

Wayne Township Public Schools

AN ENERGY SAVINGS IMPROVEMENT PROGRAM (ESIP)

October 17, 2013



Abbreviations and Acronyms

- BPU- New Jersey Board of Public Utilities
- CO₂ – Carbon Dioxide
- DoE – New Jersey Department of Education
- ECM – Energy Conservation Measure
- ESIP – Energy Savings Improvement Program
- ESP – Energy Savings Plan
- kWhrs – kilowatt hours, 1,000 watts of energy consumed for one hour
- LED – Light Emitting Diode
- M&V – Post construction measurement and verification of energy savings
- No_x – Nitrogen Oxide, cause smog, acid rain
- O&M – Post construction operation and maintenance tasks
- So_x – Sulfur Oxide, causes respiratory illness
- Therm – 100 cubic feet of natural gas

ESIP Steps and Schedule

Project Development

Oct 17, 2013

Project Costs & Savings Verified by Independent 3rd Party Engineer

Nov 8, 2013

Project Energy Savings Plan Completion

Nov 21, 2013

Energy Savings Plan Approved by Wayne Twp BOE

Project Design and Engineering

Public Bidding Begins

Mar 28, 2014

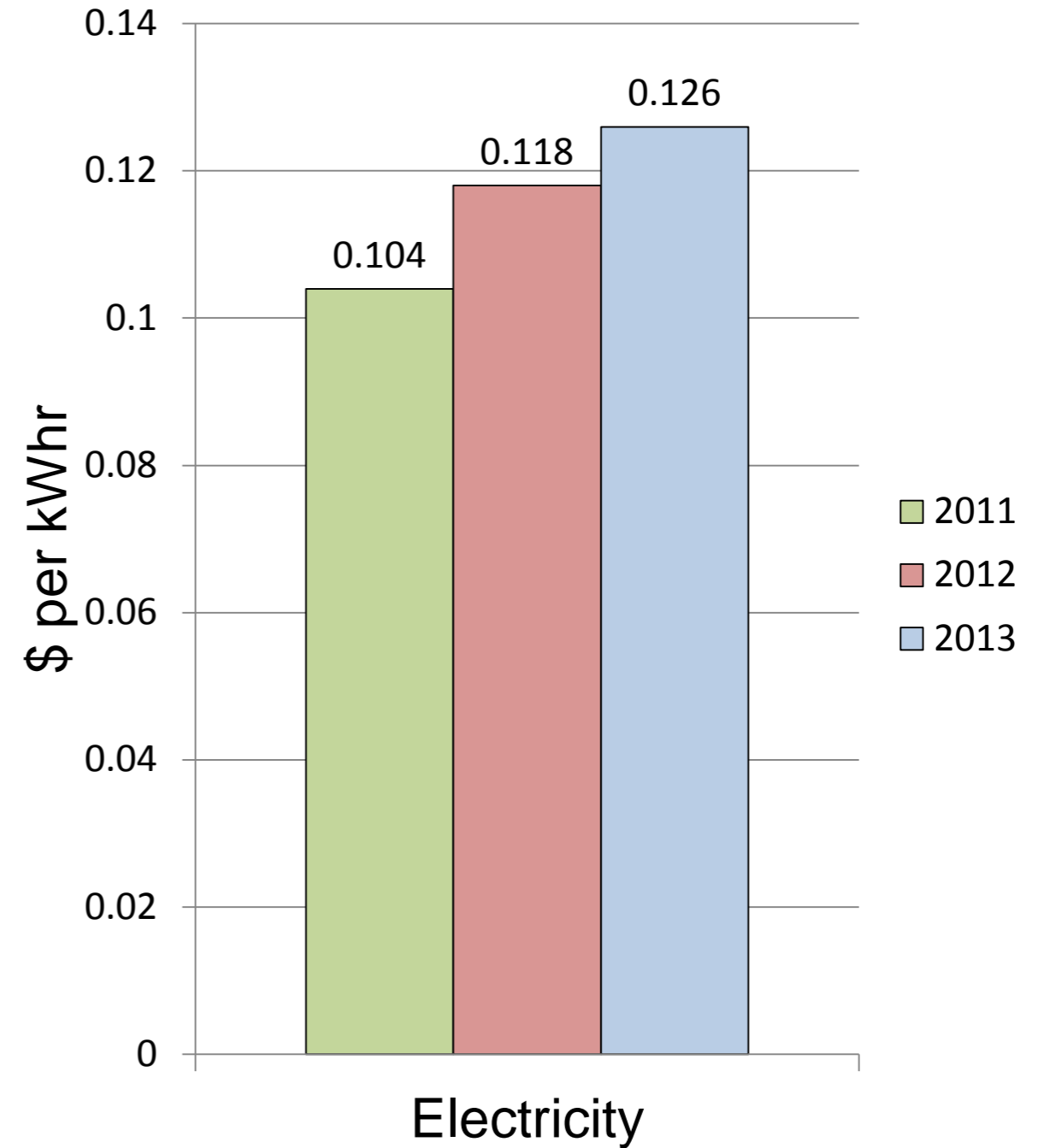
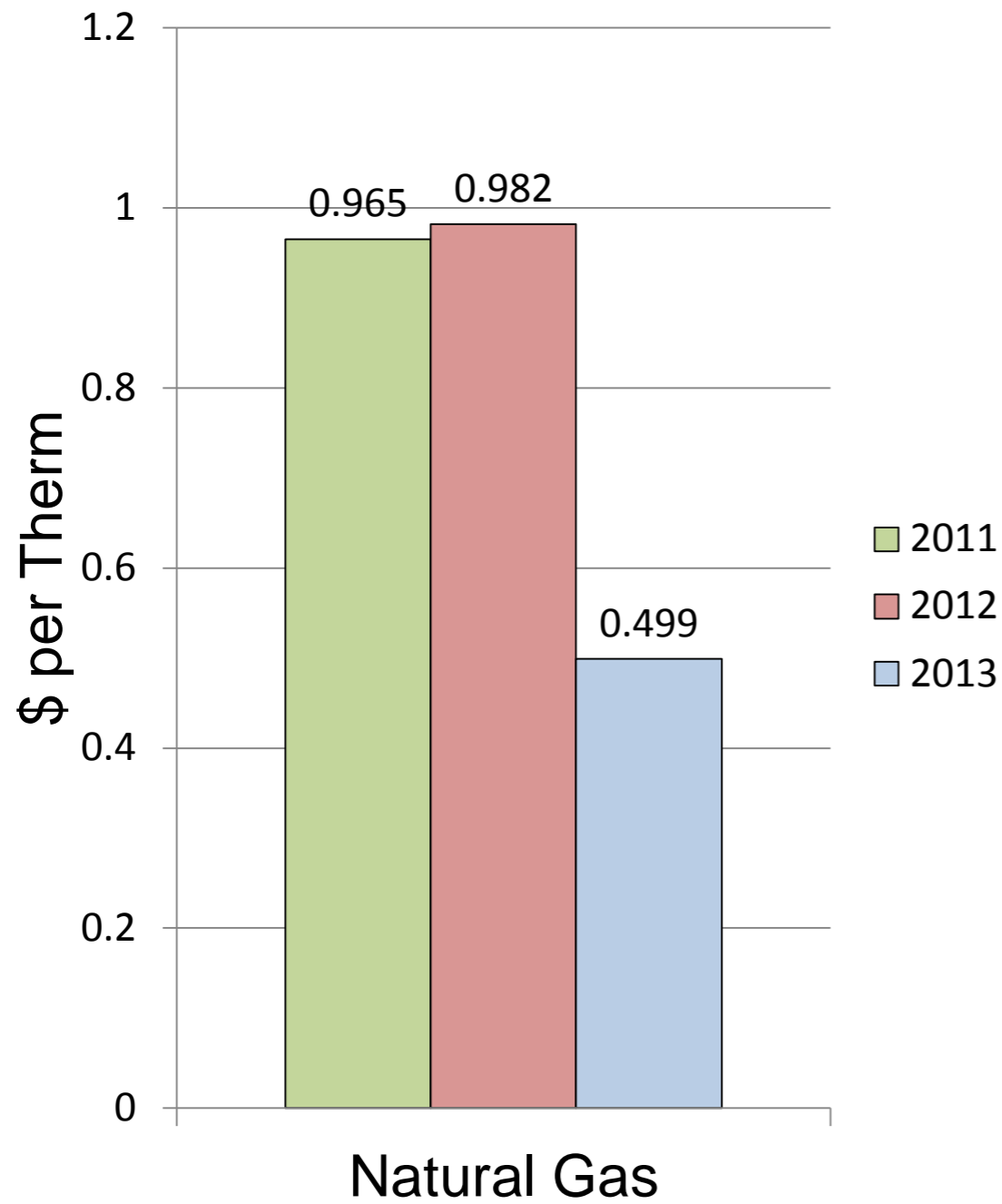
Project Implementation

