# Financial Analysis

*Familiarization with Financial Analysis Methods used in Facility Management*

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## Materials

- https://www.msbo.org/msbo-certification-program/msbo-certification-class-materials/

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## Facilities Affect Outcomes

- Indoor Air Quality
- Ventilation
- Thermal Comfort
- Acoustics
- Lighting
- Health and Safety
- Building age, Quality, Aesthetics
- School Size

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## Largest Capital Investment

- School buildings are often the largest capital investment in the community
- Maintaining them properly is vital
  - Cleanliness
  - Safety
  - Curb Appeal
  - Attitudes
- A lot of perceptions are made about a district by the condition of the buildings and grounds.

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## Who are you?

- Director of Buildings and Grounds
- Director of Operations
- Director of Maintenance
- Supervisor of Maintenance
- Facilities Director
- Facilities Manager
- Director of Physical Plant
- Director of Plant Services
- Director of Business
  - Facilities also?

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## Facility Management

- Definition
  - The practice of coordinating the physical workplace with the people and work of the organization; integrating the principles of business administration, architecture, and the behavioral and engineering sciences
  - Source
    - *The Facility Management Handbook*, 2nd Edition, David G. Cotts, P.E., C.F.M., 1999.

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**FACILITY MANAGEMENT:** A profession that encompasses multiple disciplines to ensure functionality of the built environment by integrating people, place, process and technology.

International Facility Management Assoc. (IFMA)

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## Facilities and Costs

- Facility Management Handbook (Cotts,1999)
  - Needed improvements in Facility Management
    - FM's need to justify department and initiatives w/business terms
    - FM must view themselves as a businessperson, not a technician
    - Able to speak the language of business

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## As far from the classroom as Possible

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International Facility Management Association www.ifma.org

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## Number 1
### Sustainability

- Part of vision, values, and branding
- Usually requires high performance building systems and the skill sets to operate them
- Environmentally friendlier supplies

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## Number 2
### Complex Building Technology

- Integration of systems
- Data to usable information
- Must train and educate to leverage value

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## Number 3
### Recession and Aging Buildings

- Repair, Reuse, or Replace?
- Facility Condition Assessment
- Facility Condition Index (FCI)

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# Number 4

## Preparedness

- Protection of Equipment – critical systems tested and ready
- Disasters
- Security

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# Number 5

## Quantity & Complexity of FM Data

- Advanced technical knowledge for complex systems
- Need to analyze data and put meaning to it
- Broader skills than a decade ago
- Tools and processes

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# Number 6

## Finding Top Talent

- Who will fill these roles?
- Training – 400% ROI
- Demand – interact with occupants, complex systems, strategic thinking, communicate
- Keep people happy – training, mentoring, recognition

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# Number 7

## Elevating the FM Profession

- Must convince admin of best interest to optimize performance of largest asset
- Prepared, dress & speak the part
- Follow through on all requests
- Industry best practices
- Visible

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# Number 8

## Business Acumen

- Top FM skill needed – business acumen
- Assess current capabilities – bolster weaknesses
- Develop management & leadership skills beyond FM
- Improve public speaking and presentation skills
- Learn "language of C-suite"

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# Number 9

## Enhancing Workplace Productivity

- Link facilities and FM services to core business goals and strategies
- Thermal & acoustical comfort & control of environment impact productivity
- Understand organization's key business indicators
- Total cost of operations

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# Number 10

## Changing Workplace

- More collaborative spaces
- More usage
- Explore solutions for increasing utilization of facilities

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## School Aid Fund

- Where's the money come from?

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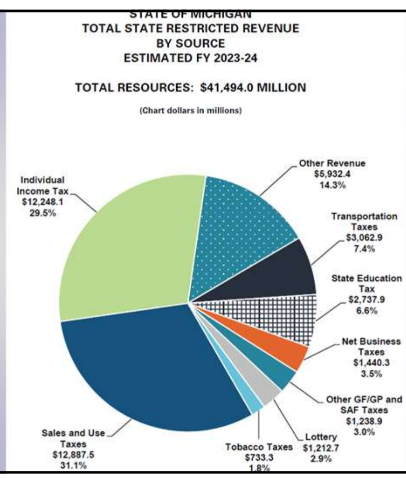


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## Facilities and Costs

- *Facility Management* (Rondeau, Brown, Lapides, 1995)
- *Facility Management Handbook* 3rd Edition (Cotts, 2010)
- *The Facility Manager's Guide to Finance & Budgeting* (Cotts, Rondeau,2004)

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## Facilities and Costs

- The Facility Manager's Guide to Finance & Budgeting (Cotts, Rondeau,2004)
  - Understand:
    - Statement of Accounts
      - Make sure it reflects your department operations
    - The pain of expenses
    - Being a cost center

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## *Financial Analysis Methods: Lowest First Cost Analysis*

- Entails finding the lowest-priced item that meets your specifications at the time you need it. This works best for a narrow set of circumstances such as:
  - Many vendors can supply your need and most brands are identical in all major respects.
  - A lot of competition in a fairly stable market ensures a steady source of supply.

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## Lowest First Cost Analysis

- Substituting one brand for another can be made fairly easily (e.g., several brands of paper towels fit in the same model of dispenser).
- An item can be precisely specified.

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## Lowest First Cost Analysis

- The economic life cycle is very short or non-existent. If an item needs to last no more than two years but is built to last for ten or fifteen years, that extra durability may not be of any value for its probable higher cost.
- There are no maintenance or operating costs associated with the item.

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## Lowest First Cost Analysis

- Cautions
  - Switching cleaning products that may seem identical -- but you need to be aware of Safety Data Sheets (SDS) requirements, dispenser labels, training, compatibility.
  - Attractive approach when cash is tight: however, if quality is an issue, this approach should not be relied on to provide satisfactory results.

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## Financial Analysis: Life Cycle Costing

- Definition/Concept
  - A process that estimates the total cost of ownership over the life of the purchase, including initial cost, maintenance, repairs, operating expenses, plus financial factors, including interest, inflation, and the time value of money.

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## Life Cycle Costing

- *The Facility Management Handbook, 2nd Edition, David G. Cotts, P.E., C.F.M., 1999*
  - *"Life-cycle costing is a best practice that is not yet widely used in facility management. The reasons usually given are that management is only interested in first cost (a dubious excuse, if you really think about it) and that facility managers are either ill prepared or too busy to do the calculations."*

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## Life Cycle Costing

- *The Facility Management Handbook, 3nd Edition, David G. Cotts, P.E., C.F.M., 2010*
  - *"Major FM decisions made solely on first costs are never good decisions and are more likely wrong than right.* Life cycle costing is one of those best practices that the profession should embrace as a standard."

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## Life Cycle Costing

- Used for comparing alternative expenditures that are expected to produce benefits over a period of time greater than one year.
- This method gained prominence as a result of the energy crisis of the 1970's.
- Another source:

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## Life Cycle Costing

- Factors
  - Original Cost (Acquisition Cost)
  - Annual Expenses
    - Operating
    - Maintenance
    - Personnel
  - One-time future expenses or income
    - Overhaul
    - Salvage

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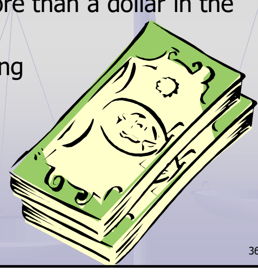
## Life Cycle Costing

- Present Value
  - Time Value of Money
  - Dollar today worth more than a dollar in the future
  - Inverse of compounding



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## Life Cycle Costing

- Discount Rate
  - Each dollar spent or received in the future is reduced by a factor derived from an interest rate (discount rate) for a given time, resulting in the present value of that dollar.
- Provides basis for selecting among alternatives

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OMB Circular No. A-94

**APPENDIX C**
(Revised November 2020)

**DISCOUNT RATES FOR COST-EFFECTIVENESS, LEASE PURCHASE, AND RELATED ANALYSES**

**Nominal Discount Rates**. A forecast of nominal or market interest rates for calendar year 2021 based on the economic assumptions for the 2022 Budget is presented below. These nominal rates are to be used for discounting nominal flows, which are often encountered in lease-purchase analysis.

