Best Practices to Find Real Operational Savings
Consult Your Facility Director

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Elk River Area School District ISD #728
LHB - Interim Director of Buildings and Grounds
Accepted the role to test our abilities for developing:
• energy management strategies
• operational commissioning
• building operations and maintenance
Accomplishments:
• Established district wide standards
• Developed master agreements for special services
• Created a master energy strategy for the district and
• Began a building engineer training program
• Analyzed all building energy consumption and costs
• Coordinated management programs and
• Studied alternative energy agreements
During the 10 months, we helped the district realize nearly $200,000 in energy savings and $100,000 in operational savings (anticipating an additional $250,000). Total Anticipated Operational Saving of Over $550,000 Annually
So......
Why Did You Decide to Attend this Presentation?

Presentation Agenda
- Why Are You Here
- Staffing Challenges
- External Agreements
- Energy and Building/System Performance
- Building and Behavioral Management
- System Improvements and Replacement
- Supporting the Leadership Team
- Questions and Discussion

Staffing Challenges
- Staff Hiring and Setting Expectations
- What are the True Skill Sets of Staff
- Managing and Scheduling: MOC and MBL
- Motivation and Advancement
- Continuing Education
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Staffing Data and Analysis

Median Expense Per:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>SF maintained per full-time custodial worker</td>
<td>23,408</td>
</tr>
<tr>
<td>SF maintained per full-time maintenance worker</td>
<td>86,194</td>
</tr>
<tr>
<td>Acres maintained per full-time grounds worker</td>
<td>44</td>
</tr>
<tr>
<td>SF maintained per building</td>
<td>63,893</td>
</tr>
<tr>
<td>SF of building maintained per student</td>
<td>174.15</td>
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</tbody>
</table>

Source: 2017 AS&U Magazine

Average Size District
800,000 Square Feet

Construction Costs
$245.00 per Square Foot

Average FF&E Value
15% of Construction Value

Total Replacement Value
$225,400,000

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Traditional Model For Staffing/Promotion
Are We Missing the Why?

- Seniority
- A Well Liked Person
- Who they Know
- Can’t be any Worse than the Last
- They Seem Smart, They’ll Figure “IT” Out
- Got them at a Good Salary
- They Understand Buildings, Systems, Operations, and People?

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Staffing Data and Analysis

<table>
<thead>
<tr>
<th></th>
<th>Per Student</th>
<th>Per Square Foot</th>
</tr>
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<tbody>
<tr>
<td>Total Payroll</td>
<td>$379.34</td>
<td>$2.56</td>
</tr>
<tr>
<td>Outside Contract Labor</td>
<td>$3.30</td>
<td>$0.01</td>
</tr>
<tr>
<td>Total Utilities</td>
<td>$297.67</td>
<td>$1.71</td>
</tr>
<tr>
<td>Total Equipment &amp; Supplies</td>
<td>$52.57</td>
<td>$0.32</td>
</tr>
<tr>
<td>Other</td>
<td>$90.96</td>
<td>Other</td>
</tr>
<tr>
<td>Total M&amp;O*</td>
<td>$823.84</td>
<td>Total M&amp;O*</td>
</tr>
<tr>
<td>Total District Expenditures (TDE)</td>
<td>$8,967</td>
<td>Total District Expenditures (TDE)</td>
</tr>
<tr>
<td>M&amp;O as % TDE</td>
<td>9.19%</td>
<td></td>
</tr>
</tbody>
</table>

Source: 2017 AS&U Magazine
Custodial/Maintenance Staffing

Staffing Strategies for Larger School Districts
- Collaboration is Essential – Leadership Level Contributor
- Maintenance Operations Coordinators – At Will Employees
- Multiple Building Leads - Union Employees
  - Both groups held accountable for building budgets
  - Direct – custodial/maintenance, contractors, and vendors
  - Works flexible schedule
  - Crossed trained to operate multiple buildings.
    - When one is out the others fill in – NO SUBSTITUTE EXPENSES!
    - If day person is out, there may not be a need to hire a substitute!

