Welcome to Facility Management

San Diego Gas & Electric Energy Innovation Center

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Welcome to Facility Management
About the Presenter

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About the Presentation

Intended for those interested in facility management:

- With little or no experience
- With 1-2 years experience
- With several years experience
Reference Text

The Facility Management Handbook, Fourth Edition
Introduction to Facility Management
Opportunities to Increase Energy Efficiency

Which phase offers the most opportunities?
Definitions

What do we mean by:

1. Facility

2. Management

3. Facility Management
Definitions

**Facility:**  Something (such as a building) *built for a specific purpose.*

**Management:**  The act or skill of controlling and making decisions about a business, department, etc.  

A *process* of continuing and related activities.
Specific Purposes
Energy Savings Opportunities

What opportunities might exist for each?
Facility management:
A profession that encompasses multiple disciplines to ensure functionality of the built environment by integrating people, place, process, and technology.
Process

Processes are used to control outcomes.

- What outcomes would you want to control?
- Describe a basic process.

Input ⇔ Throughput ⇔ Output
Traditional FM

- Traditionally the ‘poor relation’ within real estate, architecture, engineering and construction.

- Few common procedures or best management practices.
FM Has Become More Businesslike

Koontz & O'Donnell
Principles of Management
1964, McGraw Hill
‘Inescapable Aspects’

Workplace Safety

Building Codes
Workplace Safety

Is there a connection between workplace safety and energy efficiency?
Title 24 California Building Codes

1 - Building Standards Administrative Code
2 - Building Code (Volumes 1 and 2)
3 - Electrical Code
4 - Mechanical Code
5 - Plumbing Code
6 - Energy Code
7 - Elevator Safety
8 - California Historical Building Code
9 - Fire Code
10 - Existing Building Code
11 - Green Building Standards Code

Title 24 Part 6
California Building Standards Commission

- CBSC falls under the Department of General Services.
- Members are appointed by the Governor.
- In May 2018 the CBSC received proposed code changes from state agencies.
- They became the 2019 edition of Title 24, effective January 1, 2020.
Thought Question

You’re planning an energy efficiency project. Scope includes new windows, lighting and HVAC equipment. You're not sure if that will trigger code compliance for other building systems. As a facility manager, what would you do?
Consider the Energy Innovation Center

Occupant use

Program Requirements

Technical Requirements

Energy Saving Opportunities?
Occupancy Classifications

❖ Based on California Building Code (Title 24):

A - Assembly

- A-1 – fixed seating, theaters, concert halls, etc.
- A-2 – restaurants, night clubs, banquet halls, etc.
- A-3 – libraries, museums, churches, courtrooms, etc.

B – Business

E - Education
Occupancy Classifications, cont.

**F** – Factory (e.g. industrial, moderate-hazard occupancy)

**H** – High hazard (e.g. explosive, very flammable or toxic)

**I** – Institutional (e.g. hospitals, nursing homes, prisons)

**M** - Mercantile group (e.g. department and grocery stores)

**R** - Residential

**S** – Storage (e.g. warehouses, parking garages)
Types of Construction

❖ Based on fire resistance ratings (hours):

➢ Type I……Concrete and steel (non-combustible).

➢ Type II……Similar to Type I except roof is combustible.

➢ Type III…. Masonry-bearing walls with combustible structural, floors, and roof.

➢ Type IV……Similar to Type III but heavy timber interior.

➢ Type V…..Wood frame, typical single-family home.
The Facility Manager
The Facility Manager

- Coordinates planning, design and management of a facility, including systems, equipment, and furniture.

- Supports strategic goals while maintaining a safe, efficient working environment.

- Creates facilities management strategies.
Facility Manager Competencies

- Emergency Preparedness and Business Continuity
- Communication
- Finance and Business
- Human Factors
- Leadership and Strategy
- Operations and Maintenance
- Project Management
- Quality
- Real Estate and Property Management
- Technology
Accreditations (IFMA)

**Certified Facility Manager® (CFM)**
Designed to assess competence in the field through work experience, education and the ability to pass a comprehensive exam.

**Facility Management Professional® (FMP)**
Entry level knowledge-based credential designed to help transition into the profession, and prepare for CFM.