**Nominal Interest Rates on Treasury Notes and Bonds of Specified Maturities (in percent)**

| 3-Year | 5-Year | 7-Year | 10-Year | 20-Year | 30-Year |
|---|---|---|---|---|---|
| 0.2 | 0.3 | 0.6 | 0.8 | 1.5 | 1.7 |

**Real Discount Rates**. A forecast of real interest rates from which the inflation premium has been removed and based on the economic assumptions from the 2022 Budget is presented below. These real rates are to be used for discounting constant-dollar flows, as is often required in cost-effectiveness analysis.

**Real Interest Rates on Treasury Notes and Bonds of Specified Maturities (in percent)**

| 3-Year | 5-Year | 7-Year | 10-Year | 20-Year | 30-Year |
|---|---|---|---|---|---|
| -1.8 | -1.6 | -1.4 | -1.1 | -0.5 | -0.3 |

Analyses of programs with terms different from those presented above may use a linear interpolation. For example, a four-year project can be evaluated with a rate equal to the average of the three-year and five-year rates. Programs with durations longer than 30 years may use the 30-year interest rate

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OMB Circular No. A-94

**APPENDIX C**
(Revised December 12, 2022)

**DISCOUNT RATES FOR COST-EFFECTIVENESS, LEASE PURCHASE, AND RELATED ANALYSES**

**Effective Dates**. This appendix is updated annually. This version of the appendix is valid for calendar year 2023. A copy of the updated appendix can be obtained in electronic form through the OMB home page at https://www.whitehouse.gov/wp-content/uploads/2023/02/Appendix-C.pdf. The text of the Circular is found at www.whitehouse.gov/wp-content/uploads/legacy_drupal_files/omb/circulars/A94/a094.pdf.

**Nominal Discount Rates**. A forecast of nominal or market interest rates for calendar year 2023 based on the economic assumptions for the 2024 Budget is presented below. These nominal rates are to be used for discounting nominal flows, which are often encountered in lease-purchase analysis.

**Nominal Interest Rates on Treasury Notes and Bonds of Specified Maturities (in percent)**

| 3-Year | 5-Year | 7-Year | 10-Year | 20-Year | 30-Year |
|---|---|---|---|---|---|
| 4.0 | 3.8 | 3.8 | 3.9 | 4.2 | 4.2 |

**Real Discount Rates**. A forecast of real interest rates from which the inflation premium has been removed and based on the economic assumptions from the 2024 Budget is presented below. These real rates are to be used for discounting constant-dollar flows, as is often required in cost-effectiveness analysis.

**Real Interest Rates on Treasury Notes and Bonds of Specified Maturities (in percent)**

| 3-Year | 5-Year | 7-Year | 10-Year | 20-Year | 30-Year |
|---|---|---|---|---|---|
| 1.2 | 1.3 | 1.4 | 1.5 | 2.0 | 2.0 |

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## Life Cycle Cost Analysis Worksheet

| | | | |
|---|---|---|---|
| Life Expectancy "N" (yrs) | 7 | **Initial Expense** | |
| | | Purchase Price | $6,000 |
| Inflation Rate "I" (%) | 9% | Installation | $2,000 |
| Real Interest "i" (%) | 3% | Other | |
| | | **Total Initial Expense** | $8,000 |

**Ongoing Expense**

| Type | Escalation Rate "e" | Discount Rate (I+i-e) | UPW Factor | | Annual Expense (+/-) | | Present Value |
|---|---|---|---|---|---|---|---|
| Personnel | 8% | 4% | 6.00 | x | $1,000 | = | $6,000 |
| Materials | 10% | 2% | 6.47 | x | $250 | = | $1,618 |
| Energy | | | | x | | = | |
| Other | | | | x | | = | |
| | | | **Total Ongoing Expense** | | | | $7,618 |

**One-time Future Expense**

| Type | Year | Discount Rate (I+i) | SPW Factor | | One Time Expense (+/-) | | Present Value |
|---|---|---|---|---|---|---|---|
| Salvage | 7 | 12% | 0.452 | x | -$500 | = | -$226 |

**Summary**

| | |
|---|---|
| Total Initial Expense | $8,000 |
| Total Ongoing Expense | $7,618 |
| Total One-time Future Expense | -$226 |
| **Total Expense** | $15,392 |
| **Effective Annual Expense** | $2,199 |

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## Life Cycle Cost Analysis Worksheet

| | | | |
|---|---|---|---|
| **Life Expectancy "N" (yrs)** | **10** | **Initial Expense** | |
| | | **Purchase Price** | **$8,000** |
| **Inflation Rate "I" (%)** | **9%** | **Installation** | **$2,000** |
| **Real Interest "i" (%)** | **3%** | **Other** | |
| | | **Total Initial Expense** | **$10,000** |

**Ongoing Expense**

| Type | Escalation Rate "e" | Discount Rate (I+i-e) | UPW Factor | | Annual Expense (+/-) | | Presen t Value |
|---|---|---|---|---|---|---|---|
| Personnel | 8% | 4% | 8.11 | x | $800 | = | $6,488 |
| Materials | 10% | 2% | 8.98 | x | $200 | = | $1,796 |
| Energy | | | | x | | = | |
| Other | | | | x | | = | |
| | | | **Total Ongoing Expense** | | | | **$8,284** |

**One-time Future Expense**

| Type | Year | Discount Rate (I+i) | SPW Factor | | One Time Expense (+/-) | | Present Value |
|---|---|---|---|---|---|---|---|
| Salvage | 10 | 12% | 0.322 | x | -$1,000 | = | -$322 |

**Summary**

| | |
|---|---|
| **Total Initial Expense** | **$10,000** |
| **Total Ongoing Expense** | **$ 8,284** |
| **Total One-time Future Expenses** | **$ - 322** |
| **Total Expense** | **$17,962** |
| **Effective Annual Expense** | **$ 1,796** |

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EDUCATION
& EARLY DEVELOPMENT

| | |
|---|---|
| **Project:** | Project Name |
| **Project #:** | Project Number |
| **Study Period:** | 20 |
| **Discount Rate:** | 3.10% |

## Life Cycle Costs of Project Alternatives

| | Alternate #1 | Alternate #2 | Alternate #3 |
|---|---|---|---|
| **Initial Investment Cost** | **$0** | **$0** | **$0** |
| **Operations Cost** | **$0** | **$0** | **$0** |
| **Maintenance & Repair Cost** | **$0** | **$0** | **$0** |
| **Replacement Cost** | **$0** | **$0** | **$0** |
| **Residual Value** | **$0** | **$0** | **$0** |
| **Total Life Cycle Cost** | **$0** | **$0** | **$0** |
| GSF of Project | 1 GSF | 1 GSF | 1 GSF |
| Initial Cost/GSF | $0.00 | $0.00 | $0.00 |
| LCC/GSF | $0.00 | $0.00 | $0.00 |

SUMMARY / Alternate 1 / Alternate 2 / Alternate 3 / Sheet2 / Sheet3

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# Life Cycle Cost Analysis Handbook

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## *Financial Analysis: Cost-Benefit Analysis*

- Definition/Concept
  - "Are the benefits of a project worth its cost?"
  - Used for comparing alternatives based on qualitative factors along with quantitative factors.
  - Hard costs (Benefits) are more measurable and more persuasive than soft costs.

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## *Cost-Benefit Analysis*

- Soft costs (Benefits)
  - Can be tangible, but hard to measure, such as projected savings in staff time.
  - Intangible benefits and unmeasurable; could be improved levels of quality. These are usually subjective.
- These are factors you may need to address when attempting to persuade decision makers.

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## *Financial Analysis: Payback*

- Payback determines length of time required to pay back investment through savings or income earned.
- We would typically look at savings paying for the investment and the length of time.