Staffing Strategies for Medium Size Districts.
- Summer Team Cleaning
  - Enhances cleaning standards throughout district
  - Saves on summer cleaning supplies
- Summer Team Maintenance
  - Next generation of Head Custodians/MOC’s
- Consolidate after school and summer activities
  - Reduces energy costs
  - Mandatory for summer construction activities

Staffing Strategies for Smaller Districts
- Single lead person at each site - who carries appropriate licenses and performs maintenance at all sites
- Night lead person to oversee all night custodial staff in the district and helps with “set ups”
- Out sourcing cleaners only
- Out sourcing Building Management services
- Part time staff only
External Agreements

Why Do They Exist?
- Need Specialty Services
  - Costs to Provide
  - Seasonal Needs
- What are Our Expectations:
  - Quality vs Quantity
  - Comply with District Standards
- Means and Methods
  - Understand What They are Providing and How

Simple Ideas That Save Dollars

Purchasing Options
- State Contracts
  - Road salt
  - Vehicles
  - Custodial supplies
  - State surplus
- Joint Power Agreements
- ECSU’s

Energy and Building System Performance

1. Beyond the Meter: Understand the Rate Structure
   Savings Potential: 1% to 3%
2. Operational Assessments and Modifications
   Savings Potential: 7% to 17%
3. Building and Systems Management/Improvements
   Savings Potential: 5% to 20%

Notes: savings will vary based on building uses and system age/typs, etc. estimates from client analysis and collaborative research with TPSC, SmartWaves, Center for Energy and Environment
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Review the Electric Invoice

One: Beyond the Meter

- Meet with Your Utilities
  - Each Utility is Different
  - Rate Structures and Variables
  - Understand the Performance Service Opportunities
  - Review Available Rebates and The Processes to Obtain

Glossary of Terms

- Power Factor
  - A measure of how effectively electric current and voltage converts to useful power.
- Totalized KWh Interval Data
  - Total energy consumption.
- General Service
  - A rate when billable demand is greater than 25 kW.
- Basic Service Charge
  - A flat monthly charge that covers fixed costs of metering, billing, and maintenance.
- Energy Charge
  - The dollar costs of energy used for the billing period. To complement the Energy Charge, multiply the rate per KWh by the amount of KWh used.
- Demand Charge (summer-winter)
  - Adjusted seasonally to reflect the varying costs of purchasing power.
- City Fees
  - Required to collect fees on behalf of your municipality.
B3 Building Benchmarking

- Input the Building Data – One Time
  - Number of Meters and Utility Bills (5 years)
  - Building Areas and Uses
  - Building Modifications over the Period Measured
- Peer Comparisons
  - Districts of Similar Size (square foot and enrollment)
  - Types of Amenities (pools, auditoriums, stadiums, ice arenas)
- Understand the Variables
  - Occupant Comfort is Goal #1
    - Seasonal, IEP, Age, etc.
  - Baseline can be fixed or modified
  - Building System Types and Ages
  - Create Baseline to Hold Staff and Contractors Accountable

Definitions and Terms

- Utility Costs
  B3 Benchmarking allows the user to see consumption in three different currencies:
  - Energy: EUI = kBTU/SF/yr
  - Dollars: Energy $/SF - $/SF/yr
  - Carbon Emissions: CO2/yr
- Potential Savings
  Potential Savings are rough estimates meant to provide a sense of the magnitude of savings possible for buildings. Because a significant number of buildings are able to reduce consumption below 85% of the expected Benchmark modeled annual consumption. The cost factor is calculated by looking at the weighted average energy cost by energy type per MMBTU for the entire portfolio of buildings in B3.

B3 Benchmarking: Consumption vs Dollars

<table>
<thead>
<tr>
<th>EUI: kBTU/sf/yr</th>
<th>Dollars: $/sf/yr</th>
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Ranking Among Districts of similar size (1.5 – 1.9 million sf)

1. Burnsville-Eagan-Savage - $0.83
2. White Bear Lake - $0.85
3. Lakeville - $0.86
4. Mankato - $0.90
5. Eden Prairie - $0.91
6. Minnetonka - $0.94
7. Edina Public Schools - $0.99
8. St. Cloud - $1.02
9. Wayzata Public Schools - $1.02
10. North St. Paul, Maplewood, Oakdale - $1.08
11. Easter Carver County Schools - $1.28
12. Mounds View - $1.76

Target: $0.78

Data From 04/26/16
Two: Operational Assessments
- Overlay the Use Patterns and Operations with Rate Structure
  - Start-up and Shut Down (the lag time)
  - Define Building/System Zones
- Building Engineer/Staff Understanding and Training
  - Building Automation Systems and Schedule
  - Working with the User Groups and Utilities
- Occupant Comfort and Behavior Techniques
  - Thermal Comfort (can change over the day)
  - Plug Loads and Advanced Power Strips
  - Light Levels and Glare
  - Acoustics and Sound Enhancements
  - Computer Power Management (32% of office plug loads)