**Sustainability Facility Professional™ (SFP™)**
Focus on creating, managing, and operating sustainable facilities.
The Facility Manager

Do facility managers have advancement opportunities?
Managing This Facility

➢ Real Estate
➢ Sustainability
➢ Facility Lifecycle
➢ Operations & Maintenance
➢ Planning Finances and Budgeting
➢ Emergency Preparedness and Business Continuity
Energy Management
Energy Use in Office Buildings

- Over 60% is HVAC and lighting.
- Describe a low-tech way to improve efficiency.
A facility manager wants to cut energy usage by a certain percent in a commercial building. How could he or she find a realistic number?
Energy Management

Objectives:

➢ Evaluate energy use.
➢ Develop strategic plans.
➢ Set performance goals.
➢ Look for incentives.
➢ Justify project.
➢ Evaluate outcome.
Energy Management

- SDG&E Business Energy Solutions Program.
  - For customers with a monthly electrical demand less than 200 kilowatts (kW).
  - Provides a number of energy and money-saving services for qualifying small and mid-sized businesses at no cost.
  - Fluorescent lighting, LED lighting, refrigeration (door closers and suction line insulation), and vending misers.
Incentives and Rebates

Incentives engineered to reduce energy costs and payback period
Commercial Rebates

❖ Not for new construction, only existing buildings that have an active electric or natural gas account.

▪ Lighting (Instant Lighting Rebates)
  • LED Troffers
  • LED T8 Lamps
  • Screw-In LEDs
Rebate Programs

❖ AKA Energy Credit Incentive Program.

❖ Cash rebate for certain energy efficient IT, lighting or HVAC equipment / systems.

❖ Energy Star Rebates more for appliances.
SDG&E Incentives

July 2013  $7.2M check to UCSD for energy efficiency incentives
Trade Pro Alliance

❖ Qualified contractors

❖ Familiar with rebate programs

❖ Can process rebates

❖ Access to different utility provider project management platforms

❖ Access to utility-provided financing
Energy-Saving Technology
Energy-Saving Technology

- CMMS
- Building automation system
- Smart buildings
Technology

Real Time Data for an Air Handler
Technology

Dashboard Display
Facility Management Activities
Example FM Activities

- Real Estate
- Sustainability
- Facility Lifecycle
- Operations & Maintenance
- Planning Finances and Budgeting
- Emergency Preparedness and Business Continuity
Facility Planning

- Master planning
- Space management
- Major maintenance
- “Refreshes”
Facility Planning

Can facility planning help meet energy efficiency goals?

1. Support the organization's mission through improved material handling, materials control, and good housekeeping.
2. Effectively utilize people, equipment, space, and energy.
3. Minimize capital investment.
4. Be flexible and promote ease of maintenance.
5. Provide for employee safety and job satisfaction.
Project Management

- TIs and building alterations
- Major maintenance
- Capital
Facility Planning

Can project management help meet energy efficiency goals?
Real Estate Planning

Key factors for real estate planning:

❖ Deciding whether to own or lease.

❖ Evaluating different types of leases.

❖ Managing a real estate master plan.

❖ Lease negotiations.

❖ Property disposal.
Staffing and Supervision

- In-house staff
- Staff extension or outsourced
- Contract
Staffing and Supervision

A new facility will need maintenance services. How could a facility manager decide which to provide in-house and which to contract out?
Service Contracts

❖ Custodial
❖ Landscaping
❖ Security
❖ Trash disposal
❖ Specialty maintenance
  ❖ e.g. water treatment, specialty equipment
Contractor Qualifications
Contracting

Identify Needs → Write Specifications TOR and SOW → Choose a Procurement Method → Prepare Solicitation Documents → Seek, Clarify and Close Offers → Evaluate Offers → Manage the Contract → Negotiate the Contract → Evaluate the Procurement
Material Control

- Supplies
- Parts
- PPE
- Minor equipment
- Major equipment (can be depreciated)
A new building is coming online soon. The facility manager needs to order parts and supplies. How should he or she go about doing this?
Office Moves and Relocations

❖ Find leasable space
❖ Negotiate lease
❖ Prepare furniture plan
❖ Procure furniture
❖ Award moving contract
❖ Move occupants
Facility Management Process
Operations & Maintenance (O&M)

Activities and services required to assure a building will perform the functions for which it was designed and constructed.
O&M Goals

➢ Reduce unscheduled shutdowns and repairs.

➢ Extend equipment life, thereby extending facility life.

➢ Realize life-cycle cost savings.

➢ Provide safe, functional systems and facilities that meet the design intent.
Maintenance

- Routine
- Preventive
- Emergency
- Deferred
Maintenance Work Examples

- Roof repairs by HVAC curbing
- HPS parking lot lighting
- Fluorescent lamp / ballast replacements
Preventive Maintenance (PM)

- Scheduled maintenance work
- Goal: Prevent unscheduled shutdowns
- Shaped by system / equipment operating characteristics
- Relies on CMMS-generated work orders
- PM program should be “priced right”
Operations & Maintenance (O&M)

Time to complete O&M work orders has been growing steadily. What might be an explanation?
Work Control

Work order process flow

1. The task is identified
2. The maintenance request is created
3. The work order is prioritized and scheduled
4. The work is assigned and completed
5. The work order is closed and documented
6. The work order is analyzed and/or reworked
Analyze Work

If open work orders start to backlog, what are possible consequences?