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## *Payback*

- Obviously, the shorter the payback period is, the better; however, be aware of the correlation between quality and slower payback. *When quality is compromised, durability decreases and maintenance costs increase.*

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## *Payback*

- This technique is useful in the following situations:
  - Policy in place stating required payback period for investments below a certain dollar amount.
  - If there is some uncertainty on the projections of future cash flows or cost savings, the payback calculation provides a measure of how soon the investment will be recovered.
  - If cash flow is a problem, this method provides relevant information regarding the return on the investment.

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ENERGY STAR®

# Cash Flow Opportunity Calculator

Know when to finance energy efficiency projects

Please send any comments to Katy Hatcher, ENERGY STAR Public Sector National Manager at Hatcher.Caterina@epa.gov.

Developed by The Cadmus Group LLC and Catalyst Financial Group, Inc.

EPA

CFO Calculator Version 2.2 - 2018

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ENERGY STAR®

# Cash Flow Opportunity Calculator

Know when to finance energy efficiency projects

**Version 2.2 - 2018**

## Cash Flow Opportunity Calculator Instructions

**IMPORTANT NOTICE & CONTACT INFORMATION**

To use this Cash Flow Opportunity (CFO) Calculator, macros must be enabled within Microsoft® (MS) Excel®. If macros in your version of MS Excel are not automatically enables, please refer to the MS Excel Help function to learn how to enable macros.

This spreadsheet was designed for use in MS Excel 2010 through 2016versions and functionality may not be compatible with Apple products.

This calculator, like all EPA's ENERGY STAR® program products and services, is available to the public at no cost. EPA's ENERGY STAR program cannot guarantee that your project will generate the results presented herein, and makes no claims of this tool's accuracy, only its intention. An investment grade audit performed by a qualified engineering organization is required to determine the actual size of your savings opportunity. Should you have any comments, we kindly request that you notify:

**Katy Hatcher, ENERGY STAR Public Sector National Manager, at Hatcher.Caterina@epa.gov.**

**HOW TO USE THIS WORKSHEET**

**Purpose**

The purpose of this MS Excel spreadsheet is to help decision-makers quantify the costs of delaying an energy efficiency project by addressing three critical questions:

How much new energy efficiency equipment can be purchased from the anticipated savings?

Should this equipment purchase be financed now or is it better to wait and use cash from a future budget?

Is money being lost by waiting for a lower interest rate?

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# Performance Contract Measurement

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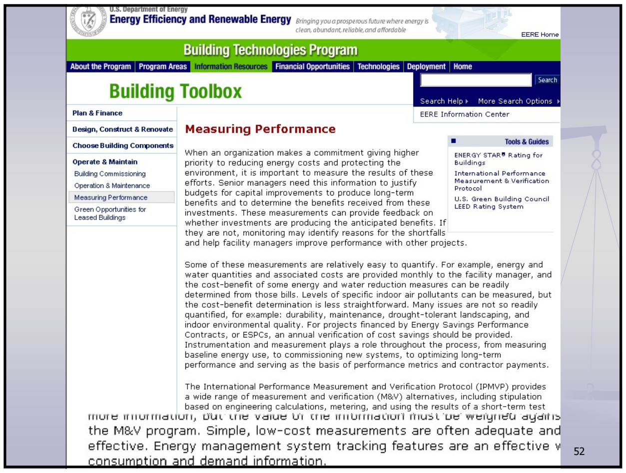
U.S. Department of Energy
Energy Efficiency and Renewable Energy
Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable
EERE Home
Building Technologies Program
About the Program | Program Areas | Information Resources | Financial Opportunities | Technologies | Deployment | Home
Search
Search Help › More Search Options ›
EERE Information Center
Building Toolbox
Plan & Finance
Design, Construct & Renovate
Choose Building Components
Operate & Maintain
Building Commissioning
Operation & Maintenance
Measuring Performance
Green Opportunities for Leased Buildings
Measuring Performance
When an organization makes a commitment giving higher priority to reducing energy costs and protecting the environment, it is important to measure the results of these efforts. Senior managers need this information to justify budgets for capital improvements to produce long-term benefits and to determine the benefits received from these investments. These measurements can provide feedback on whether investments are producing the anticipated benefits. If they are not, monitoring may identify reasons for the shortfalls and help facility managers improve performance with other projects.
Some of these measurements are relatively easy to quantify. For example, energy and water quantities and associated costs are provided monthly to the facility manager, and the cost-benefit of some energy and water reduction measures can be readily determined from those bills. Levels of specific indoor air pollutants can be measured, but the cost-benefit determination is less straightforward. Many issues are not so readily quantified, for example: durability, maintenance, drought-tolerant landscaping, and indoor environmental quality. For projects financed by Energy Savings Performance Contracts, or ESPCs, an annual verification of cost savings should be provided. Instrumentation and measurement plays a role throughout the process, from measuring baseline energy use, to commissioning new systems, to optimizing long-term performance and serving as the basis of performance metrics and contractor payments.
The International Performance Measurement and Verification Protocol (IPMVP) provides a wide range of measurement and verification (M&V) alternatives, including stipulation based on engineering calculations, metering, and using the results of a short-term test
the M&V program. Simple, low-cost measurements are often adequate and
effective. Energy management system tracking features are an effective
consumption and demand information.
Tools & Guides
ENERGY STAR® Rating for Buildings
International Performance Measurement & Verification Protocol
U.S. Green Building Council LEED Rating System
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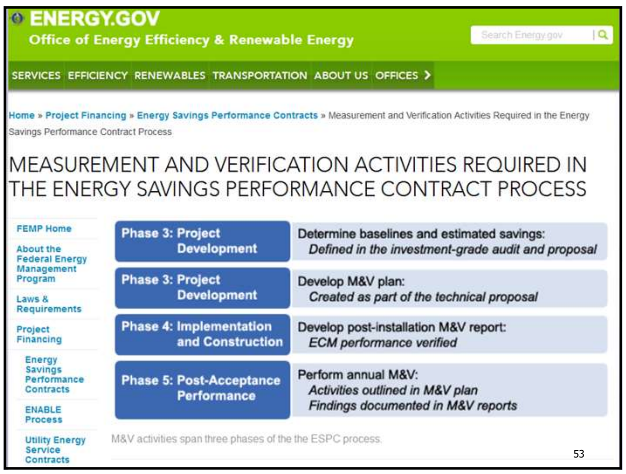
ENERGY.GOV
Office of Energy Efficiency & Renewable Energy
Search Energy.gov
SERVICES EFFICIENCY RENEWABLES TRANSPORTATION ABOUT US OFFICES
Home » Project Financing » Energy Savings Performance Contracts » Measurement and Verification Activities Required in the Energy Savings Performance Contract Process
MEASUREMENT AND VERIFICATION ACTIVITIES REQUIRED IN THE ENERGY SAVINGS PERFORMANCE CONTRACT PROCESS
FEMP Home
About the Federal Energy Management Program
Laws & Requirements
Project Financing
Energy Savings Performance Contracts
ENABLE Process
Utility Energy Service Contracts
Phase 3: Project Development
Determine baselines and estimated savings: Defined in the investment-grade audit and proposal
Phase 3: Project Development
Develop M&V plan: Created as part of the technical proposal
Phase 4: Implementation and Construction
Develop post-installation M&V report: ECM performance verified
Phase 5: Post-Acceptance Performance
Perform annual M&V: Activities outlined in M&V plan Findings documented in M&V reports
M&V activities span three phases of the the ESPC process.
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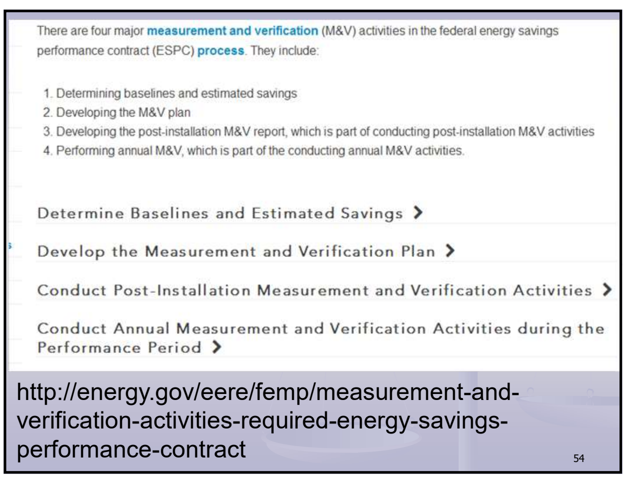
There are four major measurement and verification (M&V) activities in the federal energy savings performance contract (ESPC) process. They include:
1. Determining baselines and estimated savings
2. Developing the M&V plan
3. Developing the post-installation M&V report, which is part of conducting post-installation M&V activities
4. Performing annual M&V, which is part of the conducting annual M&V activities.
Determine Baselines and Estimated Savings ›
Develop the Measurement and Verification Plan ›
Conduct Post-Installation Measurement and Verification Activities ›
Conduct Annual Measurement and Verification Activities during the Performance Period ›
http://energy.gov/eere/femp/measurement-and-verification-activities-required-energy-savings-performance-contract
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Table 1: Overview of M&V Options

