

# NH's Unique Approach to Wastewater Energy Efficiency

**EVERSOURCE**

**Mark Toussaint, CEM**  
**Eversource Energy**

**and**

**Sharon Nall, P.E.**  
**NHDES**




**April 12, 2018**

*Working Together to Reduce Energy Use,  
Protect the Environment, and Save Money*



The unknown is scary and not  
knowing is risky

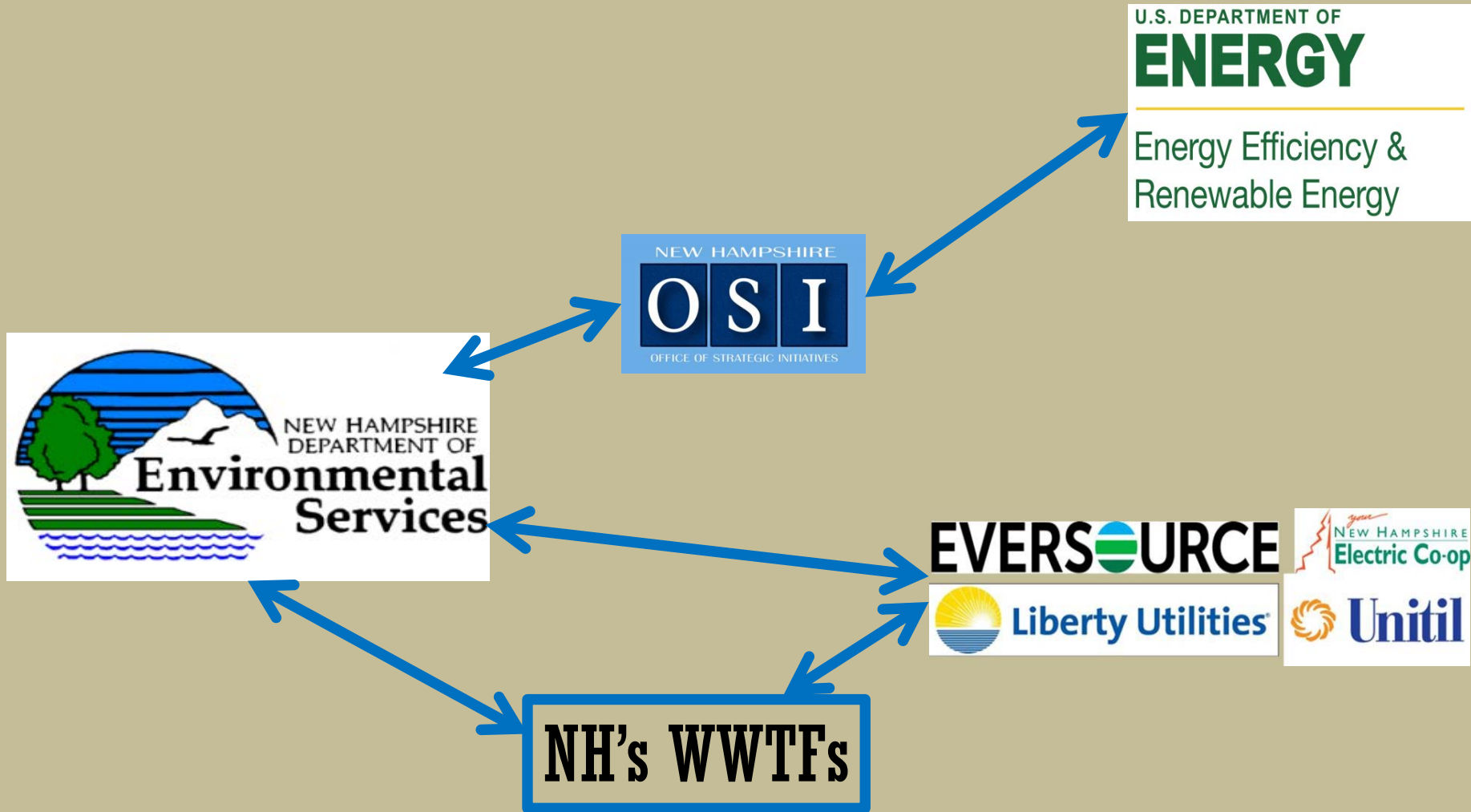
# Manage fear and risk by knowing your assets

A scenic view of a lake in a mountain valley. The lake is calm, reflecting the surrounding mountains and the sky. The mountains are dark and rugged, with some snow or light-colored patches. The sky is overcast with grey clouds. The overall mood is serene and majestic.

