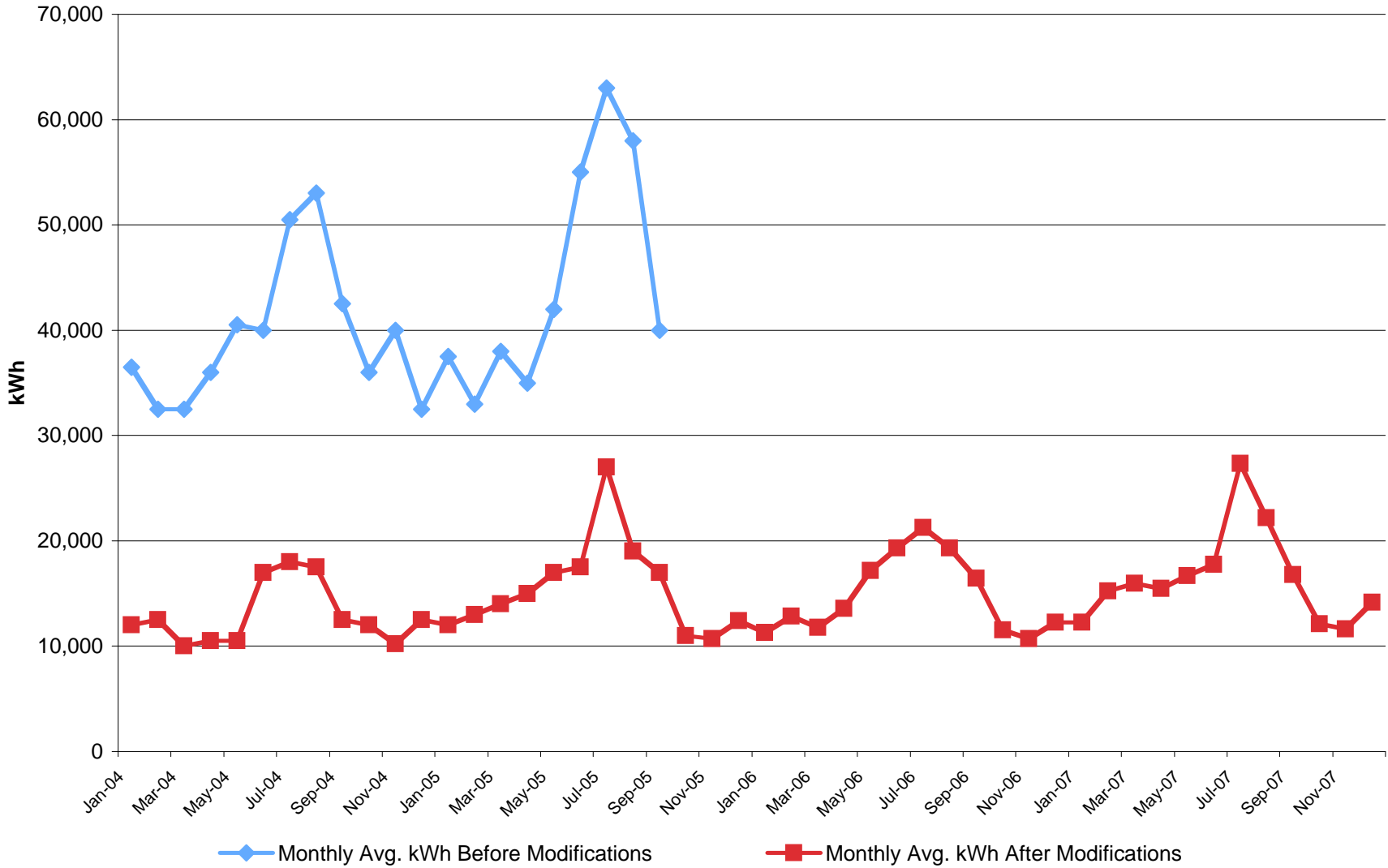
# Assessment Approach

- Explore major energy uses
- Address facility operations
- Modify/adjust operations
- Level of interest of operator
- Acceptance of assessment
- Cooperation to implement