| M&V Option | How Savings Are Calculated | Typical Applications |
|---|---|---|
| **A. Partially Measured Retrofit Isolation**<br>Savings are determined by partial field measurement of the energy use of the system(s) to which an ECM was applied, separate from the energy use of the rest of the facility. Measurements may be either short-term or continuous.<br>Partial measurement means that some but not all parameter(s) may be stipulated, if the total impact of possible stipulation error(s) is not significant to the resultant savings. Careful review of ECM design and installation will ensure that stipulated values fairly represent the probable actual value. Stipulations should be shown in the M&V Plan along with analysis of the significance of the error they may introduce. | Engineering calculations using short term or continuous post-retrofit measurements and stipulations. | Lighting retrofit where power draw is measured periodically. Operating hours of the lights are assumed to be one half hour per day longer than store open hours. |
| **B. Retrofit Isolation**<br>Savings are determined by field measurement of the energy use of the systems to which the ECM was applied, separate from the energy use of the rest of the facility. Short-term or continuous measurements are taken throughout the post-retrofit period. | Engineering calculations using short term or continuous measurements | Application of controls to vary the load on a constant speed pump using a variable speed drive. Electricity use is measured by a kWh meter installed on the electrical supply to the pump motor. In the baseyear this meter is in place for a week to verify constant loading. The meter is in place throughout the post-retrofit period to track variations in energy use. |
| **C. Whole Facility**<br>Savings are determined by measuring energy use at the whole facility level. Short-term or continuous measurements are taken throughout the post-retrofit period. | Analysis of whole facility utility meter or sub-meter data using techniques from simple comparison to regression analysis. | Multifaceted energy management program affecting many systems in a building. Energy use is measured by the gas and electric utility meters for a twelve month baseyear period and throughout the post-retrofit period. |
| **D. Calibrated Simulation**<br>Savings are determined through simulation of the energy use of components or the whole facility. Simulation routines must be demonstrated to adequately model actual energy performance measured in the facility. This option usually requires considerable skill in calibrated simulation. | Energy use simulation, calibrated with hourly or monthly utility billing data and/or end-use metering. | Multifaceted energy management program affecting many systems in a building but where no baseyear data are available. Post-retrofit period energy use is measured by the gas and electric utility meters. Baseyear energy use is determined by simulation using a model calibrated by the post-retrofit period utility data. |

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## *Financial Analysis: Net Benefit or Savings*

- Identifies the difference between the lifetime dollar savings and lifetime dollar costs of a facility investment.

Lifetime $$ savings
– Lifetime $$ costs
Net Benefit/Savings

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## *Financial Analysis: Savings-to-Investment Ratio (SIR)*

- Savings and investment costs are expressed as a ratio instead of a dollar amount.
- The higher the ratio, the more dollar savings realized per dollar of investment

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## *Net Benefit vs. Savings-to-Investment*

- When a specific dollar amount is available and you need to compare several projects:
  - Example: $55,000 available for lobby upgrade (Commercial Industry Example)

Four potential projects:

1 2 3 4

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## *Net Benefit vs. Savings-to-Investment*

1
- Replace carpeting with granite tile at a cost of $12,000
  - Expected life cycle cleaning and replacement savings of $36,000.

2
- Install new revolving doors at $30,000
  - Expected life cycle energy savings of $50,000.

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## Net Benefit vs. Savings-to-Investment

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- Reconfigure security desk at $15,000
  - Expected life cycle security savings of $30,000.

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- Install new vestibule entrance grid at $3,000
  - Expected life cycle dirt control savings of $15,000.

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## Net Benefit vs. Savings-to-Investment

- ***Compare Net Benefit Ranking to SIR***

| | Investment Cost | Expected Savings | Net Benefits | **Net Benefit Ranking** | Savings-to-Investment Ratio | **SIR Ranking** |
|---|---|---|---|---|---|---|
| 1 | $12,000 | $36,000 | $24,000 | **1** | 3.0:1 | **2** |
| 2 | $30,000 | $50,000 | $20,000 | **2** | 1.7:1 | **4** |
| 3 | $15,000 | $30,000 | $15,000 | **3** | 2.0:1 | **3** |
| 4 | $ 3,000 | $15,000 | $12,000 | **4** | 5.0:1 | **1** |

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## Net Benefit vs. Savings-to-Investment

- Using Net Benefit, the granite tile and revolving door projects would be chosen.

1 2

- Using the Savings-to-Investment Ratio, the entrance grid, granite tile, and security desk would be chosen.

4 1 3

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# Benchmarking

- Definition of Benchmarking
  - "Comparing activities, standards, levels of performance, and other factors to those of another company. "*

*BOMI, Fundamentals of Facilities Management, 1997

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# Definition of Benchmarks

- Benchmarks are the data, the standards set.
- "Remember to get beyond the metrics in benchmarking. The reason there is a difference is the important factor." *

*The Facility Management Handbook, David G. Cotts, 3rd Edition, 2010

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# Sources for Maintenance and Operations Benchmarks

- MSBO School Facility Benchmarking Survey
- Association of Higher Education Facilities Officers (APPA)
- International Sanitary Supply Association (ISSA)

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## What Can You Benchmark?

- Staffing
  Headcount per square foot or acre maintained
- Budget
  Cost per square foot and student
- Deferred Maintenance
  Facility Condition Index
- Customer Satisfaction
  Percent satisfied or very satisfied
- Response Times
  Average completion time for high, medium and low priority work orders

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- Where do we start?
  - Understand where we are
- Perceptions are realities

68

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## Poll #1

- Do you feel your custodial team is understaffed?
- Yes
- No

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**MSU braces for worst as funding cuts likely**

University eliminating 250 jobs in anticipation of budget fallout

MATTHEW MILLER • MRMILLER@LSJ.COM • SEPTEMBER 20, 2009 • FROM LANSING STATE JOURNAL

National Association of Manufacturers

**Custodial Jobs Cut**

MSU already eliminated 19 custodial positions this summer. It also announced that it wouldn't be cleaning the offices of professors and staff any longer, though departments could still choose to pay for the service.

"Logic tells you that there's some number of support personnel that you can't go below and still be able to operate a university," Poston said. "We're trying to find what that point is."

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## 2014 MSBO Facilities Benchmarking

- 14 years – 10 surveys
  - 111 districts reported (403 over time)
- 22 Key measures
- District Size – Regions
- Year to Year
- Self calculating worksheet

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## Square Footage per (increased)

- Total Buildings and Grounds: 61.53%
  - Custodial: 29.20% (23,303 → 32,914)
  - Skilled Trades: 40.83% (132,000 → 185,890)
  - Supervisory: 86.16% (360,000 → 670,170)

72

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## Salaries per Sq Foot (decreased)

- Total Buildings and Grounds: -23.81%
  - Custodial: -22.31%
  - Skilled Trades: -20.00%
  - Supervisory: -26.67%

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## Conclusions?