**If you want to conquer fear, don't  
sit home and think about it. Go  
out and get busy.**

Dale Carnegie

# LEADING NH'S WASTEWATER TREATMENT FACILITIES TO ENERGY EFFICIENCY



# AUDIT FUNDING SOURCES

**\$193,630** - USDOE Grant

**\$53,580** - NH Utilities

**\$87,890** - CWSRF Loan Forgiveness

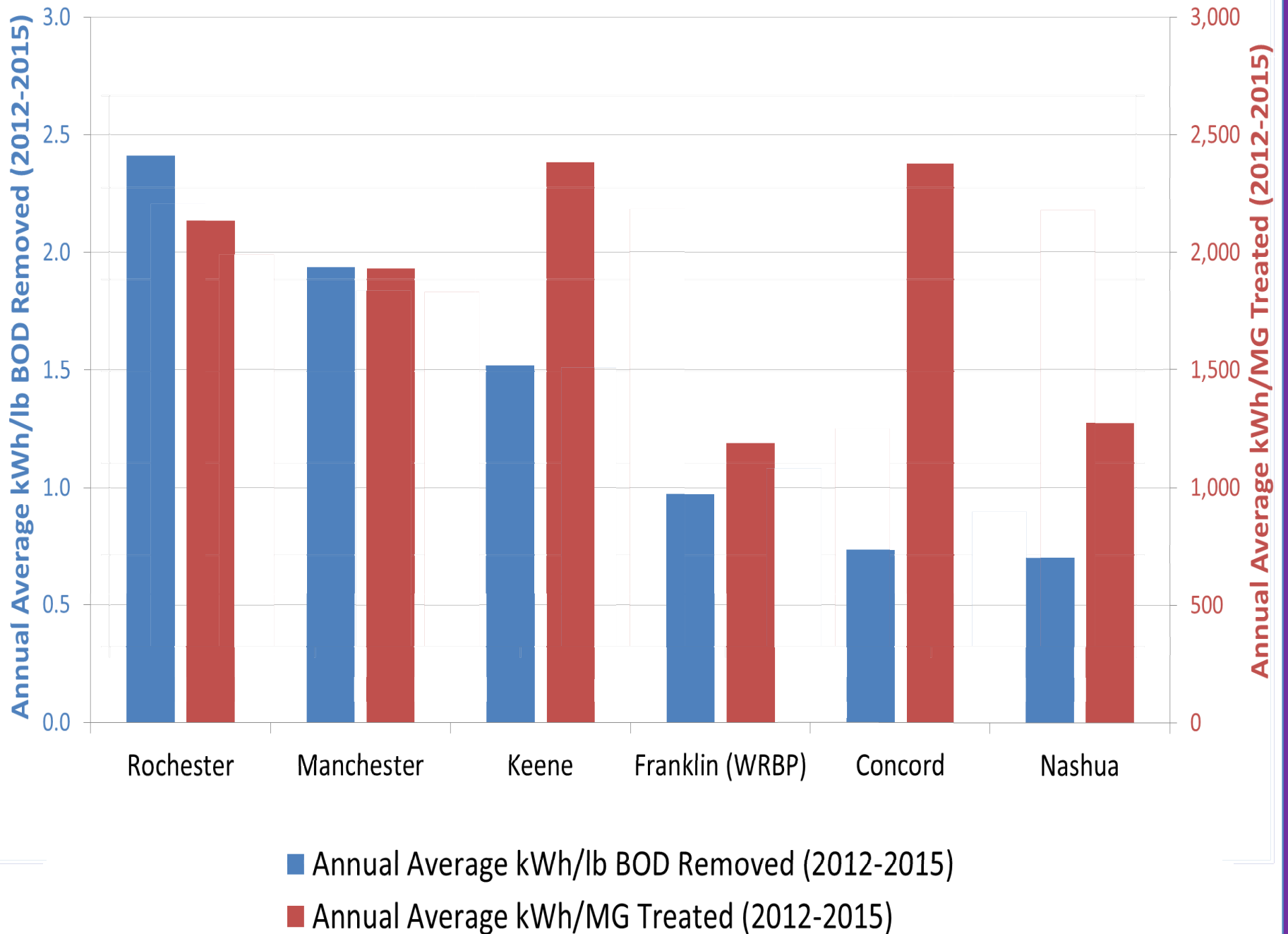
**\$80,000** - DWSRF Grant

**\$415,100** - To fund 41 DW and WW  
Energy Audits

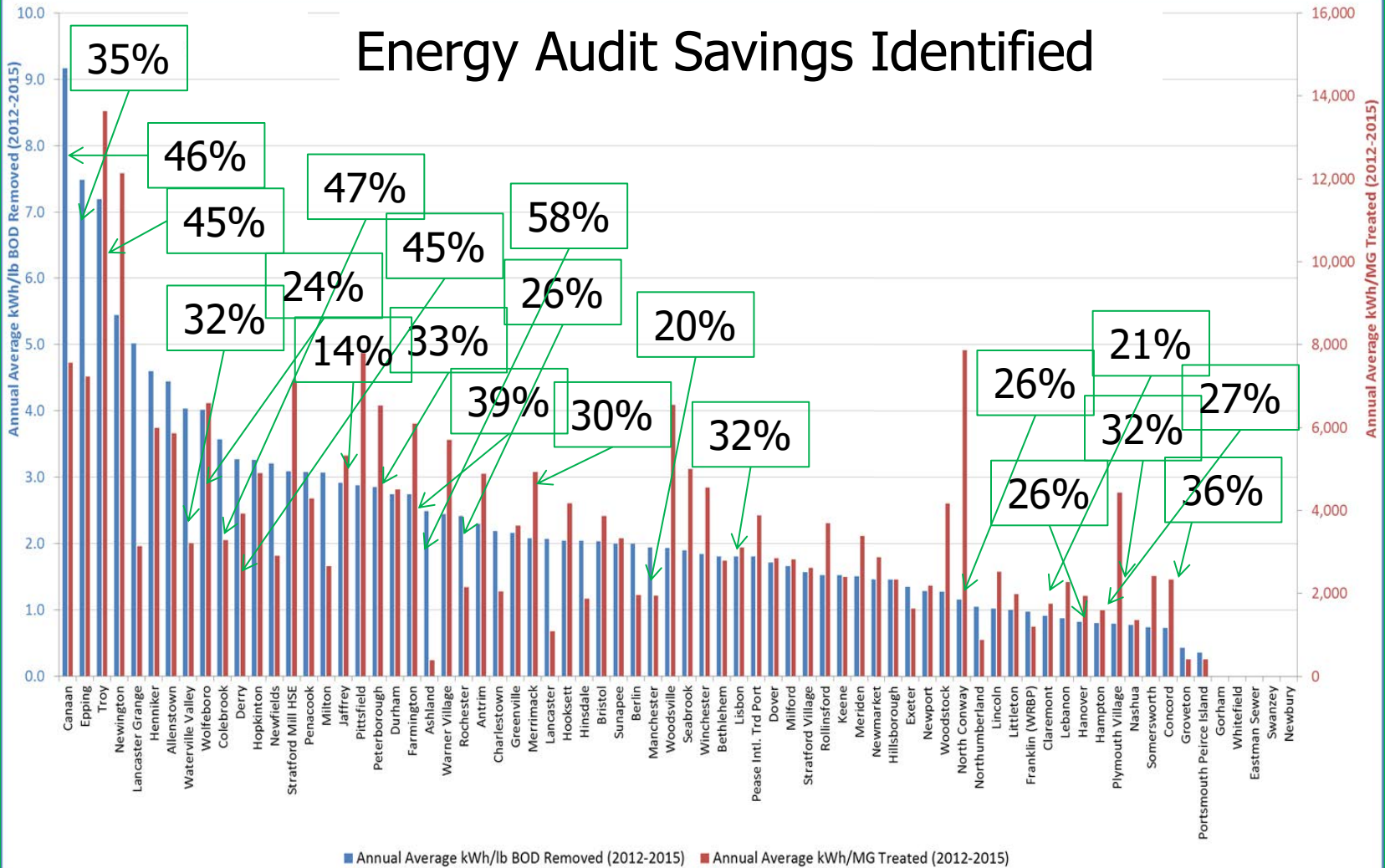


# Completed WWTF Audit Details

- 21 Audits
- Sizes: 0.08 MGD to 34 MGD
- Cumulative Design Capacity:  
78.1 MGD



# Energy Audit Savings Identified



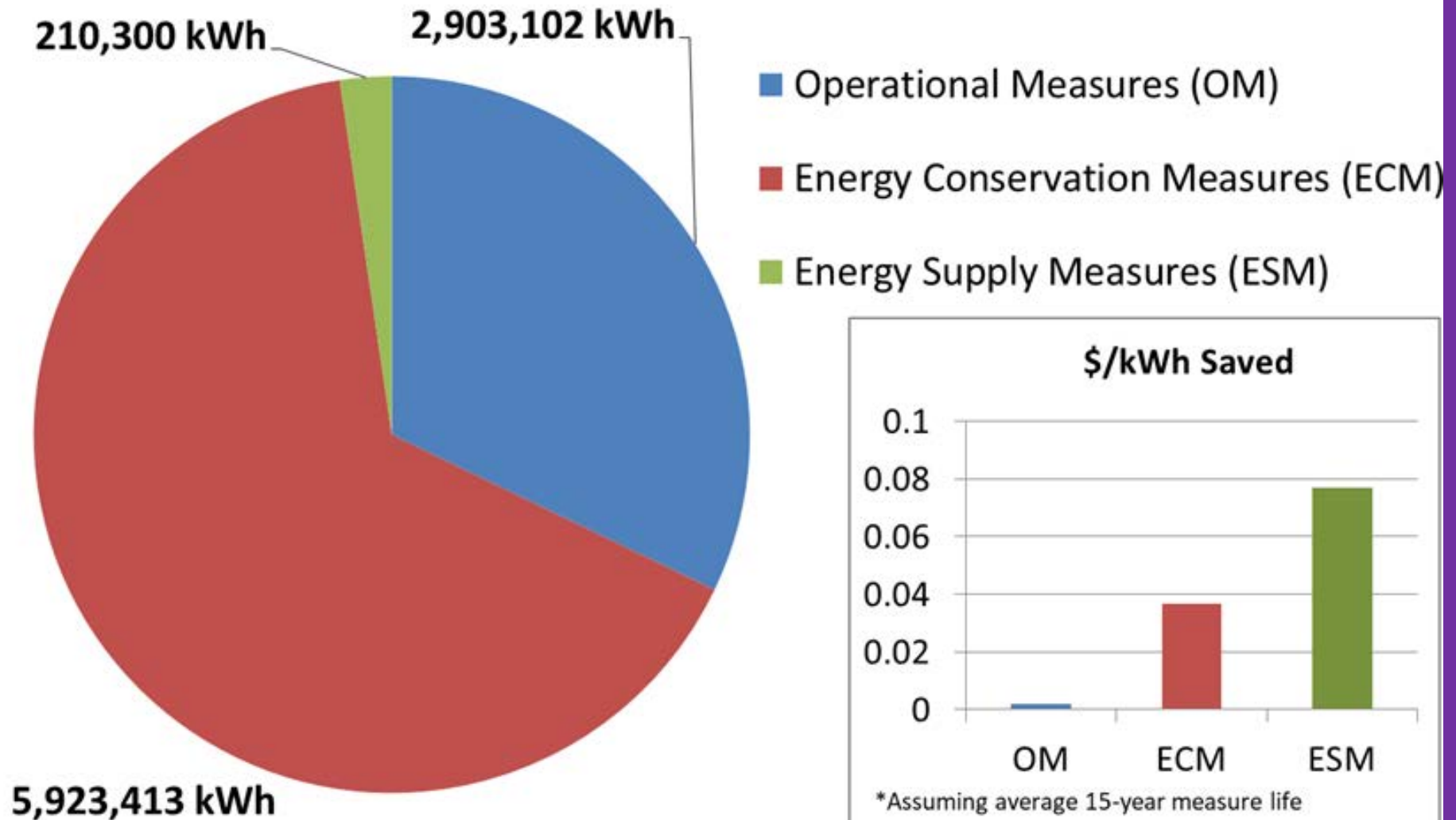


# Energy Audit Findings

## Potential Savings

- **33%** Overall Energy Use
- **9,036,815** kWh Electricity
- **48,305** therms NG
- **18,507** gallons Propane
- **6,127** gallons Fuel Oil

## Distribution of Total Annual Energy Savings (Based on findings from 21 CEAs)



\*Assuming average 15-year measure life

# Energy Audit Findings

- 30% Reduction in Energy Costs
  - For a total annual avoided energy costs of

**\$1,202,751**

- For an average annual savings of **\$15,408 per MGD (Based on design flow)**

# Implementation

- **\$3,639,090** Implementation Costs
- **\$1,202,751** Projected Annual Avoided Costs
- **3.0** Year Payback (before incentives)