# Energy Savings at Northern Moraine WWTF

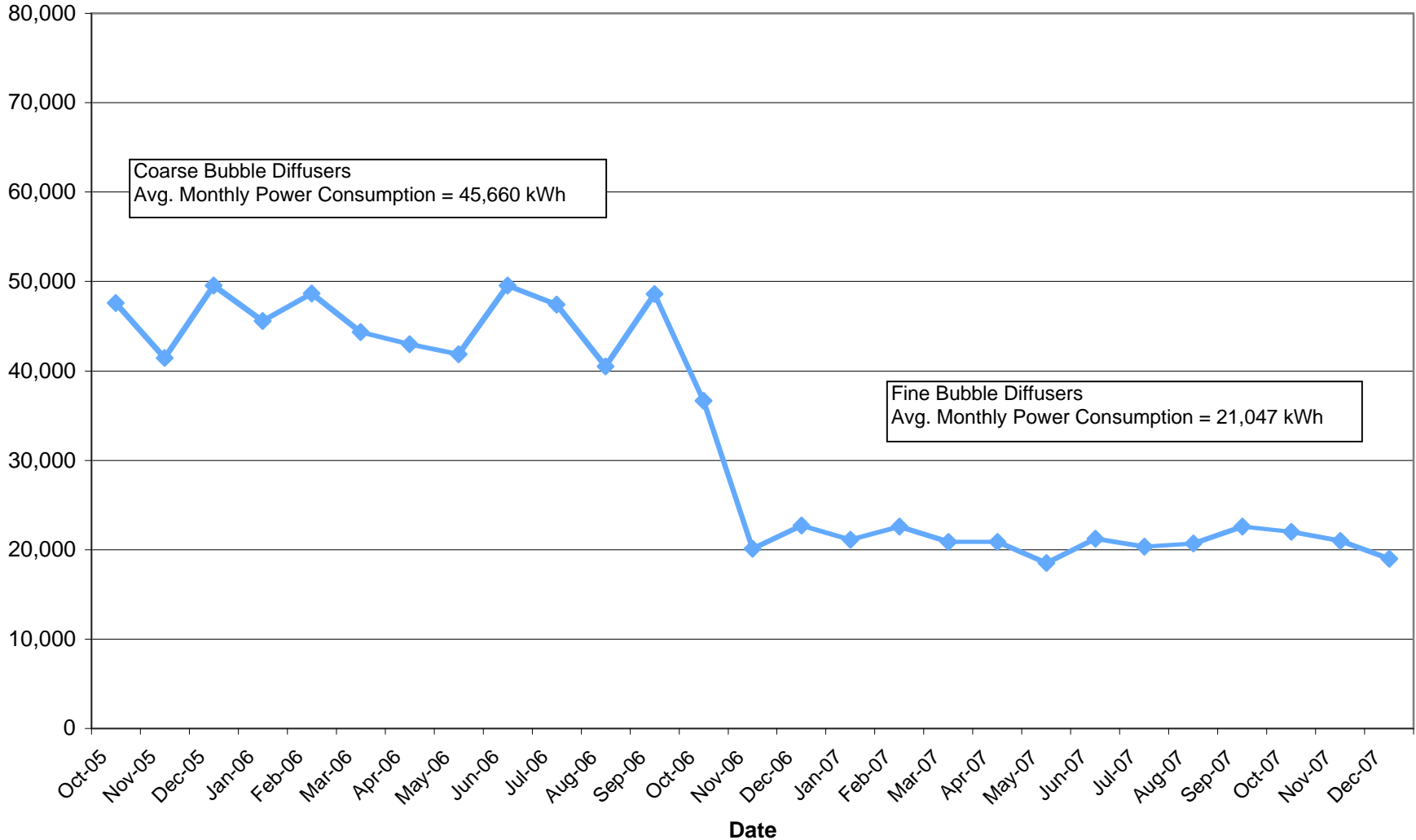
## Energy Savings Obtained Through Installed Projects Northern Moraine WWTF





# Village of Palmyra WWTF

## Village of Palmyra WWTF



# Barriers

- Not mandated, why do it?
- It works, why fix it?
- I don't get a benefit.
- Why should it be my job to save energy?
- I don't see my utility bills.
- I see my bills, but don't understand them.
- I want to maintain a DO of 5-7 in case my loading suddenly increases.
- Competition with other investments.
- EE viewed as a one-time action.