- Quantitative
- Efficiencies Implemented:
  - Sub contracting?
  - Equipment?
  - Work order tracking?

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## Quantitative vs Qualitative

- Do benchmarks represent optimum?
- Preservation of resources
- Cleanliness

75

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## Impact on Custodial Productivity

- Schedules
  - Alternate Day Cleaning
  - Team Cleaning
- Service Levels
  - Task Lists
  - Frequency
- Shifts
  - Days
  - Start times
  - T-S

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- Equipment
- Training
- Inspections/expectations
- Age of building

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- Type of instruction
- Type of flooring
- Setups
- Maintenance performed
- Grounds duties performed

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## Impact on Maintenance Productivity

- Maintenance Productivity
  - Preventive Maintenance
  - Work Order System - Something.com
    - Using it – capturing time, materials, etc.
  - Accountability
    - Excessive time in shop in morning?
    - Non "wrench" time
    - Two person crews
    - Driving for supplies?
    - Time to complete standard work orders

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- Shifts
  - Second
  - T-S
- Skilled Trades
  - Licensed
  - General Utility
    - Cross Trained

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## APPA Quality Levels

Maintenance

1. Showpiece Facility
2. Comprehensive Stewardship
3. Managed Care
4. Reactive Management
5. Crisis Response

Custodial

1. Orderly spotlessness
2. Ordinary Tidiness
3. Casual Inattention
4. Moderate Dinginess
5. Unkempt Neglect

81

81

**Figure 7. Maintenance Level Matrix**

| Level | 1 |
|---|---|
| Description | Showpiece Facility |
| Customer Service and Response Time | Able to respond to virtually any type of service, immediate response. |
| Customer Satisfaction | Proud of facilities, have a high level of trust for the facilities organization. |
| Preventive Maintenance vs. Corrective Maintenance | 100% |
| Maintenance Mix | All recommended preventive maintenance (PM) is scheduled and performed on time. Reactive maintenance (e.g., spot relamping and adjusting door closers) is minimized to the unavoidable or economical. Emergencies (e.g., storms or power outages) are very infrequent and handled efficiently. |

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| 4 | 5 |
|---|---|
| Reactive Management | Crisis Response |
| Services available only by reducing maintenance, with response times of one year or less. | Services not available unless directed from top administration, none provided except emergencies. |
| Generally critical of cost, responsiveness, and quality of facilities services. | Consistent customer ridicule, mistrust of facilities services. |
| 25–50% | 0% |
| Worn-out systems require staff to be scheduled to react to systems that are performing poorly or not at all. Significant time spent procuring parts and services due to the high number of emergency situations with weekly reporting. PM work possible consists of simple tasks and is done inconsistently (e.g., filter changing, greasing and fan belt replacement). | No PM performed due to more pressing problems. Reactive maintenance is a necessity due to worn-out systems (e.g., doors won't lock, fans lock up, heating, ventilation and air conditioning systems fail). Good emergency response because of skills gained in reacting to frequent system failures. (No status reporting, upper administration is tired of reading the reports.) |

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## Poll # 2

- Have you surveyed customers regarding Facilities services quality in last 5 years?
- Yes
- No

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## Other Measurements?

- Springfield Public Schools, Springfield, MO committed to a quality improvement program where they measure several items:
  - The following 7 slides come from a report by their quality department
  - We may not have the resources to tackle this, but there might be ideas to think about as far as department performance and how we measure and communicate.

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## Benchmarking and Data Collection

- ✓ In May of 2003, a Quality Assurance Department was established
- ✓ Data collection has been taking place ever since.
- ✓ These measurements were deemed critical to our success:
  - ✓ Responsiveness
  - ✓ Communication
  - ✓ Quality of maintenance work
  - ✓ Quality of grounds work
  - ✓ Value provided to the District

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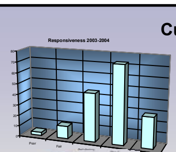
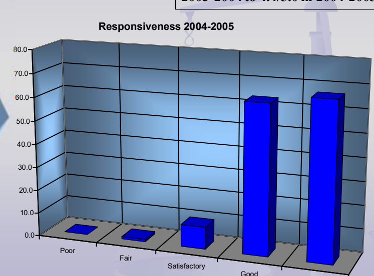
## Customer Satisfaction Metrics




**Responsiveness is the measurement of how quickly and how well our department responds to District needs. Our department has raised the overall responsiveness rating from 3.7/5.0 in 2003-2004 to 4.4/5.0 in 2004-2005.**

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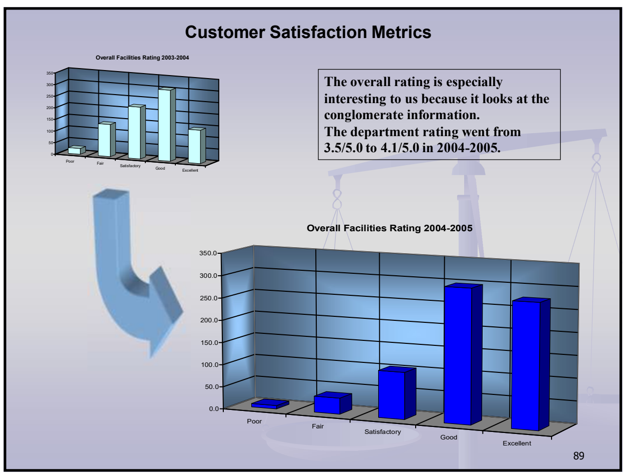
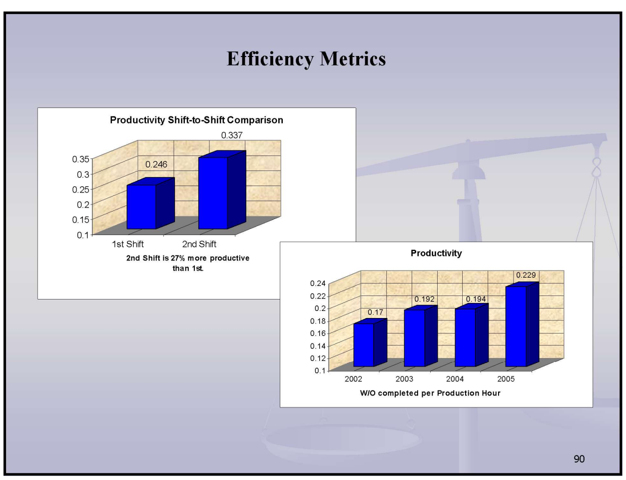
Customer Satisfaction Metrics
The quality of our work is of utmost importance to us. As can be seen, the perception of our quality has risen dramatically.
Overall, it has gone from 3.6/5.0 to 4.2/5.0
Quality of Maintenance 2004-2005
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
Poor
Fair
Satisfactory
Good
Excellent
88

88


Customer Satisfaction Metrics
The overall rating is especially interesting to us because it looks at the conglomerate information.
The department rating went from 3.5/5.0 to 4.1/5.0 in 2004-2005.
Overall Facilities Rating 2004-2005
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
Poor
Fair
Satisfactory
Good
Excellent
89

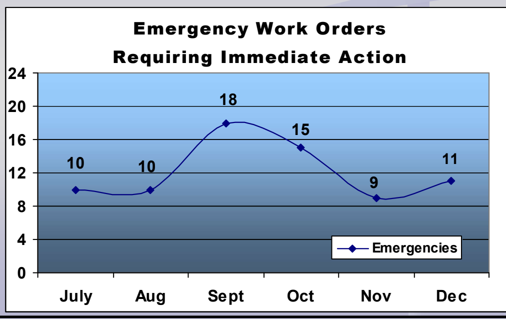
89


Efficiency Metrics
Productivity Shift-to-Shift Comparison
0.337
0.246
0.35
0.3
0.25
0.2
0.15
0.1
1st Shift
2nd Shift
2nd Shift is 27% more productive than 1st.
Productivity
0.229
0.192
0.194
0.17
0.24
0.22
0.2
0.18
0.16
0.14
0.12
0.1
2002
2003
2004
2005
W/O completed per Production Hour
90

90

## Efficiency Metrics

In 2003, we had literally 100+ emergencies a month, In our run chart for 2005-2006, it runs less than 20…………….