# What makes NH's work unique?

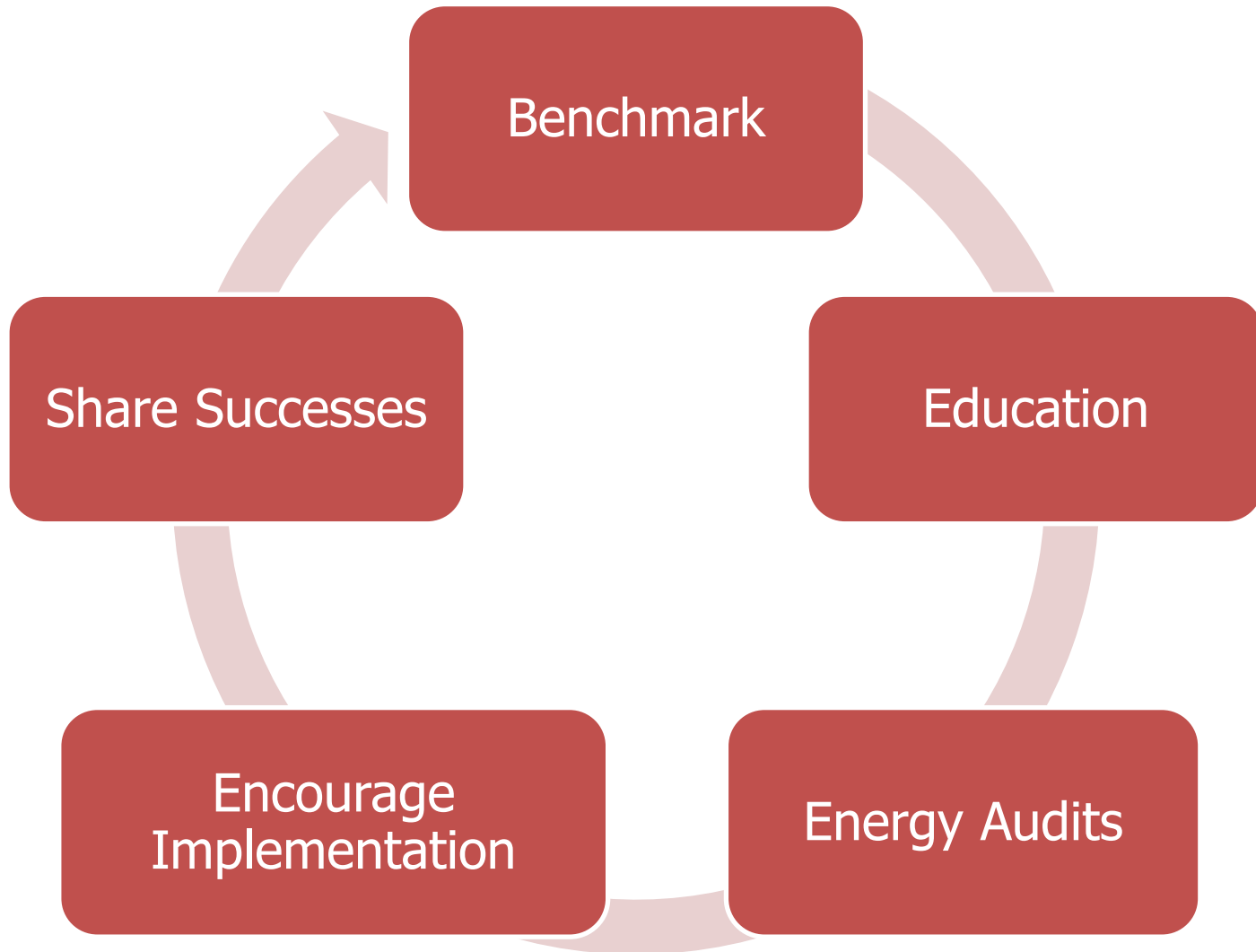




**Sharon Nall, P.E.**  
**NHDES WWEB**  
**Planning, Protection and**  
**Assistance Section**

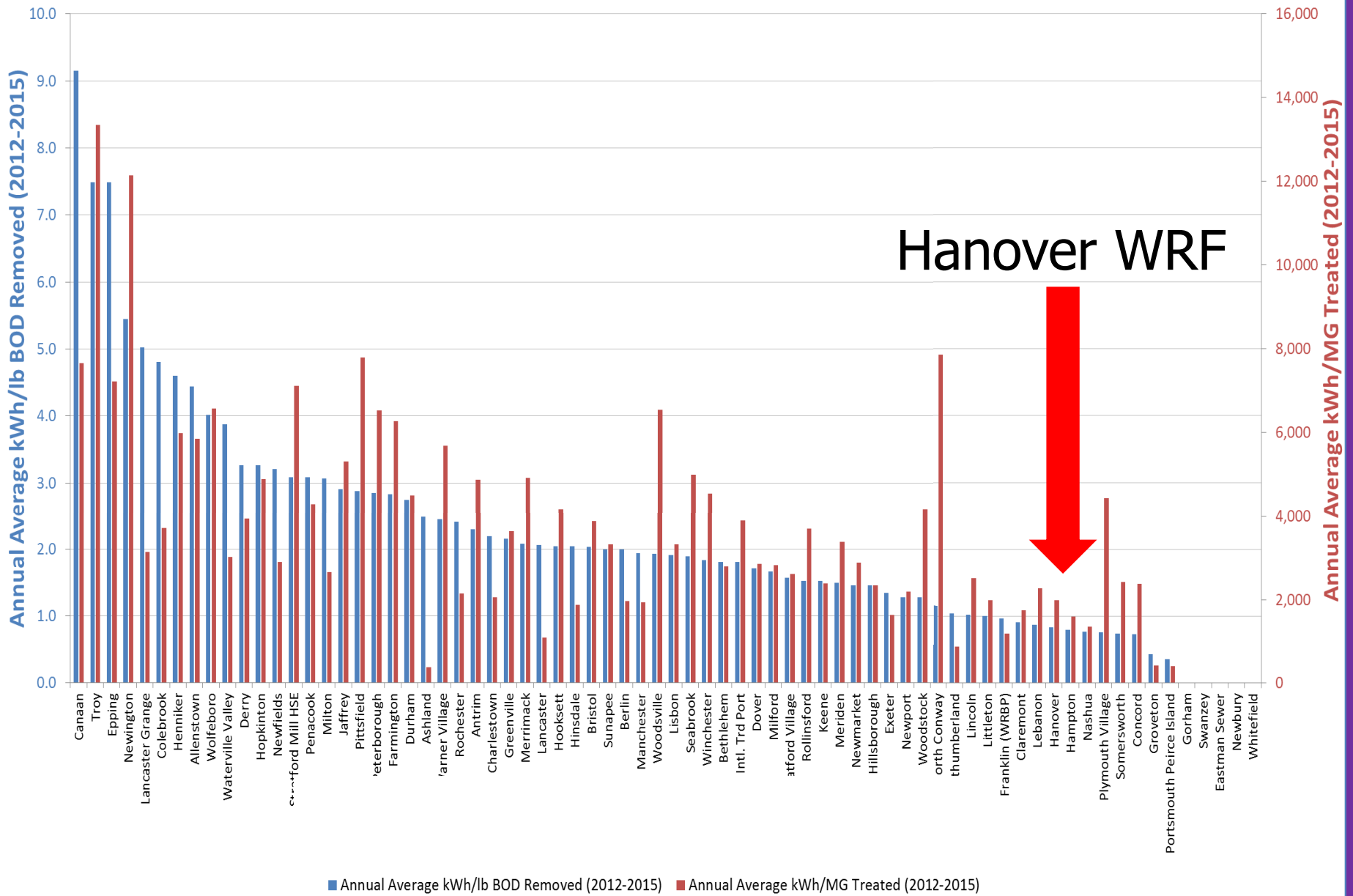


# Leading NH's Wastewater Treatment Facilities to Energy Efficiency









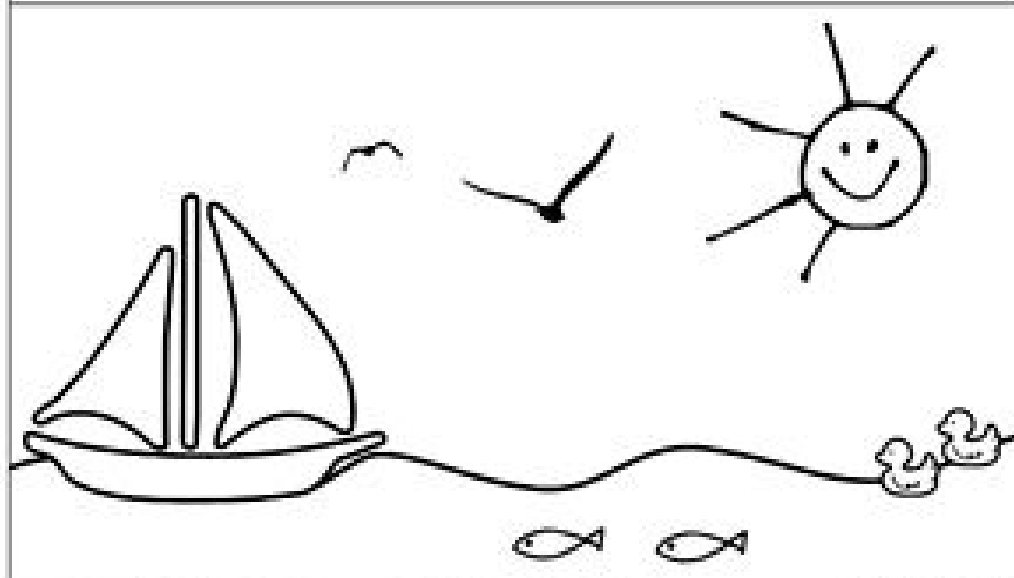
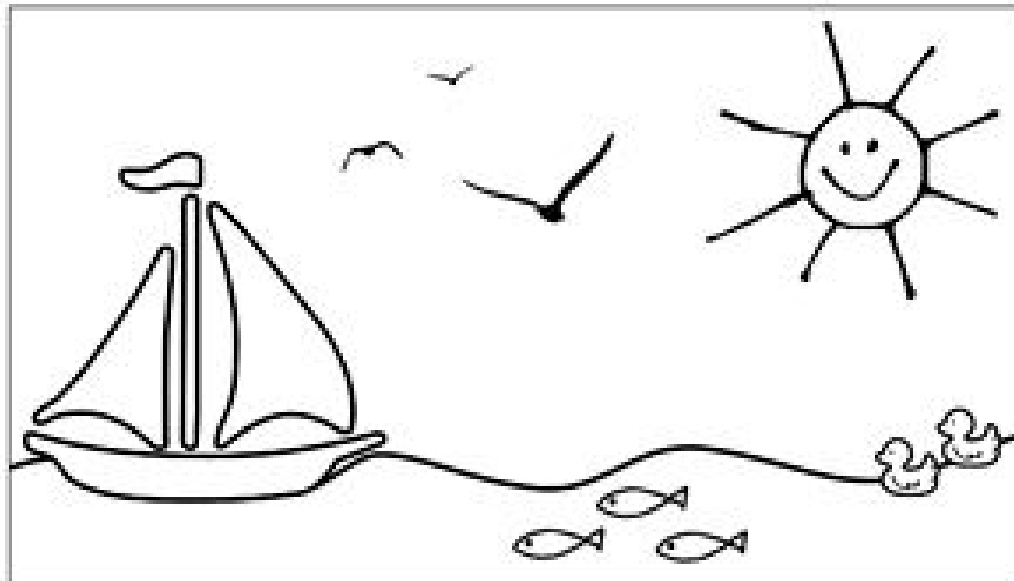
- Energy Audits