Jun 30, 2014

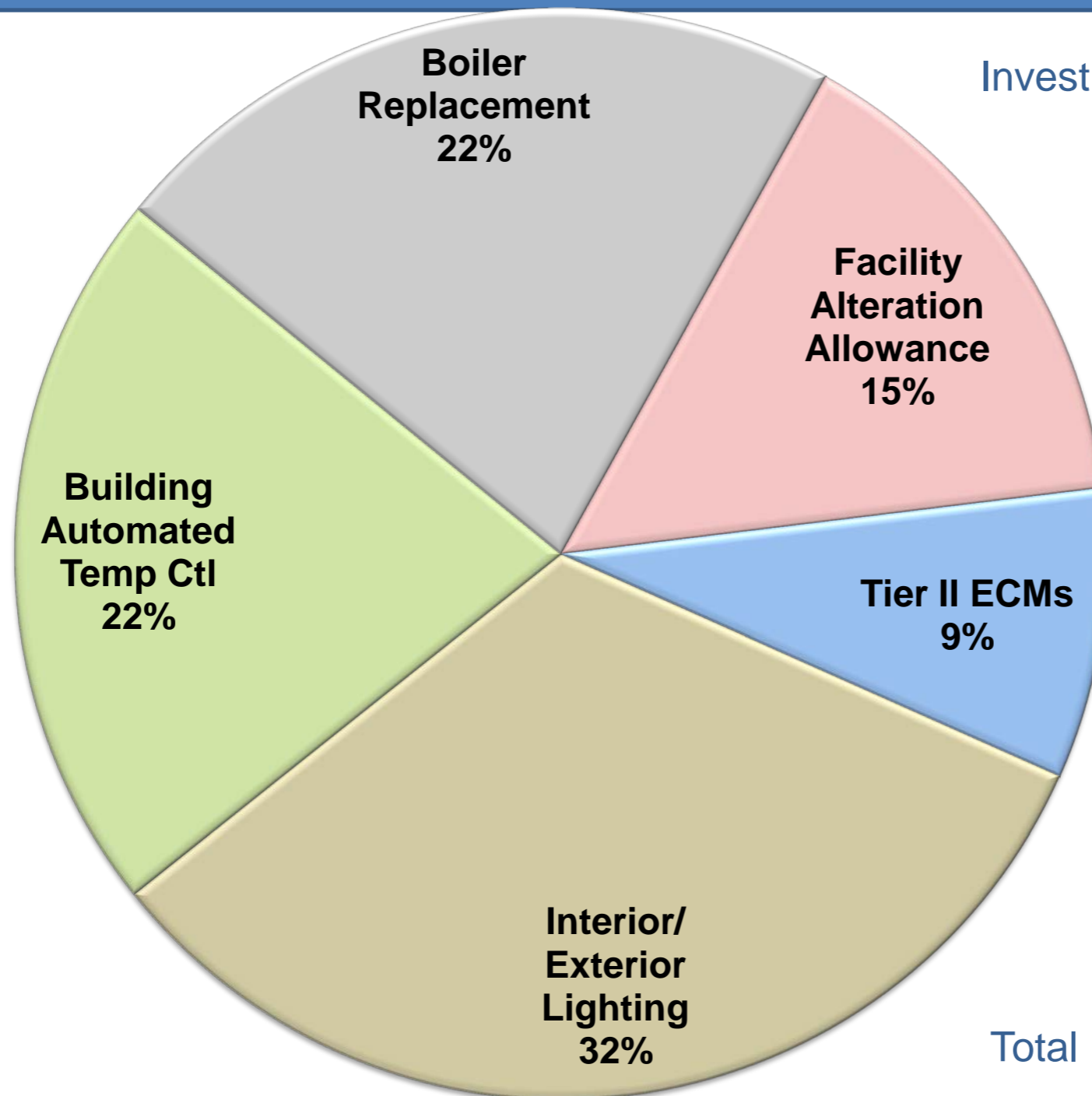
Post Construction Services

Dec 15, 2015

Utility Rates – 3 years



Energy Conservation Measures



Investment Simple Payback – 14.1 years

Tier II ECMs
Building Envelopment
Energy Star Transformers
De-stratification Fans
High Efficiency Motors
Steam Trap Replacement
Variable Frequency Drives
Load Management
Pipe and Tank Insulation
Cooler / Freezer Controls
Vending Machine Controls

Total Project Investment – \$10,164,028

Energy Conservation Measures



Tier I - \$9,289,366 Internal and External Lighting and Controls
Boiler Replacements
Building Automated Temperature Controls

Tier II - \$874,662 Building Envelope Improvements
Electrical Transformers
De-Stratification Fans
Motor Replacements
Steam Trap Replacements
Variable Frequency Drives
Pipe and Tank Insulation
Cooler / Freezer Controls
Vending Machine Controls

Tier I ECMs

LED Lighting

The ESIP Team fully investigated the use of LEDs. The consensus was:

Interior

- Use LEDs for high mounted fixtures such as in gymnasiums where reduced maintenance frequency would offset higher LED costs
- High efficiency T8 fixtures would be used for classrooms, offices and hallways

Exterior

- LED light output is equivalent to most exterior fixtures including metal halide fixtures
- Power consumption is reduced by 50%
- 90% lumen maintenance at 70,000 hours
- LEDs will replace 450 existing exterior lighting fixtures

Interior & Exterior Lighting

Interior

- About 15,000 lighting fixtures will be rebuilt, replaced or upgraded with new high efficiency T8s
- 42% of classroom and hallway fixtures will be replaced with new high efficiency T-8 units while the remaining fixtures will be rebuilt by installing a direct/indirect fixture cover, new lamps and ballasts
- 450 new LED, dimmable fixtures for each gymnasium in the District

Exterior

- 433 new exterior lighting fixtures will be installed
- Wall packs, flood lights, box and cobra head style fixtures will be replaced primarily with LED technology
- A few units will be compact fluorescent replacements due to installation difficulties associated with LED in some locations

Interior Lighting Controls

- 2,141 new occupancy based lighting controls to be installed
- Sensors will “listen” and “look” for occupants
- Wireless sensing technology will be introduced
- Day light harvesting sensors will be used where ambient can supplement generated light



A hallway at the Wayne Valley High School is an example where day lighting can be effectively employed to augment generated lighting

