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Charting a Course to Energy Independence

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Special Considerations for Healthcare Facilities

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Special Considerations for Healthcare Facilities

- The Challenge:
  - Improve energy and water efficiency without compromising patient care and comfort, containment of germs and disease, power quality and reliability.

Special Considerations for Healthcare Facilities

- Infection Control:
  - Hand Washing
  - Ventilation:
    - Operating Rooms - 100% Fresh Air No Recirculation
    - Positive or Negative Room Pressure Control
  - Hot Water Temperatures:
    - 140 ºF in the Water Storage Tank
    - 120 ºF at tap
  - Sterilization of Equipment

Special Considerations for Healthcare Facilities

- Patient Safety/Comfort
  - Lighting
  - Individual room temperatures
  - Humidity Control
- Bio-Medical Equipment (Radiology, OR Suites)
  - Energy intensive
  - Large heat load
  - Electrically sensitive
- OR Suites
  - Temperature/Humidity Range: 62-80 ºF/45-55%
  - 100% Fresh Air (currently)

Special Considerations for Healthcare Facilities

- Research Facilities
  - HVAC Requirements:
    - 100% Fresh Air
    - 100% Exhaust Air
    - Negative or Positive pressure**
    - High Air Filtration Efficiencies – HEPA**
    - 72-76 ºF **
    - 30-50% Humidity **

** Special Projects have different requirements

  - Infection Control
    - Exhaust Hoods
    - Hand washing
  - Vivariums – Animal Care

Special Considerations for Healthcare Facilities

- Department of Veterans Affairs:
  - Owned:
    - 5,440 Buildings (1,651 Historic)
    - 144,579,708 sq ft
  - Leased:
    - 1,377 Leases
    - 14,489,729 sq ft
- 163 Medical Centers
  - 25 Medical Centers are Energy Star Labeled

Energy Conservation, Sustainable Design & Renewable Energy at the VA

- Major projects designed to achieve:
  - LEED Silver certification equivalent
  - Energy consumption 30% below ASHRAE 90.1

Examples:

- New Medical Center, Orlando, FL
  - 1,160,000 sq ft $500 M
- Mental Health Addition, VAMC, Bay Pines, FL
  - 345,000 sq ft $140 M
- Replacement Medical Center, New Orleans, LA
  - 800,000 sq ft $800 M
- Replacement Medical Center, Denver, CO
  - 1,100,000 sq ft $500 M
- New Medical Center, Las Vegas, NV
  - 775,000 sq ft $400 M

Energy Conservation, Sustainable Design & Renewable Energy at the VA

- Features that may be included:
  - PV electric power generation
  - Solar hot water systems
  - High efficiency chillers, pumps, fans
  - Enthalpy Energy recovery systems
  - Smart lighting systems
  - Building Automation System
  - Condenser water recovery
  - Micro turbines
  - Condenser water coupled to ground water
  - Decentralized condensing HW boilers

North Texas VAMC

289-bed acute care medical center
90-bed Transitional Care Unit
40-bed Domiciliary care unit
30-bed Spinal Cord Injury Center
39-Bed Telemetry Unit
56-bed Psychiatric Residential Rehabilitation Treatment Program
Built since 1940
38 Buildings 8 Historic
2,154,744 sq ft

North Texas VAMC Items of Interest

- Installed Power Factor correction capacitors with detuned filters
  - Reduced voltage THD from 7% to <2%
  - Eliminated a severe voltage unbalance at the chiller plant while increasing power factor > .95
  - Avoiding power factor penalty charges of >$50k annually
- Occupancy Sensors for Bi-level parking lot light (Pilot Phase)
  - Cut power to the fixture 50% when no movement is detected
  - Could be expanded to over 200 fixtures burning 12 hrs/day average

North Texas VAMC
Emergency Power Evaluation

Evaluated the EPSS critical electrical branch

- Installed drive on secondary chilled water pump at Energy Center
  - Allows thermal energy storage system water to continue to serve less than life critical cooling loads- Lab, Pharmacy, etc.
- Replaced analog voltage regulators with high performance digital regulators
  - Seven most critical generators
  - Increased the response to load drift time = reduced voltage

North Texas VAMC
Emergency Power Evaluation (cont.)

Additional Recommendations:

- Upgrade generator controls
  - Allows participation in electric utility demand response program
  - Estimated income to the facility: $100k annually
- Replace fluorescent exit signs with non-radioactive, non-toxic, photo-luminescent signs
  - Use no power other than ambient light.
- Replace fluorescent tubes with LED retrofit lamps in egress lighting

Huntington, WV

90-bed acute care VA Medical Center
Built in 1932
17 Buildings 9 Historic
650,069 sq ft

Initiated a water reduction project as part of its Green Environmental Management (GEMS) Systems initiatives.

Huntington, WV
GEMS Water Reduction Project

The project consisted of :

- Converting 178 Faucets from:
  - 2.2 GPM laminar flow devices

    to
  - 1.5 silver ion antimicrobial coated laminar flow
- Converting 33 Shower Heads from:
  - 2.5 GPM patient shower head flow restrictors

    to
  - 1.75 GPM silver ion antimicrobial coated flow restrictors

Huntington, WV
GEMS Water Reduction Projects

- Savings exceeded all expectations

  Faucets 0.7 GPM or 32% reduction in water usage

  Showers 0.75 GPM or 30% reduction in water usage

In one year:

- Water usage reduced by 1,538,000 gallons
- Cost savings: $12,897.00 in water purchase and disposal
- Total implementation cost: $771.00

Simple payback: 22 Days

Huntington, WV
GEMS Water Reduction Project

- Added benefit to infection control program. . .
  - Incorporated silver ion technology
  - Silver attacks the bacterial cell wall and interrupts cell metabolism – preventing growth
  - Bio-film formation on the laminar flow devices and shower head/hose is eliminated

22 Days

Special Considerations for Healthcare Facilities

- VAMC Tomah, WI:
  - Converted abandoned potable deep wells to Geothermal cooling
  - Savings: over $10K/year per building
- Mountain Home VAMC, TN:
  - Worked with Johnson City to utilize methane gas from landfill for production of steam and electricity
  - Savings: over $1.5 M/year in Natural Gas cost.

Special Considerations for Healthcare Facilities

- VAMC Coatesville, PA:
  - $2.4M Chiller Plant replacement: whole system approach w/variable volume chilled water system and EMS
  - Savings: $30-40K/year
- VAMC Bronx, NY:
  - Installed new expandable/scalable EMS/BAS
  - Pay back: less than 8 months
  - Controlling the peak demand will lower demand charges
  - Could realize an additional savings of up to $400K/year

- Questions?

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