Name: \_\_\_\_\_

## Spot The Difference

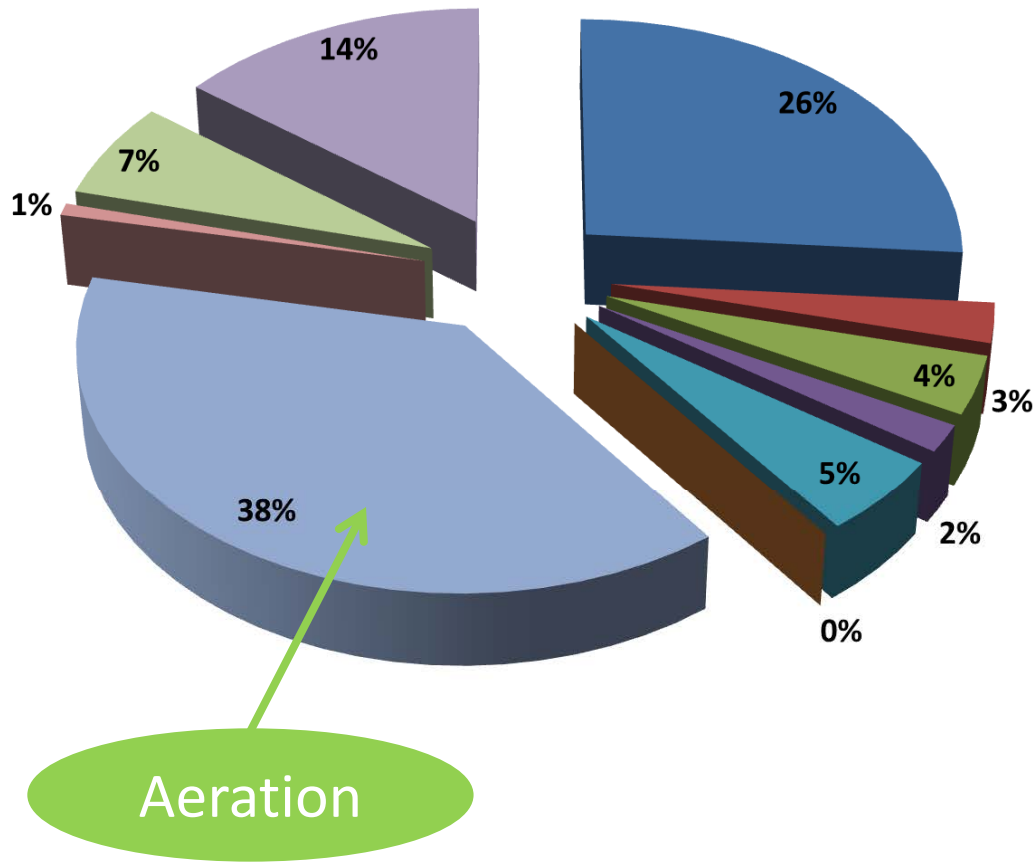
Find 4 differences between the pictures on the top and the pictures on the bottom.



# Conventional Activated Sludge Plant

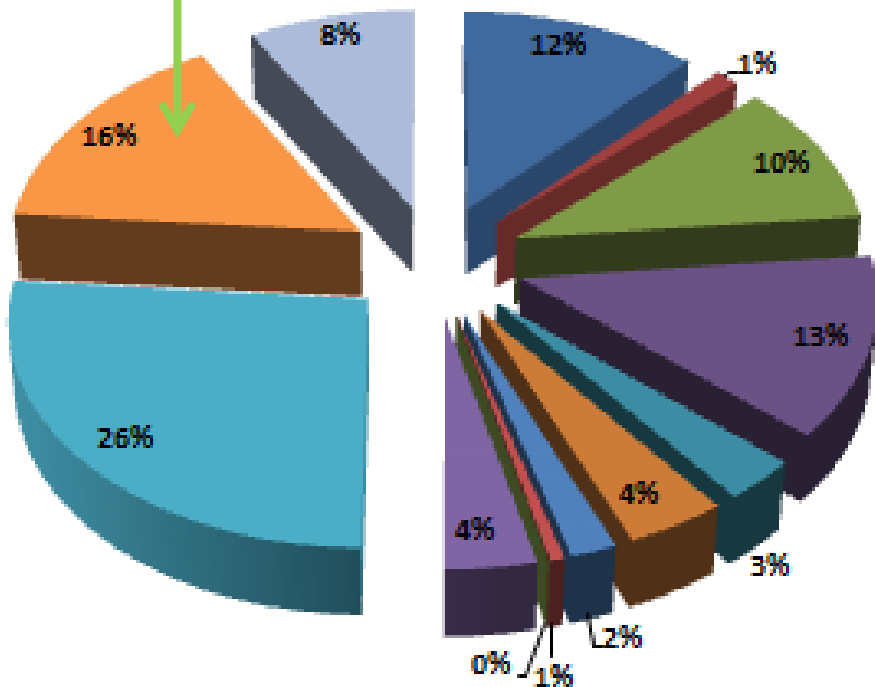
## 2016 Hanover Energy Audit

- Building Systems
- Disinfection
- Misc Process
- Primary Treatment
- Secondary Clarifiers/RAS Pumps
- Septage
- Aeration Blowers
- Preliminary Treatment
- Anoxic Mixers
- Sludge Digesters and Dewatering