- Routine maintenance
- Preventive maintenance

How could you evaluate cost impacts?
Analyze Work

You’re managing a 200,000 SF commercial facility. It has office, research and light manufacturing space. Costs are averaging:

- Utilities…..$2.20 / SF
- Energy….$0.65 / SF
- Cleaning…..$1.50 / SF
- M&R……..$2.10 / SF

Executive management wants to know if these numbers are competitive. How could you find out?
BOMA Office Experience Exchange

U.S. Private-Sector Office Building Expense Figures

- Total operating expenses: $8.07 psf
- Security: $0.72 psf
- Cleaning: $1.52 psf
- Utilities: $2.16 psf
- Repairs and maintenance: $2.00 psf
Example Budgets

- Capital
- Operating
  - Utilities
  - Payroll
  - Material and supplies
  - Tools and equipment
  - Service contracts
  - IT and communications
- Major maintenance
- Capital renewal

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Building Systems
A new building is coming online soon. A preventive maintenance program needs to be set up. What building systems and equipment would you recommend?
Cooling
Comfort Air
Comfort Air

Blue = HVAC System

‘Thermostat wars’

- Human variable
- Human variable
Cooling: Air Conditioning Units
Equipment: Air Handlers

Conditions and circulates air as part of a HVAC system.

Capacity is measured in terms of cubic feet / minute (CFM).
Equipment: Air Handlers
Equipment: Air Conditioning Units

Conditions and circulates air as part of a HVAC system.

Capacity is measured in terms of cubic feet / minute (CFM).
Equipment: Chillers

**Chiller:** Machine that removes heat from a liquid via the refrigeration cycle.

Capacity measured in *tons*.

Cools and dehumidifies air in mid-to large-size facilities.
Equipment: Chillers
Equipment: Cooling Towers
Heating: Boilers
Central Plant

A plant on the grounds of a multi-building facility or campus.

Provides heating, cooling, or electricity to at least one building on the same campus.

Typically has boiler, chiller, circulating pumps, closed-loop piping, cooling tower, etc.
Maintenance Problems

Leaking Tubes

Scale and Deposits
Maintenance Problems
Air Distribution
Air Distribution Problems
Lighting Systems
Lighting Systems

Purpose: Provide proper illumination for tasks and other activities.

Considerations

- Quantity of light
- Quality of light
- Fixture efficiency
Lighting Systems

Does it make sense to put lighting systems on a preventive maintenance program?
How Can You Explain This?
Plumbing Systems

Purpose:

- Supply potable water
- Remove waste water
- Remove stormwater
Plumbing Systems

Supply side equipment:
- Backflow preventer
- Pressure regulator
- Hot water heater or boiler
- Circulation pumps
- Piping
- Valves and fixtures
Drain Side Equipment

Sink waste lines typically 2” pipe or ABS

Clean-out

Floor drain

Typically 4” cast iron or ABS

Vent to roof
Sustainability

Fallbrook Library Green Roof
Sustainability

Facility-related efforts

- Recycling
- Universal waste
- Reclaimed water
- Retro-commissioning
- ‘Green’ housekeeping products
- Integrated pest management plan
Water Resources

San Diego County imports ~80% of its water supply

State Water Project (Bay-Delta) 30%
Local Supplies and Conservation 20%
Colorado River 50%
Fire Detection Systems
Fire Suppression Systems
Fire Code?
Typical Fire Code Violations
Typical Fire Code Violations
Smoke barriers must be continuous through all concealed spaces, such as those found above a ceiling.
Typical Fire Code Violations

Pendant sprinkler within 18” of light fixture
Fire Code?
Electrical Code Violations
Design Fail
Design Fail
Design Fail
Design Fail
Looking Ahead: Challenges for FM
Looking Ahead: Challenges for FM

- **Sustainability** - Move from an emphasis on new construction to existing building operations.

- **Building systems and controls technology**
  Integrate changing technology with existing facilities.

- **Aging buildings** - As facilities and mechanical systems reach and exceed expected operating lives, more “repair or replace” issues will be addressed.

- **Business continuity after a disrupting event**
  Facility managers will play an increasing role.
Thank You!