Building Schedules versus Energy Costs
- Building Performance
  - Metering Strategies
  - Zone Analysis
  - Warm-Up Schedule
  - Building Uses
  - Types of Activities
  - Technology Solutions
    - Work from home strategy
  - Elk River Public Schools
    - 14% Reduction = $34,000
    - November '15/January '16

Three: The Building and Systems
- Understand the Building System and Program Relationships
  - Understand the Relationship of All Systems and Materials
  - Envelope 1st – Electrical Systems 2nd – Mechanical Systems 3rd
    - Glass Types: glare, heat gain, and dust
    - Kitchen equipment, hoods, and make-up air systems
    - Changing Systems Impacts: heat sink walls, geothermal, and comfort
- The Mechanical System Strategies
  - Commissioning and Determining System Potential
    - Designed Occupant Loads vs Actual posted Occupant Loads
  - "Rebates" Make It Difficult to not Focus on Mechanical Systems
  - Performance Contracting
    - Calculating Long Term Payback: designing the largest system possible
Simple Example: North St Paul Maplewood Oakdale

A simple look at the 15 districts of similar size found the following:

- The average annual operating costs per square foot for NSP-M-O: $1.08
  Note: costs for the last 12 month period
- The average annual operating costs per square foot for 15 districts: $0.96
- The average annual EUI per square foot for NSP-M-O: 68.96 kBTU
  Note: costs for the last 12 month period
- The average annual EUI per square foot for 15 districts: 68.41 kBTU
- The difference between the operational average and ISD NSP-M-O: $0.12

There are 1,743,485 square feet in the district so the potential operational savings to “average”:

$0.12 \times 1,743,485 \text{ sf} = \$209,218 \text{ dollars annually.}

Some of the best performers include across the state:
- Albert Lea ($0.67)
- Duluth ($0.75)
- Burnsville ($0.75)
- Bloomington ($0.84)
- Eden Prairie ($0.82)
- Minnetonka ($0.87)

Note: Building age has very little to do with the potential performance.

Data From 04/26/16

North St Paul, Maplewood, Oakdale Baseline

Building Consumption Compared Year to Year

Building and Behavioral Management

- **Thermal Comfort**
  - Building Type and System Type
  - Designed Zones: exposure
  - Consistent Temperatures

- **Acoustical Comfort**
  - Delivery System and Comfort Level: height of occupant
  - System Turbulence
  - Materials and Textures

- **Lighting and Glare**
  - Retrofit Projects vs Relighting Project
  - Windows and Blinds
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Simple Ideas That Save $

- **Lets Talk Maintenance!**
  - Routine Maintenance - $ - custodial cleaning
  - Preventative Maintenance - $ Mfg.
  - Predictive Maintenance* - $ Data driven repairs
  - Proactive Maintenance - $$ Replace B4 failure
  - Reactive Maintenance - $$$$$ EMERGENCY

- **Work Order Systems will reduce - $$$$$**
  - School Dude
  - Micromain
  - Maintenance Connection

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Training, Training, Training

We are in the Education Business!

- How many districts have dedicated funds for custodial/maintenance training?
- MASMS Certification
  - Certified Plant Supervisor
  - Certified Plant Maintenance Manager
  - Certified Plant Engineer
- Minnesota - EPA
  - Indoor Air Quality

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System Improvement and Replacement

- **Building Reclassification**
  - May be able to Eliminate Rated Walls: new code applications
  - Identifies Future Design Strategies: consider more options

- **Retro-Commissioning and Re-Commissioning**
  - Functional Testing and Verification
  - Depreciation and System Age
  - Controls and Monitoring

- **Construction Types**
  - Heat Sink Structures: about 1990 and Older
  - Insulated Structures: about 1990 and Newer
  - System Impacts and Design Strategies
Basic Ideas That Save Dollars

Construction/Maintenance

- Create District Specifications and Standards
  - Doors, Locks, and Hardware
  - Flooring – carpeting, VCT, etc.
  - Finishes – case work, paint, window treatment, etc.
  - Mechanical - pumps, valves, BAS
  - Electrical – lights, fixtures, etc.
  - Component/System Numbering
  - Furniture Fixtures and Equipment
  - Construction Insurance

- Why?
  - Do You Own the Ability to Use the Documents

Supporting the Administrative Team

Just Ask for Our Thoughts

We are Learning with You
Questions and Discussion

Mike Boland – CPMS, CPS

Phil Fisher – CPE