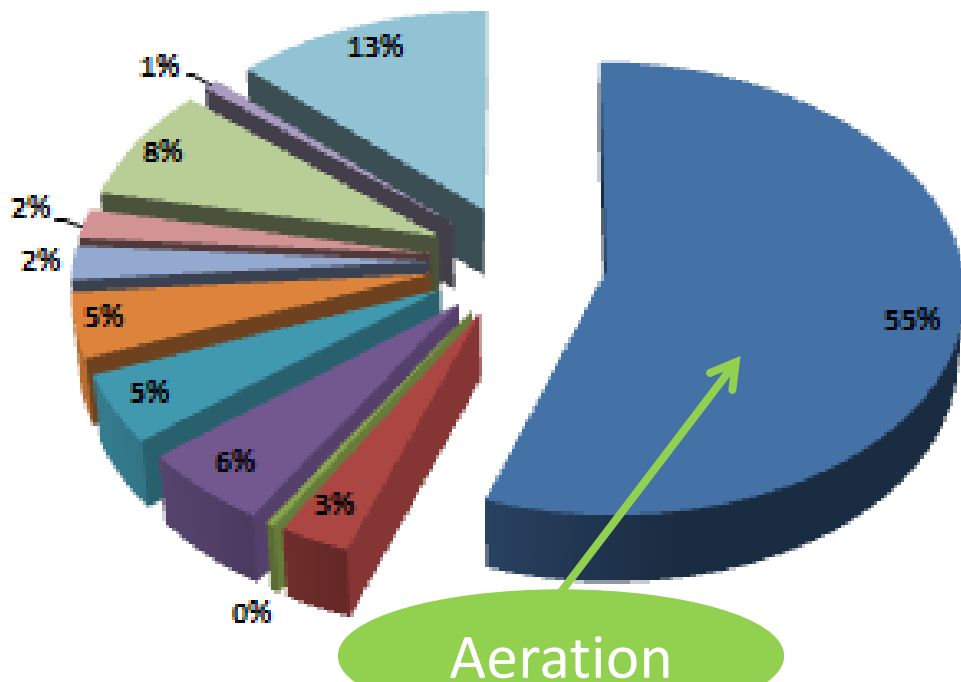


Aeration

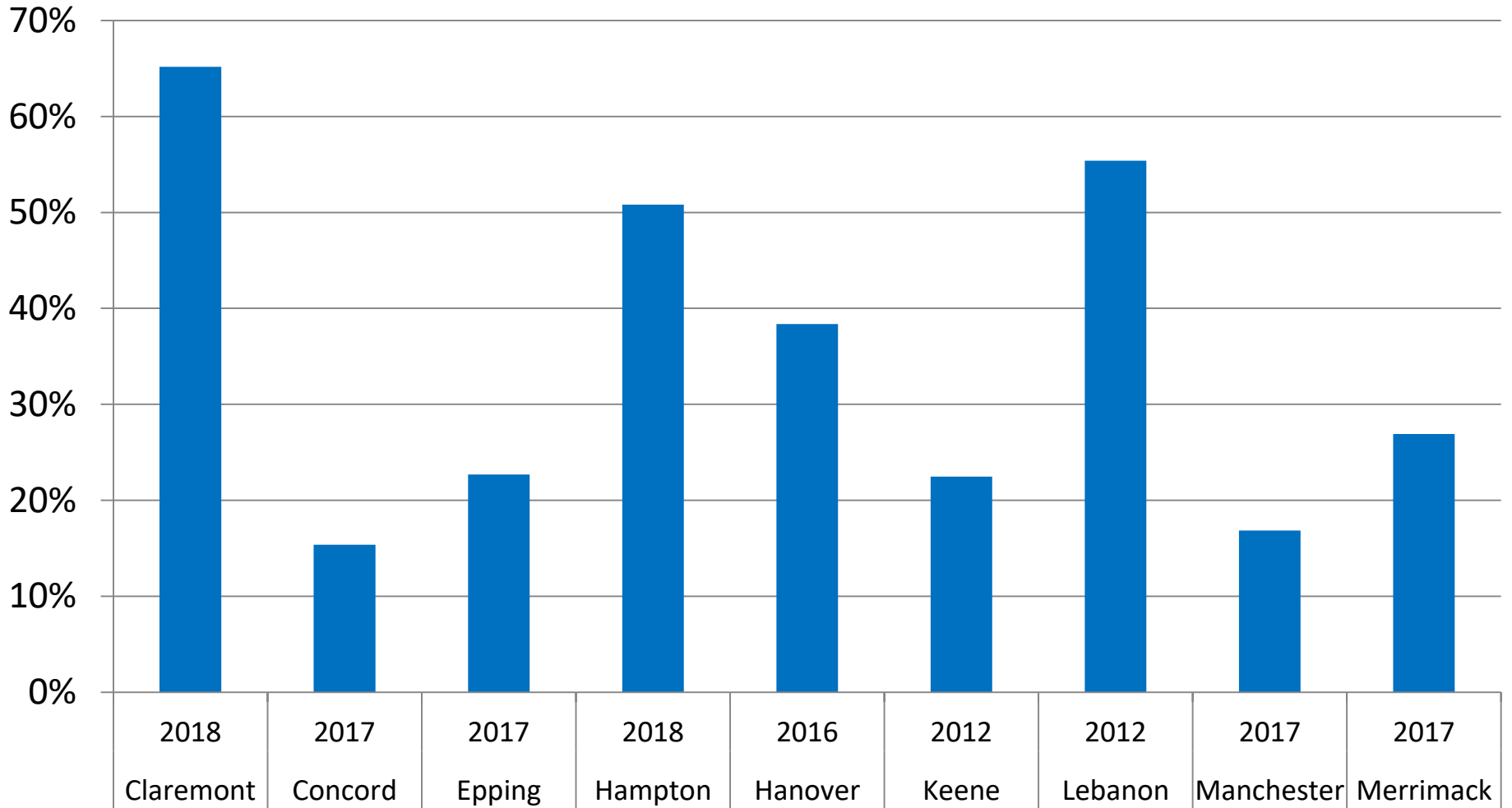
# Concord AS WWTF



# Lebanon AS WWTF

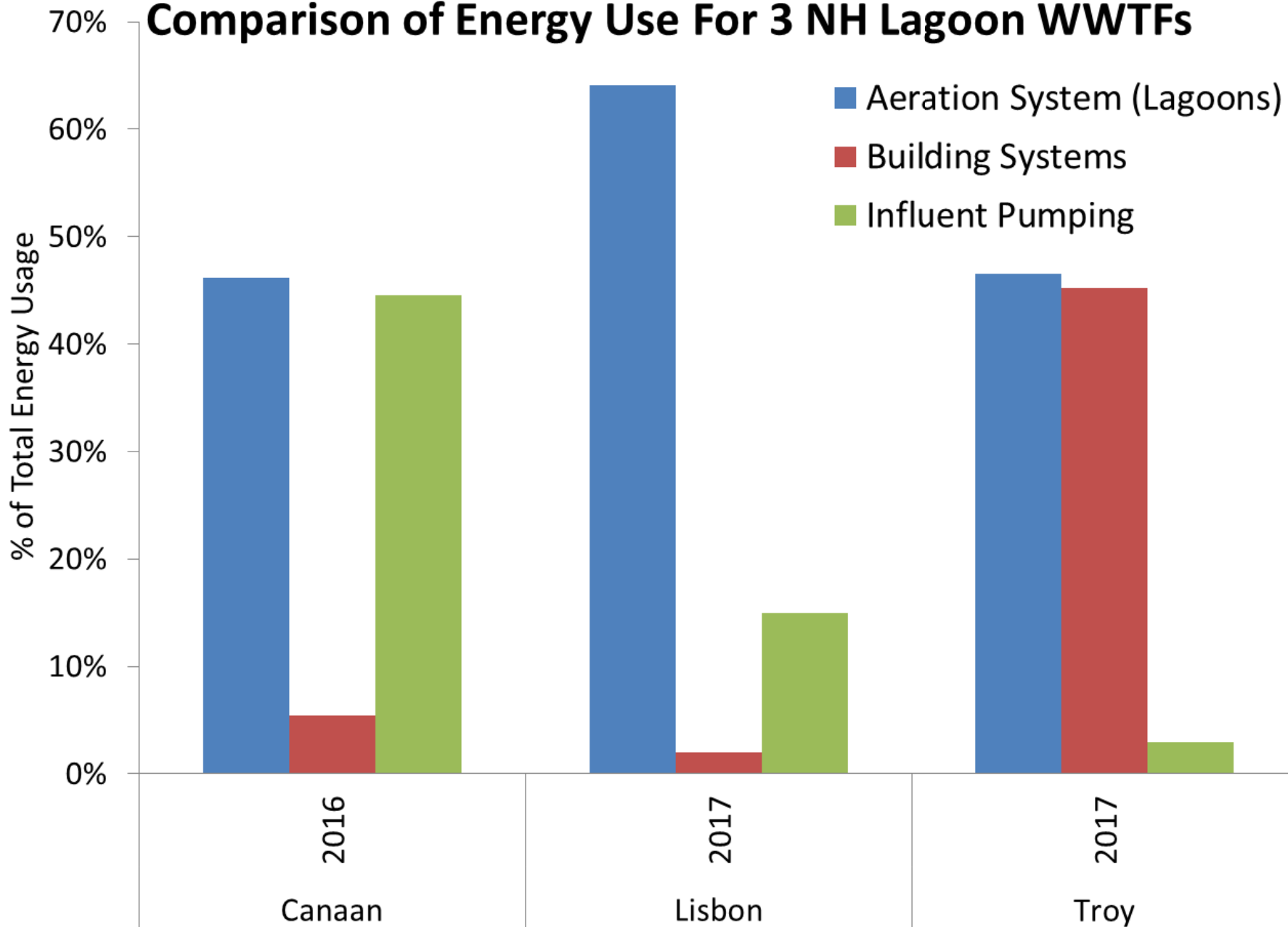


## NH's Conventional Activated Sludge WWTFs