Boiler Replacements

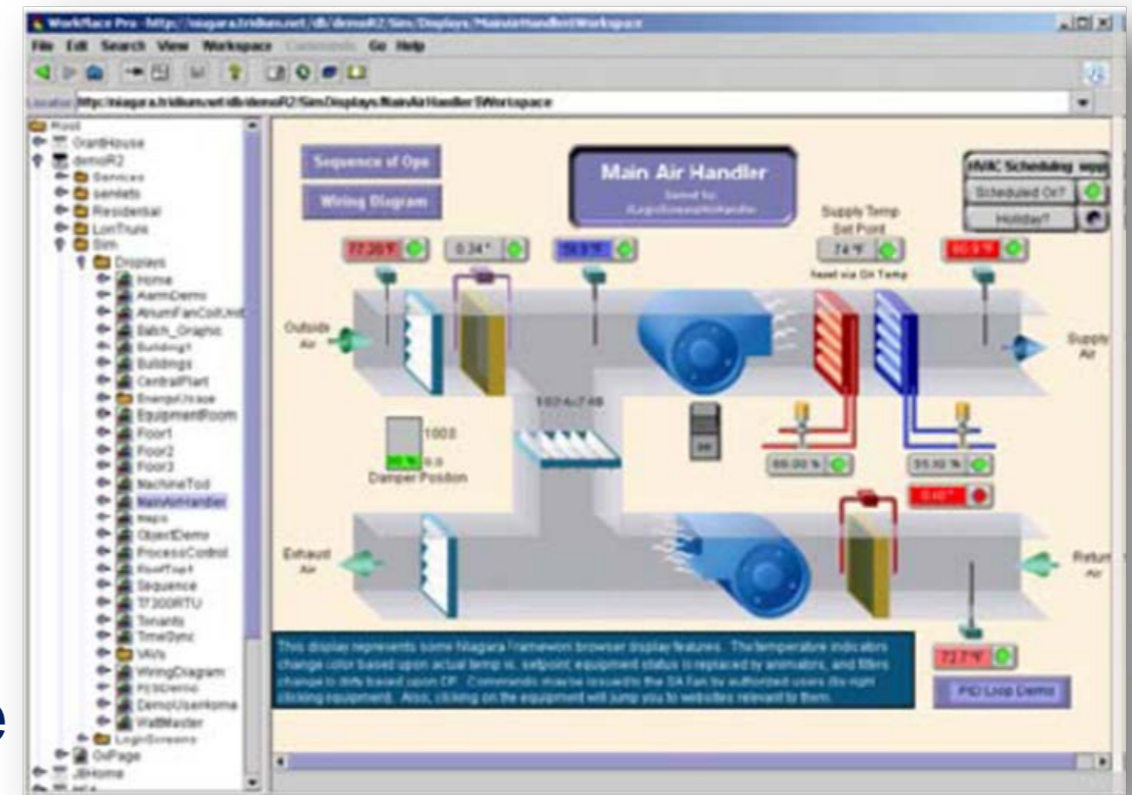
- Currently the District has 35 boilers across 14 schools
- 13 boilers in 6 schools will be replaced based on their age and current fuel inefficiencies



New high efficiency natural gas condensing boiler

Automated Building Temperature Controls

- The existing building temperature controls are antiquated and require extensive continuing maintenance. In several buildings the controls are proprietary, only allowing access by outside companies.
- The new building temperature control system is “open protocol” architecture and low maintenance, provides a platform for future expansion
- Building energy efficiency will improve by over 20%



New web based graphical interface will allow for easy remote monitoring and control of all District buildings

Tier II ECMs

Tier II Measures

- Building Envelope Improvements
- Electrical Transformers
- De-Stratification Fans
- High Efficiency Motors
- Steam Trap Replacements
- Variable Frequency Drives
- PC Load Management Controls
- Pipe and Tank Insulation
- Cooler/Freezer Controls
- Vending Machine Controls

Continuing Certification

- Through the ESIP, the District is registered with the U.S. EPA “Portfolio Manager” web based program to help apply for:
- Energy Star Certification 
- Collaborative for High Performance Schools 
- Green Ribbon Schools 
- NJ BPU “Pay for Performance” Rebates. Currently estimated to be \$1,111,455, payable over 4 payments beginning after construction completion 

Project Environmental Impacts



Estimated Emissions Reductions

CO ₂ in pounds	5,751,412
NO _x in pounds	9,138
SO ₂ in pounds	8,295

Greenhouse Gas Equivalents

Automobiles off the road	543
Gallons of Gasoline not burned	292,466
Acres of Pine Forests	2,138



Continuing Wayne Township Public School initiatives for World Class Facilities:

- The largest Public School District Solar Photovoltaic System in New Jersey providing up to 2.8 megawatts of electrical output to the District and the State
- Of the first 25 Public School Districts in New Jersey to implement a BPU Energy Savings Improvement Program (ESIP) under the 2009 Legislation, Wayne Township ESIP is among the largest to be implemented at \$10 million **with no additional cost to the residents of Wayne.**