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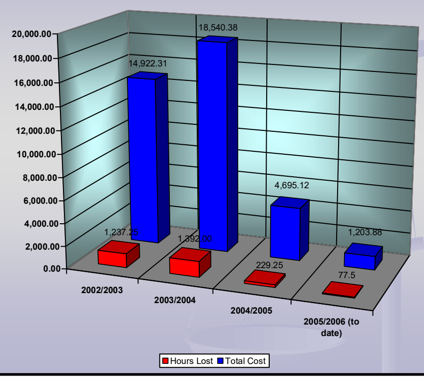
## •On-The-Job Injury (OJI) Reduction

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# Presenting the Situation

The following slides were developed by Pearl River School District, a school district in New York State.

They demonstrate a good way of communicating the scope of the facilities operations.

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## Custodial

District Buildings are utilized 17 Hrs. a day, 350 days a year

District Square Footage - 394,734

Average Home 1,800 – 2,200 Sq. Ft.
Divide 394,734 by 2,000 = 197 Homes

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- 197 Homes Divided by 12 Staff = 16.4 Homes are Cleaned and Maintained Daily Per Staff Member (32,895 sq ft per)
- District Students and Staff 3,063 (Does not include approx. 500 Daily Visitors, Parents, Seniors, Visiting Teams, Adult Ed. Classes or outside use by the Community )

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## Maintenance

District Buildings are utilized 17 Hrs. a day, 350 days a year

District Square Footage 394,734
Average Home 1,800 – 2,200 Sq. Ft.-
Divide 394,734 by 2,000 = 197 Homes

197 Homes Divide by 2 Staff = 98 Homes a Day are Maintained Daily Per Staff Member

District Students and Staff 3,063 (Does not include approx. 500 Daily Visitors,Parents,Seniors,Visiting Teams, Adult Ed. Classes or outside use by the Community )

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## Maintenance

- Computerized Maintenance Management Software (CMMS)
  - Produces history
  - Reporting functions
  - Analyze operations

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## Poll #3

- Do you utilize a formal CMMS?
- Yes
- No

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## Use the Tools

- Work order status by school
- Work order reports by technician
- Energy cost/consumption by school and year to year comparison
- Customer satisfaction survey
- Ongoing capital plan
- Facility usage reports
- Scheduled PM plan
- Wireless assignments and close out

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# Transportation

**STUDENT TRANSPORTATION BENCHMARKING SURVEY**

MSBO

Michigan School Business Officials

in conjunction with

Management Partnership Services, Inc.

July 2013

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# Transportation

*Student Transportation Benchmarking Survey*
*July 2013*

**Table of Contents**



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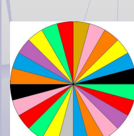
# BREAK

When we return, we'll spin the wheel for a gift card prize!



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## Energy Management

- An area that still demands attention
- Money sitting on the table
- Buy-in and awareness, not always easy

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## Poll #4

- Has your district done a Performance Contract to reduce energy costs in the last 5 years?
- Yes
- No

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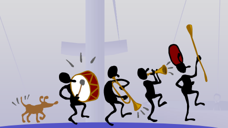
## Energy Essentials

- Traditional Approach
  - Only a Facilities Concern
  - Dealt with through Equipment Upgrades
- Energy costs are a significant part of the budget
- Lack of Awareness
- Lack of Energy Accounting
  - Benchmarking



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## Energy Management

- Energy Consumption – Tells story of success, more than cost
- Energy Management plan
  - Board Policy
  - Standards/Regulations
  - Higher Administrative Support
- Energy Tracking Mechanism

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**School Operations and Maintenance: Best Practices for Controlling Energy Costs**

A Guidebook for K-12 School System Business Officers and Facilities Managers

August 2004

Prepared by: Princeton Energy Resources International
1700 Rockville Pike
Suite 550

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understanding of the various staffing, program design, and other options available to school administrators as they plan and implement the details of their district's O&M effort. With a more complete knowledge of all the options and alternatives, school administrators will be better able to design and implement an energy management effort that is appropriate to, and successful in, their own district.

**Major Conclusions and Recommendations**

1) High energy costs are not "fixed" and can be reduced by 5% to 20% by effectively managing, maintaining, and operating school physical plants, regardless of school age.
2) School organizations can readily utilize techniques to systematically assess O&M practices in their physical plant as well as the magnitude of potential energy-saving opportunities resulting from changed O&M practices.
3) Substantial energy savings can be achieved from improved O&M practices without significant capital investments.
4) The biggest challenges to obtaining school district cost savings are not technical. Active and continuing support by senior administrators, as well as staff training and motivation, is critical to the success of energy-efficient O&M management efforts.

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## Benefits of Energy Management

- Cost Savings – DOE estimates schools could save 25% by improving energy efficiency
- Positive public image of economy & good stewardship
- Contributes to reducing fossil fuel usage and emissions
- Models positive behaviors for students

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The Federal government is the single largest domestic user of energy, spending more than $9 billion to power its vehicles, operations, and approximately 500,000 facilities throughout the United States. Federal agencies impact every energy-consuming sector of our economy—commercial, industrial, agricultural, transportation.

Efficient energy management at Federal facilities and operations:
- Saves taxpayers money;
- Reduces greenhouse gas emissions;
- Protects the environment and natural resources; and
- Contributes to the preservation of our national security.

FEMP meet legislative residential directives, and their energy management goals by creating partnerships, leveraging resources, transferring technology, and providing training and technical guidance and assistance. These activities support Executive Orders 13123, 13221, and other Executive Orders and Presidential Directives and relevant laws. *(http://www.eere.energy.gov/femp/about/legislation.cfm)*

As stated in the Presidential Directive on Energy Conservation at Federal Facilities, "...the Federal government should set a good example of conservation by reducing its own energy use...". ***Lead By Example*** is FEMP's slogan for Federal agencies to show positive action toward energy awareness, conservation, and efficiency. It is also a key to mitigating the adverse budgetary and

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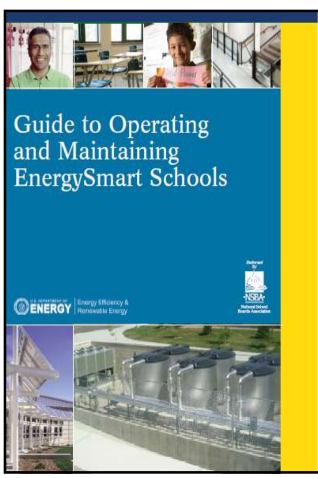


**High-Performance District**

- ❑ Policy
- ❑ Tracking
- ❑ Surveys
- ❑ Training
- ❑ Recognition
- ❑ Sharing
- ❑ Planning

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## Energy Taskforce

- Cross-functional Team
- High-energy District Stakeholders
- Develop a District Energy Plan
- NEED - Energy Curriculum Development
- Publicity and Community Awareness Planning

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## Who's in our buildings???

- The largest user of energy in our buildings is students and staff
- Don't we need to include them in our efforts for long term success?

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## Energy Knowledge Positively Correlates with Key Energy-Saving Activities

- Turning off lights
- Lowering the thermostat in winter
- Recycling newspapers and cans

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## The NEED Project
## Putting Energy into Education

NEED Putting Energy into Education

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## The NEED Project

- National Energy Education Development
  P.O. Box 10101
  Manassas, VA 20108
  Telephone 703.257.1117
  Fax 703.257.0037
  www.need.org

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energy Wise

A MELG initiative working toward a leaner, meaner, and greener work environment

September 2007

**Welcome to EnergyWise**

Welcome to the premier issue of the EnergyWise news brief. EnergyWise is a newly formed committee of representatives from each of the MELG offices who will be working throughout the building to improve ways we use resources in an attempt to reduce waste, save money, and model environmental stewardship that is practical for both professional and home settings. The founding members of this committee are:

- Scott Little, Chair (MSBO)
- Brooke Clay (MSBO)
- Kris Maier (MASB)
- Micki Magee (MASB)
- Erin Houlroyd (MASB)
- Carol Rooke (MASSP)
- Jason O'Donnell (Michigan ASCD)
- James Scofield (MASA)

Feel free to contact any of us with questions, ideas, or concerns. We hope to include everyone in our efforts to become "energy wise." Look for some fun, informative, and only mildly irritating energy saving initiatives from us in the near future.