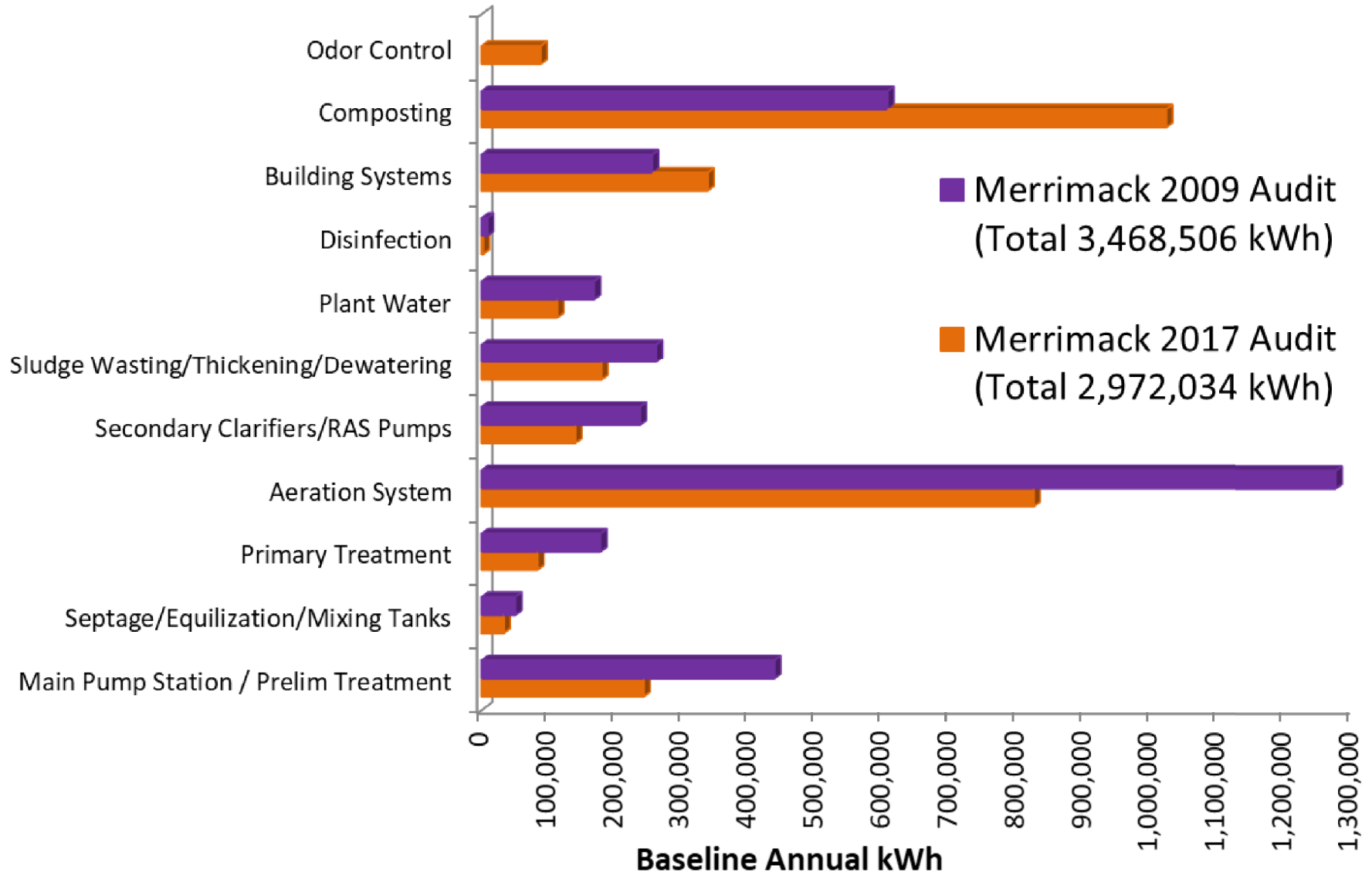


## Aeration System Energy Use

# Comparison of Energy Use For 3 NH Lagoon WWTFs



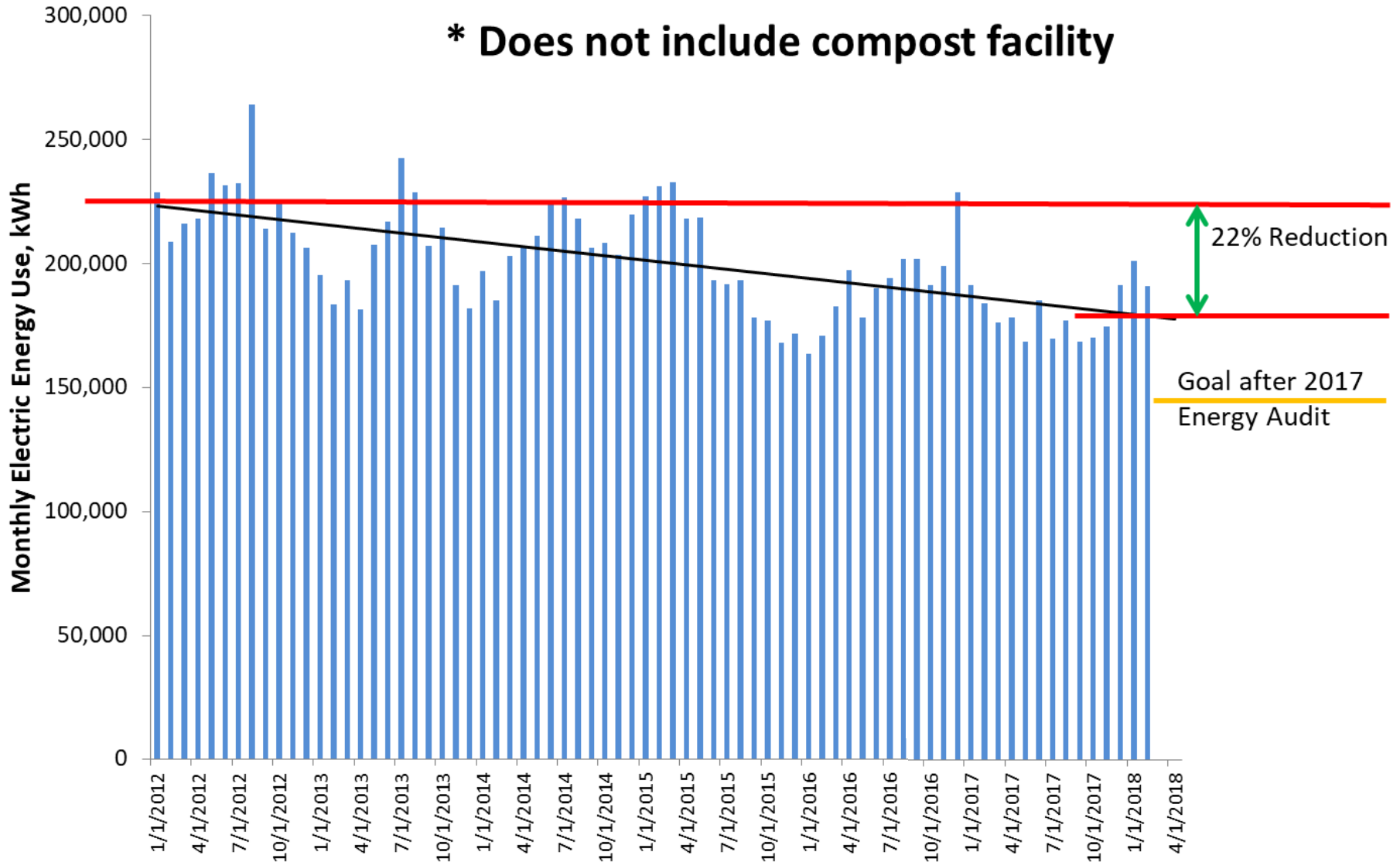
# Comparison of Energy Audit Results for Merrimack WWTP