# Energy Management in the Real World

*“I’ll bet you can’t find any energy savings at my facility.”*

*“I know there are no energy savings available at my facility because I already have fine bubble diffusers.”*

*“When I became Superintendent that motor was running, so I keep it running even though I don’t know what it does.”*

*“The Mayor told me I have to use the equipment we already have because we paid for it.”*

*“Why modify anything? The system has run this way from the start up and we are meeting our discharge limits.”*

*“It’s not required, why bother?”*

# Water and Wastewater Energy Best Practice Guidebook

Provided By:



Funding for this guidebook was provided by Focus on Energy. Focus on Energy is a public-private partnership offering energy information and services to energy utility customers throughout Wisconsin. The goals of this program are to encourage energy efficiency, use of renewable energy, enhance the environment and ensure the future supply of energy for Wisconsin.

Prepared by:

**Science Applications International Corporation  
(SAIC)**

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**Characteristics of Wisconsin Wastewater Treatment Facilities  
Served by Focus on Energy**

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# General Facility Energy Best Practices

## # TITLE

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- 1 Facility Energy Assessments
- 2 Real Time Energy Monitoring
- 3 Energy Education for Facility Personnel
- 4 Electric Peak Reduction
- 5 Manage Electric Rate Structure
- 6 Idle or Turn Off Equipment
- 7 Install High Efficiency Motors
- 8 Variable Speed Technologies
- 9 Optimize Pump System Efficiency
- 10 Comprehensive Planning Before Design
- 11 Design Flexibility for Today and Tomorrow
- 12 Renewable Energy Options

# Wastewater Treatment Energy Best Practices

- | #  | TITLE                                  |
|----|--|
| 1  | Variable Frequency Drive Applications  |
| 2  | Reduce Fresh Water Consumption         |
| 3  | Optimize Flow with Controls            |
| 4  | Operational Flexibility                |
| 5  | Staging of Treatment Capacity          |
| 6  | Manage for Seasonal/Tourist Peaks      |
| 7  | Flexible Sequencing of Tank Use        |
| 8  | Recover Excess Heat from Wastewater    |
| 9  | Cover Basins for Heat Retention        |
| 10 | Optimize Aeration System               |
| 11 | Fine-Bubble Aeration                   |
| 12 | Aerobic Digestion Options              |
| 13 | Biosolids Processing Options           |
| 14 | Biosolids Mixing Options: Aerobic      |
| 15 | Variable Blower Air Flow Rate: Aerobic |
| 16 | Dissolved Oxygen Control: Aerobic      |
| 17 | Biosolids Mixing Options: Anaerobic    |
| 18 | Ultraviolet (UV) Disinfection Options  |
| 19 | Final Effluent Recycling               |

# What We Learned with Focus

- Energy awareness – management
- Knowledge of energy use is critical
- Energy efficiency without impact to effluent limits
- Significant savings available
- System assessment necessary
- Savings are long-term
- Publicize the need for energy efficiency

# What We Also Learned with Focus

- Must overcome barriers
- Designers need to become aware of value
- Need to address electric charge rates
- Need to develop more training in energy efficiency
- Require energy efficiency/education for certification
- Agencies need to address energy efficiency



# What is **THE** next step?

## What can **BE** achieved?

**Best Practice Benchmarks and Top Performance Quartiles  
for Wisconsin Wastewater Facilities**

Facility Type	Flow Range (MGD)	Average Energy Use (kWh/MG)	Top Performance Quartile (kWh/MG)	Best Practice Benchmark (kWh/MG)	Average Potential Savings <sup>10</sup>
Activated Sludge	0 - 1	5,440	< 3,280	3,060	44%
	1 - 5	2,503	< 1,510	1,650	34%
	> 5	2,288	< 1,350	1,760	23%
Aerated Lagoon	< 1	7,288	< 4,000 <sup>11</sup>	3,540	51%
Oxidation Ditch	< 1.2	6,895	< 4,000 <sup>12</sup>	4,320	37%

# IF YOU HAVE QUESTIONS, PLEASE CONTACT:

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