*Task force members pose for photo after discussing ways to make MELG more "energy wise."*

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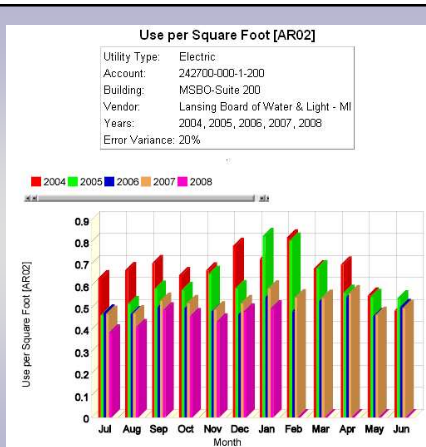


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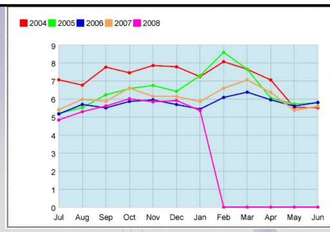
Cost per Day




| | 2004 | | | 2005 | | | 2006 | | | 2007 | | | 2008 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Cost | Days | Cost/Day | Cost | Days | Cost/Day | Cost | Days | Cost/Day | Cost | Days | Cost/Day | Cost | Days | Cost/Day |
| July | $211.94 | 30 | 7.06 | $155.99 | 30 | 5.20 | $165.38 | 32 | 5.17 | $173.16 | 32 | 5.41 | $145.16 | 30 | 4.84 |
| August | $223.35 | 33 | 6.77 | $171.15 | 31 | 5.52 | $165.22 | 29 | 5.70 | $173.43 | 29 | 5.98 | $153.49 | 29 | 5.29 |
| September | $233.06 | 30 | 7.77 | $193.17 | 31 | 6.23 | $176.16 | 32 | 5.51 | $193.91 | 33 | 5.88 | $185.13 | 33 | 5.61 |
| October | $216.17 | 29 | 7.45 | $190.68 | 29 | 6.58 | $175.95 | 30 | 5.87 | $191.63 | 29 | 6.61 | $174.38 | 29 | 6.01 |
| November | $220.06 | 28 | 7.86 | $209.18 | 31 | 6.75 | $172.56 | 29 | 5.95 | $178.15 | 29 | 6.14 | $163.52 | 28 | 5.84 |
| December | $249.16 | 32 | 7.79 | $186.31 | 29 | 6.42 | $165.08 | 29 | 5.69 | $184.25 | 30 | 6.14 | $177.45 | 30 | 5.92 |
| January | $231.64 | 32 | 7.24 | $255.34 | 35 | 7.30 | $190.33 | 35 | 5.44 | $205.17 | 35 | 5.86 | $182.08 | 34 | 5.36 |
| February | $258.24 | 32 | 8.07 | $249.21 | 29 | 8.59 | $170.40 | 28 | 6.09 | $191.23 | 29 | 6.59 | - No Data - | | |
| March | $214.16 | 28 | 7.65 | $214.27 | 28 | 7.65 | $185.01 | 29 | 6.38 | $190.67 | 27 | 7.06 | - No Data - | | |
| April | $218.73 | 31 | 7.06 | $181.59 | 30 | 6.05 | $190.50 | 32 | 5.95 | $197.22 | 31 | 6.36 | - No Data - | | |
| May | $177.12 | 32 | 5.54 | $177.37 | 31 | 5.72 | $162.58 | 29 | 5.61 | $166.34 | 31 | 5.37 | - No Data - | | |
| June | $159.88 | 29 | 5.51 | $179.24 | 31 | 5.78 | $180.06 | 31 | 5.81 | $179.06 | 32 | 5.60 | - No Data - | | |
| **Average** | **$217.79** | | **$7.15** | **$196.96** | | **$6.48** | **$174.94** | | **$5.76** | **$185.35** | | **$6.08** | **$168.74** | | **$5.55** |

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## MSBO

Average Unit Cost [OR05]

All Years
All Utility Type
Month: All Months
Buildings: MSBO-Suite 200
Accounts: 242700-000-1-200

| Account Number | Year | Total Cost | Total Use | Avg Unit Cost |
|---|---|---|---|---|
| 242700-000-1-200 | 2004 | $2,613.51 | 31,601 KWH | $0.083 |
| 242700-000-1-200 | 2005 | $2,363.50 | 28,814 KWH | $0.082 |
| 242700-000-1-200 | 2006 | $2,099.23 | 23,396 KWH | $0.090 |
| 242700-000-1-200 | 2007 | $2,224.22 | 24,352 KWH | $0.091 |
| 242700-000-1-200 | 2008 | $1,181.21 | 12,381 KWH | $0.095 |

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## Summary- MSBO's electricity usage

- From FY04 to FY08-
  - **14.5% increase** in Avg Unit Cost of Electricity
  - 22.4% decrease in cost per day of electricity
  - **33% decrease** in **usage** per square foot

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## Focus on Consumption

- Calculating based on usage
  We avoided $661 in 2007 (energy not used multiplied by current cost)
- Calculating based on cost
  We only saved $390 in 2007

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## Summary- MSBO's electricity usage

- From FY04 to beginning of FY07-
  - 13% increase in Avg Unit Cost of Electricity
  - 19% decrease in cost per day of electricity
  - **30% decrease** in **usage** per square foot

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# MSBO

Energy Management

Resource Page

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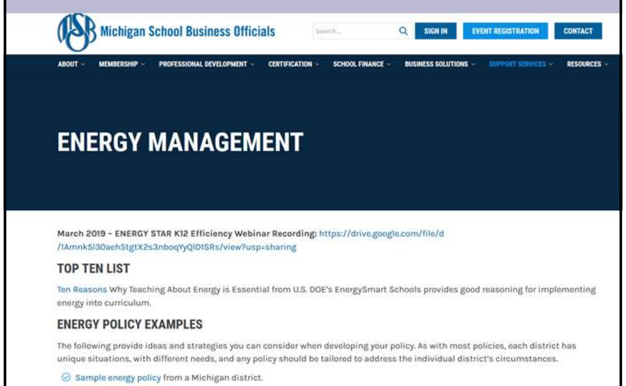


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Michigan Schools Energy Cooperative (MISEC)

Bringing Renewable Innovation to Education
BRITE

Contact Jan Rogers – 269-324-7335, jan.rogers@se.com

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## Incentives/rebates

- Utility company rebates for projects
- Consumers? Contact Dave Kirk
  - David.Kirk@dnv.com
  - 517-896-5830

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## Other Areas of Cost

- Contracts
  - Trash
  - Elevators
  - PM
  - Electrical/Mechanical/Plumbing
  - Others??

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## Other Areas of Cost

- Workers Comp
  - Properly address injuries
  - Lower Mod Rate – significant dollars

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## Doing More With Less

"We have done so much with so little for so long that we can now do everything with nothing forever."

--Anonymous, but attributed to the U.S. Navy Seabees

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James E. Christenson suggests some ideas in an article he wrote in the January/February 2002 *Facilities Manager* magazine, published by APPA.

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His checklist includes the following:

- Eliminate Waste
- Reduce Consumption of Energy
- Improve Productivity
- Prioritize and Eliminate Facilities Activities

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## Eliminate Waste

Take advantage of the view of the workers. They often recognize wasteful processes, but do as directed

Create an environment that promotes sharing that type of information and then act on good ideas

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## Improve Productivity

Christenson suggests 4 sequential aspects of productivity.