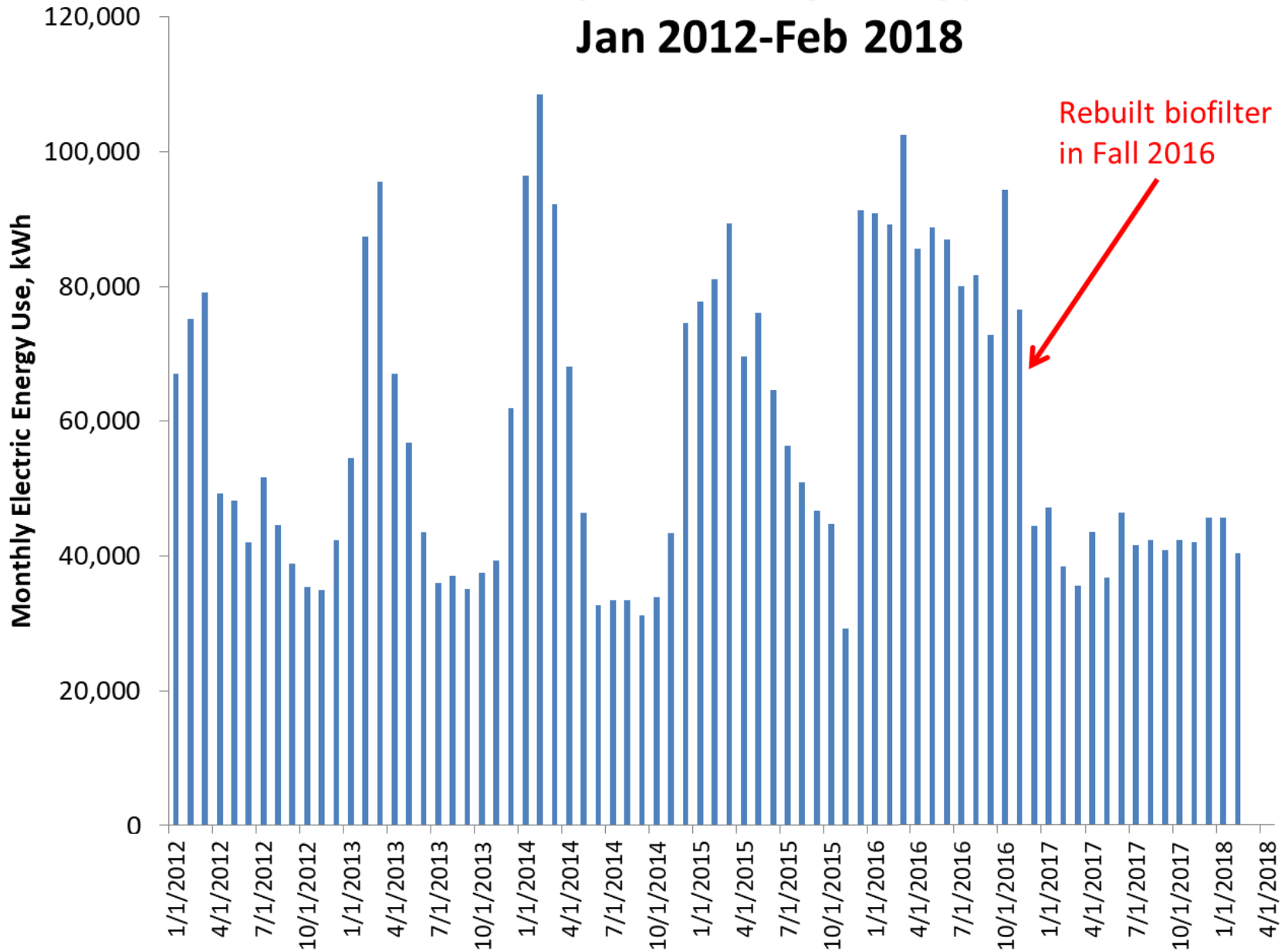
# Merrimack WWTF Electric Energy Usage Over Time, kWh Jan 2012-Feb 2018

**\* Does not include compost facility**



# Merrimack Compost Facility Energy Use Over Time

## Jan 2012-Feb 2018





**EEB4RE**





## Why EEB4RE?

- The cheapest energy is the energy NOT used!
- Energy efficiency:
  - 33% energy savings on average
  - 3 year payback on average
- Solar:
  - Long payback (typically 7+years)
  - 0% energy savings

# Let your EE savings pay for your RE projects!

Energy  
Costs



Savings

EE Upgrade  
Investment

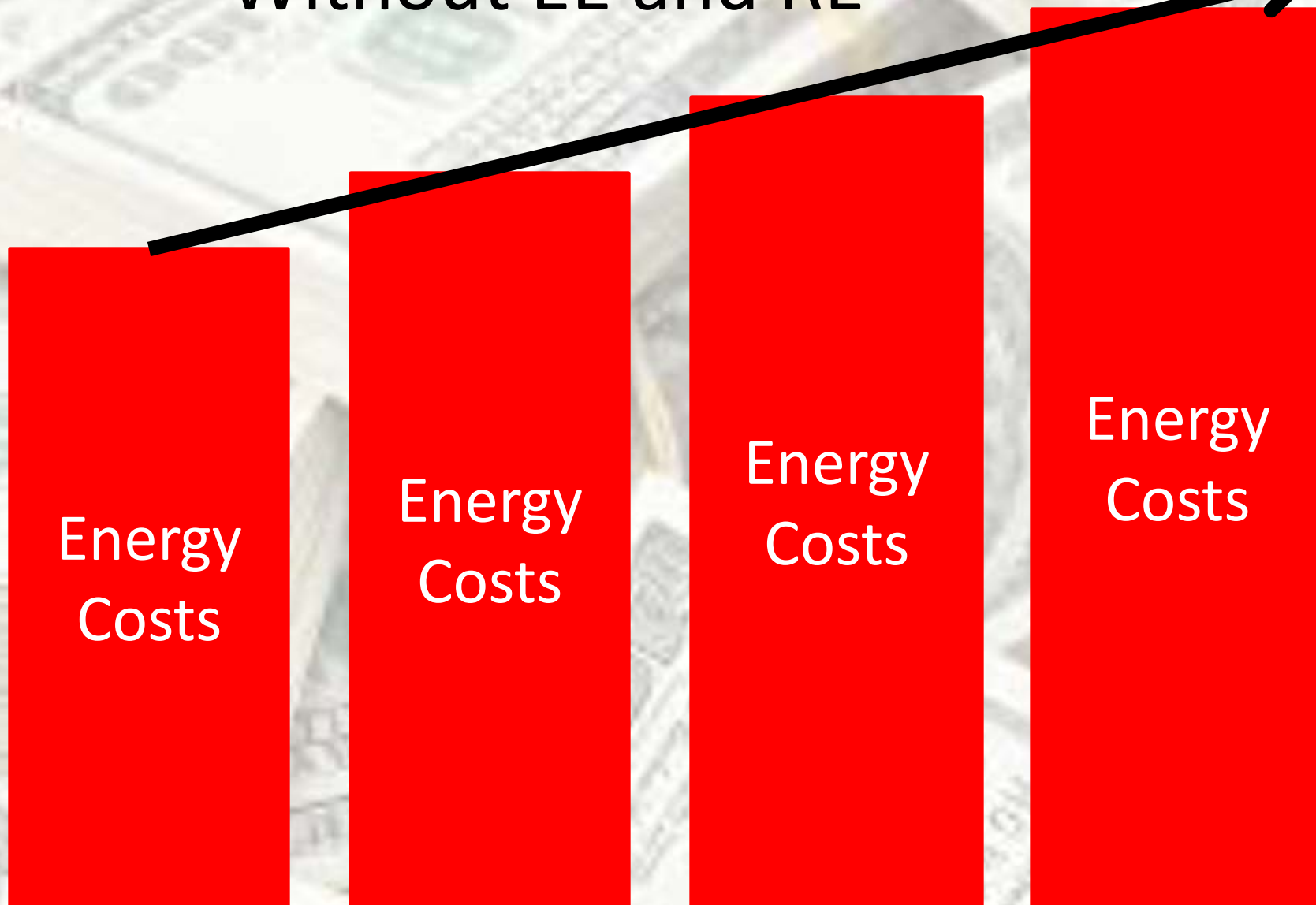
Energy  
Costs

# Let your EE savings pay for your RE projects!





Without EE and RE



where

do we go

from

here?

Expand Benchmark Tool



Continue Energy Audits



Promote Implementation



Energy Data Management



Share Successes





# Questions?

Sharon Nall, P.E.  
NHDES Wastewater Engineering  
[Sharon.nall@des.nh.gov](mailto:Sharon.nall@des.nh.gov)  
(603) 271-2508

Mark Toussaint, CEM  
Eversource EE Consultant  
[Mark.toussaint@eversource.com](mailto:Mark.toussaint@eversource.com)  
(603) 634-2301

With credits for the CEA findings to Steve Bolles, Process Energy Services