- Being at the district
- Being at the job site
- Working
- Working efficiently

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## Prioritize and Eliminate Facilities Activities

List all tasks in order of importance to the mission.

Eliminate the least important

Examples might include reducing interior painting, office trash collection less frequent, mow less.

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# Outsourcing

- Considerations
- Potential Benefits
- Potential Negatives
- Comparing internal operations

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# Poll #5

- Does your district utilize contracted custodial services?
- Yes
- No

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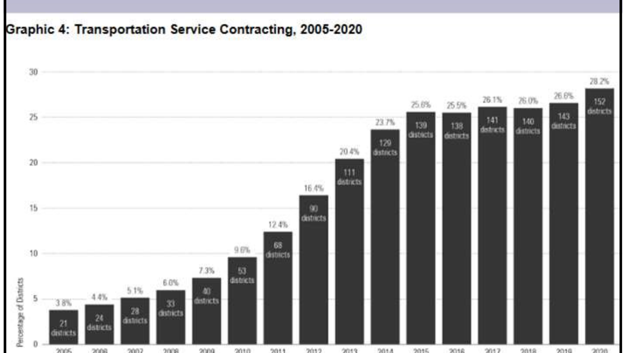


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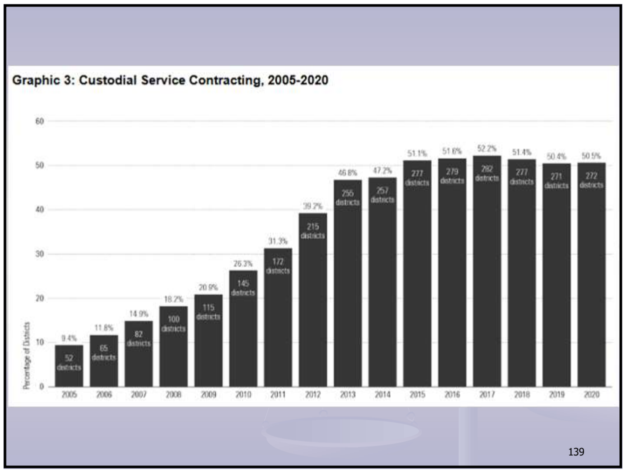
Graphic 3: Custodial Service Contracting, 2005-2020
Percentage of Districts
9.4% 52 districts
11.8% 65 districts
14.9% 82 districts
18.2% 100 districts
20.9% 115 districts
26.3% 145 districts
31.3% 172 districts
39.2% 215 districts
46.8% 255 districts
47.2% 257 districts
51.1% 277 districts
51.6% 279 districts
52.2% 282 districts
51.4% 277 districts
50.4% 271 districts
50.5% 272 districts
2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020
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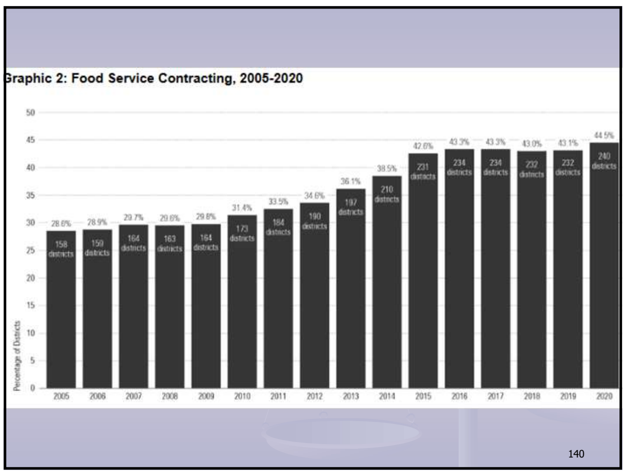
Graphic 2: Food Service Contracting, 2005-2020
Percentage of Districts
28.6% 158 districts
28.9% 159 districts
29.7% 164 districts
29.6% 163 districts
29.8% 164 districts
31.4% 173 districts
33.5% 184 districts
34.6% 190 districts
36.1% 197 districts
38.5% 210 districts
42.6% 231 districts
43.3% 234 districts
43.3% 234 districts
43.0% 232 districts
43.1% 232 districts
44.5% 240 districts
2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020
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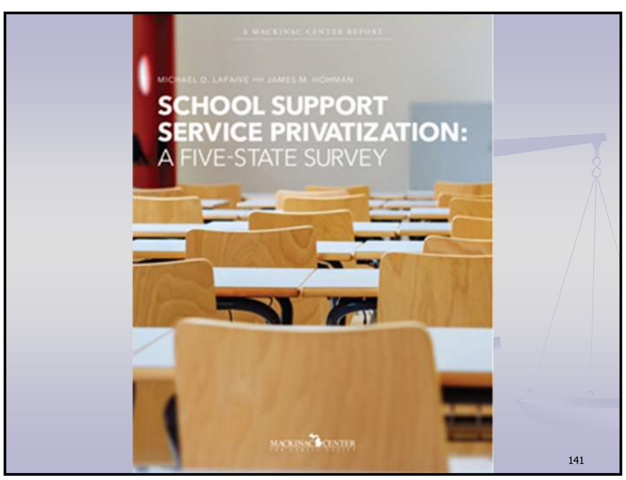
A MACKINAC CENTER REPORT
MICHAEL D. LAFAIVE AND JAMES M. HOHMAN
SCHOOL SUPPORT SERVICE PRIVATIZATION: A FIVE-STATE SURVEY
MACKINAC CENTER
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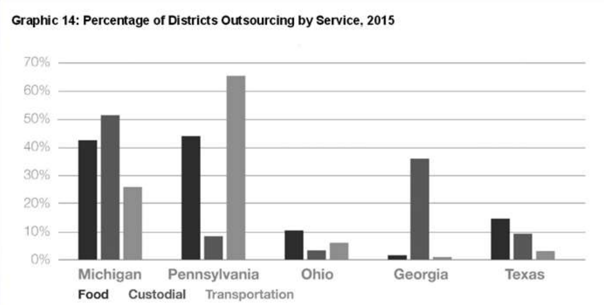


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## Custodial Contracting

- Must Know Current Practices
  - True costs
- Know what to ask for
- Don’t turn over the store. Keep in house oversight of contractor
- Documents at msbo.org on Purchasing Pages under Custodial Contracting

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## Other Contracting

- Grounds
- Snow removal
- Specific tasks – job order contracting
- Gym floor refinishing
- Furniture assembly and disposal of materials

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## Cyber Security

- Review your technology devices/programs with your IT Dept to make sure it's as secure as possible

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## Marketing Your Facilities Department

**If you don't tell management about your successes, they'll only notice when something goes wrong …**

All facilities groups – no matter what industry – have direct performance and financial impact on expense control/profitability, productivity, staff welfare, and delivery of products and services. Unfortunately, many senior managers don't understand or appreciate the importance of facilities management until something goes wrong.

Bill Bancroft, Buildings Magazine Nov 2009

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## Questions

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## Finally

It is imperative that FM professionals commit themselves to asking the appropriate questions and putting in place the tools with which to demonstrate the value of their decisions. Why? Because in the future, those who don't add value won't matter; and those who don't matter won't survive.

"Tough Choices and the Road Less Traveled", Today's Facility Manager, June 2004, Tim Springer

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## Upcoming Workshops

- MSBO Annual Conference – April 23–25, 2024
  - Facilities Preconference – April 23, 2024
  - Amway Grand Hotel, Grand Rapids, MI
- Facilities Conference – Sept 29 – Oct 1, 2024
  - Crystal Mountain Resort, Thompsonville, MI
- Regular Facilities Town Hall meetings
- Facilities Group Solutions – Feb 29, 2024

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## Finalize Credit for Attendance

- ✓ Receive e-mail from MOECS-noreply@michigan.gov to fill out an evaluation for SCECHs. ONLY if you hold a certificate through the state and have a valid PIC#
- ✓ Receive an email from survey monkey for the MSBO evaluation. This is how credit is applied so MAKE SURE TO FILL OUT AND SUBMIT. You will have until Monday, October 23, 2023.

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**Business**

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